REVIEW OF ENVIRONMENTAL FACTORS (REF)
STORMWATER MANAGEMENT PLAN
SHEAFFE ST, CALLALA BAY

Contents

Document control

Item	Details
Project	Review of Environmental Factors – Stormwater Management Plan – Sheaffe St, Callala Bay
Client	Environmental Services, Shoalhaven City Council
Prepared By	City Services, Shoalhaven City Council

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*Review and endorsement statement:

"I certify that I have reviewed and endorsed the contents of this REF document and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under clause 170 of the EP&A Regulation, and the information it contains is neither false nor misleading".

Assessment and approvals overview

Item	Details
Assessment type	Division 5.1 (EP&A Act) - Review of Environmental Factors (REF)
Proponent	Shoalhaven City Council
Determining authority / authorities	Shoalhaven City Council
Required approvals (consents, licences and permits)	Nil
Required publication	Yes: this REF must be published on the determining authority's (Council's) website or the NSW planning portal, in accordance with clause 171(4) EP&A Regulation 2021 and the guidelines published under cl.170, as being a matter of public interest.

1. PROPOSAL AND LOCATION

1.1 Proposed activity

This Review of Environmental Factors (REF) addresses the potential environmental impacts of – and provides mitigation measures for – the construction of stormwater infrastructure, including an infiltration basin to address foreshore erosion at Sheaffe St, Callala Bay.

The proposal involves:

- Widening and reconstruction of Sheaffe St east of Boorawine Terrace, with a widened end containing a turning head and formalised car-parking spaces across the eastern end of Sheaffe St, and with gradient fall to the north-east corner of the pavement area.
- Construction of kerb and gutter adjacent to new pavement, with concrete driveway laybacks at access points to private property and the park (maintenance and emergency access).
- Construction of 1.8m kerb inlet pit and 375mm RCP tying into existing stormwater pipe on Boorawine Terrace for future kerb construction.
- Removal of redundant timber bollards at the eastern end of Sheaffe St.
- Relocation of existing picnic table, seat and beach shower.
- Construction of 29m long, variable width (to max. 8m approx.), approx. 0.4m deep, vegetated infiltration basin within the foreshore park to the north of Sheaffe St.
- Works would be undertaken in two stages, with stage 2 works involving partial reconstruction of Sheaffe St (bound in red on Figure 3) and all other works to be undertaken in Stage 1.
- Works would involve implementation of safeguards and mitigation measures to reduce the risk of impacts on the environment (refer to section 7 of this REF).

Figures 1 and 2 below show the site location and site overview. Concept plans are provided in Appendix A, with excerpt clips in Figures 3 and 4.

Shoalhaven City Council (SCC) is the proponent and 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 171 of the *Environmental Planning and Assessment Regulation 2021*. In doing so, this Review of Environmental Factors (REF) fulfills 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 works would occur within Lot 7005 DP 1074751 (Crown Land for which Shoalhaven City Council is the Land Manager) and within the Sheaffe St road reserve. Lot 7005 occurs on the foreshore of Jervis Bay Marine Park and forms part of Jervis Bay State Park.

Table 1. Property affected by the proposal

Lot / DP	Description	Land owner / manager	Other pertinent information
-	Sheaffe St	Shoalhaven City Council	
Lot 7005 DP 1074751	Jervis Bay State Park / Callala Creek Bushland Reserve	Crown Land - Shoalhaven City Council is Land Manager	Crown Reserve R91042 - Community Land: Natural Area / Park

Figure 1. Site location

Figure 2. Site overview

Figure 3. Layout plan (from Footprint 2024: *"Proposed Infiltration Basin Sheaffe Street, Callala Bay"*, Drawing 2385-C02, Issue 2)

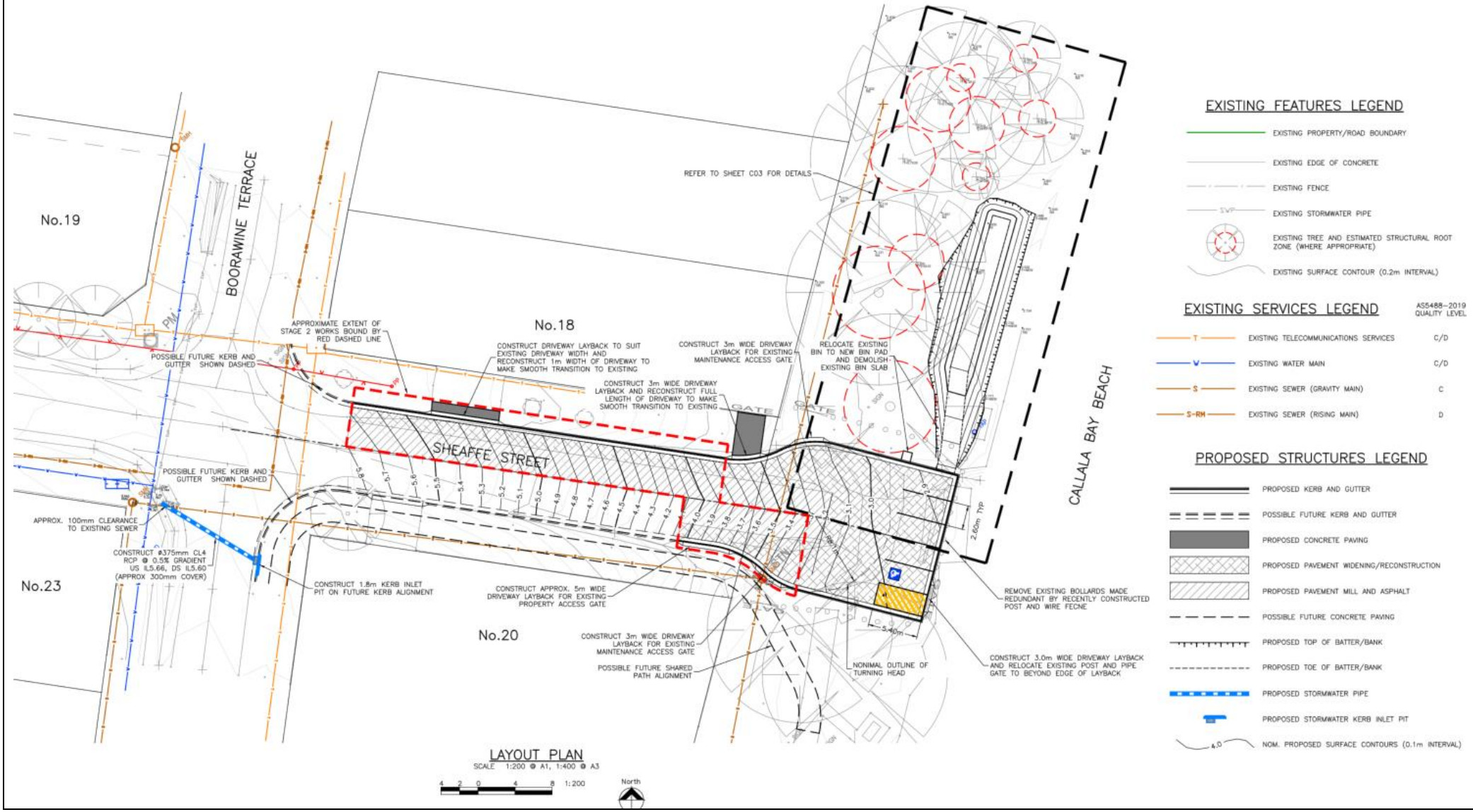
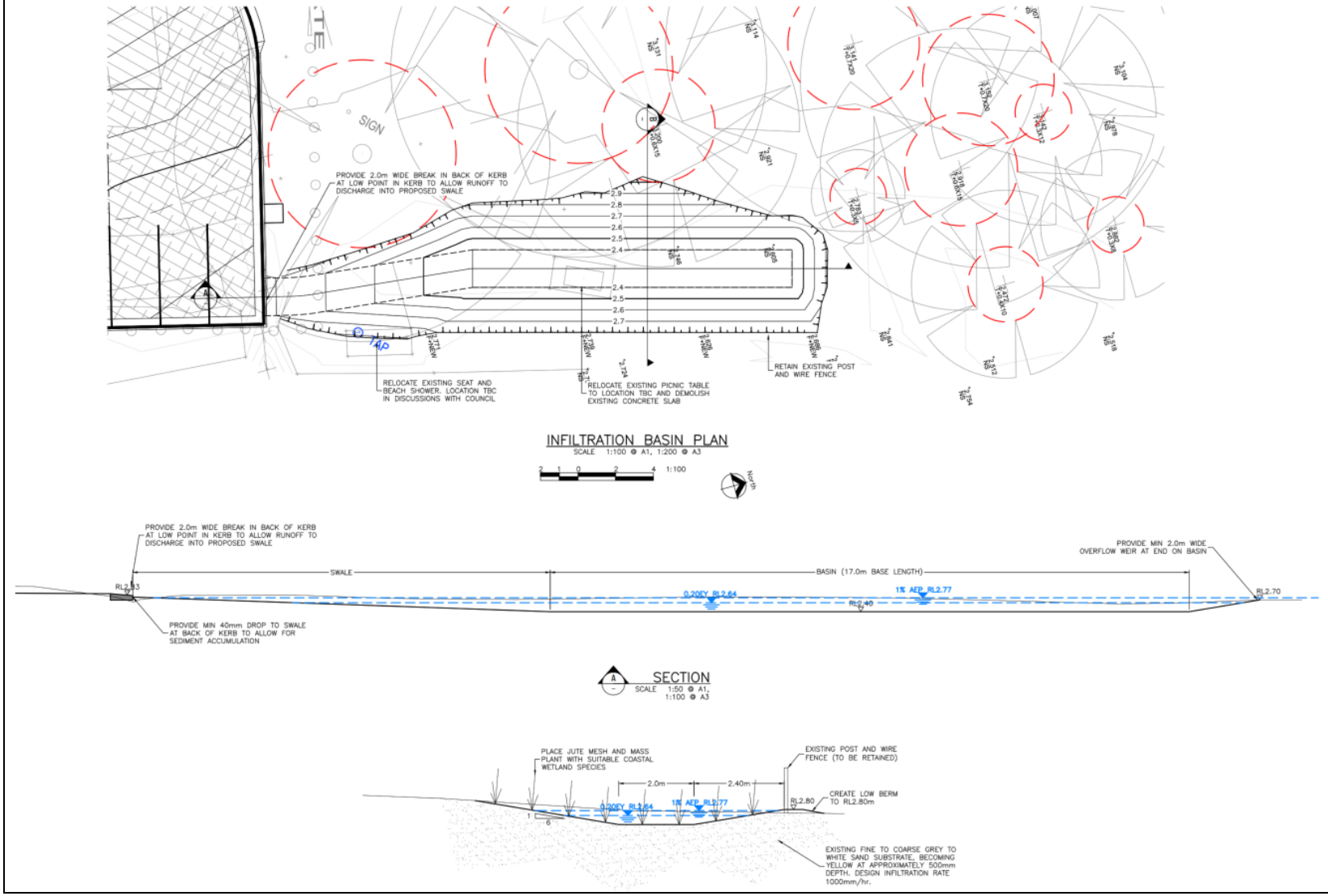


Figure 4. Infiltration Basin Details (from Footprint 2024: *"Proposed Infiltration Basin Sheaffe Street, Callala Bay"*, Drawing 2385-C03, Issue 2)



1.3 Background and justification of proposal

The eastern end of Sheaffe St comprises a sealed pavement road, with no kerb and gutter, terminating in an informal car-parking area. Timber bollards and a post and wire fence separate the car parking area from the immediately adjacent foreshore embankment, with a gated emergency / maintenance vehicle access to the beach.

The slope of the road in combination with elevated, grassed verges directs uncontrolled overland stormwater flow toward the foreshore area, resulting in erosion of the foreshore embankment and associated coastal management works (dune reshaping and native plant revegetation).

The proposal seeks to control stormwater flow and reduce erosion of the foreshore by introducing kerb and gutter to capture stormwater and direct it to a vegetated infiltration basin constructed behind a stabilised section of the foreshore embankment.

2. EXISTING ENVIRONMENT

The site was assessed by a Council Environmental Officer on 5th March 2024.

Site investigations involved vegetation and habitat assessment, recording all flora species within and immediately adjacent to the subject site, determination of vegetation communities, targeted survey for potentially occurring threatened flora species and investigation of habitat availability on site.

Photos of the site are provided in section 2.3.1 below.

2.1 Subject site – general description

The subject site consisted of a road reserve containing a sealed road which extended into and terminated within a foreshore park of Jervis Bay.

The eastern end of Sheaffe St comprised a sealed pavement road, with no kerb and gutter, terminating in an informal car-parking area. Timber bollards and a post and wire fence separated the car parking area from the immediately adjacent foreshore embankment, with a gated emergency / maintenance vehicle access to the beach.

A narrow, eroded embankment with minimal vegetation currently exists between the end of the road and the beach.

To the north and south of the car-parking area, the foreshore park existed as a managed parkland, with scattered trees and an almost entirely cleared understorey with mown turf grass.

A narrow (2 – 3 m wide), fenced, vegetated buffer was present between the mown area and the embankment scarp. The scarp was generally about 1 m high.

Beach wrack was present in large quantities along the beach in proximity to the site during site investigations. No live seagrass occurred in proximity to the site and aerial imagery shows seagrass generally occurring over 75 m from the foreshore. As the proposal would occur entirely on terrestrial land, further consideration of the marine environment is not warranted.

2.2 Topography, geology and soils

The subject site is mapped as having an eastern aspect, with altitude ranging from around 6 m above sea-level (ASL) at Boorawine Terrace at the western end of the site, down to around 2 – 3 m at the eastern end.

No watercourses occur within or in close proximity to the site. Boorawine Creek joins Jervis Bay approximately 120 m to the north-north-west of the site.

The underlying geology of the beach is mapped as Coastal deposits (beach facies), with Wandrawandian Formation (fine-grained quartz-lithic silty sandstone, mudstone and siltstone) occurring on the landward side of the beach[1] (Figure 5).

The subject site and surrounds are mapped as Class 5 Acid sulphate soils (A.S.S) (Figure 6).

[1] Source: MinView https://minview.geoscience.nsw.gov.au/#/?lon=148.5&lat=-32.50000&z=7&l=

Figure 5. Underlying geology mapped in proximity to the site[1]

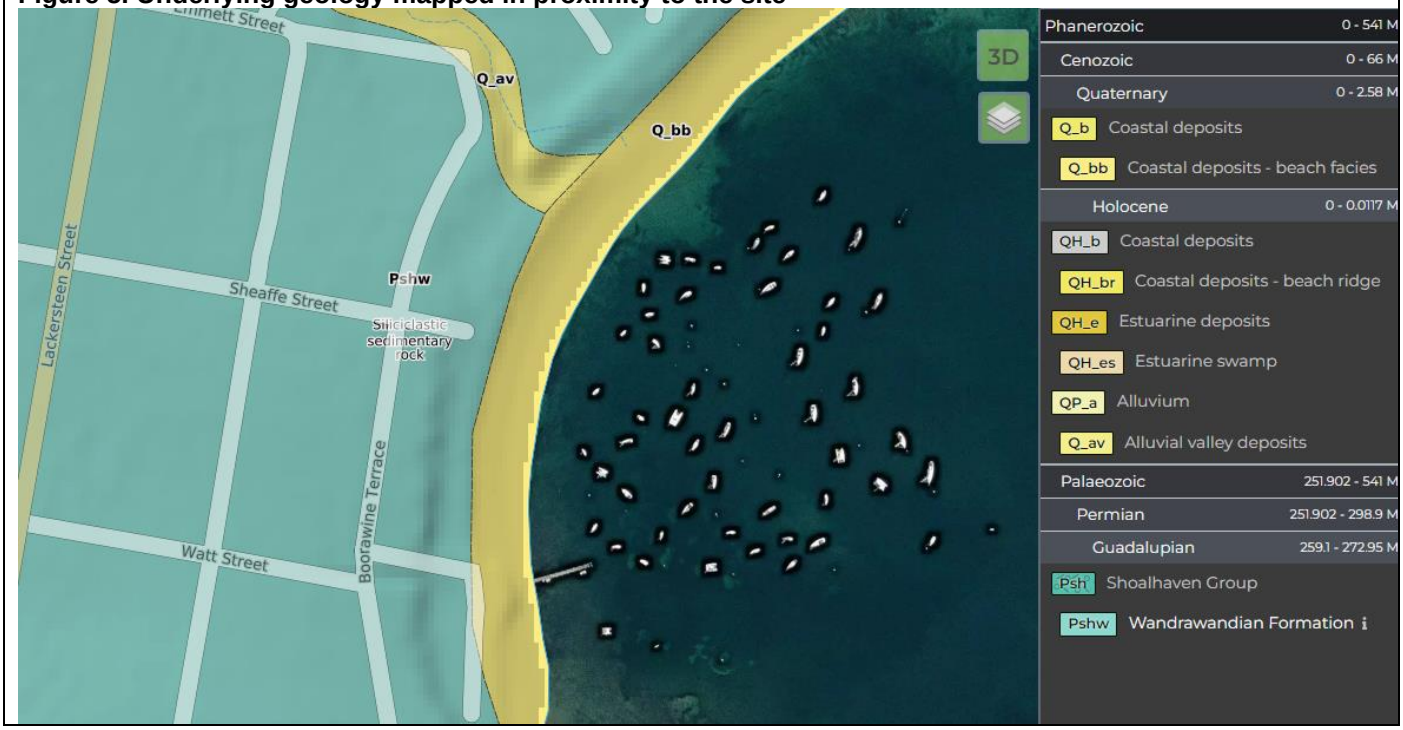
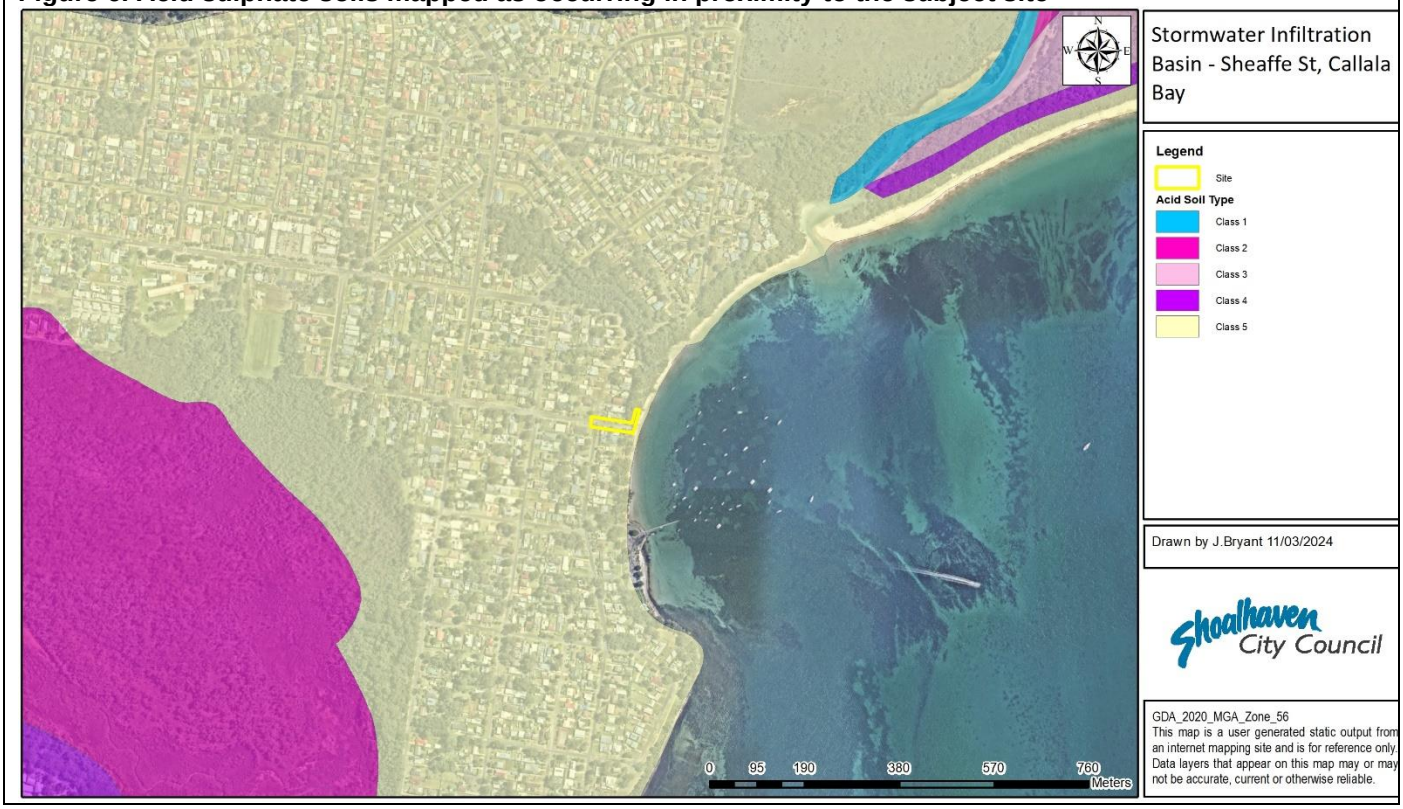


Figure 6. Acid sulphate soils mapped as occurring in proximity to the subject site



2.3 Terrestrial habitat and vegetation assessment

NSW Plant Community Type (PCT) vegetation mapped as occurring over and in proximity to the subject site (refer to Figure 7) includes:

- PCT3273 South Coast Lowland Shrub-Grass Forest
- PCT4009 Shoalhaven Lowland Flats Wet Swamp Forest

Vegetation recorded on site during investigations was limited to scattered trees, including Bangalay (*Eucalyptus botryoides*), Rough-barked Apple (*Angophora floribunda*), Coastal Banksia (*Banksia integrifolia*) and occasional Spotted Gum (*Corymbia maculata*). The understorey was almost entirely cleared, with a mown turf cover of Buffalo grass (*Stenotaphrum secundatum*) and occasional Guinea Flower (*Hibbertia scandens*) and Sydney Golden Wattle (*Acacia longifolia*).

A narrow (2 – 3 m wide), fenced and vegetated buffer was present between the mown area and the embankment scarp. The buffer contained occasional trees and shrubs including Spikey Mat-rush (*Lomandra longifolia*) and had been subject to recent stabilisation works involving jute mesh installation and revegetation plantings of Knobby Club-rush (*Ficinia nodosa*), Coastal Rosemary (*Westringia fruticosa*) and Pigface (*Carpobrotus glaucescens*).

The vegetation observed on site was not considered to align with NSW Plant Community Type mapping and was instead considered to be a degraded form of PCT3638 South Coast Sands Bangalay Forest. PCT3638 is mapped as isolated patches in the broader locality with occurrences as close as 1.6 km from the site.

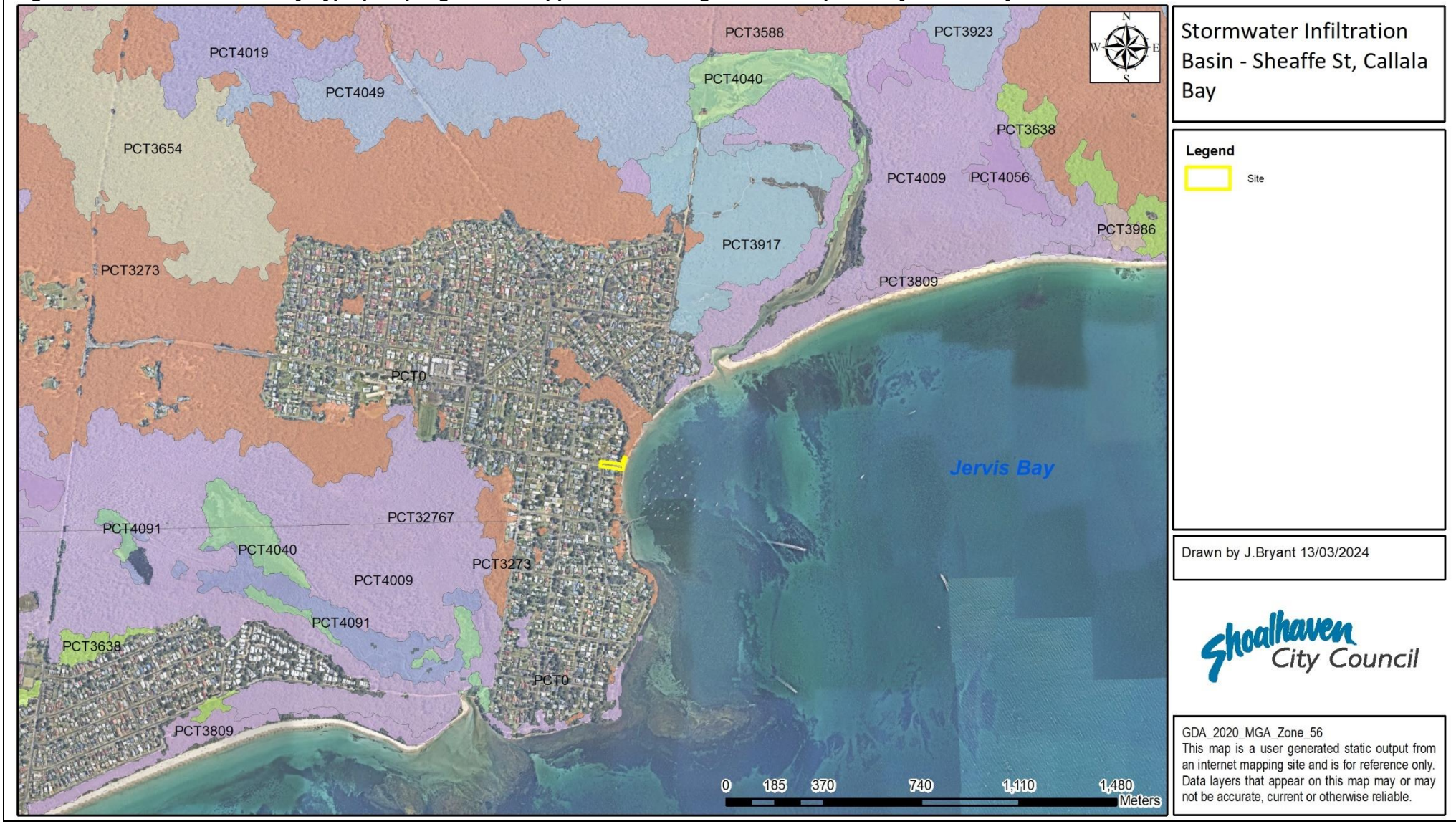
Overviews of relevant vegetation communities mapped as occurring in proximity to the site or found to occur during investigations are presented below.

Contiguous canopy extended through the foreshore park from Sheaffe St through to the riparian corridor associated with Boorawine Creek. A canopy gap of at least 8 m occurred over Sheaffe St, and to the south the canopy was discontinuous, with large breaks of 25 m or more.

PCT3273 South Coast Lowland Shrub-Grass Forest

PCT3273 is a tall to very tall sclerophyll open forest with a very sparse dry shrub layer and a ground cover of grasses, graminoids and ferns found on low-lying landscapes of the South Coast between Nowra and Tathra. The tree canopy is highly variable with no single eucalypt species consistently recorded. *Eucalyptus pilularis* and *Corymbia gummifera* are both commonly recorded together with a high cover across extensive areas. However, either or both may be replaced or associated with *Corymbia maculata*, *Eucalyptus sclerophylla*, *Eucalyptus longifolia*, *Eucalyptus paniculata* or *Eucalyptus punctata*. One or more species from the stringybark eucalypt group are also commonly found in association, with *Eucalyptus globoidea* the most frequent. The mid-stratum is typically very sparse however is layered with a taller cover of small trees that very frequently includes *Allocasuarina littoralis*. In addition, sites on poorly defined open gentle depressions include a sparse cover of *Melaleuca* species, the most frequent and abundant being *Melaleuca decora* and *Melaleuca ericifolia*. The lower dry shrub layer is also very sparse, only rarely mid-dense. Typically, one of two individuals of species including *Banksia spinulosa, Acacia binervata, Leptospermum polygalifolium* and *Pittosporum undulatum* are recorded. The characteristic feature of the PCT is the mid-dense to dense ground cover of grasses, graminoids, forbs and ferns. The grasses *Entolasia stricta, Entolasia marginata, Microlaena stipoides, Imperata cylindrica* are all very frequent, with *Themeda triandra* also common. Very frequently occurring graminoid species such as *Dianella caerulea*, *Lomandra longifolia* and *Lepidosperma laterale*, with occasional high cover of *Gahnia radula* add to the grass like appearance of the ground cover. Forbs such as *Lobelia purpurascens* and *Brunoniella pumilio* as well as the fern *Pteridium esculentum* are all very frequent the later with a patchy cover. This PCT occurs across a wide range of coarse to fine grained sediments on gentle gradients on low elevation. This PCT is not associated with any threatened ecological community.

Figure 7. NSW Plant Community Type (PCT) vegetation mapped as occurring over and in proximity to the subject site



PCT4009 Shoalhaven Lowland Flats Wet Swamp Forest

PCT4009 is a mid-high to very tall swampy sclerophyll open forest with a layered mid-stratum of *Melaleucas* and dense ground cover of tall sedges found on boggy low-lying flats on the South Coast between Sydney and Bodalla. The tree canopy is either dominated by *Eucalyptus botryoides* or *Eucalyptus robusta* (rarely both), occasionally with *Eucalyptus longifolia*. The mid-stratum is typically layered with a taller sparse to mid-dense cover of *Melaleucas* (mainly *Melaleuca ericifolia* and *Melaleuca linariifolia*) commonly with *Casuarina glauca*. A lower layer of dry shrubs is sparse and commonly includes species such as *Acacia longifolia* and *Leptospermum polygalifolium*. The ground layer is characterised by a high cover of sedges with the taller *Gahnia clarkei* very frequently recorded with an abundance of *Baumea juncea*. Other sedge species are less frequently recorded along with occasional *Phragmites australis*, as well as other grasses, ferns and graminoids. This PCT occupies very low elevations of less than 20 metres asl on regularly inundated alluvial flats, and often occurs in or near standing water. Mainly distributed on the south coast and is very common on the margins of Jervis Bay and St Georges Basin in the Shoalhaven. A northern spatial outlier on sandy alluvium in Pittwater, northern Sydney. This community grades into taller eucalypt forests PCTs 4021, 4019 or 3273 on better drained alluviums and swamp forest PCT 4056 on lower elevation estuarine creek flats. PCT4009 is associated with NSW Swamp Sclerophyll Forest on Coastal Floodplains TEC.

PCT3638 South Coast Sands Bangalay Forest

PCT3638 is a mid-high to tall, rarely very tall, dry shrubby sclerophyll open forest found on low-lying marine sand deposits and occasionally on wind-formed headland dunes of the southern NSW coastal zone. The tree canopy is very frequently dominated by *Eucalyptus botryoides* and is commonly the only tree however, occasionally there are local stands of *Eucalyptus pilularis* or rarely *Corymbia gummifera*, *Angophora costata* or *Angophora floribunda*. The mid-stratum is very frequently layered, with taller small trees of *Banksia serrata* and *Banksia integrifolia* with lower dry shrubs. The lower layer is variable in cover however mainly a sparse to mid-dense combination of *Monotoca elliptica*, *Acacia longifolia* and *Breynia oblongifolia* with *Pittosporum undulatum* present in long unburnt sites. The ground layer is characterised by a mid-dense cover of *Pteridium esculentum, Lomandra longifolia* and *Imperata cylindrica* which are almost always present, the former with highest foliage cover. This PCT extends south from Botany Bay in Sydney to Eden on the far south coast, mainly at elevations of below 40 metres asl. It grades into littoral forest PCT 3639 on dunes within the littoral zone. PCT3638 is associated with NSW Bangalay Sand Forest TEC.

2.3.1 Site photos showing relevant vegetation and habitat features

Photo 1. Sheaffe St facing east (approx.) from Boorawine Terrace

Photo 2. Eastern end of Sheaffe St

Photo 3. Facing north (approx.) from eastern end of Sheaffe St

Photo 4. Proposed location of infiltration basin, facing south (approx.) towards Sheaffe St

Photo 5. Site showing narrow, vegetated buffer to foreshore embankment

Photo 6. Eroded foreshore embankment at east end of Sheaffe St

Photo 7. Emergency / maintenance access to beach from Sheaffe St, showing eroded embankment.

Photo 8. Eroded foreshore embankment at eastern end of Sheaffe St and recent coastal protection works

2.3.2 Targeted fauna and threatened species surveys

Survey for potentially occurring threatened flora species, in addition to potential habitat features for threatened fauna species (including hollow-bearing trees and feed trees) was carried out in conjunction with flora surveys over the subject site.

No threatened flora, nor suitable habitat for locally occurring cryptic threatened species (including threatened orchids) were identified on site during vegetation surveys.

No hollow-bearing trees, Glossy Black Cockatoo (*Calyptorhynchus lathami*) feed trees (i.e. *Allocasuarina littoralis* with characteristic chewed cones), Yellow-bellied Glider (*Petaurus australis*) feed trees (e.g. *Corymbia gummifera* or *Eucalyptus punctata* with v-shaped feeding scars) or other types of significant habitat for threatened fauna species were observed within the site. No evidence of potential threatened fauna (e.g. bandicoot diggings, owl white-wash or other threatened fauna scats) was observed during investigations.

Due to the disturbed and modified nature of the vegetation and the lack of habitat features, the subject site was considered unlikely to be utilised by threatened fauna species except for possible transient roosting and opportunistic canopy foraging by a limited range of highly mobile bird species. Targeted fauna surveys including nocturnal spotlighting and stag-watching surveys were therefore considered unnecessary to inform the assessment.

Threatened and migratory wading bird species may occur along the beach in proximity to the site but would not utilise the site itself.

2.4 Other

No potential Aboriginal and non-indigenous heritage objects were observed within the site during investigations, noting that accessibility and visibility were limited in some areas due to dense understorey vegetation, particularly Lantana infestations.

In the context of this REF, the subject site of the proposed activity:

- 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 (refer to section 3.4 of this REF for more information);
- does not contain and is not in proximity to any heritage items listed on the NSW State Heritage Register or the Shoalhaven Local Environment Plan;
- is not mapped as flood liable land;
- is not mapped as “potentially contaminated land”;
- is not mapped as being within the “coastal management areas” (*e.g.* littoral rainforest, coastal wetlands, *etc*.) for the purposes of Part 2.2 of the *State Environmental Planning Policy (Resilience and Hazards) 2001*;
- is not in a coastal risk planning zone;
- is subject to Aboriginal land rights claims made under the NSW *Aboriginal Land Rights Act 1983,* noting that this has no bearing on the current land manager’s authority, does not affect the outcome of this REF, does not trigger any procedural rights and is included in this REF for information purposes only.

No further consideration of these matters is required.

3. ASSESSMENT OF LIKELY IMPACTS ON THE ENVIRONMENT

3.1 Impacts associated with the proposal

Direct impacts of the proposal may occur associated with machinery access; disturbance and excavation of soil for widening the road and for construction of the stormwater infiltration basin; construction of widened road pavement with kerb and gutter; construction of the infiltration basin within the park.

Direct impacts of the proposal would be limited to the Sheaffe St road reserve and an open, cleared area of Jervis Bay State Park.

- *Potential impacts on terrestrial vegetation & habitat including mature trees within the park.*

  No trees or other native vegetation are proposed to be removed as part of the proposal.

  The footprint of the infiltration basin has been designed to avoid encroaching into the estimated structural root zones (SRZ) of trees but would encroach into the tree root protection zones (TPZ) of three trees and would exceed the recommended 10% encroachment threshold for two of those trees, with encroachments of approximately 20%.

  The infiltration basin would be constructed in sandy, free-draining soil, to a depth above the height of the scarp base at the top of the beach and therefore above the water table. Trees in proximity to the infiltration basin would therefore not be subjected to waterlogged soil as a result of the proposal.

  Machinery access within the park would be restricted (by delineated exclusion zones) to the disturbance footprint of the infiltration basin to minimise soil compaction within TPZ.

  Excavator size shall be as small as practical to undertake the required works and minimise compaction and other disturbances.

  Safeguards and mitigation measures are prescribed in Section 7 to minimise and manage potential impacts on tree health.

  No significant habitat was found to occur within the site. The site is not regarded as containing suitable habitat for nesting threatened shorebirds and works would not impact on areas considered to be potential foraging habitat for shorebirds (refer to Sections 3.2.2 and 3.3).

- *Potential impacts on aquatic habitat and protected areas of Jervis Bay Marine Park*

  Potential impacts on water quality, riparian corridors and key fish habitat associated with surface water flow, erosion and sediment movement are discussed in section 3.6.

  No directs impacts would occur on the beach or waterway. Indirect impacts on the beach and Jervis Bay waterway associated with erosion and sediment movement are unlikely to occur.

- *Potential impacts associated with erosion and sediment movement.*

  Disturbance of the land to construct the stormwater infiltration basin may temporarily increase the potential for erosion and sediment movement.

  Stabilisation of soil would be carried out immediately involving installation of jute mesh (or similar) and planting out with suitable sedges, rushes and other vegetation.

Excavation and construction works would involve the installation and maintenance of sediment and erosion controls to minimise impacts associated with water contamination and sediment movement and deposition while disturbed areas are revegetating and stabilising.

There exists a risk that the foreshore berm between the infiltration basin and the beach may become destabilised as a result of supersaturation of the soil occurring behind and beneath the berm. This could lead to reduced structural stability of the berm – increased due to its relatively narrow width (3 m approx.) and the sparseness of established trees and large shrubs in this location. It is assumed that the free-draining capacity of the sand present would make this risk minimal, but it is recommended that the risk be further considered and that additional planting is undertaken along the berm to increase its stability.

Widening of the road pavement and the capture and directing of stormwater with kerb and gutter could increase stormwater velocity. However, the proposal seeks to manage stormwater discharge and associated impacts by directing stormwater into a vegetated infiltration basin, thereby reducing the potential for erosion caused by stormwater movement, particularly along the foreshore embankment at the eastern end of Sheaffe St, where substantial erosion has occurred.

Potential impacts on water quality, riparian corridors and key fish habitat associated with surface water flow, erosion and sediment movement are further discussed in section 3.6.

- *Potential impacts on public use and visual amenity of the park*

  Public and private access to the park on the north side of Sheaffe St would be temporarily disrupted during construction activities of the proposal. A public exclusion zone would be implemented in the park during construction of the infiltration basin.

  The proposal would impact on future public access and use by removing the area where the infiltration basin is proposed for availability as a picnic or recreational area and preventing access along this section of the park.

  The loss of recreational space within the park is justified by the intent of the proposal to protect the park and access to the park via Sheaffe St from erosion. Public access of the park would remain available, access to the beach would remain – including around the infiltration basin, and extensive recreational areas would remain within grassed areas of the park to the north and particularly to the south of Sheaffe St.

  Unauthorised storage of small watercraft occurs along the park, including within the footprint of the infiltration basin. These boats, etc, would require removal or relocation prior to works commencing.

- *Potential impacts associated with sound and vibration disturbance during construction*

  Temporary, localised sound and vibration impacts would occur during normal hours of construction for the proposal.

  No drilling, blasting or rock-breaking would occur.

  It is unlikely that construction works would result in unacceptable noise or vibration impacts on neighbouring properties.

  Refer to environmental safeguards and mitigation measures in section 7.

Potential impacts on the environment, including indirect impacts have been considered and assessed including:

- Impacts on threatened species;
- Impacts on indigenous and non-indigenous heritage;
- Impacts on water quality, the riparian zone and key fish habitat;
- Impacts associated with flood liable land.

Each of these is discussed below.

3.2 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.

3.2.1 Part 7A *Fisheries Management Act 1994*

Part 7A relates to threatened species conservation.

There are no threatened species listed under the Act which are mapped as occurring or which are likely to occur within or in close proximity to the site[2].

No marine vegetation occurs within or in close proximity to the site.

All works and associated direct impacts would occur on terrestrial land.

No works would occur on or involve direct impacts on water land.

No marine vegetation or threatened marine fauna would be directly impacted by the proposal.

No indirect impacts are likely to occur on marine vegetation or other aquatic habitats.

Further consideration of Parts 1 through 6 of the NSW DPI Threatened species assessment criteria, which considers impacts to threatened species, habitat of threatened species, and endangered ecological communities listed under the Act, is not warranted.

As demonstrated in Table 2 below (Part 7 of NSW DPI Threatened species assessment criteria), the proposal would not contribute significantly to key threatening processes, as listed under Part 7A of the Act.

It is concluded that the proposal is unlikely to result in any impact on threatened entities or their habitat; or contribute significantly to key threatening processes, as listed under Part 7A of the Act.

The proposed activity therefore does not require an Environmental Impact Statement (EIS) or Species Impact Statement (SIS) under the Act.

Table 2. Fisheries Management Act – Key Threatening Process Assessment

Key Threatening Process	Assessment
Degradation of native riparian vegetation along NSW water courses	Negligible. All trees and other native vegetation in proximity to the site is proposed to be retained. Safeguards and mitigation measures would be

[2] Fisheries NSW Spatial Data Portal https://webmap.industry.nsw.gov.au/Html5Viewer/index.html?viewer=Fisheries_Data_Portal

Key Threatening Process	Assessment
	implemented (refer to Section 7) to minimise and manage potential impacts on tree health. The proposal would involve planting out of the infiltration basin with native sedges and other plants. The intent of the proposal is to alleviate impacts of stormwater erosion on the foreshore.
Hook and line fishing in areas important for the survival on threatened fish species	Not applicable – proposal does not comprise or facilitate hook and line fishing.
Human-caused climate change	Not applicable – the proposal does not contribute to human-cause climate change.
Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams	Not applicable – the proposal does not involve the installation and operation of instream structures or other mechanisms that alter natural flow regimes of rivers and streams.
Introduction of fish to waters within a river catchment outside their range	Not applicable – the proposal does not involve releasing fish.
Introduction of non-indigenous fish and marine vegetation to the coastal waters of NSW	Not applicable – the proposal does not involve the introduction of non-indigenous fish.
Removal of large woody debris from NSW rivers and streams	Not applicable – the proposal does not involve the removal of woody debris.
The current shark meshing program in NSW waters	Not applicable – the proposal does not involve shark meshing.

3.2.2 Part 7 *Biodiversity Conservation Act 2016*

An assessment of the potential for NSW threatened flora and fauna species occurring on-site or otherwise being impacted by the proposal was undertaken (Appendix B). The following threatened species or 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:

- *Callocephalon fimbriatum Gang-gang Cockatoo*
- *Pteropus poliocephalus Grey-headed Flying-fox*
- *Bangalay Sand Forest of the Sydney Basin and South East Corner Bioregions*

Section 7.3 of the Act provides a 'five-part' test 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 A - 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.

Gang-gang Cockatoo

The Gang-gang Cockatoo (*Callocephalon fimbriatum*) is generally found in tall mountain forests and woodlands in spring and summer, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. May also occur in sub-alpine Snow Gum (*Eucalyptus pauciflora*) woodland and occasionally in temperate rainforests. Gang-gang Cockatoo favours old growth forest and woodland attributes for nesting and roosting. Breeding is generally from Oct-Jan (OEH 2022b). Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts. Nesting hollows are usually vertical or points steeply upward (Morcombe 2004).

Gang-gang Cockatoo has been recorded in the park in proximity to the site. The site contains suitable tree species for foraging of Gang-gang Cockatoo. No hollow-bearing trees providing suitable nesting habitat for Gang-gang Cockatoo were observed within or in proximity to the site.

The proposal would not involve removal of trees or other native vegetation. Safeguards and mitigation measures would be implemented to minimise and manage potential impacts on tree health.

No impact on foraging habitat, breeding habitat or movement corridors for the species would occur as a result of the proposal.

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

Grey-headed Flying-fox *Pteropus poliocephalus*

The Grey-headed Flying-fox (GHFF) is the largest Australian bat, with a head and body length of 23 - 29 cm. It has dark grey fur on the body, lighter grey fur on the head and a russet collar encircling the neck. The wing membranes are black and the wingspan can be up to 1 m. It can be distinguished from other flying-foxes by the leg fur, which extends to the ankle. Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. This species occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. GHFF can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. They feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines, also foraging in cultivated gardens and fruit crops (2020a).

No GHFF camp exists in close proximity to the site, the nearest being at Huskisson approx. 6.8 km to the south-west of the subject site and Comerong Island, approximately 12 km north of the subject site[3].

[3] Source: http://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf

Potential foraging habitat for GHFF exists within and in proximity to the site as flowering gum trees (*Eucalyptus, Angophora and Corymbia* species).

The proposal would not involve removal of trees or other native vegetation. Safeguards and mitigation measures would be implemented to minimise and manage potential impacts on tree health.

Works would occur during standard construction hours, so would not impact on the primarily nocturnal feeding periods of this species.

The proposal would not result in any barrier to movement for this species.

No impact on foraging habitat, breeding habitat or movement corridors for the species would occur as a result of the proposal.

It is therefore considered unlikely that Grey-headed Flying-fox would be impacted by the proposed works, and the proposed activity is unlikely to have an adverse effect on the lifecycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

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

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

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

Vegetation recorded on site during investigations was limited to scattered trees, including Bangalay (*Eucalyptus botryoides*), Rough-barked Apple (*Angophora floribunda*), Coastal Banksia (*Banksia integrifolia*) and occasional Spotted Gum (*Corymbia maculata*). The understorey was almost entirely cleared, with a mown turf cover of Buffalo grass (*Stenotaphrum secundatum*) and occasional Guinea Flower (*Hibbertia scandens*) and Sydney Golden Wattle (*Acacia longifolia*).

The vegetation observed on site was considered to be a degraded form of PCT3638 South Coast Sands Bangalay Forest. PCT3638 is associated with Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions threatened ecological community (TEC).

<u>Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions</u>

Bangalay Sand Forest is the name given to the ecological community associated with coastal sand plains of marine or Aeolian origin. It occurs on deep, freely draining to damp sandy soils on flat to moderate slopes within a few kilometres of the sea and at altitudes below 100 metres. The community is characterised by an assemblage of species specified in the Scientific Committee's determination (NSW Scientific Committee 2011), typically with a relatively dense or open tree canopy dominated by Bangalay (*Eucalyptus botryoides*) and Coast Banksia (*Banksia integrifolia*), an understorey of mesophyllous or sclerophyllous small trees and shrubs, and a variable groundcover dominated by sedges, grasses or ferns.

No native vegetation would be removed as part of the proposal. The proposal would occur entirely within existing disturbed and cleared areas (grassed with Kikuyu turf), with minimal encroachment into the tree protection zones of three (3) trees.

Safeguards and mitigation measures would be implemented to minimise and manage potential impacts on tree health.

Landform and hydrology would be modified with construction of the infiltration basin. The infiltration basin would be constructed in sandy, free-draining soil, to a depth above the height of the scarp base at the top of the beach and therefore above the watertable.

Effects on soil moisture and the frequency of waterlogging where the EEC occurs, as a result of the proposal, would therefore be minimal.

It is therefore unlikely that the proposal would result in sediment movement or changes to hydrology which would impact on the EEC.

The proposal would not result in the fragmentation or isolation of areas of any EEC and is unlikely to adversely affect the extent or composition of any EEC such that a local occurrence of the EEC would be placed at risk of extinction.

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

(iii)the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity

(iv)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

(v) 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 or otherwise significantly impacted (see Part A).

No EEC would not be fragmented or isolated, nor removed or modified to an extent that would affect the long-term survival of the EEC occurring in the locality (refer to Part B).

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

Part D – 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 E – 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.

No key threatening processes listed in the NSW *Biodiversity Conservation Act 2016* are considered relevant to the proposed activity.

3.3 Threatened species impact assessment (Commonwealth EPBC Act 1999)

A Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Report was generated on 8th January 2024. Of those threatened species and endangered ecological communities reported as likely occurring or having habitat within the area of the report, the following were considered to have potential habitat within the site requiring further assessment:

- Gang-gang Cockatoo *Callocephalon fimbriatum* (E)
- Grey-headed Flying-fox *Pteropus poliocephalus* (V)

(CE – Critically Endangered; E – Endangered; V – Vulnerable; M – Migratory).

Refer also to Likelihood of Occurrence Table in Appendix B.

Additional species listed under the Act, including migratory birds, may occur occasionally and transiently within the vicinity of the proposed activity but would not be affected by the proposal.

A significant impact assessment of EPBC listed threatened entities was undertaken in Table 3.

Table 3. EPBC Significant impact assessment

Vulnerable species - Significant impact criteria Species to consider: • **Grey-headed Flying-fox (GHFF)**	
Criteria	***Assessment***
Lead to a long-term decrease in the size of an important population of a species.	The proposed activity will not directly impact on a known local population of GHFF, will not affect or disrupt breeding, will not impact on breeding habitat, and will have only a negligible impact on potential foraging and refuge habitat. Refer to Section 3.2.2 for more information.
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 for this species will be impacted by the proposed activity. No breeding, and only very minimal potential foraging or refuge habitat for GHFF would be impacted. Refer to Section 3.2.2 for more information.
Disrupt the breeding cycle of an important population.	Works would not affect breeding habitat. Refer above and to Section 3.2.2 for more information.
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 by the proposed activity. Refer to Section 3.2.2 for more information.
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 species - Significant impact criteria Species to consider: • **Gang-gang Cockatoo**	
Criteria	
Lead to a long-term decrease in the size of a population.	The proposed activity will not directly impact on a known local population of Gang-gang Cockatoo, will not affect or disrupt breeding or impact on breeding habitat of this

	species, and will not impact on potential movement corridors. Refer to Section 3.2.2 for more information.
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.	No critical habitat for this species will be impacted by the proposed activity. Refer to Section 3.2.2 for more information.
Disrupt the breeding cycle of a population.	Works would not affect breeding habitat. Refer above and to Section 3.2.2 for more information.
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 by the proposed activity. Refer to Section 3.2.2 for more information.
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

Conclusion of EPBC Significant Impact Assessment

The proposal is unlikely to have an adverse effect on a vulnerable, endangered, critically endangered or migratory species or its habitat, nor on the extent or integrity of an endangered ecological community such that its local occurrence is likely to be placed at risk of extinction.

No other matters of significance, i.e.:

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

would be affected as a result of the proposed activity.

Further assessment and referral to the Commonwealth is therefore not required.

3.4 Indigenous heritage

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.

Landscape features that are regarded as indicating a higher potential for Aboriginal objects, as outlined in the NSW Department of Environment, Climate Change and Water's Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (2010) include:

- within 200m of waters, or
- located within a sand dune system, or
- located on a ridge top, ridge line or headland, or
- located within 200m below or above a cliff face, or
- within 20m of or in a cave, rock shelter, or a cave mouth.

The site occurs on the foreshore of Jervis Bay.

A search on the Aboriginal Heritage Information Management System (AHIMS) on 18th March 2024 indicated that there are no recorded Aboriginal sites within or in proximity to the subject site (refer to Figure 8 below).

No potential Aboriginal heritage objects were observed within the site during investigations, noting that ground surface visibility was limited due to grass coverage. The exposed sand embankment adjacent to the site contained natural shell deposits mixed with sand, but no apparent midden lens.

The Due Diligence Guidelines define disturbed land as follows:

"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 site of the proposed activity is disturbed as a result of past clearing of the land and maintenance of the park.

As the proposal would occur on disturbed land and would not impact any recorded Aboriginal sites or places, the Due Diligence Guidelines requires no further assessment, an AHIP is not required, and the activity can proceed with caution.

In the event that any unexpected find of potential Aboriginal heritage is encountered during works, it must be reported to the NSW Environment Line and NSW Heritage.

Figure 8. AHIMS search results

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Sheaffe St
Client Service ID : 874306

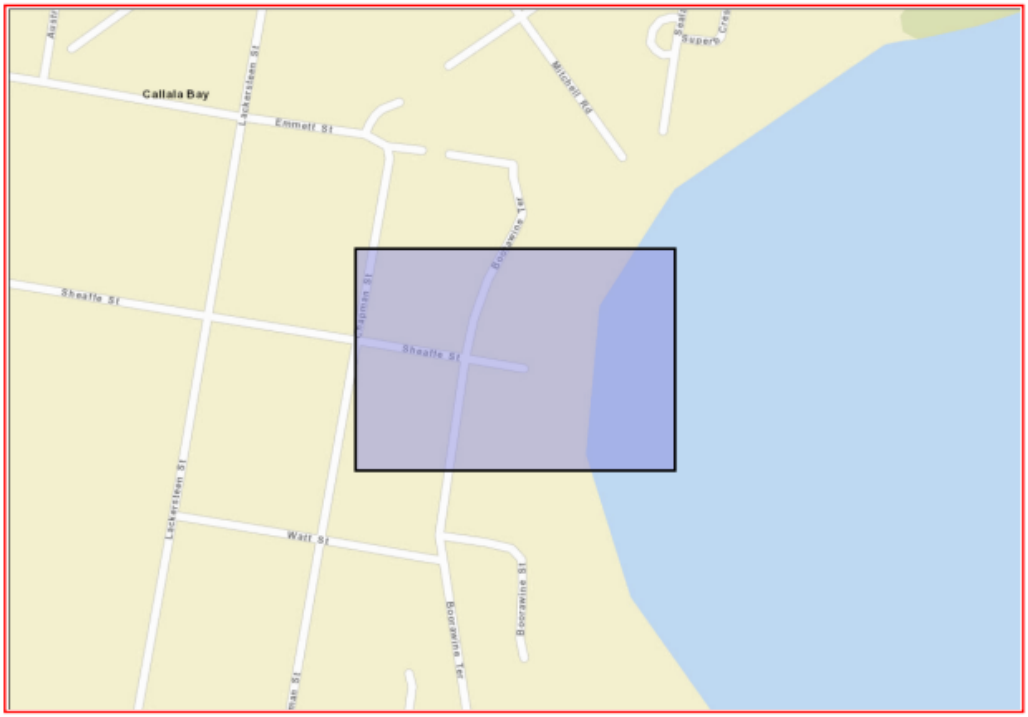
Shoalhaven City Council
42 Bridge Road
Nowra New South Wales 2541
Attention: Jeff Bryant
Email: jeff.bryant@shoalhaven.nsw.gov.au

Date: 18 March 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -34.9994, 150.7224 - Lat, Long To : -34.9972, 150.7262, conducted by Jeff Bryant on 18 March 2024.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

3.5 Non-indigenous heritage

No heritage listings are recorded as occurring in proximity to the site of the proposed activity on the NSW Heritage Register or on the Shoalhaven Local Environment Plan 2014.

It is therefore concluded that the proposal would not result in any impacts on heritage items or values.

In the event that any unexpected finds of potential relics are encountered during works, notification to NSW Heritage Council is required under s146 of the *Heritage Act 1977.*

3.6 Riparian corridors, Key Fish Habitat & Water quality

Impacts on riparian corridors, Key Fish Habitat (KFH) and water quality were considered with regard to the following:

- Likely and potential impacts on vegetation, stability or function of riparian corridors as a result of construction activities.
- Sediment movement into waterways as a result of construction and ongoing operational activities.

Riparian corridors

The proposal would not involve the removal of any riparian vegetation. The proposal would occur entirely within existing disturbed and cleared areas (grassed with Kikuyu turf).

The footprint of the infiltration basin has been designed to avoid encroaching into the estimated structural root zones (SRZ's) of trees, but would encroach into the tree root protection zones (TPZ's) of three trees and would exceed the recommended 10% encroachment threshold for two of those trees, with encroachments of approximately 20%.

Safeguards and mitigation measures would be implemented to minimise and manage potential impacts on tree health.

The infiltration basin would be constructed in sandy, free-draining soil, to a depth above the height of the scarp base at the top of the beach and therefore above the watertable.

Effects on soil moisture and the frequency of waterlogging on riparian vegetation, as a result of the proposal, would therefore be minimal.

The infiltration basin would be stabilised with jute mesh upon construction and subsequently planted with native sedges, rushes and other species to provide stability, energy dissipation, filtration and absorption.

It is therefore unlikely that the proposal would result in sediment movement or changes to hydrology which would impact on the riparian corridor.

The proposal would not result in the fragmentation of the riparian corridor, would not result in alteration of flow regimes which would impact on the riparian corridor and would not result in impacts on the function or integrity of the riparian corridor.

It is therefore concluded that impacts on riparian corridors, resulting from the proposal, would be minimal and mitigations would further reduce immediate and long-term impacts.

Water Quality

The proposal would not impact directly on Jervis Bay waterway, the beach or foreshore embankment.

Disturbance of the land to construct the stormwater infiltration basin may temporarily increase the potential for erosion and sediment movement, however, stabilisation of soil would be carried out immediately involving installation of jute mesh (or similar) and planting out with suitable sedges, rushes and other vegetation.

Installation and maintenance of sediment and erosion controls would further minimise impacts associated with water contamination and sediment movement and deposition while disturbed areas are revegetating and stabilising.

The proposal seeks to manage stormwater discharge and associated impacts by directing stormwater into the vegetated infiltration basin, thereby reducing the potential for erosion caused by stormwater movement, particularly along the foreshore embankment at the eastern end of Sheaffe Street, where substantial erosion has occurred. Existing erosion impacts on water quality and aquatic habitat would therefore be reduced.

Acid sulphate soils are unlikely to be disturbed as a result of proposed works (refer to section 2.2 and section 3.8).

It is therefore concluded that sediment movement and the risk of impact on water quality, resulting from the proposal, would be minimal and mitigations would further reduce immediate and long-term impacts.

Key Fish Habitat

KFH is mapped as occurring in association with Jervis Bay, extending over the eastern end of Sheaffe St and the foreshore park (Refer to Figure 9 below).

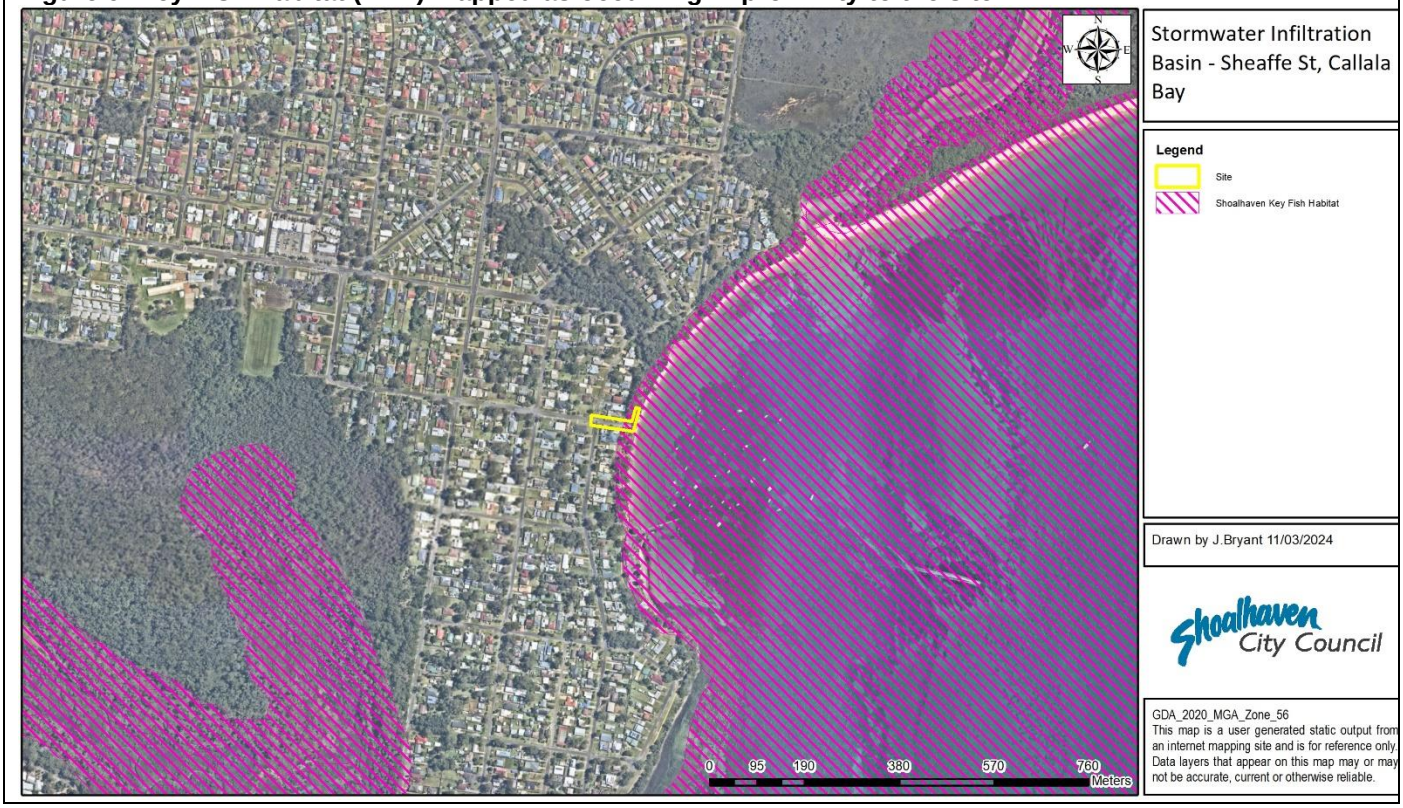
All direct impacts would occur within the road reserve and the foreshore park. No direct impacts on the waterway would occur as a result of the proposal.

Indirect impacts associated with sediment movement are unlikely to impact on the waterway (refer above).

Beach wrack was present in large quantities along the beach in proximity to the site during site investigations. No live seagrass occurred in proximity to the site and aerial imagery shows seagrass generally occurring over 75 m from the foreshore. No direct impacts would occur on the beach or waterway.

Aquatic habitat is therefore unlikely to be impacted by the proposal.

Figure 9. Key Fish Habitat (KFH) mapped as occurring in proximity to the site



3.7 Flood liable land

The subject site is not mapped as being flood liable land and no mapped flood liable land occurs in proximity to the site.

The infiltration basin would occur on free-draining, sandy soil, at a lower elevation than adjacent properties, and has been designed to accommodate 20% annual exceedance probability (AEP) rain events. An overflow weir would be constructed in the northern end of the basin.

The proposal is therefore unlikely to affect flood behaviour.

3.8 Acid Sulphate Soil

Acid sulphate soils (A.S.S) are the common name given to sediments and soils containing iron sulphides which, when exposed to oxygen generate sulfuric acid. The majority of acid sulphate sediments were formed by natural processes in the Holocene geological period (the last 10,000 years). Formation conditions require the presence of iron-rich sediments, sulphate (usually from seawater), removal of reaction products such as bicarbonate, the presence of sulphate reducing bacteria and a plentiful supply of organic matter. These conditions tend to exist in mangroves, salt marsh vegetation or tidal areas, and at the bottom of coastal rivers and lakes. The relatively specific conditions under which acid sulphate soils are formed usually limit their occurrence to low lying parts of coastal floodplains, rivers and creeks. This includes areas with saline or brackish water such as deltas, coastal flats, backswamps and seasonal or permanent freshwater swamps that were formerly brackish. Due to flooding and stormwater erosion, these sulphidic sediments may continue to be re-distributed through the sands and sediments of the estuarine floodplain region. Sulphidic sediment may be found at any depth in suitable coastal sediments – usually beneath the watertable (ASSMAC 1998).

The subject site and surrounds are mapped as Class 5 A.S.S. Refer to section 2.2 of this REF.

The *Shoalhaven Local Environment Plan 2014* indicates that a risk of exposure of A.S.S exists for Class 5 A.S.S where works would occur within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

The proposed activity would not involve works within 500 m of adjacent Class 1, 2, 3 or 4 land and furthermore, would not involve, or result in, any lowering of the watertable.

No risk of exposure of A.S.S would therefore result from the proposed activity.

3.9 Other considerations

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

- 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
- is not mapped as “potentially contaminated land”

3.10 EP&A Regulation – Section 171 matters of consideration

Section 171(2) of the *Environmental Planning and Assessment Regulation 2021* 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. These matters are addressed in Table 4.

Table 4. Section 171 Matters of consideration

Does the proposal:	Assessment	Reason
a) Have any environmental impact on a community?	Overall positive	The proposal would impact on future public access and use of the park but would control stormwater flow and protect the park and access to the park via Sheaffe St from foreshore erosion. Public access of the park and extensive recreational areas would remain. The proposal would not have any impact on other community services and infrastructure such as power, water and waste-water, educational, medical or social services. Refer to section 3.1 for more information.
b) Cause any transformation of a locality?	Positive	The use of the land would continue to provide an area for public foreshore access and recreation. The road and parking would be improved and formalised. Erosion of the foreshore would be addressed. A relatively small area of the foreshore park would be used to construct the infiltration basin. Refer to section 3.1 for more information.
c) Have any environmental impact on the ecosystem of the locality?	Positive	The five-part test of significance (Section 3.2) concludes that the proposed activity would not have a significant impact upon threatened species or endangered ecological communities. No food or habitat resources critical to the survival of a particular species would be removed. Aquatic ecosystems are not likely to be affected by the construction of the proposed activity. Existing erosion impacts on water quality and aquatic habitat would be reduced. Refer to s3.2 and s3.6 for more information. Refer to prescribed environmental safeguards and mitigation measures (Section 7).
d) Cause a diminution of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	Low adverse	The proposal would result in the loss of an area for recreational purposes, but would be for the purpose of protecting the access and foreshore park. Refer to section 3.1 for more information. The proposed activity is unlikely to impact negatively on the environmental qualities of the site (refer to sections 3.1, 3.2, 3.3 and 3.6 of this REF).
e) Have any effect on a locality, place or building having	Negligible	The site of the proposed activity has no significant architectural, cultural, historical or scientific values.

aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, or social significance or other special value for present or future generations?		Aesthetic values would not be impacted by the proposal. Vegetation proposed to be planted in the infiltration basin would be low-growing and would not obstruct views. Social values are limited to recreational use – discussed above. No items in the vicinity of the work site which are listed on the State Heritage Register and the Shoalhaven Local Environmental Plan would be impacted by the proposal (refer to Section 3.5). 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 3.4).
f) Have any impact on the habitat of protected fauna (within the meaning of the Biodiversity Conservation Act 2016)?	Negligible	No native vegetation or habitat would be removed or otherwise directly impacted on by the proposal. Indirect impacts are unlikely. Refer to sections 3.1 and 3.2 of this REF for more information. The prescribed environmental safeguards and mitigation measures (Section 7) would mitigate indirect impacts to fauna and habitat.
g) Cause any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	Negligible	The five-part test of significance, provided in Section 3.2 above, concludes that the proposed activity would not have a significant impact upon threatened fauna. No threatened species are likely to rely on habitat that would be impacted on as a result of the proposal. No indirect impacts to threatened species are likely to result from the proposal. The prescribed environmental safeguards and mitigation measures (Section 7) would minimise the risk of impact to resident fauna including threatened microbat species.
h) Have any long-term effects on the environment?	Positive	Existing erosion impacts on water quality and aquatic habitat would be reduced (refer to s3.6). The possible impacts have been discussed in detail under Section 3. Refer also to the prescribed environmental safeguards and mitigation measures in Section 7.
i) Cause any degradation of the quality of the environment?	Positive	Aquatic ecosystems are not likely to be 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. Existing erosion impacts on water quality and aquatic habitat would be reduced (refer to s3.6).

		Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.
j) Cause any risk to the safety of the environment?	Low-adverse	The proposed activity would not involve hazardous wastes and would not lead to increased bushfire or landslip risks. Erosion risk in the vicinity of Sheaffe Street would be reduced. The proposal would involve a possible risk of destabilisation of the foreshore berm between the infiltration basin and beach (refer to s3.6).
k) Cause any reduction in the range of beneficial uses of the environment?	Low adverse	The proposal would result in the loss of an area for recreational purposes, but would be for the purpose of protecting the access and foreshore park. Refer to section 3.1 for more information.
l) Cause any pollution of the environment?	Negligible	Sediment and erosion control in accordance with the Blue Book will be implemented to minimise movement of sediment into waterways. 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. The risk of contamination and spills from machinery including fuel and hydraulic fluids would be minimised through safeguards and mitigation measures (Section 7).
m) Have any environmental problems associated with the disposal of waste?	Negligible	Excavated material would be reused on site where appropriate. Any excess spoil generated as part of the proposal would be reused in accordance with relevant NSW EPA Resource Recovery Exemptions (RRE's). 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*.
n) Cause any increased demands on resources (natural or otherwise) which are, or are likely to become, in short supply?	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.
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	Positive	The proposed activity would improve the resilience of the foreshore at the end of Sheaffe Street.

and coastal hazards, including those under projected climate change conditions		The site is not located in a coastal hazard area.
q) Any applicable local strategic planning statement, regional strategic plan or district strategic plan made under Division 3.1 of the Act	Positive	The proposed activity meets Planning Priority 2 (Delivering Infrastructure) of the *Shoalhaven 2040* Strategic Land-use Planning Statement https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D20/437277 The activity is not inconsistent with the Illawarra Shoalhaven Regional Plan 2041 https://www.planning.nsw.gov.au/-/media/Files/DPE/Plans-and-policies/Plans-for-your-area/Regional-plans/Illawarra-Shoalhaven-Regional-Plan-05-21.pdf The site is not mapped on the Regional Environmental Plan.
r) Any other relevant environmental factors	N/A	

4. PERMISSIBILITY

4.1 Environmental Planning & Assessment Act 1979

Section 4.1 (Development that does not need consent) of the *Environmental Planning and Assessment Act 1979* (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, section 2.73(3) of the NSW *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport & Infrastructure SEPP) provides that (underline added for emphasis):

> *"Any of the following development may be carried out by or on behalf of a council without consent on a public reserve under the control of or vested in the council—*
> *(a) development for any of the following purposes—*
> *(i) roads, pedestrian pathways, cycleways, single storey car parks, ticketing facilities, viewing platforms and pedestrian bridges,*
> *…*
> *(b) environmental management works,*
> *…"*

As the proposal does not require development consent, and as it constitutes an 'activity' for the purposes of Part 5 of the EP&A Act, being carried out by (or on behalf of) a public authority, environmental assessment under Part 5 of the EP&A Act is required. This REF provides this assessment and ensures that Council as determining authority in consideration of the activity, meets its obligation under s5.5 of the EP&A Act, to examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

4.2 Crown Land Management Act 2016

Works would be undertaken on Crown Land for which Shoalhaven City Council (SCC) is the appointed Crown Land Manager, in addition to the Sheaffe Street road reserve for which SCC is the roads authority.

Crown Reserve R91042 was gazetted for public recreation on 17th February 1978 and was later included as part of Jervis Bay State Park with the additional purposes of public recreation, community purposes, environmental protection, tourist facilities and services (gazetted 27th June 2008 – Figure 10 below).

Under Section 3.21 of the NSW *Crown Land Management Act 2016* (CLM Act), a Council Crown Land Manager is authorised to classify and manage its dedicated or reserved Crown Lands as if it were public community land within the meaning of the NSW *Local Government Act 1993* (LG Act). Refer to section 4.3 for more information.

Figure 10. Gazette of reserve R91042 inclusion in Jervis Bay State Park

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AGGREGATION OF RESERVES AND ADDITIONAL RESERVE PURPOSES

THE Crown reserves specified in the Schedule 1 hereunder are included in Wallaga Lake State Park.

The Crown reserves specified in the Schedule 2 hereunder are included in Wallaga Lake State Park with the additional public purposes, unless already so reserved, of Public Recreation; Community Purposes; Environmental Protection; Tourist Facilities and Services, pursuant to section 121A of the Crown Lands Act 1989.

Local Government Area: Eurobodalla and Bega Valley.

File No.: 08/5100.

TONY KELLY, M.L.C.,
Minister for Lands

SCHEDULE 1

1. Reserve number 77771 for future public requirements.
2. Part Reserve numbers 752130 (Lot 7301, DP 1128704) and 1011268 (Lot 7301, DP 1128708; Lot 7306, DP 1128709; Lot 7300, DP 1128707 and including bed of Wallaga Lake) for future public requirements.
3. Reserve No. 88847 for preservation of native flora and fauna.

SCHEDULE 2

1. Dedication 580068 for public recreation.
2. Reserve numbers 21043, 48732, 59552, 90784, 60470, 7056, 42822 for public recreation.
3. Reserve numbers 69268, 62823 for public recreation and resting place.
4. Part Reserve 82706 (Lot 7302, DP 1128712) for public recreation and resting place.
5. Reserve number 62319 for access, public recreation and resting place.
6. Reserve number 7064 for public baths.
7. Reserve number 263 for public purposes.

AGGREGATION OF RESERVES AND ADDITIONAL RESERVE PURPOSES

THE Crown reserves specified in the Schedule 1 hereunder are included in Jervis Bay State Park.

The Crown reserves specified in the Schedule 2 hereunder are included in Jervis Bay State Park with the additional public purposes, unless already so reserved, of Public Recreation; Community Purposes; Environmental Protection; Tourist Facilities and Services, pursuant to section 121A of the Crown Lands Act 1989.

Local Government Area: Shoalhaven.

File No.: 08/5098.

TONY KELLY, M.L.C.,
Minister for Lands

SCHEDULE 1

1. Reserve numbers 1005189 and 1003033 (Lot 7012, DP 1037796) for environmental protection.
2. Part Reserve numbers 755903 (Lots 46 to 49, DP 755903; Lot 120, DP 823244; Lot 7301, DP 1128619; Lot 7307, DP 1128678; Lot 7310, DP 1128700; Lot 7309, DP 1128700; Lot 7312, DP 1128701); 755928 (Lot 7300, DP 112866; Lot 7301, DP 1128698; Lot 58, DP 755928; Lot 7036, DP 1094568; Lot 93, DP 755928; Lot 90, DP 755928; Lot 76, DP 755928) and 1011268 (Lot 7306, DP 1128620; Lot 7301, DP 1128621; Lot 7302, DP 1128621; Lot 7303, DP 1128621; Lot 7304, DP 1128621; Lot 7305, DP 1128621; Lot 7300, DP 1128622; Lot 7301, DP 1128622; Lot 7302, DP 1128622) for future public requirements.
3. Reserves 84483, 1006481 and 1006482 for future public requirements.
4. Reserve number 71501 for preservation of native flora.
5. Reserved land at Lot 8, DP 522659 and Lot 701, DP 1025015.
6. Reserved land for future public requirements at Lot 7037, DP 1094569; Lot 701, DP 1029715; Lot 7038, DP 1094563; Lot 7039, DP 1094563; Lot 7040, DP 1094563; Lot 7041, DP 1094563; Lot 7042, DP 1094563; Lot 7035, DP 1094570; Lot 83, DP 755928; Lot 7043, DP 1094566; Lot 7010, DP 1076655 and Lot 7011 DP 1076655.

SCHEDULE 2

1. Reserve number 180045 for public recreation, preservation of native flora and fauna and preservation of aboriginal relics.
2. Reserve No. 1003034 for public recreation and coastal environmental protection.
3. Reserve numbers 64558, 76047, 76522, 91042, 91568, 90666, 96376, 96904, 76522, 78757, 64234 and 64234 for public recreation.
4. Reserve number 96902 for parking.

4.3 Local Government Act 1993

Under Section 35 of the Local Government Act 1993, community land is required to be used and managed in accordance with the plan of management applying to the land, any laws permitting the use of the land for a specified purpose or otherwise regulating the use of the land, and any other relevant clause in Part 2, Division 2 of the Act.

Crown Reserve R45715 is classified as Community Land with and categorised as Natural Area/Park. The foreshore area where the proposal would occur is managed as a park.

Under Council's *Generic Community Land Plan of Management Parks* (the POM) the core objectives for management of community land categorised as Park are:

- to encourage, promote and facilitate recreational, cultural, social and educational pastimes and activities, and
- to provide for passive recreational activities or pastimes and for the casual playing of games, and
- to improve the land in such a way as to promote and facilitate its use to achieve the other core objectives for its management.

The POM core objective "to encourage, promote and facilitate recreational, cultural, social and educational pastimes and activities" includes objectives to provide car parking and improve access to parks and to ensure the management and use of parks does not negatively impact on the natural environment.

As the proposal would provide, improve and protect car parking and access to the park, the proposal is considered to be consistent with the management objectives of the land.

4.4 Fisheries Management Act 1994

The proposal would not involve any impact on marine habitat protected under the *Fisheries Management Act 1994* (FM Act). Seaweed wrack occurring on the beach in proximity to the site would not be affected by the proposal. A permit under section 205 of the FM Act is therefore not required.

The proposal would involve excavation (dredging) and minor reclamation on land which is mapped as key fish habitat (KFH) for the purpose of the FM Act.

Section 200 of the Act prescribes circumstances where a local government can carry out dredging or reclamation on water land, *i.e.*:

- Under the authority of a permit ("Fisheries Permit"), or
- Work authorised under the Crown Land Management Act 2016, or
- Work authorised by a relevant public authority (other than a local government authority).

Under the *Policy and guidelines for fish habitat conservation and management* (NSW DPI 2013), DPI Fisheries focuses the application of the FM Act and FM Regulations and associated policies and guidelines on "key fish habitat" (KFH). Issue of a Fisheries Permit is typically required for activities constituting dredging or reclamation on water land within or with potential to impact areas identified as KFH.

While dredging and minor reclamation would occur on land mapped as KFH, the proposal would occur entirely on land occurring above the highest astronomical tide and which is <u>not</u> submerged by water (permanently or intermittently).

Section 200 does therefore not apply to the proposal.

The proposal shall nevertheless be referred to NSW DPI Fisheries for comment and confirmation of permit requirements.

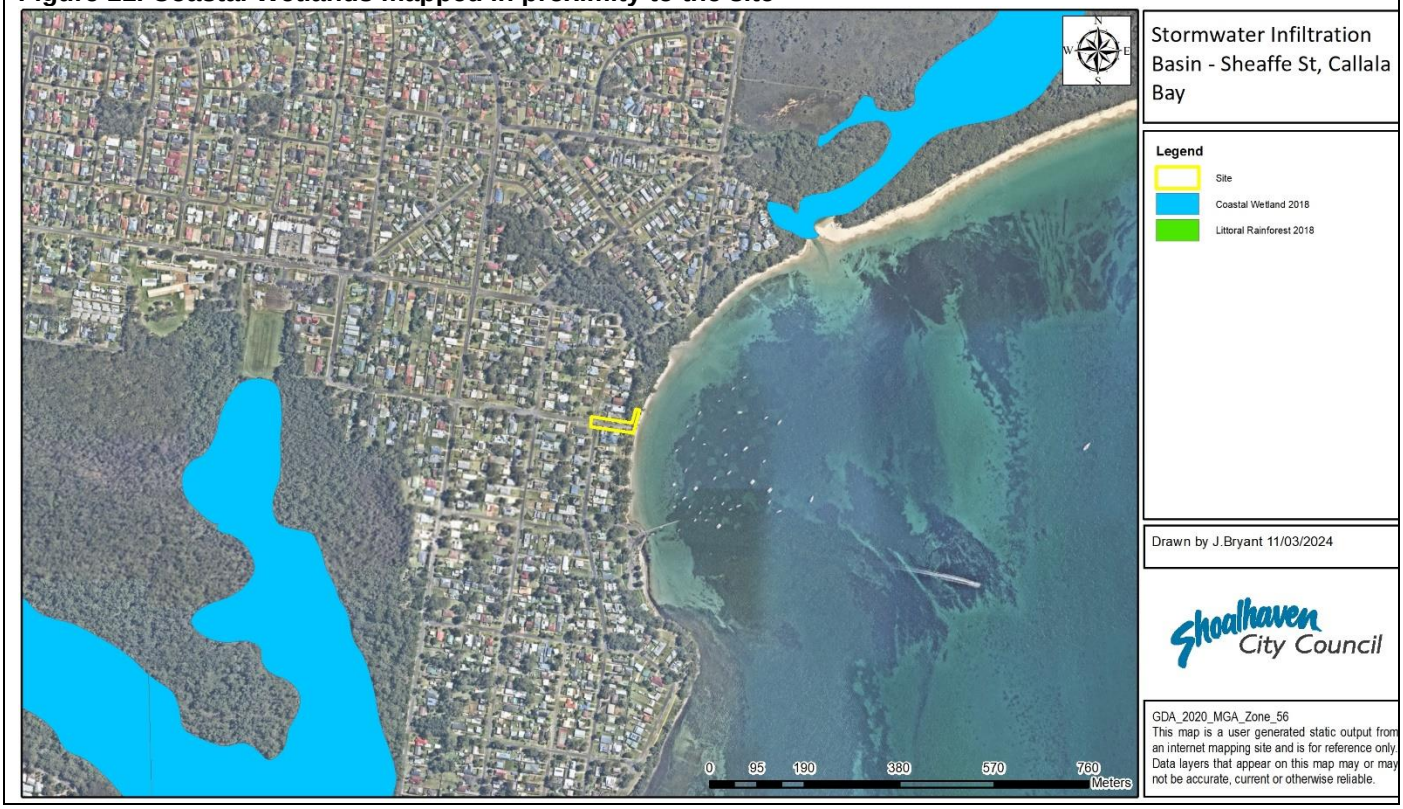
4.5 State Environmental Planning Policy (Resilience and Hazards Management) 2021

The proposed activity would be undertaken in an area 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 do not need addressing.

The proposal would not occur in an area mapped as Coastal Wetland or Littoral Rainforest and would not result in impacts on any such area (refer to Figure 11).

Other considerations of the SEPP are not relevant to the proposal.

Figure 11. Coastal Wetlands mapped in proximity to the site



4.6 Biodiversity Conservation Act 2016

The proposed development complies with the *Biodiversity Conservation Act 2016* for the following reasons:

- The proposed activity is unlikely to have a significant impact on threatened species and/or threatened ecological communities listed in the schedules of the Act. There is, therefore, no requirement to 'opt in' to the Biodiversity Offset Scheme.
- The design and mitigation measures (Section 7 of this REF) would ensure that no *serious and irreversible impacts on biodiversity values* (as defined by the BC Act) occur at the site of the proposed activity.
- The proposed activity is not within an area declared to be of "outstanding biodiversity value" as defined in the Act and Regulations.

Because of the above considerations, neither a species impact statement nor a biodiversity development assessment report is required for the proposed activity.

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 Environmental Planning and Assessment Act 1979 after compliance with that Part.

The activity will not remove vegetation that is listed under Schedule 1 Threatened Species, Schedule 2 Threatened ecological communities and Schedule 6 Protected Plants. Therefore, the activity is considered permissible as this REF has been prepared and determined in accordance with the EP&A Act.

Refer to Section 3.2 for more information.

4.7 Other

A summary of other relevant legislation and permissibility is provided in Table 5 below.

Table 5. Summary of other relevant legislation and permissibility

NSW STATE LEGISLATION
***Environmental Planning and Assessment Act 1979* (EP&A Act)**
Permissible √ Not permissible ☐
The Transport and Infrastructure SEPP provides for the proposed works to be undertaken without development consent (refer above). 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 ☐
Under the SLEP the proposed activity may have required development consent. The provisions of Transport and Infrastructure SEPP, 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.
Roads Act 1993
Permissible √ Not permissible ☐
Section 71 of the Act provides that a roads authority may carry out road work on any public road for which it is the roads authority and on any other land under its control.
Fisheries Management Act 1994
Permissible √ Not permissible ☐
Justification: The proposed activity: • would not affect declared aquatic reserves (Part 7, Division 2 of the Act); • would not involve dredging or reclamation on water land in Key Fish Habitat (Part 7, Division 3) (**refer to section 4.4 for more information**);

- would not involve or result in the blocking the passage of fish (s.219);
- would not impact mangroves and marine vegetation (Part 7, Division 4);
- would not involve disturbance to gravel beds where salmon or trout spawn (s.208);
- does not involve the release of live fish (Part 7, Division 7);
- does not involve the construction of dams and weirs (s.218);
- would not impact threatened species or endangered ecological communities (Part 7A);
- does not constitute a declared key threatening process (Part 7A); and
- would not use explosives in a watercourse (Clauses 70 and 71 of the *Fisheries Management (General) Regulation 2019).*

A Fisheries Permit is therefore not required.

Refer to section 4.4 of this REF for more information.

Marine Estate Management Act 2014

Permissible √ Not permissible ☐

Justification:

The purpose of the Jervis Bay Marine Park and the MEM Regulation has been considered with regard to the proposal.

The proposal is considered unlikely to have any negative impact on Jervis Bay Marine Park.

The proposal shall be referred to the Jervis Bay Marine Park Authority for comment. Any response from the Jervis Bay Marine Park Authority shall be given due consideration.

***National Parks and Wildlife Act 1974* (NP&W Act)**

Permissible √ Not permissible ☐

The proposed activity would not encroach into National Park estate.
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 of 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 3.4 for more information.

Heritage Act 1977

Permissible √ Not permissible ☐

The proposed activity would not disturb an item of state heritage significance. The proposal would occur in a previously disturbed area. Works can be undertaken with caution under an applicable exception from an excavation permit under s139(1) and (2) of the *Heritage Act 1977*.

Refer to s3.5 of this REF for more information.

Water Management Act 2000

Permissible √ Not permissible ☐

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 *Environment Protection and Biodiversity Conservation Act 1999* (EP&BC Act)

Permissible √ Not permissible ☐

The proposed activity would not be undertaken on Commonwealth land and no matters of National Environmental Significance are likely to be significantly impacted by the proposed activity (Section 3.3). The proposed activity is therefore not a controlled action and does not require Commonwealth referral.

Commonwealth *Native Title Act 1993*

Permissible √ Not permissible ☐

The proposal would occur partly on Crown Land Lot 7005 DP 1074751 to which Native Title applies.

Native Title assessment has been undertaken for the proposal as a Future Act under Subdivision J (Council reference D24/117203). Notification and request for comment shall be provided to registered parties for a period of 28 days.

5. CONSULTATION WITH GOVERNMENT AGENCIES

5.1 Transport & Infrastructure SEPP

Note that consultation under Chapter 2, Part 2.2 of the Transport & Infrastructure SEPP applies only to relevant development undertaken as development without consent under the provisions of Chapter 2.

Section 2.10 – Development with impacts on council-related infrastructure or services

The asset custodian for stormwater infrastructure, the road and the park is a proponent of the proposal.

No impacts on sewerage systems, water infrastructure, nor excavation of footpaths, such as described under section 2.10(1) would occur.

Consultation under section 2.10 is therefore not required.

Section 2.11 – Development with impacts on local heritage

No listed heritage items occur in proximity to the proposal. Refer to Section 3.5 of this REF for more information.

Consultation under section 2.11 is therefore not required.

Section 2.12 – Development with impacts on flood liable land

The proposal would occur on land which is not mapped as being flood liable.

Consultation under section 2.12 is therefore not required.

Section 2.13 – Consultation with State Emergency Service—development with impacts on flood liable land

The proposal would occur on land which is not mapped as being flood liable.

Consultation under section 2.13 is therefore not required.

Section 2.14 – Development with impacts on certain land within the coastal zone

The proposal would not occur within a coastal vulnerability area. Consultation is therefore not required.

Section 2.15 – Consultation with public authorities other than councils

In consideration of the consultation requirements specified under section 2.15 of the Transport and Infrastructure SEPP, the proposed activity:

- would not be undertaken on adjacent to land reserved under the *National Parks and Wildlife Act 1974* or in Zone E1 or in equivalent zones.
- does not comprise a fixed or floating structure in or over navigable waters
- 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 (only relevant to the defence communications facility near Morundah)
- would not be undertaken on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*

- would not be development on, or reasonably likely to have an impact on, a part of the Willandra Lakes Region World Heritage Property—the World Heritage Advisory Committee and Heritage NSW,
- does not comprise development within a Western City operational area specified in the Western Parkland City Authority Act 2018, Schedule 2 with a capital investment value of $30 million or more—the Western Parkland City Authority constituted under that Act.

The consultation requirements specified under section 2.15 of the Transport and Infrastructure SEPP therefore do not apply.

Section 2.16 – Consideration of Planning for Bush Fire Protection (PBP)

The proposed activity is not a type applicable to this clause i.e. health services facilities, correctional centres and residential accommodation. Consideration of PBP is therefore not required, however, bush fire risk and any requirements for asset protection zones shall be considered in the location of sheds and other storage structures (refer to section 3.9 of this REF).

Summary

No consultation is required under Chapter 2, Part 2.2 of the Transport & Infrastructure SEPP.

6. COMMUNITY ENGAGEMENT

Notification of the proposal and opportunity for comment shall be provided to relevant Community Consultative Bodies and property owners and residents adjacent to works.

7. ENVIRONMENTAL SAFEGUARDS AND MEASURES TO MINIMISE IMPACTS

Note that all safeguards are prescribed unless otherwise stated.

Safeguard / Measure	Responsibility
Works planning, approvals, consultation & notification	
1. It is recommended that the risk of berm destabilisation due to supersaturation of the soil be further considered and that additional planting (including trees and large shrubs) along the berm be included in the proposal to increase stability and reduce the risk of failure.	SCC District Engineer / SCC Project Manager
2. It is recommended that rock scour protection be incorporated into the infiltration basin inlet for energy dissipation and additional stabilisation.	SCC Project Manager
3. The proposal shall be referred to DPI Fisheries for comment and confirmation of Permit requirements.	SCC Environmental Officer
4. The proposal shall be referred to Jervis Bay Marine Park Authority for comment.	SCC Environmental Officer
5. Notification of the proposal shall be provided to relevant Community Consultative Bodies and surrounding property owners and residents adjacent to works.	SCC Project Manager
6. This REF must be published on the determining authority's (Council's) website or the NSW planning portal, in accordance with clause 171(4) EP&A Regulation 2021 and the guidelines published under cl.170, as being a matter of public interest.	SCC Environmental Officer
Site Establishment	
7. A traffic management plan shall be developed and implemented for works on Sheaffe Street.	Construction contractor
8. Exclusion zones shall be established and delineated with construction fencing, para-webbing or similar to prevent pedestrians entering works areas within the park during construction and until revegetation of the infiltration basin is complete.	Construction contractor
9. Any machinery, vehicles and stockpiles utilised during construction shall be stored and/or operated within the project footprint and existing cleared areas only. Works, machinery and vehicles shall not encroach into tree protection zones.	Construction contractor
10. Machine operators 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.	Construction contractor

Safeguard / Measure	Responsibility
11. No major equipment maintenance works shall be undertaken on-site.	Construction contractor
12. Any on-site refuelling of machinery shall be carried out with due care to avoid spilling fuel and a tray shall be used to catch any accidentally spilt fuel.	Construction contractor
Construction works	
13. Erosion and sediment controls shall be installed and maintained in accordance with the 'Blue Book' (Landcom 2004) to prevent the entry of sediment into waterways. Erosion and sediment controls shall be maintained in good working order for the duration of the works and subsequently until associated areas of the site are suitably stabilised and the risk of sediment movement is minimal.	Construction contractor
14. Tree protection measures in accordance with AS4970 – *Protection of trees on development sites* shall be implemented to minimise the risk of impact to the structural root zones of trees to be retained. Tree protection zones shall be delineated on site to minimise encroachment to that required for the infiltration basin.	Construction contractor
15. 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).	Construction contractor
16. Staff working at the site will be instructed to stop work immediately on identification of any suspected Aboriginal heritage artefact. If any objects are found, NSW Department of Planning, Industry and Environment (ph:131 555) shall be contacted.	Construction contractor
17. In the event that any relics are found during works, notification to NSW Heritage Council is required under s146 of the Heritage Act 1977.	Construction contractor
18. No machinery shall operate on the beach.	Construction contractor
19. If engineering fill is imported to the site, all conditions prescribed in the applicable Resource Recovery Exemptions and associated Orders shall be complied with, including: • ensuring the producer of the waste has complied with the applicable Order such as testing and validation • ensuring the material has met all chemical and other material requirements specified in the applicable Order	Construction contractor

Safeguard / Measure	Responsibility
• keeping a written record of the following for a period of six years: o the quantity of material received o the name and address of the supplier	
20. If Virgin Excavated Natural Material (VENM) is taken to the site (*i.e.* without chemical testing and validation): a. the material must meet the definition of VENM (http://www.epa.nsw.gov.au/waste/virgin-material.htm) b. the supplier must fill out and complete the *VENM Certificate* The completed *VENM Certificate* shall be kept for at least six years and provided to the EPA upon any request.	Construction contractor
21. Any application of waste material to land shall be in accordance with relevant NSW Resource Recovery Exemptions (RRE's) under the *Protection of Environment Operations (Waste) Regulation 2014*, including: a) Material classified as Excavated Natural Material (ENM) or Recovered Aggregate may be used to level and stabilise stockpile areas. b) Material classified as Reclaimed Asphalt Pavement, Recovered Aggregate or ENM may be used in construction and stabilisation of internal access roads.	Construction contractor
22. Any waste generated on site shall be reused in accordance with relevant Resource Recovery Orders and Exemptions, or otherwise disposed of at a licenced waste facility.	Construction contractor
23. Immediately following construction (on the same day), the infiltration basin shall be stabilised with jute mesh or similar.	Construction contractor
24. Planting of the infiltration basin shall be undertaken by a suitably qualified and experienced Bush Regeneration or Landscaping contractor.	SCC Project Manager
25. Planting of the infiltration basin shall utilise suitable native sedges, rushes, grasses and groundcovers such as *Ficinia nodosa, Juncus usitatus, Juncus krausii, Sporobolus virgincus, Zoysia macrantha* and *Gahnia filum* planted at suitable density (e.g. 4 – 5 plants per square metre) to ensure coverage of the basin within 6 months growth from initial planting. Upper edges of the infiltration basin and the berm should utilise species tolerant of drier conditions including *Lomandra longifolia, Ficina nodosa, Carpobrotus glaucescens* and *Tetragonia tetraganoides.* It is recommended that additional tree and shrub species are planted along the berm including *Banksia integrifolia,*	Bush Regeneration / Landscaping contractor; SCC Project Manager

Safeguard / Measure	Responsibility
Leucopogon parviflorus, Monotoca elliptica and *Leptospermum laevigatum.*	
Post construction monitoring and maintenance	
26. Monitoring and maintenance of plantings, including replacement of dead plants shall be undertaken for a minimum of 6 months.	Bush Regeneration / Landscaping contractor;
27. Monitoring of the infiltration basin, the adjacent berm and the overflow weir at the end of the basin shall be undertaken. Any minor scouring shall be addressed with additional scour protection or planting as appropriate. Any evidence of potential or actual failure of the berm shall be reported to the District Engineer - Central and the Coastal Coordinator. In the event that any portion of the berm fails onto the beach, sediment controls shall be immediately installed to contain the unstable area and stabilisation works shall be planned for urgent remediation.	District Engineer – Central

8. SIGNIFICANCE EVALUATION & DECISION STATEMENT

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 stormwater infrastructure, including an infiltration basin to address foreshore erosion at Sheaffe St, Callala Bay

In consideration of the proposal as described in Section 1, in accordance with any design plans referred to in this report, and assuming the implementation of all proposed safeguards and mitigation measures (Section 7), it is determined that:

1. It is unlikely that there will be any significant environmental impact as a result of the proposed activity and an Environmental Impact Statement is not required.
2. The proposed activity will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats, and a Species Impact Statement / BDAR is not required.
3. No statutory approvals, licences or permits are required. Consultation with the following external government consultations shall be undertaken:
    a. DPI Fisheries
    b. Jervis Bay Marine Park Authority
4. The proposed activity may proceed.

In accepting and adopting this REF, Shoalhaven City Council commits to ensuring the implementation of the proposed safeguards and mitigation measures identified in this report (Section 7) to minimise and/or prevent detrimental environmental impacts.

Determined by:

David Wilson
District Engineer – Central
Shoalhaven City Council

Date: 14th May 2024

9. REFERENCES

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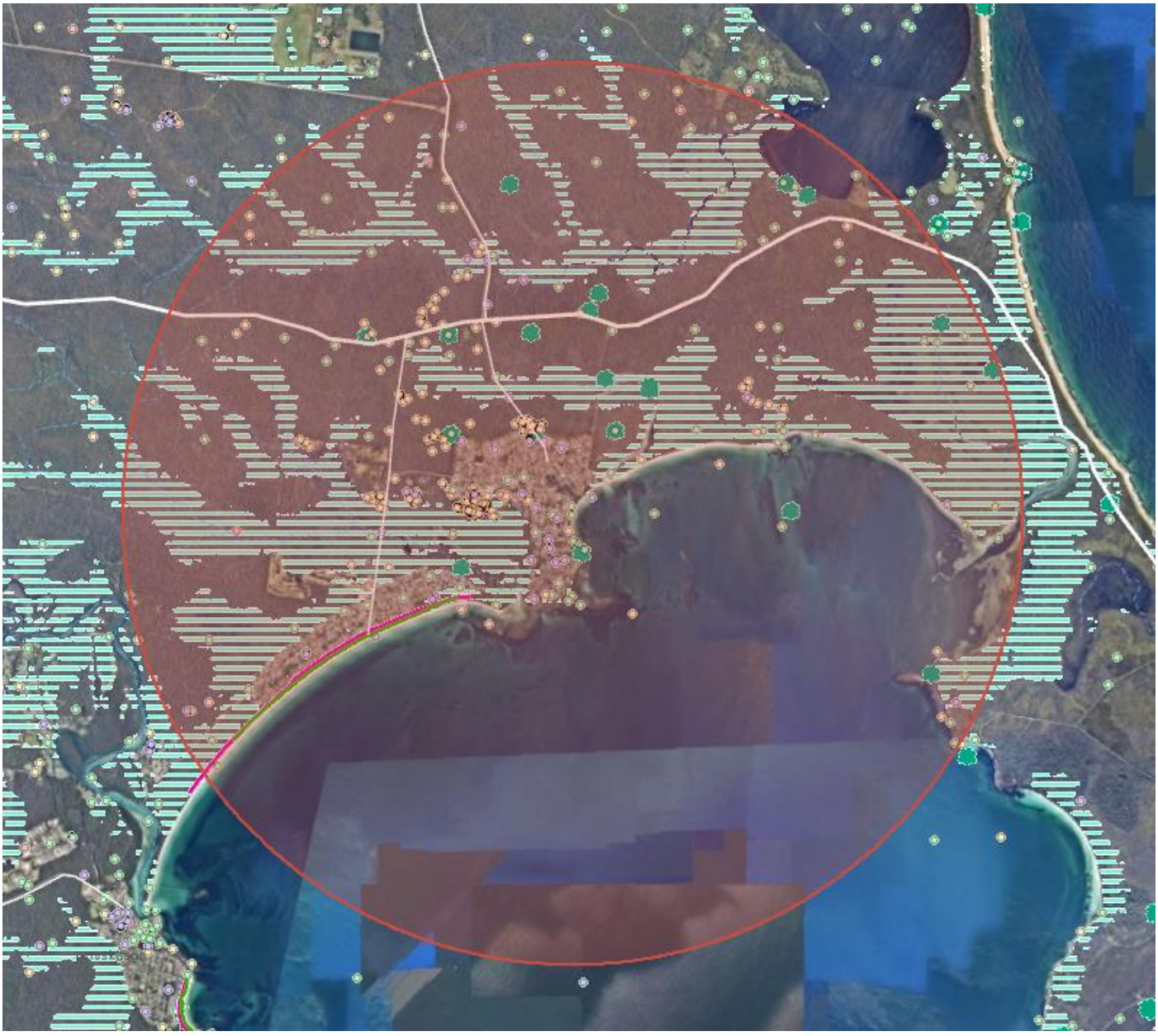
OEH (NSW Office of Environment and Heritage). 2022b. *Gang-gang Cockatoo – profile.* Available from: https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10975

APPENDIX A – Concept Design Plans

“Proposed Infiltration Basin Sheaffe Street, Callala Bay”
Concept Design
Drawing No. 2385-C03 (Issue 2)
Footprint Sustainable Engineering
Council Reference D24/138835

APPENDIX B – Threatened Species Likelihood of Occurrence



NSW Threatened Species Likelihood of Occurrence Table

The table of likelihood of occurrence evaluates the likelihood of threatened ecological communities and threatened species to occur on the subject site. This list is derived from previously recorded species within a 5 km radius (taken from NSW BioNet Atlas) around the subject site. Ecology information unless otherwise stated, has been obtained from the *Threatened Biodiversity Profile Search* on the NSW OEH (Office of Environment & Heritage) online database (https://www.environment.nsw.gov.au/threatenedspeciesapp/).

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 NSW *Biodiversity Conservation Act 2016* “Test of Significance” 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. A NSW *Biodiversity Conservation Act 2016* “Test of Significance” and/or EPBC Act significance assessment is required for this species, population or ecological community.

Note that where further assessment is deemed required, this is undertaken within the REF as a Test of Significance (in the case of NSW listed species) or an EPBC Significant Impact Assessment (in the case of Commonwealth listed species).

Threatened 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 (BC Act)	Endangered - NSW BC Act	Indicative species of the TEC occur on and in proximity to the site. Further assessment has been undertaken in section 3.2.2 of this REF.
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions (BC Act) *Subtropical and Temperate Coastal Saltmarsh* (EPBC Act)	Endangered - NSW BC Act Vulnerable - Commonwealth EPBC Act	Site investigations confirmed that the TEC does not occur within or in close proximity to the site, such that there is any risk of impact on the TEC as a result of the proposal.
Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (BC Act)	Endangered - NSW BC Act	Site investigations confirmed that the TEC does not occur within or in close proximity to the site, such that there is any risk of impact on the TEC as a result of the proposal.
Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion (BC Act) *Illawarra and south coast lowland forest and woodland ecological community* (EPBC Act)	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Site investigations confirmed that the TEC does not occur within or in close proximity to the site, such that there is any risk of impact on the TEC as a result of the proposal.
Illawarra Subtropical Rainforest in the Sydney Basin Bioregion (BC Act) *Illawarra– Shoalhaven subtropical rainforest of the Sydney Basin Bioregion* (EPBC Act)	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Site investigations confirmed that the TEC does not occur within or in close proximity to the site, such that there is any risk of impact on the TEC as a result of the proposal.
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act) *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia* (EPBC Act)	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Site investigations confirmed that the TEC does not occur within or in close proximity to the site, such that there is any risk of impact on the TEC as a result of the proposal.
Milton Ulladulla Subtropical Rainforest in the Sydney Basin Bioregion (BC Act) *Illawarra– Shoalhaven subtropical rainforest of the Sydney Basin Bioregion* (EPBC Act)	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Site investigations confirmed that the TEC does not occur within or in close proximity to the site, such that there is any risk of impact on the TEC as a result of the proposal.

Threatened Ecological Community name	***Status***	***Likelihood of presence within areas impacted by the activity***
River-flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act) *River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria* (EPBC Act)	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Site investigations confirmed that the TEC does not occur within or in close proximity to the site, such that there is any risk of impact on the TEC as a result of the proposal.
Robertson Basalt Tall Open-forest in the Sydney Basin and South Eastern Highlands Bioregions (BC Act)	Critically Endangered – NSW BC Act	Site investigations confirmed that the TEC does not occur within or in close proximity to the site, such that there is any risk of impact on the TEC as a result of the proposal.
Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions (BC Act) *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community* (EPBC Act)	Endangered - NSW BC Act Endangered - Commonwealth EPBC Act	Site investigations confirmed that the TEC does not occur within or in close proximity to the site, such that there is any risk of impact on the TEC as a result of the proposal.
Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (BC Act) *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland* (EPBC Act)	Endangered - NSW BC Act Endangered - Commonwealth EPBC Act	Site investigations confirmed that the TEC does not occur within or in close proximity to the site, such that there is any risk of impact on the TEC as a result of the proposal.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Calochilus pulchellus	Pretty Beard Orchid	Flora	Endangered NSW BC Act	The habitat of this species varies considerably. At Vincentia the species grows in dense low wet heath in wet sand over sandstone. In Booderee National Park it grows in a tall heathy association. In Morton National Park on the Little Forest Plateau it occurs in low heath among scattered clumps of emergent eucalypts and Banksia in shallow coarse white sand over sandstone, in a near-escarpment area subject to strong orographic precipitation.	No suitable habitat occurs within the site.
Cryptostylis hunteriana	Leafless tongue Orchid	Flora	Vulnerable EPBC Act Vulnerable NSW BC Act	Occurs in a wide variety of habitats from moist sandy soil to dense heathland, sedgeland and verges of fire trails. The larger populations typically occur in woodland dominated by Scribbly Gum (Eucalyptus sclerophylla), Silvertop Ash (E. sieberi), Red Bloodwood (Corymbia gummifera) and Black Sheoak (Allocasuarina littoralis); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (C. subulata) and the Tartan Tongue Orchid (C. erecta).	No suitable habitat occurs within the site.
Distichlis distichophylla	Australian Saltgrass	Flora	Endangered NSW BC Act	A coloniser of damp saline soils; found at the edges of salt marshes and on low dunes. Flowers and sets seed in late spring and summer.	Not observed during site surveys.
Genoplesium baueri	Bauer's Midge Orchid	Flora	Endangered EPBC Act Endangered NSW BC Act	Grows in dry sclerophyll forest and moss gardens over sandstone.	No suitable habitat occurs within the site.
Prasophyllum affine	Jervis Bay Leek Orchid	Flora	Endangered NSW BC Act	Highly localised species, known from 4 sites with 93%on private property. Found in heathland and sedge in well drained sandy soil (Stephenson 2011)	No suitable habitat occurs within the site.
Prostanthera densa	Villous Mint-bush	Flora	Vulnerable EPBC Act Vulnerable NSW BC Act	Villous Mintbush is generally grows in sclerophyll forest and shrubland on coastal headlands and near coastal ranges, chiefly on sandstone, and rocky slopes near the sea. Plants regenerate from rootstock after fire and flower within the first year or two.	No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Syzygium paniculatum	Magenta Lilly Pilly	Flora	Vulnerable EPBC Act Endangered NSW BC Act	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest.	Not observed during site surveys
Wilsonia backhousei	Narrow-leafed Wilsonia	Flora	Vulnerable NSW BC Act	This is a species of the margins of salt marshes and lakes.	No suitable habitat occurs within the site.
Wilsonia rotundifolia	Round-leafed Wilsonia	Flora	Endangered NSW BC Act	Grows in mud in coastal saltmarsh and inland saline or brackish lake beds. May be a clonal species so that what appear to be large populations at some sites may actually be composed of only limited numbers of genetically distinct individuals which are the result of vegetative (asexual) reproduction.	No suitable habitat occurs within the site.
Litoria aurea	Green and Golden Bell Frog	Amphibian	Vulnerable EPBC Act Endangered NSW BC Act	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).	Unlikely to occur. No suitable habitat occurs within the site.
Actitis hypoleucos	Common Sandpiper	Bird	Migratory EPBC Act	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep.	Unlikely to occur. No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Anthochaera phrygia	Regent Honeyeater	Bird	Critically endangered EPBC Act Critically endangered NSW BC Act	Temperate woodlands and open forests- and drier coastal woodlands in some years (flowering coastal woodlands and forests including box-ironbark woodland, and riparian forests-that exhibit large numbers of mature trees, high canopy cover and abundance of mistletoes).	Unlikely to occur. No suitable habitat occurs within the site.
Ardenna pacifica	Wedge-tailed Shearwater	Bird	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 %.	Unlikely to occur. No suitable habitat occurs within the site.
Ardenna tenuirostris	Short-tailed Shearwater	Bird	Migratory EPBC Act	Coastal, oceanic.	Unlikely to occur. No suitable habitat occurs within the site.
Arenaria interpres	Ruddy Turnstone	Bird	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 sand or coral. 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. The Ruddy Turnstone roosts on beaches, above the tideline, among rocks, shells, beachcast seaweed or other debris.	Unlikely to occur. No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Bird	Vulnerable NSW BC Act	The Dusky Woodswallow is often reported in woodlands is eastern, southern and southwestern Australia. In New South Wales it is widespread from coast to inland, including the western slopes of the great Diving Range and farther west. It is often reported in woodlands and dry open sclerophyll forests, usually dominated by eucalyptus, including mallee associations.	Unlikely to occur. No suitable habitat occurs within the site.
Calidris acuminata	Sharp-tailed Sandpiper	Bird	Migratory EPBC Act	Prefers grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches. Breeds in Siberia in the peat-hummock	Unlikely to occur. No suitable habitat occurs within the site.
Calidris canutus	Red Knot	Bird	Migratory EPBC Act	Inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps. Forages in soft substrate near the edge of water on intertidal mudflats or sandflats exposed by low tide.	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Calidris ferruginea	Curlew Sandpiper	Bird	EPBC Act: Migratory NSW BC Act: Endangered	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Forages on mudflats and nearby shallow water.	Unlikely to occur. No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Calidris ruficollis	Red-necked Stint	Bird	Migratory EPBC Act	The Red-necked Stint mostly forages on bare wet mud on intertidal mudflats or sandflats, or in very shallow water; mostly in areas with a film of surface water and mostly close to edge of water. During high tides they sometimes forage in non-tidal wetlands. Red-necked Stints may also forage in samphire, generally avoid beds of seagrass, but may feed along edges. On sandy ocean beaches they sometimes forage in beachcast seaweed.	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Callocephalon fimbriatum	Gang-gang Cockatoo	Bird	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 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	Possibly occurring within the site and utilising foraging habitat in the site. Further assessment has been undertaken in section 3.2.2 and 3.3 of this REF.
Calyptorhynchus lathami lathami	Glossy Black-cockatoo	Bird	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	Unlikely to occur. No suitable habitat occurs within the site.
Chlidonias leucopterus	White-winged Black Tern	Bird	Migratory EPBC Act	In Australia, and elsewhere in their non-breeding range, the species mostly inhabits fresh, brackish or saline, and coastal or subcoastal wetlands. White-winged Black Terns frequent tidal wetlands, such as harbours, bays, estuaries and lagoons, and their associated tidal sandflats and mudflats.	Unlikely to occur. No suitable habitat occurs within the site.
Daphoenositta chrysoptera	Varied Sittella	Bird	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	Unlikely to occur. No suitable habitat occurs within the site.
Dasyornis brachypterus	Eastern Bristlebird	Bird	Endangered EPBC Act	Sedgeland/heathland/dry sclerophyll and woodlands- / requires thick shrub/heath layer for shelter, nesting and foraging	Unlikely to occur. No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
			Endangered NSW BC Act		
Epthianura albifrons	White-fronted Chat	Bird	Vulnerable NSW BC Act	Commonly occurring in the saltmarshes of southern Australia, the White-fronted Chat is often seen foraging for insects and their larvae among the succulent leaves and stems of stunted saltmarsh plants.	Unlikely to occur. No suitable habitat occurs within the site.
Glossopsitta pusilla	Little Lorikeet	Bird	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.	Unlikely to occur. No suitable habitat occurs within the site (habitat is degraded).
Haematopus fuliginosus	Sooty Oystercatcher	Bird	Vulnerable NSW BC Act	Shore bird. Found around the entire Australian coast, including offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW coast. The availability of suitable nesting sites may limit populations. Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Forages on exposed rock or coral at low tide for foods such as limpets and mussels. Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks.	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Haematopus longirostris	Pied Oystercatcher	Bird	Endangered NSW BC Act	Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
				above the high tide mark, often amongst seaweed, shells and small stones.	
Haliaeetus leucogaster	White-bellied Sea-Eagle	Bird	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. 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.	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Hirundapus caudacutus	White-throated Needletail	Bird	Migratory EPBC Act	Almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species.	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Hydroprogne caspia	Caspian Tern	Bird	Migratory EPBC Act	Occur along the Australian coastline, and also occur inland along major rivers, especially in the Murray-Darling and Lake Eyre drainage basins, preferring wetlands with clear water to allow easy prey detection.	Unlikely to occur. No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Lathamus discolor	Swift Parrot	Bird	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).	Unlikely to occur. No suitable habitat occurs within the site.
Limosa lapponica	Bar-tailed Godwit	Bird	Migratory EPBC Act	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats.	Unlikely to occur. No suitable habitat occurs within the site.
Limosa limosa	Black-tailed Godwit	Bird	Vulnerable NSW BC Act	Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps. Individuals have been recorded in wet fields and sewerage treatment works.	Unlikely to occur. No suitable habitat occurs within the site.
Lophoictinia isura	Square-Tailed Kite	Bird	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.	Unlikely to occur. No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Ninox strenua	Powerful Owl	Bird	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.	Unlikely to occur. No suitable habitat occurs within the site.
Numenius madagascariensis	Eastern Curlew	Bird	Critically Endangered EPBC Act	Most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves.	Unlikely to occur. No suitable habitat occurs within the site.
Pachycephala olivacea	Olive Whistler	Bird	Vulnerable NSW BC Act	The Olive Whistler inhabits the wet forests on the ranges of the east coast. It has a disjunct distribution in NSW chiefly occupying the beech forests around Barrington Tops and the MacPherson Ranges in the north and wet forests from Illawarra south to Victoria.	Unlikely to occur. No suitable habitat occurs within the site.
Pandion cristatus	Eastern Osprey	Bird	NSW BC Act Vulnerable	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Petroica phoenicea	Flame Robin	Bird	Vulnerable NSW BC ACT	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The ground layer of the breeding habitat is dominated by native grasses and the shrub layer may be wither sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes.	Unlikely to occur. No suitable habitat occurs within the site.
Pezoporus wallicus wallicus	Eastern Ground Parrot	Bird	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.	Unlikely to occur. No suitable habitat occurs within the site.
Pluvialis fulva	Pacific Golden Plover	Bird	Migratory EPBC Act	This species usually forages on sandy or muddy shores (including mudflats and sandflats) or margins of sheltered areas such as estuaries and lagoons, though it also feeds on rocky shores, islands or reefs. In addition, Pacific Golden Plovers occasionally forage among vegetation, such as saltmarsh, mangroves or in pasture or crops. They usually roost near foraging areas, on sandy beaches and spits or rocky points, islets or exposed reefs, occasionally among or beneath vegetation including mangroves or low saltmarsh, or among beachcast seaweed.	Unlikely to occur. No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Pterodroma leucoptera leucoptera	Gould's Petrel	Bird	NSW BC Act Vulnerable EPBC Act Endangered	Breeds on both Cabbage Tree Island, 1.4 km offshore from Port Stephens and on nearby Boondelbah island. The range and feeding areas of non-breeding petrels are unknown. The first arrival of Gould's petrel on cabbage tree Island occurs from mid to late September. Principal nesting habitat is located within two gullies which are characterised by steeply, sloping rock scree with a canopy of Cabbage Tree Palms. They nest predominantly in natural rock crevices among the rock scree and also in hollow fallen palm trunks, under mats of fallen palm fronds and in cavities among the buttresses of fig trees.	Unlikely to occur. No suitable habitat occurs within the site.
Sterna hirundo	Common Tern	Bird	Migratory EPBC Act	Common Terns are marine, pelagic and coastal. In Australia, they are recorded in all marine zones, but are commonly observed in near-coastal waters, both on ocean beaches, platforms and headlands and in sheltered waters, such as bays, harbours and estuaries with muddy, sandy or rocky shores. Occasionally they are recorded in coastal and near-coastal wetlands, either saline or freshwater, including lagoons, rivers, lakes, swamps and saltworks.	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Sternula albifrons	Little Tern	Bird	Endangered NSW BC Act Migratory EPBC Act	Mostly exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above the high tide mark near estuary mouths or adjacent to coastal lakes and islands. Nests in a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles.	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Thalasseus bergii	Crested Tern	Bird	Migratory EPBC Act	Crested Terns inhabit coastal areas, offshore waters, beaches, bays, inlets, tidal rivers, salt swamps, lakes and larger rivers. The species breeds during Sep-Jan in the south and Mar-Jun in the north in large, dense colonies on small islands. Nesting occurs on sand or shingle among low vegetation behind the beaches (Pizzey & Knight 2012; Morcombe 2011)	Unlikely to occur. No suitable habitat occurs within the site.
Tringa nebularia	Common Greenshank	Bird	Migratory EPBC Act	Found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms.	Unlikely to occur. No suitable habitat occurs within the site.
Tringa stagnatilis	Marsh Sandpiper	Bird	Migratory EPBC Act	Lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes.	Unlikely to occur. No suitable habitat occurs within the site.
Tyto novaehollandiae	Masked Owl	Bird	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.	Unlikely to occur. No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Arctocephalus forsteri	New Zealand Fur Seal	Mammal	Vulnerable NSW BC Act	Occurs in Australia and New Zealand. Reports of non-breeding animals along southern NSW coast particularly on Montague Island, but also at other isolated locations to north of Sydney. Prefers rocky parts of islands with jumbled terrain and boulders. Feeds principally on cephalopods and fish, but also seabirds and occasionally penguins.	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Arctocephalus pusillus doriferus	Australian Fur-seal	Mammal	Vulnerable NSW BC Act	Prefers rocky parts of islands with flat, open terrain. They occupy flatter areas than do New Zealand Fur-seals where they occur together.	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Cercartetus nanus	Eastern Pygmy-possum	Mammal	Vulnerable NSW BC Act	Rainforest, sclerophylla forest & woodland to heath – but heath & woodland preferred. Forages on banksias, eucalypts & bottlebrushes.	Unlikely to occur. No suitable habitat occurs within the site.
Dasyurus maculatus	Spotted-tailed Quoll	Mammal	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.	Unlikely to occur. No suitable habitat occurs within the site.
Dugong dugon	Dugong	Mammal	NSW BC Act Endangered	Extends south from warmer coastal and island waters of the Indo-West Pacific to northern NSW, where its known from incidental records only. Major concentrations of Dugongs occur in wide shallow protected bays, wide shallow mangrove channels and in the lee of large inshore islands. Will also occupy deeper waters if their sea grass food is available. Have a low reproductive rate. Shallow waters such as tidal sandbanks and estuaries have been reported as sites for calving.	Unlikely to occur. No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	Mammal	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 feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi.	Unlikely to occur. No suitable habitat occurs within the site.
Petauroides volans	Southern Greater Glider	Mammal	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.	Unlikely to occur. No suitable habitat occurs within the site.
Petaurus australis	Yellow-bellied Glider	Mammal	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.	Unlikely to occur. No suitable habitat occurs within the site.
Phascolarctos cinereus	Koala	Mammal	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.	Unlikely to occur. No suitable habitat occurs within the site.
Pseudomys novaehollandiae	New Holland Mouse	Mammal	Vulnerable NSW BC Act	Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes It is a social animal, living predominantly in burrows shared with other individuals Distribution is patchy in time and space, with peaks in abundance during early to mid stages of vegetation succession typically induced by fire	Unlikely to occur. No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Pteropus poliocephalus	Grey-headed Flying-fox	Mammal	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.	Unlikely to occur. No suitable habitat occurs within the site.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Microchiropteran bat	NSW BC Act Vulnerable	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).	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Microchiropteran bat	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 in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Miniopterus orianae oceanensis	Large Bent-winged Bat	Microchiropteran bat	NSW BC Act Vulnerable	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 in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Myotis macropus	Southern Myotis	Microchiropteran bat	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).	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Scoteanax rueppellii	Greater Broad-nosed Bat	Microchiropteran bat	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 in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.
Chelonia mydas	Green Turtle	Reptile	Vulnerable EPBC Act Vulnerable NSW BC Act	Ocean-dwelling species spending most of its life at sea. Eggs are laid in holes dug in beaches throughout their range.	Possibly occurring in proximity to the site. Unlikely to occur within the site and unlikely to be indirectly affected by the proposal.