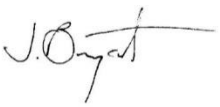
REVIEW OF ENVIRONMENTAL FACTORS (REF)
STORMWATER OUTLET UPGRADE
NARRAWALLEE BEACH - LOT 7009 DP1116370
VICTOR AVENUE, NARRAWALLEE

Contents

Document control:

Item	Details
Project	Stormwater outlet upgrade – Narrawallee Beach – Victor Avenue, Narrawallee
Client/Proponent	City Development and City Services, Shoalhaven City Council
Prepared By	City Services, Shoalhaven City Council

Document status

Version	Author / Reviewer*	Name	Signed	Date
V1.0	Author	Geoff Young		08/02/2024
	Reviewer	Jeff Bryant		22/02/2024

*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 – as a matter of public interest (Section 171(4)(c) of the NSW *Environmental Planning and Assessment Regulation 2021*).

1. PROPOSAL AND LOCATION

1.1 Overview and background

The proposed activity is the upgrade of the stormwater outlet and outflow onto Narrawallee Beach, off Victor Avenue, Narrawallee.

The purpose of the proposed activity is to reduce the erosion of the beach escarpment currently occurring below the existing outlet situated on top of the escarpment. The outlet was assessed as high risk for asset damage in Shoalhaven City Council's (SCC) Stormwater Impact Assessment report (Footprint 2023). If the erosion is not abated, civil infrastructure could become exposed and become vulnerable to damage. This infrastructure includes the public road (Victor Avenue) and nearby gravity and pressure rising sewer mains.

The proposed activity includes (Figure 2 and Appendix A):

- demolition of the existing headwall and replacement with junction pit,
- installation of DN525-SN8 Blackmax flexible stormwater pipe of approximately 16 metres in length from the newly installed junction pit to the sandstone rock platform at the beach,
- installation of a stacked rock outlet headwall,
- 100mm thick concrete slab between the stormwater works and Victor Avenue,
- associated earthworks and sewer infrastructure protection works (if required by Shoalhaven Water), and
- earthen filling and stabilisation through erosion control measures and revegetation.

Access to the site would be from Victor Avenue and Surfers Avenue.

Works would also involve the implementation of safeguards and mitigation measures prescribed in Section 7 of this Review of Environmental Factors (REF).

Shoalhaven City Council (SCC) is the proponent and the determining authority under Part 5 of the EP&A Act. The environmental assessment of the proposed activity and associated environmental impacts has been undertaken in the context of Clause 171 of the *Environmental Planning and Assessment Regulation 2021*. In doing so, this REF helps to fulfil the requirements of Section 5.5 of the Act that SCC examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

1.2 Location

The proposed activity would be undertaken within the Victor Avenue road reserve, Lot 398 DP218610 (Lot 398) and Lot 7009 DP1116370 (Lot 7009) (Figure 1 below).

SCC is the road authority for Victor Avenue.

Lot 398 is a SCC owned reserve (Victor Ave Reserve) that is community land with a park category pursuant to the NSW Local Government Act 1993.

Lot 7009 is a Crown reserve (R91246, Narrawallee Beach) to which SCC is the appointed Crown Land Manager under the NSW *Crown Land Management Act 2014.* The purpose of the reserve is

"public recreation". Access to the site from Surfers Avenue would be along the Sewage Pumping Station access road and then along the beach (Figure 1 below).

Figure 1 Location of the proposed activity

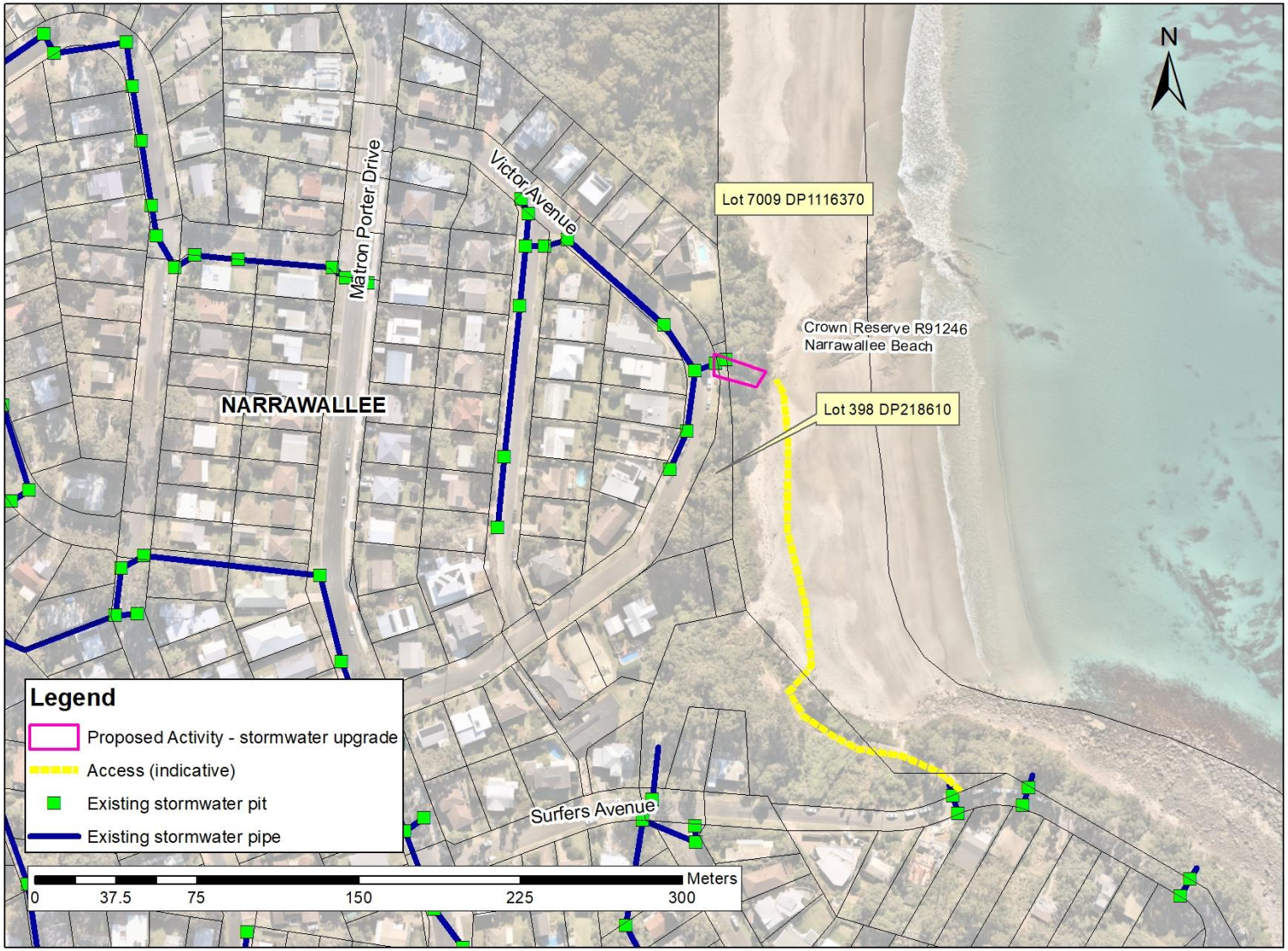
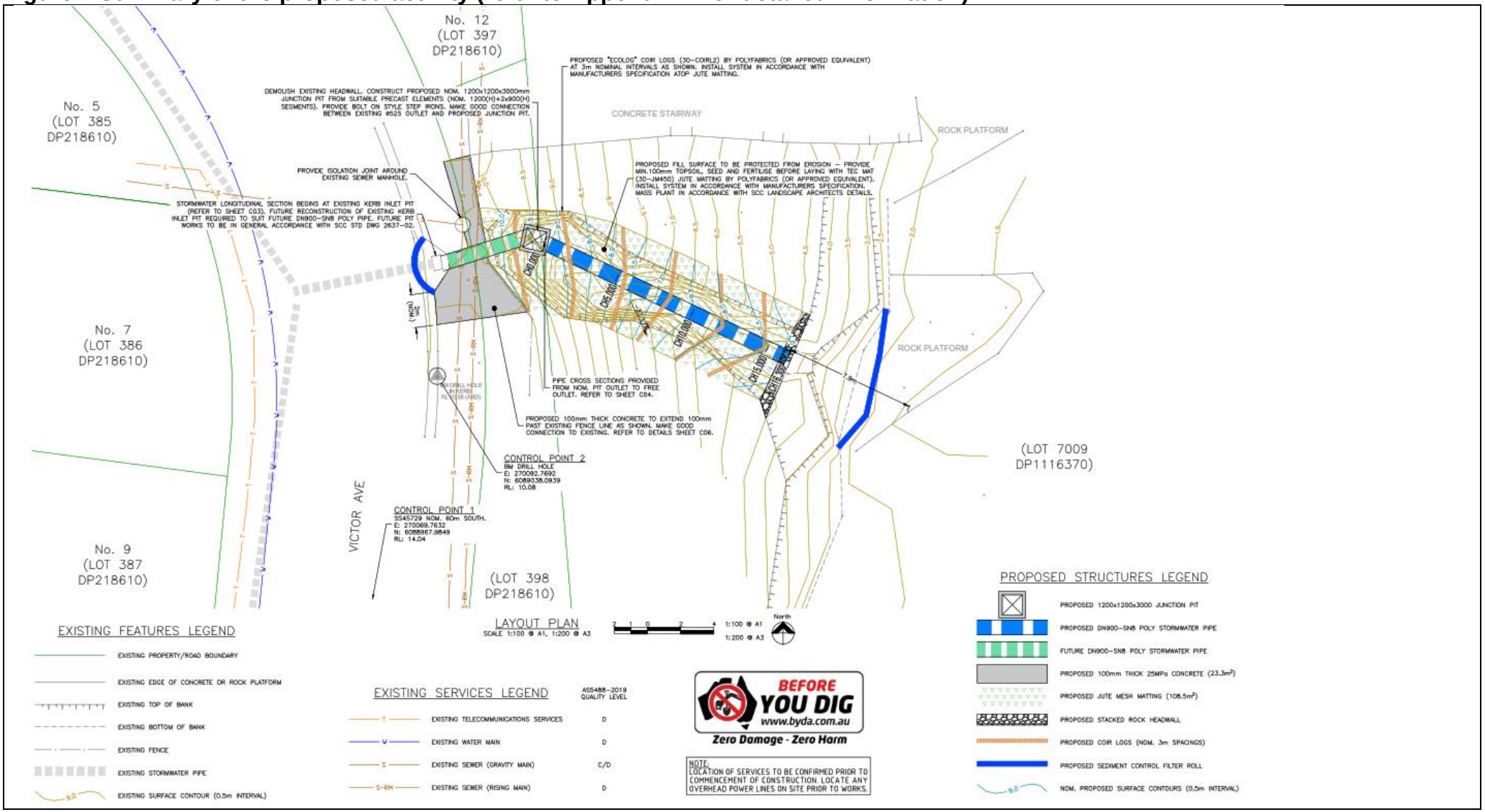


Figure 2 Summary of the proposed activity (refer to Appendix A for detailed information)



2. EXISTING ENVIRONMENT

Photos of the site are provided in Section 2.4 below.

The site of the proposed activity was assessed by a SCC Environmental Operation Officer on 31 January 2024.

Investigations involved vegetation and habitat assessment, recording flora species within and immediately adjacent to the proposed activity, determination of vegetation communities including the presence of threatened ecological communities, Aboriginal heritage objects and investigation of habitat availability for threatened flora and fauna species.

2.1 Terrestrial Habitat and vegetation assessment

The proposed activity would predominantly be undertaken within an erosion gully and highly disturbed beach escarpment.

Vegetation communities mapped as occurring in the vicinity of the proposed activity site are (Figure 3 p.10):

- Plant Community Type (PCT) 3805 - Southern Sandplain Heath
- PCT 3410 – Spinifex Strandline Grassland

Neither are associated with an endangered ecological community (EEC) listed in the NSW *Biodiversity Conservation Act 2016* (BC Act 2016).

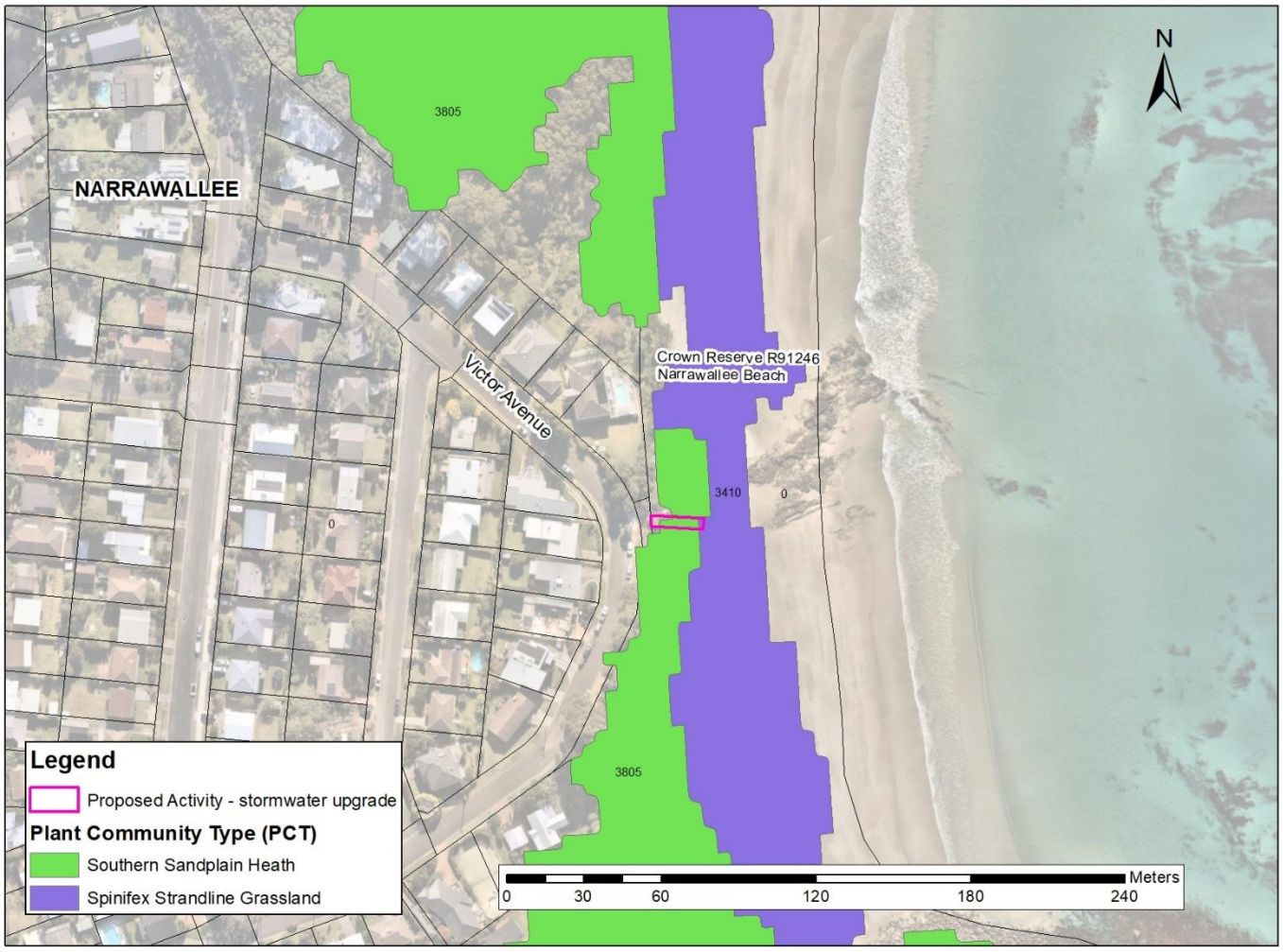
Although mapped as PCT 3805, the area that would be directly impacted has little quality in terms of native vegetation comprising mainly exotic and weedy species such as Coastal Pennywort *Hydrocotyle bonariensis,* Blackberry *Rubus fruticosus,* Formosa Lily *Lilium formosanum,* Kikuyu *Cenchrus clandestinus,* Vasey Grass *Paspalum urvillei,* Common Sow Thistle *Sonchus oleraceus,* and Montbretia *Crocosmia x crocosmiiflora.* Native vegetation is extant at the base of the erosion gully where the new outlet structure would be located. Species include Coast Banksia *Banksia integrifolia,* Pig Face *Carpbrotus glaucescens,* Knobby Club-rush *Ficinia nodosa,* Bangalay saplings *Eucalyptus botryoides,* Sweet Pittosporum *Pittosporum undulatum,* Swamp Oak *Casuarina glauca,* Sea Rocket *Cakile edentula,* Spiny-head Mat-rush *Lomandra longifolia,* and Spinifex *Spinifex sericeus.*

No South-eastern Glossy Black-Cockatoo *Calyptorhynchus lathami lathami* feed trees (*e.g. Allocasuarina littoralis* with characteristic chewed cones), nor Yellow-bellied Glider *Petaurus australis* feed trees (e.g. e.g. *Corymbia gummifera* or *Eucalyptus punctata* with v-shaped feeding scars) occur within or in close proximity to the site. No signs of potential threatened fauna use of the site (e.g. bandicoot diggings, owl white-wash or other threatened fauna scats) were noted.

There are no hollow-bearing trees in the area that would be affected by the proposed activity.

The site does not comprise habitat for threatened orchids.

Figure 3 Plant Community Types (PCT) mapped in the vicinity of the proposed activity



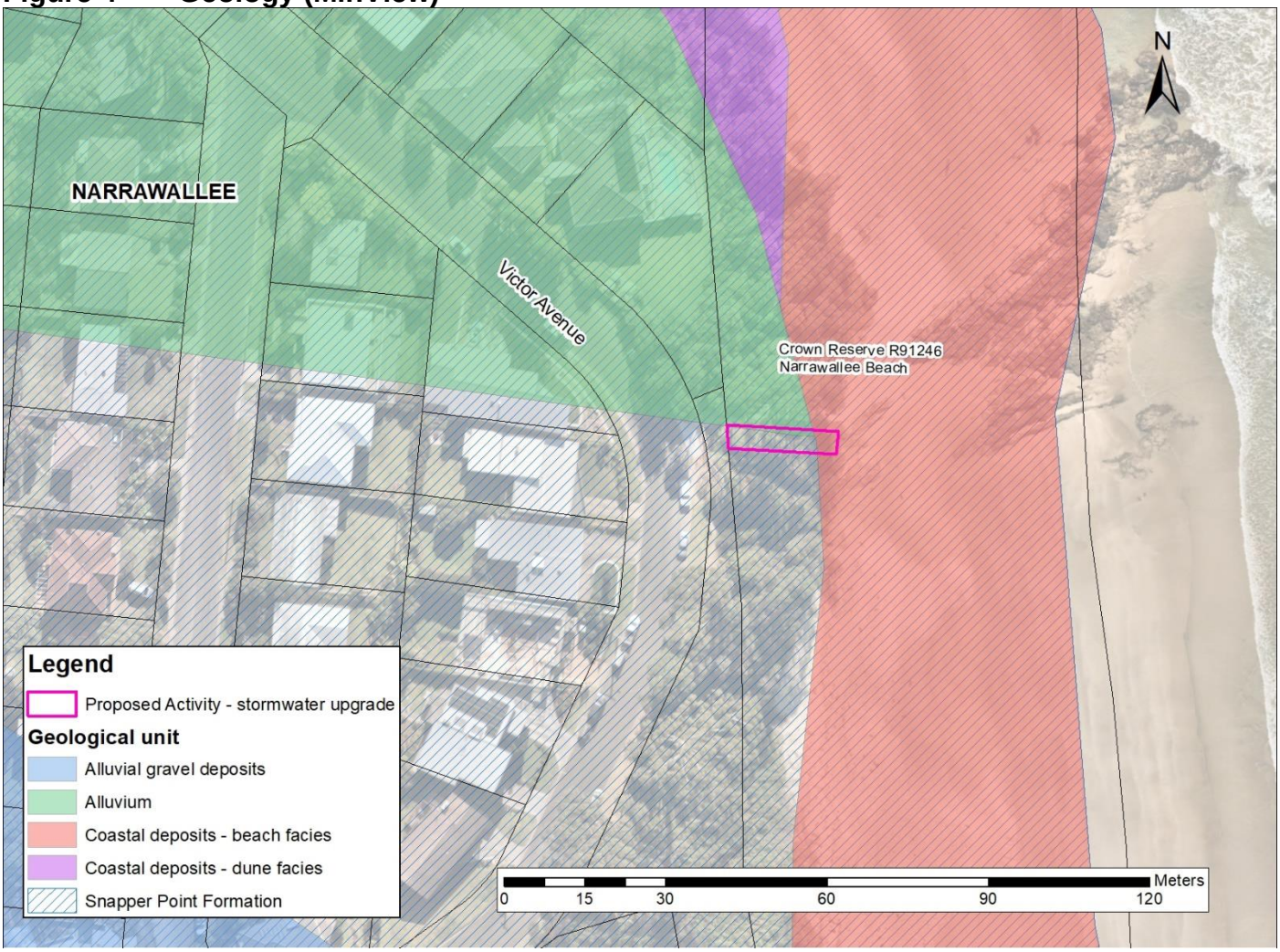
2.2 Geology

The geology of the proposed activity area comprises unconsolidated to poorly consolidated alluvial gravel, sand and clay deposits. These sediments are underlain by Snapper Point Formation (likely to be sandstone) which is exposed on the beach and at the base of the erosion gully (refer photos in Section 2.4 below).

The stormwater outlet would be situated on Snapper Point Sandstone with stormwater directed onto the beach essentially comprising marine deposited quartz-lithic fine to medium grained sand, and shell material.

The alluvial deposits, Snapper Point Sandstone, and beach facies material have a low risk of containing iron sulfides which, when exposed to oxygen, generate sulfuric acid *i.e.* acid sulfate soils. This is reflected in the acid sulfate soil risk map where the site is mapped as “class 5” (low probability and low risk) in the Shoalhaven Local Environmental Plan 2014 (SLEP 2014).

Figure 4 Geology (MinView)



2.3 Other Environmental Features

Of relevance to the proposed activity, the site:

- is not mapped as being contaminated (SCC GIS Enquiry),
- is the subject of unresolved Aboriginal Land Rights Claims (only Lot 7009 DP 1116370),
- is not mapped as flood prone,
- does not contain riparian areas and does not comprise land below the mean high water mark,
- does not contain / comprise littoral rainforest or coastal wetlands and is not mapped as such for the purposes of the *State Environmental Planning Policy Resilience and Hazards) 2021,*
- is mapped as having "High Environmental Value" in the Illawarra Shoalhaven Regional Plan 2014 https://www.planning.nsw.gov.au/sites/default/files/2023-03/illawarra-shoalhaven-regional-plan-2041.pdf

- is listed in the Environmental Heritage Schedules of the Shoalhaven Local Environmental Plan 2014 as Item 324 – Silica Wharf and Tramway (remnants) however no material remnants are evident at the site (refer to Section 3.5 of this REF for more information).

2.4 Photos

Photo 1: The proposed activity area – looking from Narrawallee Beach

Photo 2: The proposed activity area – looking from the adjacent beach access stairs

Photo 3: The proposed activity area – from the top of the existing outlet

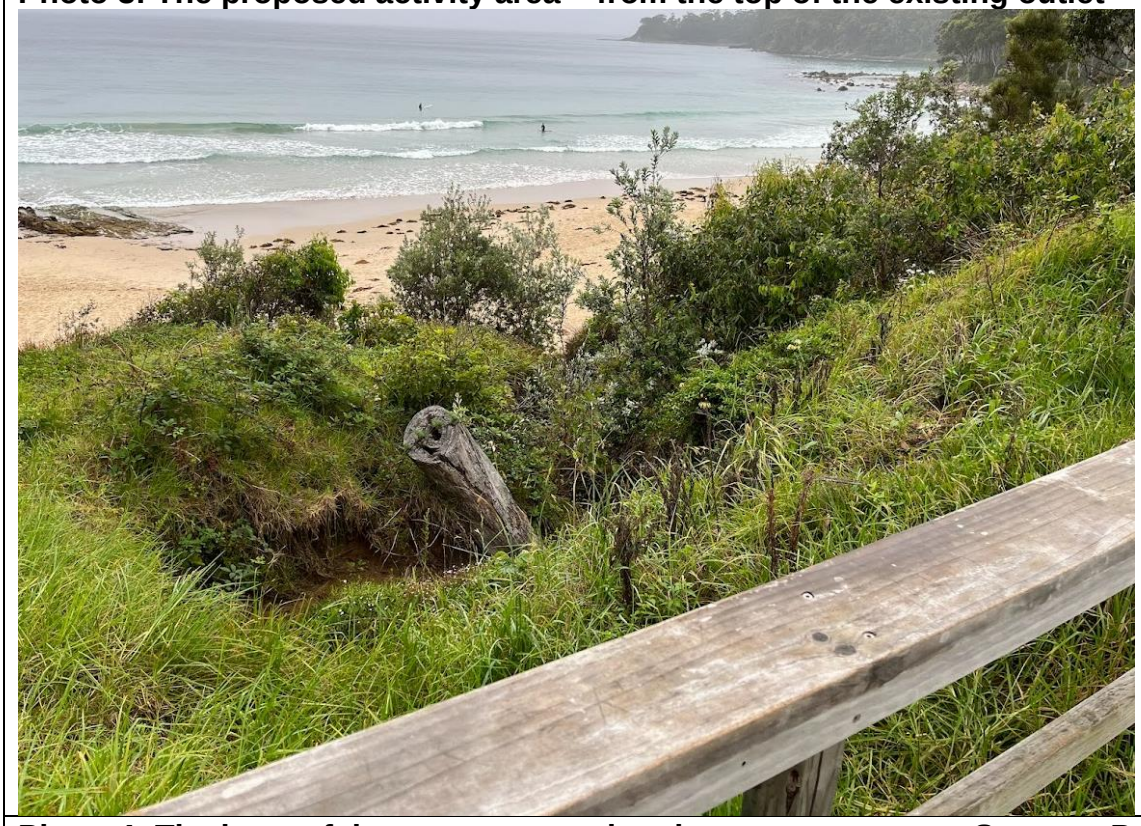


Photo 4: The base of the new proposed outlet structure – onto Snapper Point Formation sandstone

Photo 5: Access to the beach is likely to be from Surfers Avenue to the south of the proposed activity area

3. ASSESSMENT OF LIKELY IMPACTS ON THE ENVIRONMENT

3.1 Impacts associated with the proposed activity

The proposal would involve the following disturbance and direct impacts:

- Removal of approximately 50m^2 of vegetation extent on the top and edges of the erosion gully and excavation works necessary to install the pit, pipe and outlet headwall.
- Increase noise during works.
- Disruption to traffic and pedestrian access to the beach and Victor Road.
- Potential increase in beach sand erosion.

Other impacts on the environment, including indirect impacts have been considered, including:

- threatened species, and
- indigenous and non-indigenous heritage.

Each is discussed below.

3.2 Vegetation removal

The proposed activity would remove approximately 50m^2 of vegetation, including native species (refer to Section 2.1 of this REF).

The impact to vegetation as described above is not significant for the following reasons:

- There are no plants in this area listed in the threatened species schedules of the NSW *Biodiversity Conservation Act 2016* (NSW BC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- The vegetation species are common in the area or are non-native.
- Fauna species listed in the threatened species schedules of the NSW BC Act and the EPBC Act are not likely to reside in this location or rely on this vegetation for food, refuge or breeding (refer to Section 3.3 of this REF).
- The clearing would not have a significant impact on an endangered ecological community listed under the NSW BC Act and EPBC Act (refer to Section 3.3 of this REF).
- The vegetation does not appear to provide important food sources for locally occurring threatened species and do not appear to contain nests or hollows.
- The vegetation is not mapped on the Biodiversity Values Map administered for the purposes of the NSW *Biodiversity Conservation Act 2016.*
- Revegetation works would be undertaken once the site has been stabilised using native species typically occurring in the area *e.g. Lomandra longifolia,* Pig Face, Coastal Wattle, Coast Banksia (this is reflected in the environmental impact mitigation measures prescribed in Section 7 of this REF).

The area is mapped on the Terrestrial Biodiversity Map layer ("biodiversity – significant vegetation") in the Shoalhaven Local Environmental Plan (2014) and mapped as "High Environmental Value" in the *Illawarra Shoalhaven Regional Plan 2014* (*https://www.planning.nsw.gov.au/sites/default/files/2023-03/illawarra-shoalhaven-regional-plan-2041.pdf*). It is assumed, however, that this is because it has been mapped incorrectly as the EEC *Bangalay Sand Forest.* The site of the proposed activity does not comprise Bangalay Sand Forest

and does not represent significant vegetation (refer to Section 2.1 of this REF). The proposed activity also seeks to cease the erosion of the beach escarpment that is currently leading to significant loss of vegetation.

An environmental impact statement (EIS) is therefore not warranted.

3.3 Threatened species impact assessment (NSW)

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

3.3.1 Part 7A *Fisheries Management Act 1994*

Part 7A relates to threatened species conservation. As the proposed activity would not affect key fish habitat or aquatic and marine environments, this part of the Act is not relevant and further assessment and consideration is not necessary.

3.3.2 Part 7 *Biodiversity Conservation Act 2016*

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.

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

- Sooty Oystercatcher *Haematopus fuliginosus*
- Pied Oystercatcher *Haematopus longirostris*
- Eastern Hooded Dotterel/ Hooded Plover *Thinornis cucullatus cucullatus*
- Little Tern *Strenula albiforns*

These species may be present on the sections of the beach used to access the proposed activity from Surfers Avenue (Figure 1 p.7). The actual site of works are unlikely to contain threatened species.

The presence of transient and mobile species is possible occasionally (*e.g.* White-bellied Sea-Eagle *Haliaeetus leucogaster),* however, the site is not considered useful or important habitat for these species. Any impact to these species would be negligible.

The Sooty Oystercatcher occupies rocky headlands, reefs and offshore islands along the entire coast, apparently as a single continuous population. It occurs and breeds around the coastline, where it is vulnerable to human disturbance. The species inhabits marine littoral habitats, within 50 metres of the shoreline. The Sooty Oystercatcher forages in the intertidal zone mostly for marine invertebrate, especially molluscs, crustaceans and other hard-shelled animals, and above the tideline (on beaches, around stranded seaweed) for other invertebrates at high tide. Its nest is typically a scrape in sand, gravel, shingle or among rocks above the tideline, usually in bare areas

though sometimes amongst wrack (NSW Scientific Committee 2008). Human disturbance is inferred to be the main threat to this species (NSW Scientific Committee 2008).

The Pied Oystercatcher occurs and breeds around coastlines of mainland and Tasmania. It is restricted to the littoral zone of beaches and estuaries, where it nests on the ground just above the tideline. The Pied Oystercatcher forages in the intertidal and wash-zone mostly for marine invertebrates, especially bivalve molluscs. A key prey species, the Pipi *Donax deltoides,* has undergone a severe long-term decline because of commercial harvesting. The species food supply (beach macroinvertebrates) is also adversely affected by other human activities such as vehicle use on beaches (NSW Scientific Committee 2010).

The Eastern Hooded Dotterel is endemic to southeastern Australia and is now found mainly along the coast from south of Jervis Bay, NSW, south through Victoria and Tasmania to the western side of the Eyre Peninsula in South Australia. In south-eastern Australia, the Dotterel prefer sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding, much beach-cast seaweed, and backed by sparsely vegetated dunes for shelter and nesting. Occasionally the species are found on tidal bay and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs. They regularly use near-coastal saline and freshwater lakes and lagoons, often with saltmarsh. The Dotterel forage in sand at all levels of the wave-wash during low and mid-tide or among seaweed at high-tide, and occasionally in dune blowouts after rain. At night they favour the upper zones of beaches for roosting. When on rocks they forage in crevices in the wave-wash or spray zone (OEH 2021).

The Eastern Hooded Dotterel usually breed from August to March on sandy beaches strewn with beachcast seaweed, in a narrow strip between the high-water mark and the base of the fore-dunes. They often nest within 6 metres of the fore-dune, mostly within 5 metres of the high water mark, but occasionally among or behind dunes. The nest is a scrape in the sand near debris, making it vulnerable to predators and beach disturbance (OEH 2021).

The Little Tern is almost exclusively coastal, preferring sheltered environments. The species nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands. The nest is a scrape in the sand. The species is often seen feeding in flocks, foraging in the shallow water of channels and estuaries, and in the surf on beaches, or skipping over the water surface with a swallow-like flight (OEH 2021b).

The beach area, likely to be used to access the proposed activity, comprises habitat for these species. The proposed activity however is unlikely to have an adverse effect on the lifecycle of these species such that a viable local population is likely to be place at risk of extinction for the following reasons:

- The proposed activity would not impact known breeding habitat.
- The proposed activity would have no adverse effect on prey availability.
- The impact on the availability of habitat caused by the proposed activity would be insignificant compared to the amount and quality of habitat in the surrounding areas that would not be impacted by the proposed activity.
- Any birds foraging in the vicinity of the works and machinery traverse would fly away to nearby sections of the beach to forage without direct harm.
- The beach is intensively used by humans and dogs, and therefore unlikely to be a viable nesting location for any of these species. Regardless, at the start of the project, a SCC

Environmental Officer would undertake a pre-works survey of the beach prior to being used by machinery to access the site. If a nest or nesting birds are detected, works shall cease, and mitigation measures would be adapted in consultation with the NPWS Shorebird Recovery Coordinator (or similar expert), to minimise risk of disturbance and ensure their protection (*e.g.* postponing works).

A species impact statement (SIS) and/or entry into the Biodiversity Offset Scheme (BOS) is therefore not required for these species.

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

Two endangered ecological communities (EEC) are mapped on SCC's GIS as occurring in the landscape in the vicinity of the proposed activity *i.e. Bangalay Sand Forest of the Sydney Basin and South East Corner Bioregions* (hereafter referred to as 'Bangalay Sand Forest') and *Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (hereafter referred to as 'Littoral Rainforest') (Figure 5 below).

The proposed activity would not impact the mapped local occurrence of the Littoral Rainforest EEC nearby to the north. Site investigations conducted by the author of this REF also indicate that this has been incorrectly mapped, and is not Littoral Rainforest.

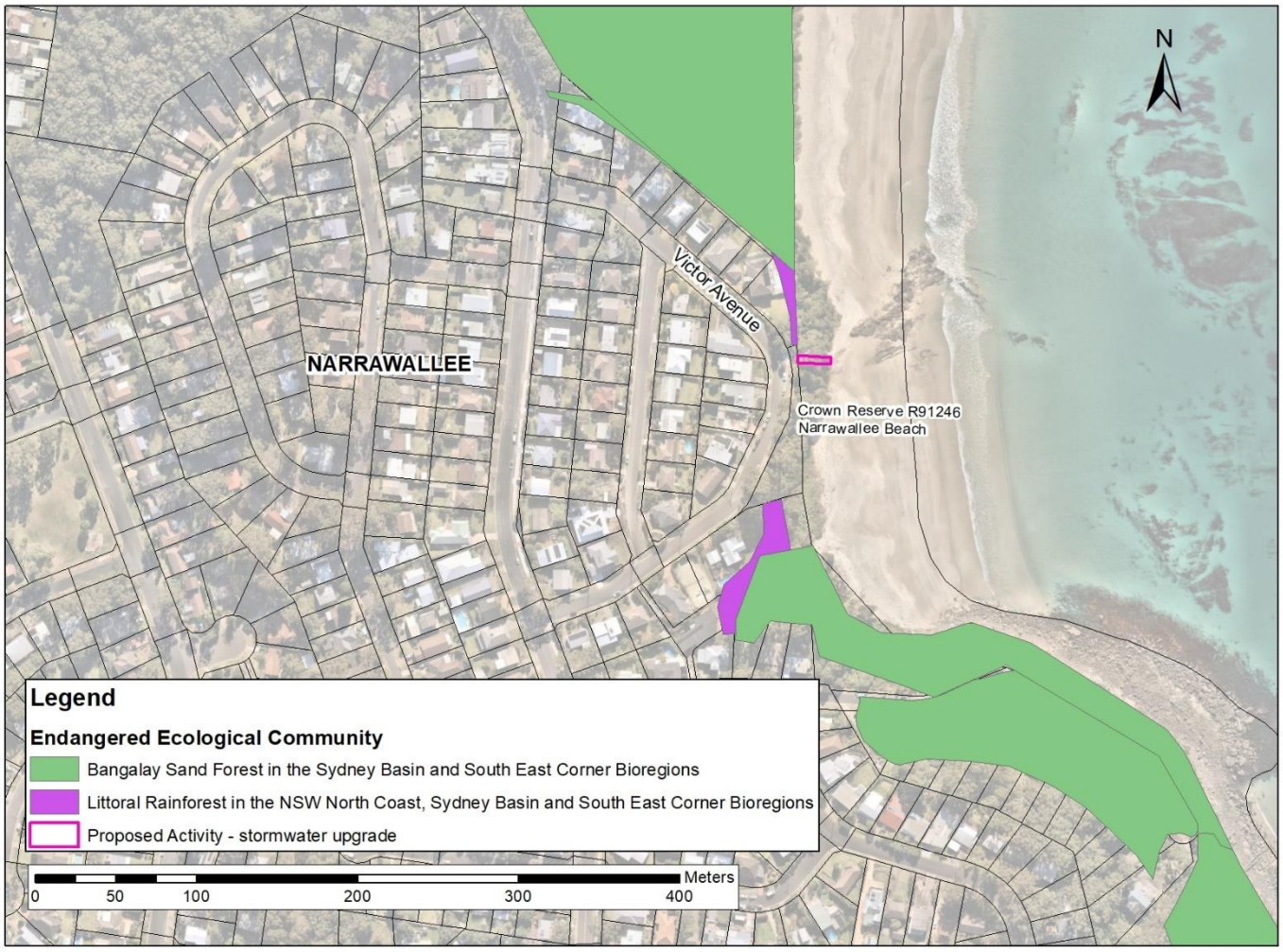
The proposed activity would not impact the mapped local occurrence of Bangalay Sand Forest (Figure 5 below). Although the proposed activity would remove species that are indicative of this community, the site does not comprise Bangalay Sand Forest as it does not occur on marine or aeolian sands (refer to Section 2.2 of this REF).

The proposed activity also seeks to cease the erosion of the beach escarpment that is currently leading to significant loss of vegetation.

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

A species impact statement (SIS) or entry into the BOS is therefore not required.

Figure 5 Endangered Ecological Communities in proximity to the proposed activity



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

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

(ii) 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

(iii) 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 be further 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. The proposed activity would not involve clearing of native vegetation as defined by the Scientific Committee's determination (OEH 2021), i.e.:

> *the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of a stand or stands.*

Conclusion of the Part 7 Biodiversity Conservation Act 2016 'five-part test'

The proposed activity is unlikely to have a significant impact on threatened species, endangered ecological communities, critically endangered ecological community, and declared areas of outstanding biodiversity values and does not comprise or significantly exacerbate a key threatening process. A species impact statement (SIS) or entry into the Biodiversity Offset Scheme (BOS) 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 Code') (DECCW 2010) to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for an AHIP.

In accordance with Step 1 of the Due Diligence Code, a search on the Aboriginal Heritage Information Management System (AHIMS) indicated that there were no recorded Aboriginal heritage objects or sites in the area (Figure 6 p.23).

Step 2 of the Due Diligence Guidelines requires consideration of whether unrecorded Aboriginal objects are likely to be in the area of the proposed activity with regard to certain landscape features, *i.e.:*

- within 200 metres of waters, or
- located in a sand dune system, or
- located on a ridge top, ridge line or headland, or
- located within 200 metres below or above a cliff face, or

- within 20 metres of, or in a cave, rock shelter, or cave mouth

The subject site does comprise such landforms (within 200 metres of waters). Consequently, an onsite inspection was conducted on 29 January 2024 for a search on any surface artefacts, or mounded areas that could comprise a shell midden, or a lens of stratified cultural material or skeletal remains within the exposed earth of the erosion gully. Nothing was found.

A literature search was conducted utilising SCC's document archive and AHIMS. A report titled *"Milton / Ulladulla Sewerage Scheme Augmentation EIS – Cultural Heritage Component"* by Navin Officer Heritage Consultants (2000) describes surveys undertaken in the vicinity of the proposed activity *i.e.* for the nearby sewer rising main. No Aboriginal cultural heritage sites were found by these archaeologists.

It is, therefore, reasonable to conclude that there is a low probability of Aboriginal heritage objects occurring in the area of the proposed activity. As a result, an AHIP is not required, and the activity can proceed with caution.

NB: As the geology of the area comprise unconsolidated sediments in a coastal environment, there is a risk (albeit low) of Aboriginal ancestral skeletal remains being present in the locality.

Cautionary measures are prescribed in Section 7 of this REF.

Figure 6 Results of AHIMS Aboriginal heritage search

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : victor ave
Client Service ID : 863448

Shoalhaven City Council - Nowra
PO Box 42 Bridge Rd
Nowra New South Wales 2541
Attention: Geoffrey Young
Email: geoff.young@shoalhaven.nsw.gov.au

Date: 12 February 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 270033.0 - 270162.0, Northings : 6088941.0 - 6089150.0 with a Buffer of 0 meters, conducted by Geoffrey Young on 12 February 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 items listed on the NSW Heritage Inventory occur within of in proximity to the site. The entire lot, 7009 DP1116370, however is in the Environmental Heritage Schedule 5 of the Shoalhaven Local Environmental Plan 2014 (SLEP 2014). The lot contains the “Silica Wharf and

Tramway (Remnants). There is not much left of these items but include silica workings on Bannister Point, the remains of iron bark piles in Narrawallee Creek and embankments and drystone walling with the bridge abutments north of Narrawallee Creek. The tramway extended from Bannister Point to Pattimores Lagoon near Lake Conjola. There is however no material evidence of the tramway extant at the location of the proposed activity. The site is either developed as a public road or on steep escarpment slope that would have been unsuitable for tramway. Remnants are therefore unlikely to occur at the site.

The proposed activity would occur in a previously disturbed area and constitutes 'minor works' under 'Relics of local heritage significance: a guide for minor works with limited impact'. The proposed activity would not result in any direct impacts on heritage items or values. Works can be undertaken with caution under exception 2(b) made under s139(4) of the NSW *Heritage Act 1977*.

3.6 Impacts to neighbouring residents

The proposed activity would be conducted in a residential in proximity to houses. Construction noise would be unavoidable but temporary in nature (~one month). Noise impact mitigation measures are to be implemented before and during construction. These measures are prescribed in Section 7 of this REF.

3.7 Impacts to vehicle and pedestrian traffic

The proposed activity is likely to cause disruption to vehicle traffic along Victor Avenue. The adjacent stairway may also require temporary closing or otherwise management of people to reduce risks from construction works.

Trucks and excavators accessing the site from Surfers Avenue may also disrupt access to Narrawallee Beach and pose a risk to beach visitors.

To mitigate the risk to the public and mitigate access disruptions, the Construction Contractor shall prepare a pedestrian and vehicle traffic management plan and submit to SCC for approval.

3.8 Beach sand erosion

The purpose of the proposed activity is to reduce the active erosion of the beach escarpment below the existing outlet to reduce the risk to civil infrastructure within the Victor Avenue road reserve. This will be achieved by extending the pipe system and bringing the outlet down to the base of the escarpment and releasing onto the sandstone outcrop at the beach interface. Although initially releasing onto the sandstone the stormwater will then run onto the beach sands at an anticipated higher velocity. This may lead to a comparative increase in the erosion of beach sands. This has been considered by SCC as acceptable as:

- The proposed activity would not increase the volume of water through this system.
- Some energy dissipation and spread would occur as the stormwater runs over the sandstone outcrop initially.
- The outlet would be rocky and keyed into a layer of blinding concrete with geotextile protection to address discharge immediately at the outlet.

- Sand erosion caused by stormwater outlets during significant rainfall events is temporary in nature and affects only a small section of the beach. Accretion of sand to fill erosion affected area would occur naturally post-storm event through marine and aeolian processes.

There is a residual risk beach erosional events may cause consternation amongst the community. This can be managed through community engagement.

3.9 EP&A Regulation – Clause 171 matters of consideration

Clause 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. The following assessment in Table 1 below deals with each of the factors in relation to the proposed activity.

Table 1: Clause 171(2) Factors

Does the proposal:	Assessment	Reason
a) Have any environmental impact on a community?	Positive	The proposed activity would benefit the community and the environmental as it is anticipated to reduce the current erosional impacts caused by stormwater runoff. The proposed activity also aims to protect civil infrastructure such as Victor Avenue and sewage infrastructure. The proposed activity is consistent with the existing land use (stormwater outlet). The proposed activity would not have any impact on other community services and infrastructure such as power, water, waste-water, waste management, educational, medical or social services.
b) Cause any transformation of a locality?	Positive	The proposed activity would improve the locality's use as a stormwater management system and alleviate the erosion of the beach escarpment.
c) Have any environmental impact on the ecosystem of the locality?	Low adverse	The site of the proposed activity is highly disturbed dominated by weeds and other exotic species. There are no rare or threatened species and it does not comprise an endangered ecological community. No hollow-bearing trees, threatened flora species, rocky outcrops, caves, crevices or waterbodies would be removed or otherwise impacted. No significant habitat features would be removed or otherwise impacted. No food resources critical to the survival of a particular species would be removed. An assessment provided in Section 3.3 of this REF concludes that the proposed activity would not have a significant impact upon threatened species or endangered ecological communities. Aquatic ecosystems are not likely to be significantly affected by the proposed activity and there is not likely to

Does the proposal:	Assessment	Reason
		be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem. The stormwater would discharge onto stable sandstone bedrock and then sand in an area already experiencing this effect/impact. Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.
d) Cause a diminution of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	Temporary low adverse but positive once constructed	The proposed activity may temporarily disrupt access to Narrawallee Beach and disturb visitors to the Beach. Removal of vegetation and habitat will be minimal, occurring on existing edges of the erosion gully and not resulting in significant fragmentation of habitat. Stabilisation and revegetation works would be undertaken to mitigate adverse visual impacts The area that would be affected by the proposed activity has no significant value in terms of science or other environmental qualities. The proposed activity would have no impact on these values.
e) Have any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, or social significance or other special value for present or future generations?	Negligible	The site of the proposed activity has no significant aesthetic, architectural, cultural, historical, scientific or social values. As such, the proposed activity would have no impact on these items. 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. 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 of this REF).
f) Have any impact on the habitat of protected fauna (within the meaning of the Biodiversity Conservation Act 2016)?	Low adverse	A small area of marginal fauna habitat will be removed by the activity. No important habitat will be removed or otherwise impacted. The potential impact is therefore considered to be insignificant or inconsequential. The proposed activity would not have a significant impact upon threatened fauna (refer to Section 3.3 of this REF). The specified environmental mitigation measures (Section 7 of this REF) would mitigate indirect impacts to fauna and habitat.

Does the proposal:	Assessment	Reason
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	No potentially important habitat or food resources for locally occurring fauna specie would be removed or otherwise impacted by the proposed activity. No hollow-bearing trees, threatened flora species, rocky outcrops, caves, crevices or water bodies would be removed or otherwise impacted. No food resources critical to the survival of a particular species would be removed. There are no species likely to rely on the site of the proposed works to the extent that modification would put them further in danger. The prescribed environmental safeguards and mitigation measures (Section 7 of this REF) would minimise the risk of impact on fauna, fish, and flora.
h) Have any long-term effects on the environment?	Negligible	Works would be relatively short term and the noise generated will occur during normal working hours. There are no particularly noise sensitive receivers in the vicinity of the proposed works. The proposed activity would not use hazardous substances or use or generate chemicals which may build up residues in the environment. The works would be short-term and would stabilise the current erosional processes. The stormwater would discharge onto stable Snapper Point Sandstone more resistant to erosion than the existing beach escarpment. The possible impacts have been discussed in detail under Section 3.
i) Cause any degradation of the quality of the environment?	Positive	The aim of the proposed activity is to alleviate erosional processes that are currently degrading the quality of the environment. Aquatic ecosystems are not likely to be significantly 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. The proposal would not intentionally introduce noxious weeds, vermin, or feral animals into the area or contaminate the soil. The stormwater would discharge onto stable Snapper Point Sandstone more resistant to erosion than the existing beach escarpment. Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.

Does the proposal:	Assessment	Reason
j) Cause any risk to the safety of the environment?	Positive	The aim of the proposed activity is to alleviate erosional processes that is currently threatening a local road and sewage infrastructure. The proposed activity would not involve hazardous wastes and would not lead to increased bushfire or landslip risks. The activity is not anticipated to adversely affect flood behaviour or exacerbate flooding or bushfire risks.
k) Cause any reduction in the range of beneficial uses of the environment?	Positive	The site and local environment will remain relatively unchanged. The area is currently being used to discharge stormwater. The proposed activity would improve this use.
l) Cause any pollution of the environment?	Low adverse	The proposal would involve a temporary and local increase in noise during the construction phase due to the use of machinery. This, however, would not affect any sensitive receivers such as residential areas, schools, childcare centres and hospitals. The Construction Contractor and / or SCC Project Manager would engage directly with neighbouring residents and implement measures to mitigate noise impacts (refer to Section 3.6 of this REF). 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 proposal does not involve the use, storage or transportation of hazardous substances or the generation of chemicals which may build up residues in the environment. The excavated material is unlikely to acid generation characteristics (refer to Section 2.2 of this REF). The risk of contamination and spills from machinery including fuel and hydraulic fluids would be minimised through prescribed environmental safeguards and mitigation measures (Section 7).
m) Have any environmental problems associated with the disposal of waste?	Negligible	The waste that would be disposed off-site can be recycled or re-used in accordance with resource recovery exemptions or taken to a licensed waste facility. There would be no trackable waste, hazardous waste, liquid waste, or restricted solid waste as described in the NSW *Protection of the Environment Operations Act 1997*.

Does the proposal:	Assessment	Reason
		The excavated material is unlikely to acid generation characteristics (refer to Section 2.2 of this REF).
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. Mitigation measures (Section 7) shall be implemented to minimise the risk of cumulative environmental effects. The current proposal would not significantly affect habitat connectivity or reduce any significant vegetation. No further activities involving clearing of vegetation are planned for this location.
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	Positive	The proposed activity should decrease the erosion of the beach escarpment thereby improving the protection of civil assets within the Victor Avenue road reserve. The proposed activity would have no effect on coastal processes including those projected under climate change conditions. The proposed activity area is not located in a coastal hazard area.
q) applicable local strategic planning statements, regional strategic plans or district plans made under the Act, Division 3.1	Positive	The proposed activity is consistent with the *Shoalhaven 2040* Strategic Land-use Planning Statement, including Planning Priority 2 *Delivering infrastructure* https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D20/437277. The proposed activity is consistent 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) particularly Objective 12 – *Build resilient places and communities* by improved management of stormwater. Although, the area is mapped as “High Environmental Value” in the Illawarra Shoalhaven Regional Plan 2041, it is assumed that this is because it has been mapped incorrectly as the EEC Bangalay Sand Forest. The

Does the proposal:	Assessment	Reason
		vegetation at the site is not of high environmental value (refer to Section 2.1 and 3.2 of this REF).
r) other relevant environmental factors	n/a	Environmental factors have been addressed in Section 3 of this REF.

4. PLANNING APPROVALS PATHWAY AND 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 2.137 of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP) provides that:

> *"(1) Development for the purpose of stormwater management systems may be carried out by or on behalf of a public authority without consent on any land."*

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.

4.2 Crown Land Management Act 2016 and the Local Government Act 1993

SCC is the appointed Crown Land Manager for the Crown reserve R91246 (Narrawallee Beach) in which the stormwater outlet would be upgraded. Section 3.21 of the NSW *Crown Land Management Act 2016* (CLM Act) provides that:

> *"(1) A council manager is authorised to classify and manage its dedicated or reserved Crown land within the meaning of the Local Government Act 1993, subject to this Division.*
>
> *(2) Accordingly, a council manager is also authorised to manage its dedicated or reserved Crown land as if it were community land or operational land, but only as permitted by this Division."*

Under Section 35 of NSW *Local Government Act 1999* (LG Act), community land is required to be used and managed in accordance with the plan of management (PoM) applying to the land. The PoM likely to apply to the Narrawallee Beach is the *Generic Community Land Plan of Management – Natural Areas.* (https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D16/208141) . Regarding stormwater systems, the PoM states:

> "*The protection of foreshore, riparian and coastal vegetation is vital in helping to reduce erosion and improve water quality. Foreshore vegetation acts as a soil stabiliser that reduces the impacts of erosion. Riparian vegetation not only stabilises the soil to prevent erosion, but helps to slow the velocity of water so that sediment is deposited along the length of the watercourse, rather than at its point of entry into a large water body.*
>
> *Stormwater drains discharging into Natural Areas and streams flowing through Natural Areas often carry high levels of nutrients and fertilisers, as well as other pollutants such as herbicides and pesticides. High nutrient levels favour weed species over native species an*

are partially responsible for the degradation of Natural Areas. Stormwater discharge and eroded channels also carry high sediment loads that impact on water quality.

…

Low impact solutions to the problems of stormwater runoff and erosion and the maintenance of water quality will be given precedence over high impact engineering solutions for their aesthetic, economic and environmental rationale. However, more engineered erosion control measures may also be necessary in some instances. High impact solutions will be considered in circumstances where:

- *The site is within areas of cliff/slope instability (5.1.2) of 'other areas of potential coastal instability (s.5.1.3) identified in Chapter G6 in the Shoalhaven DCP 2014;*
- *The proposed development would not result in an increase in geotechnical risk:*
- *Other options for stormwater disposal have been exhausted (e.g. charged system, use of stormwater pump); and*
- *The proponent is able to demonstrate that the discharge or collected stormwater from the property through the community land will not compromise the core objectives of the plan of management applying to the land."*

The proposed activity is consistent with this PoM as it meets these criteria identified in the DCP and SLEP as it is mapped as "area of cliff/slope instability" and "Beach Erosion / Oceanic Inundation" and in close proximity to Coastal Hazard Lines" (Figure 7 below). The proposed outlet would also discharge stormwater in the area of higher stability and more resistant to erosion *i.e.* upon Snapper Point Sandstone as opposed to poorly consolidated sediment. The proposed activity therefore complies with both Acts and no further consideration is required.

4.3 NSW Aboriginal Land Rights Act 1983

The Narrawallee Beach Reserve is the subject of two separate Aboriginal land rights claims, ALC 26709 which was lodged on 3 August 2010 and again as part of the 2017 'multiple and blanket' claims. These claims were made prior to the proposed activity being considered. As such, the land remains 'claimable land' as defined in the Act.

Although the Act does not preclude the proposed activity, structures, facilities, public works etc constructed after the claims were made could become property of the claimants if successful.

4.4 Commonwealth *Native Title Act 1993*

It can reasonably be assumed that Native Title has been extinguished as a *Previous Exclusive Possession Act* over Victor Avenue road reserve.

The proposed works on Narrawallee Beach reserve would affect Native Title. The applicable Future Act option was determined to be provided by Subdivision K for the following reasons:

- Although the reserve was gazetted on the 08/09/1978 many years prior to the commencement of the *Native Title Act 199*3, the proposed activity is not consistent with the reservation ("public recreation"). Subdivision J therefore does not apply.
- The future act relates to an onshore place.

- The future act is *"(i) a drainage facility…."*
- The future act *"(ii) consists of the construction, operation, use, maintenance or repair, by or on behalf of the Crown, or a local government body…in any of its capacities…that is to be operated, or is operated, for the general public".*
- The future act would be undertaken by a local government for the general public.
- The future act would not prevent native title holders from having reasonable access to the land or water in the vicinity of the works.
- The NSW *National Parks and Wildlife Act 1974* makes provision for the protection of sites and areas.

Consequently, a 'future act' assessment was submitted to SCC's Native Title Manager on the 6 February 2024 (SCC document reference D24/46550). A referral to NTSCORP, who represent The South Coast People Native Title claimants, was sent on the 9 February 2024 (SCC document D24/53169). As of the 22 February 2024, no response has been received. Native Title Future Act processes are therefore complete, and the proposed activity can commence as a valid act.

Figure 7 Coastal hazard mapping

4.5 Other

A summary of other relevant legislation and permissibility is provided in Table 2 below.

Table 2: Summary of other relevant legislation and permissibility

NSW STATE LEGISLATION
Environmental Planning and Assessment Act 1979 **(EP&A Act)**
Permissible √ Not permissible ☐
Justification: 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.
Protection of the Environment Operations Act 1997
Permissible √ Not permissible ☐
Justification: The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.
Fisheries Management Act 1994
Permissible √ Not permissible ☐
The proposed activity: • would not affect declared aquatic reserves (Part 7, Division 2 of the Act); • would not involve dredging and reclamation in Key Fish Habitat (Part 7, Division 3); • would not involve blocking the passage of fish (s.219); • would not impact on mangroves and marine vegetation in key fish habitat (Part 7, Division 4); • would not involve disturbance to gravel beds where salmon or trout spawn (s.208 of the Act); • 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 result in the blocking of the passage of fish; • would not impact on declared threatened species of 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).*

Local Land Services Act 2013
Permissible √ Not permissible ☐
Justification: Any clearing of vegetation would be of a kind authorised under Section 60O(b)(ii) of the Act ("an activity carried out by a determining authority within the meaning of Part 5 of the Act after compliance with that Part."). No separate authorisation under the Act is required.
***National Parks and Wildlife Act 1974* (NP&W Act)**
Permissible √ Not permissible ☐
Justification: • 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 Code (DECCW 2010) 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 of this REF for more information.
Biodiversity Conservation Act 2016
Permissible √ Not permissible ☐
Justification: • The proposed activity is unlikely to have a significant impact on species and communities listed in the schedules of the Act (refer to Section 3.3 of this REF). • The proposed development is not within an area declared to be of "outstanding biodiversity value" as defined in the Act. • The environmental impact mitigation measures (Section 7) 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 therefore is not deemed to be *likely to significantly affect threatened species* and an environmental impact statement (EIS) or a Biodiversity Development Assessment Report (BDAR) is not required. It is also a defence to a prosecution for an offence under Part 2 of the Act (harming animals, picking plants, damaging the habitat of threatened species or ecological communities *etc*) if the work was essential for the carrying out of an activity by a determining authority within the meaning of Part 5 of the *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.

Water Management Act 2000

Permissible √ Not permissible ☐

Justification:

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

State Environmental Planning Policy (Resilience and Hazards) 2021

Permissible √ Not permissible ☐

The proposed activity would not be undertaken in an area mapped as littoral rainforest or coastal wetland. Other considerations of the SEPP are not applicable to the proposed activity.

Wilderness Act 1987

Permissible √ Not permissible ☐

The proposed activity is not located within a wilderness area declared under this Act.

Heritage Act 1977

Permissible √ Not permissible ☐

The proposed activity would not disturb an item of state heritage significance. The proposal would constitute 'minor works' under 'Relics of local heritage significance: a guide for minor works with limited impact'. The proposal would not result in any direct impacts on heritage items or values. Works can be undertaken with caution under an applicable exception under s139(1) and (2) of the Act.

COMMONWEALTH LEGISLATION

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

Permissible √ Not permissible ☐

Justification:

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. The proposed activity is therefore not a controlled action and does not require commonwealth referral.

5. CONSULTATION WITH GOVERNMENT AGENCIES

5.1 Transport and Infrastructure SEPP 2021 requirements

Section 2.10 – Consultation with councils - development with impacts on council-related infrastructure or services

The proposed activity would be undertaken over and adjacent to sewer gravity and pressure rising mains managed by Shoalhaven Water. Prior to works, Shoalhaven Water shall be notified and any requirements they may have to protect the infrastructure shall be acknowledged and implemented.

If the work within the Victor Avenue road reserve is undertaken by a contractor, a Section 138 (NSW *Roads Act 1993*) may be required from the relevant section of SCC.

These requirements are reflected in the environmental impact mitigation measures and safeguards prescribed in Section 7 of this REF.

No other consultation requirements listed in Section 2.10 of the Transport and Infrastructure SEPP are relevant to the proposed activity and location.

Section 2.11 – Consultation with councils - development with impacts on local heritage

No impacts to any local heritage item would occur (refer to Section 3.5 of this REF). Consultation under Section 2.11 is therefore not required.

Section 2.12 – Consultation with councils - development with impacts on flood liable land

and

Section 2.13 – Consultation with State Emergency Service (SES) - development with impacts on flood liable land

The proposed activity is not on flood liable land. No consultation with prescribed agencies is required.

Section 2.14 – Consultation with councils - development with impacts on certain land within the coastal zone

The proposal would not occur within a coastal vulnerability area as defined in the SEPP. Consultation is therefore not required.

Section 2.15 – Consultation with public authorities other than councils

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

- would not be undertaken adjacent to land reserved under the *National Parks and Wildlife Act 1974* or land acquired under that Act,
- would not be undertaken on land in Zone E1 National Parks and Nature Reserves or in an equivalent land use zone,
- does 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 have an impact on the Willandra Lakes Region World Heritage Property,
- would not occur in a Western City operational area specified in the *Western Parkland City Authority Act 2018.*

These prescribed consultation requirements therefore do not apply.

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

The proposed activity is not a development prescribed in this section (health services facilities, correctional centres, residential accommodation). Consideration of PBP is therefore not required.

5.2 SCC Internal Asset Custodian

Once constructed, the upgraded stormwater system would be managed by City Services Southern District Engineer (as the Asset Custodian).

Copies of the plans, as part of a 'notice of intention', were provided to the Southern District Engineer on 14 February 2014 (SCC reference D24/61206). The subsequent response supported the proposed activity and plans (SCC document D24/61208).

6. COMMUNITY ENGAGEMENT

In accordance with Council's Community Engagement Policy, the proposed activity constitutes a *Local Area – Low Impact* activity.

To be commensurate with the Community Engagement Policy, the following is recommended:

- Neighbouring residents shall be informed of the works including commencement dates through letterbox drop.
- Placement of project information on SCC's Get Involved webpage.
- Letter / email to the relevant Community Consultative Body outlining the proposed activity and construction timeframes.

SCC shall also continually engage with neighbours over the course of the construction project to mitigate noise impacts.

These requirements are reflected in the environmental impact mitigation measures and safeguards prescribed in Section 7 of this REF.

7. ENVIRONMENTAL SAFEGUARDS AND MEASURES TO MINIMISE IMPACTS

Note that all environmental safeguards and measures are prescribed unless otherwise stated

Safeguard / Measure	Responsibility
Works planning, approvals, consultation & notification	
1. This REF shall be published on the NSW Planning Portal as a matter of public interest.	SCC Environmental Operations Officer (EOO)
2. A traffic and pedestrian management plan shall be developed and implemented to minimise disruption and reduce the risk of incident along Victor Avenue, Narrawallee Beach and the beach access stairs.	SCC Project Manager and Construction Contractor
3. To be commensurate with the Community Engagement Policy, the following shall be undertaken: a. Placement of project information on SCC's "View Current Projects" webpage. b. Letters to nearby residents with plans and construction timeframes. c. Letter/email to the relevant Community Consultative Body outlining the proposed activity and construction timeframes.	SCC Project Manager
4. If contractors are to be engaged to undertake the works, a Section 138 (Roads Act 1993) consent shall be sought from the SCC Roads Asset Manager.	SCC Project Manager and Construction Contractor
5. Shoalhaven Water shall be engaged to determine any construction methodology for construction works over and near gravity and rising sewer mains.	SCC Project Manager and Construction Contractor
Construction works	
6. Prior to accessing the beach with trucks, excavators, and machinery a shorebird survey shall be undertaken by a SCC Environmental Officer. If a nest or nesting birds are detected, works shall cease, and mitigation measures would be adapted in consultation with the NPWS Shorebird Recovery Coordinator (or similar expert), to minimise risk of disturbance and ensure their protection (*e.g.* postponing works)	SCC Project Manager and Construction Contractor

Safeguard / Measure	Responsibility
7. Vegetation removal shall be undertaken only to the extent required to carry out the works.	Construction Contractor
8. Machinery access, construction compound (if required), vehicles and stockpiles shall be located within existing cleared areas and street.	Construction Contractor
9. All employees, contractors and subcontractors shall receive an environmental / noise / vibration induction. The induction should at least include: a. All project specific and relevant standard noise and vibration mitigation measures. b. Permissible hours of work. c. Any limitations on high noise generating activities. d. Construction employee parking areas. e. Designated loading / unloading areas and procedures. f. Implementation of behaviour practices near dwellings and public areas.	Construction Contractor
10. Owners and occupants of nearby residential properties shall be informed of the dates of the intended works, sequencing, and timing of noisy events. Where possible, this should include an indicative noisy works schedule over a weekly period.	Construction Contractor; SCC Project Manager
11. Construction activities shall be limited to the hours shown below	Construction Contractor

<table>
<tr><th>Safeguard / Measure</th><th>Responsibility</th></tr>
<tr><td>
<table>
<tr><th>Construction hours</th><th>Monday to Friday</th><th>Saturday</th><th>Sunday and public holidays</th></tr>
<tr><td>Standard construction hours</td><td>7:00 am to 6:00 pm</td><td>8:00 am to 1:00 pm</td><td>No work[1]</td></tr>
<tr><td>Construction activities with impulsive or tonal noise emissions</td><td>8:00 am to 5:00 pm[2]</td><td>9:00 am to 1:00 pm[2]</td><td>No work[1]</td></tr>
</table>
[1] Emergency works to protect persons, property and the environment permitted.

[2] Works may be carried out in continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block. 'Continuous' includes any period during which there is less than a one hour respite between ceasing and recommencing any or the work the subject of this condition.
</td><td></td></tr>
<tr><td>12. Non-tonal reversing beepers (or equivalent mechanisms) should be fitted and used on all construction vehicles and mobile plant regularly used on site.</td><td>Construction Contractor</td></tr>
<tr><td>13. Unexpected heritage finds procedures shall be applied:
a. Staff working at the site shall be instructed to stop work immediately on uncovering any suspected Aboriginal heritage objects. If any objects are found the SCC Environmental Operations Officer shall be contacted.
b. If skeletal remains that are suspected to be human are uncovered, works are to cease, the area secured and NSW Police are be notified. Ulladulla Local Aboriginal Land Council and Heritage NSW are to be notified if advised by NSW Police.
c. If any non-indigenous relics are uncovered (i.e. silica tramway items):
i. Works around the find shall stop immediately and the find physically protected.
ii. The find shall be reported to the SCC Project Manager.
iii. If the find is a relic, a harm mitigation strategy shall be developed and implemented. A s.149 permit (Heritage Act 1977) may be required if the find can't be avoided.</td><td>Construction Contractor</td></tr>
</table>

Safeguard / Measure	Responsibility
iv. If the find is a relic, the Heritage Council shall be notified in accordance with s.146 of the *Heritage Act 1977.*	
14. Any stockpiles of soil shall have erosion and sediment controls in place in accordance with the 'Blue Book' (Landcom 2004).	Construction Contractor
15. If engineering fill derived from waste material (e.g. mulch and excavated soil) is imported to the site, all conditions prescribed in the applicable Resource Recovery Exemption shall be complied with, including: a. ensuring the producer of the waste has complied with the applicable Order such as testing and validation. b. ensuring the material has met all chemical and other material requirements specified in the applicable Order. c. keeping a written record of the following for a period of six years: i. The quantity of material received. ii. The name and address of the supplier.	
16. 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 (https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material) b. the supplier must fill out and provide the *VENM Certificate.* The complete VENM Certificate shall be kept for at least six years and provided to the EPA upon any request.	Construction Contractor
17. The contractor shall keep an emergency spill kit on-site at all times with procedures to contain and collect any leakage or spillage of fuels, oils and greases from plant and equipment. No major equipment maintenance works shall be undertaken on-site.	Construction contractor
18. Any waste generated on site shall be reused in accordance with relevant Resource Recovery Orders and Exemptions or otherwise be managed, transported, stored, collected and disposed of in an environmentally satisfactory manner (*e.g.* at	Construction Contractor

Safeguard / Measure	Responsibility
a licenced waste facility) pursuant to NSW *Protection of the Environment Operations Act 1997*.	
19. The filled area above the new pipe shall be stabilised as per plans (Appendix A) and revegetated using locally occurring. Low-growing, native species such as Spiny-headed Matt-rush, Coastal Wattle *Acacia longifolia var sopharae*, Pig Face, Coastal Rosemary *Westringia fruticosa,*	Construction Contractor
Post construction	
20. An asset form must be trimmed to file 44574E on commissioning of the assets in Accordance with POL15/8 Asset Accounting Policy section 3.1.4 and POL16/79 Asset Management Policy section 3.3.	SCC Project Manager

8. SIGNIFICANCE EVALUATION & DECISION STATEMENT

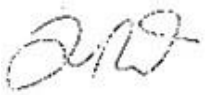
This Review of Environmental Factors has assessed the likely environmental impacts, in the context of Part 5 of the *Environmental Planning and Assessment Act 1979*, of a proposal by Shoalhaven City Council for an upgrade to the stormwater outlet onto Narrawallee Beach at Victor Avenue, Narrawallee.

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 work and an Environmental Impact Statement is not required for the proposed works.
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, permits and external government consultations are required.
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:



Troy Punnett
District Engineer – Southern
Shoalhaven City Council Date: 26/3/24

9. REFERENCES

DECCW (Department of Environment, Climate Change and Water, NSW) 2010 Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. Available at: https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/634694/Policy-and-guidelines-for-fish-habitat.pdf

Footprint 2023 *Coastal Erosion: Stormwater Impact Assessment.* Unpublished report for Shoalhaven City Council (SCC reference D23/527112)

Landcom 2004 *Managing Urban Stormwater: Soils and Construction – Volume 1.* Published by Landcom ISBN 0-97520-3037 https://www.environment.nsw.gov.au/research-and-publications/publications-search/managing-urban-stormwater-soils-and-construction-volume-1-4th-editon

Navin Officer (Navin Officer Heritage Consultants) 2001 *Conjola Regional Sewerage Scheme – Cultural Heritage Component.* Unpublished report for CH2MHill Pty Ltd

NSW Scientific Committee 2008 *Sooty Oystercatcher Haematopus fuliginosus: Review of Current Information in NSW. https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Scientific-Committee/sc-sooty-oystercatcher-haematopus-fuliginosus-review-report.pdf?la=en&hash=A490734D9D257D288D4CD8063836E5F308FD3221*

NSW Scientific Committee 2010 *Final Determination – Pied Oystercatcher (Haematopus longirostris) – endangered species listing https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2008-2010/pied-oystercatcher-haematopus-longirostris-endangered-species-listing*

OEH (Office of Environment and Heritage, NSW) 2021 *Eastern Hooded Dotterel – profile https://threatenedspecies.bionet.nsw.gov.au/profile?id=10803*

OEH (Office of Environment and Heritage, NSW) 2021b *Little Tern – profile https://threatenedspecies.bionet.nsw.gov.au/profile?id=10769*

APPENDIX A – The Proposed Activity

PROPOSED STORMWATER OUTLET REMEDIATION
VICTOR AVENUE, NARRAWALLEE

LOCALITY PLAN
NOT TO SCALE

North

SHEET INDEX

DRAWING No.	SCC REF. No.	DESCRIPTION
2307–C01	5583.01	TITLE SHEET
2307–C02	5583.02	LAYOUT PLAN
2307–C03	5583.03	PIPE LONGITUDINAL SECTION
2307–C04	5583.04	PIPE CROSS SECTIONS
2307–C05	5583.05	DETAILS – SHEET 1 OF 2
2307–C06	5583.06	DETAILS – SHEET 2 OF 2

GENERAL NOTES:

1. READ THESE NOTES IN CONJUNCTION WITH OTHER ENGINEERING DRAWINGS AND SPECIFICATIONS, AND WITH SUCH OTHER WRITTEN INSTRUCTIONS ISSUED. REFER TO CIVIL DRAWINGS FOR SETTING OUT AND DETAILED DIMENSIONS. REFER ANY DISCREPANCIES BETWEEN DOCUMENTATION TO SUPERINTENDENT BEFORE PROCEEDING WITH WORK.
2. SUBMIT DETAILS OF CHANGES TO SCOPE, WORK METHODS OR MATERIALS ETC FOR APPROVAL BEFORE PROCEEDING. APPROVAL DOES NOT AUTHORISE A VARIATION TO THE CONTRACT.
3. NOMINATION OF PROPRIETARY ITEMS DOES NOT INDICATE EXCLUSIVE PREFERENCE, BUT INDICATES REQUIRED PROPERTIES OF THE ITEM. SIMILAR ALTERNATIVES HAVING THE REQUIRED PROPERTIES MAY BE OFFERED FOR APPROVAL. APPROVAL DOES NOT AUTHORISE A VARIATION TO THE CONTRACT. INSTALL PROPRIETARY ITEMS IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS AND RECOMMENDATIONS.
4. DO NOT OBTAIN DIMENSIONS BY SCALING FROM DRAWINGS.
5. DIMENSIONS ARE IN METRES UNO, LEVELS ARE IN METRES UNO, CHAINAGE ARE IN METRES UNO.
6. MAINTAIN STRUCTURES IN A STABLE CONDITION DURING CONSTRUCTION AND PROVIDE TEMPORARY BRACING AND/OR SUPPORT AS REQUIRED. PROVIDE SPREADERS AT LOADS AND/OR LIFTING POINTS WHERE REQUIRED. ENSURE NO PART IS OVERSTRESSED. DO NOT PLACE OR STORE BUILDING MATERIALS ON STRUCTURAL MEMBERS WITHOUT SUPERINTENDENTS APPROVAL. PROVIDE CALCULATIONS TO PROVE ADEQUACY OF STRUCTURE FOR PROPOSED CONSTRUCTION METHOD AND LOADS.
7. UNLESS NOTED OTHERWISE THESE DRAWING DO NOT DETAIL TEMPORARY WORKS. CONSTRUCTION METHODS AND TEMPORARY WORK ARE THE RESPONSIBILITY OF THE CONTRACTOR.
8. OBTAIN REQUIREMENTS FOR ADJOINING ELEMENTS TO BE FIXED TO OR SUPPORTED ON WORK AND PROVIDE FOR REQUIRED FIXINGS. DRAWINGS DO NOT SHOW DETAILS OF ALL FIXTURES, INSERTS, SLEEVES, RECESSES OR OPENINGS ETC REQUIRED. PROVIDE FOR TEMPORARY SUPPORT OF ADJOINING ELEMENTS DURING CONSTRUCTION.
9. WHERE NEW WORK ABUTS EXISTING PROVIDE SMOOTH TRANSITION FREE OF ABRUPT CHANGES.
10. BUILD FABRICATE AND PROCURE ONLY FROM DRAWING 'ISSUED FOR CONSTRUCTION'.

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	14/02/24

FOR CONSTRUCTION

SCALES
AS NOTED
ORIGINAL
A1

SURVEYOR: SCC/KEATLEY
DATUM: AHD
AZIMUTH: GDA2020/ MGA56
DRAWN: HB
DESIGNED: HB
DESIGNED DATE: APR 2023
CHECKED: AB

footprint
sustainable engineering
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jamberoo nsw 2533
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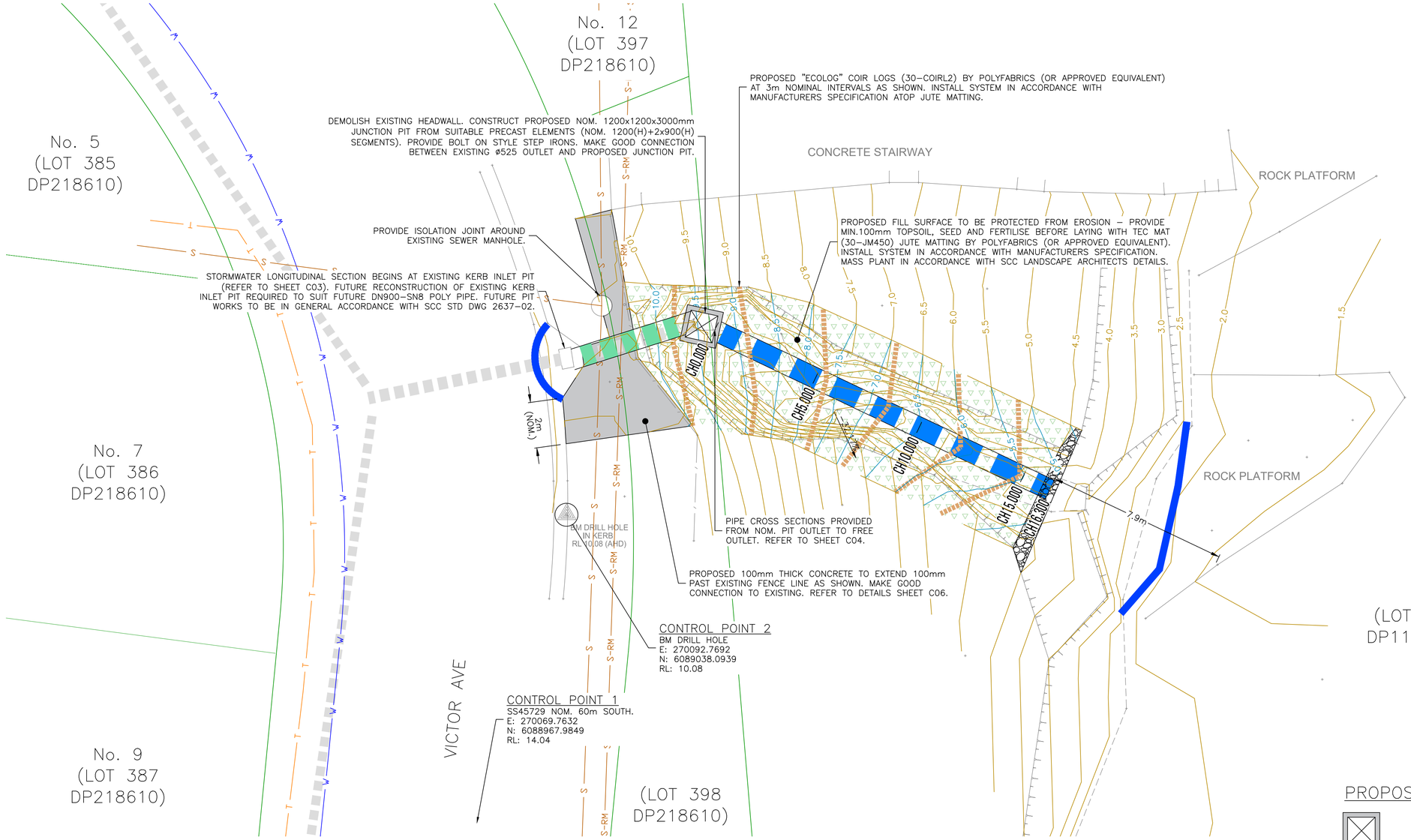
m. 0430 421 661

PROPOSED STORMWATER OUTLET REMEDIATION
VICTOR AVENUE, NARRAWALLEE
TITLE SHEET

DRAWING NO.
2307-C01
ISSUE.
A
SHEET 1 OF 6

Shoalhaven City Council
SCC PLAN REFERENCE
5583.01



EXISTING FEATURES LEGEND

- EXISTING PROPERTY/ROAD BOUNDARY
- EXISTING EDGE OF CONCRETE OR ROCK PLATFORM
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING FENCE
- EXISTING STORMWATER PIPE
- EXISTING SURFACE CONTOUR (0.5m INTERVAL) — 9.0

EXISTING SERVICES LEGEND

		AS5488-2019 QUALITY LEVEL
T	EXISTING TELECOMMUNICATIONS SERVICES	D
W	EXISTING WATER MAIN	D
S	EXISTING SEWER (GRAVITY MAIN)	C/D
S-RM	EXISTING SEWER (RISING MAIN)	D

BEFORE YOU DIG www.byda.com.au
Zero Damage - Zero Harm

NOTE:
LOCATION OF SERVICES TO BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION. LOCATE ANY OVERHEAD POWER LINES ON SITE PRIOR TO WORKS.

PROPOSED STRUCTURES LEGEND

- PROPOSED 1200x1200x3000 JUNCTION PIT
- PROPOSED DN900-SN8 POLY STORMWATER PIPE
- FUTURE DN900-SN8 POLY STORMWATER PIPE
- PROPOSED 100mm THICK 25MPa CONCRETE (23.3m²)
- PROPOSED JUTE MESH MATTING (108.5m²)
- PROPOSED STACKED ROCK HEADWALL
- PROPOSED COIR LOGS (NOM. 3m SPACINGS)
- PROPOSED SEDIMENT CONTROL FILTER ROLL
- NOM. PROPOSED SURFACE CONTOURS (0.5m INTERVAL) — 9.0

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	14/02/24

FOR CONSTRUCTION

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SCALES: AS NOTED
ORIGINAL: A1

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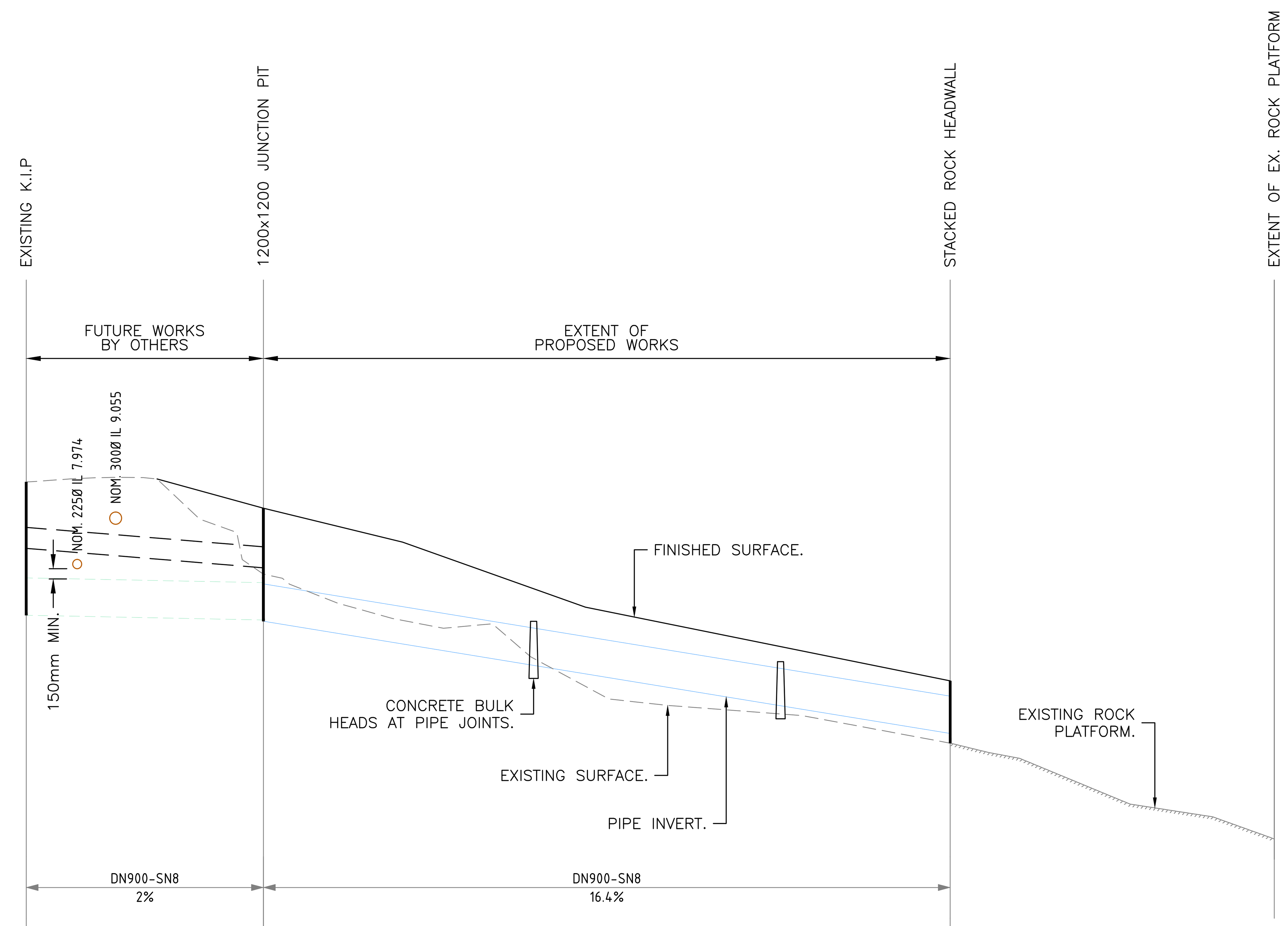
PROPOSED STORMWATER OUTLET REMEDIATION

VICTOR AVENUE, NARRAWALLEE

LAYOUT PLAN

DRAWING NO. 2307-C02
ISSUE. A
SHEET 2 OF 6

Shoalhaven City Council
SCC PLAN REFERENCE 5583.02



PIPE DETAILS	DN900-SN8		DN900-SN8		
SLOPE/GRADE	2%		16.4%		
DATUM RL -1					
DEPTH TO INVERT	3.249	2.727	2.755	1.283	
PROPOSED DN900 INV. RL			6.693	*3.956	
FUTURE DN900 INV. RL	6.839	6.723			
EX. Ø525 RCP INV. RL	~8.470	7.950			
FINISHED SURFACE	10.088	9.450		5.239	
EXISTING SURFACE	10.088	7.847		3.720	1.386
CHAINAGE	0.000	5.781		22.521	30.420
	5.781		16.740		7.899

* ADJUST LEVEL ON SITE AS REQUIRED TO SUIT LEVEL OF ROCK PLATFORM.

PIPE LONGITUDINAL SECTION

SCALE H 1:100, V 1:100

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	14/02/24

FOR CONSTRUCTION

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SCALES: AS NOTED
ORIGINAL: A1

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DESIGNED: HB
DESIGNED DATE: APR 2023
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PROPOSED STORMWATER OUTLET REMEDIATION

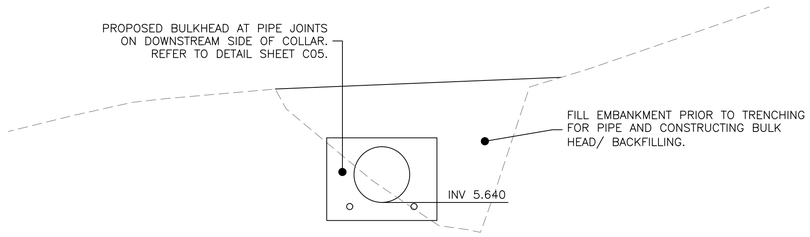
VICTOR AVENUE, NARRAWALLEE

PIPE LONGITUDINAL SECTION

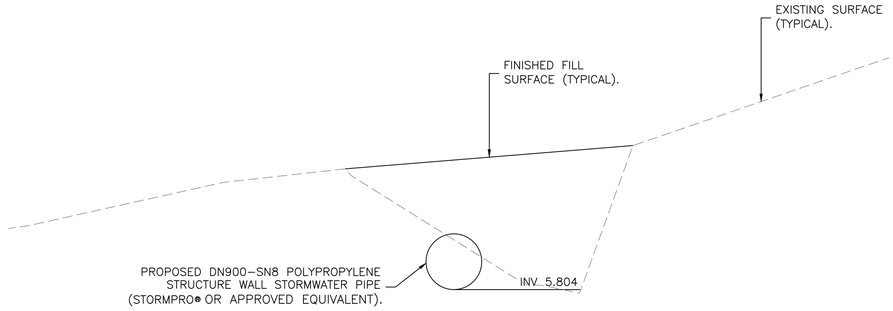
DRAWING NO. 2307-C03
ISSUE. A
SHEET 3 OF 6

Shoalhaven City Council

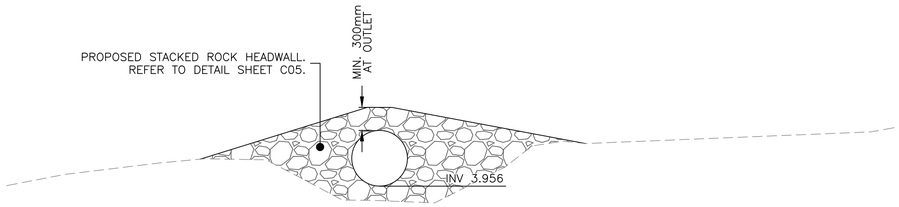
SCC PLAN REFERENCE 5583.03



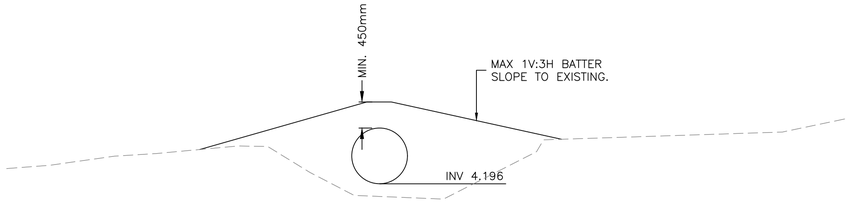
CH6.000
(NOM. PIPE JOINT 1/ CONCRETE BULK HEAD)



CH5.000



CH16.300
(OUTLET)



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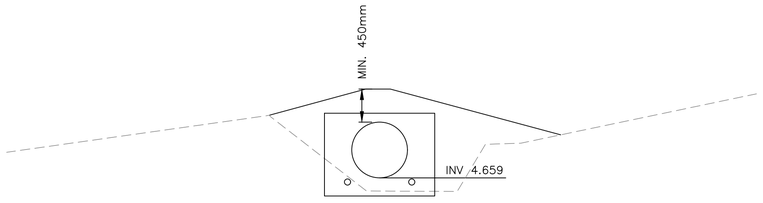

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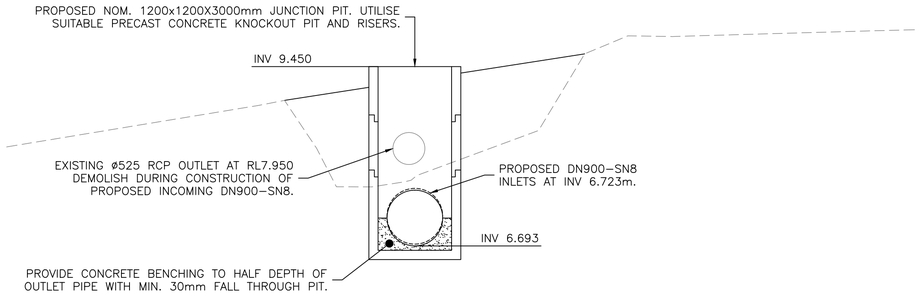
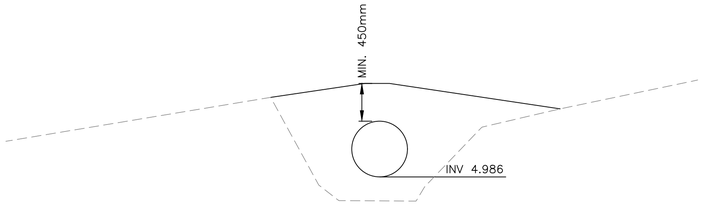


CH0.000
(CONNECTION AT PROPOSED PIT)



CH10.000

1	ISSUED FOR CONSTRUCTION	14/02/24
ISSUE	DESCRIPTION	DATE

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SCALES
H1:50 V1:50
ORIGINAL
A1

SURVEYOR:SCC/KEATLEY
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AZIMUTH: GDA2020/ MGA56
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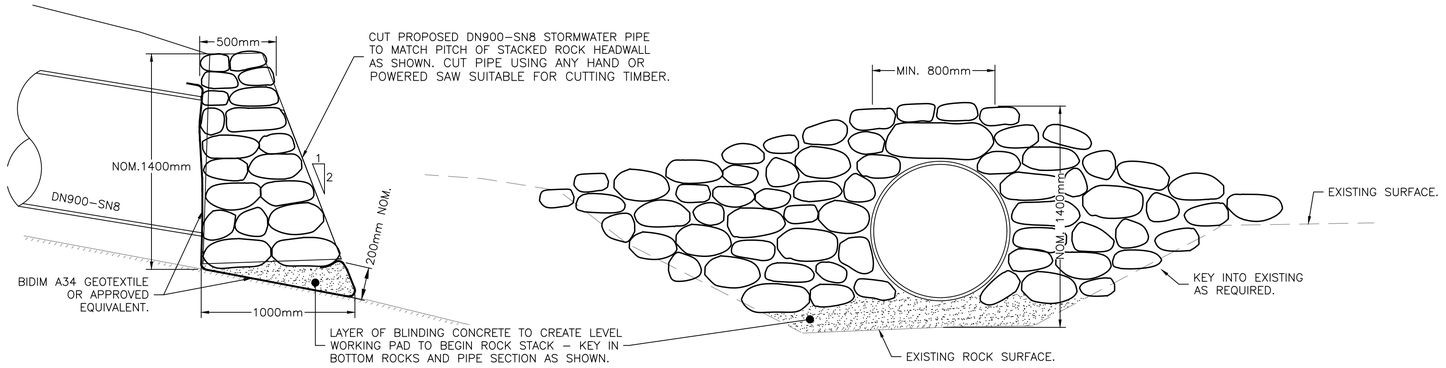
PROPOSED STORMWATER OUTLET REMEDIATION

VICTOR AVENUE, NARRAWALLEE

PIPE CROSS SECTIONS

DRAWING NO.
2307-C04
ISSUE.
A
SHEET 4 OF 6

Shoalhaven City Council
SCC PLAN REFERENCE
5583.04



LONGITUDINAL

TRANSVERSE

TYPICAL STACKED ROCK HEADWALL DETAIL

SCALE 1:20

GENERAL NOTES FOR STACKED ROCK HEADWALL:

1) ROCK BOULDER MUST HAVE THE FOLLOWING CHARACTERISTICS:
   - SEMI BLOCK LIKE IN SHAPE TO ALLOW STACKING.
   - HEIGHT 0.3m(MIN)
   - LENGTH 0.8m(MIN)
   - WIDTH 0.6m(MIN)

2) ROCKS SHALL BE PLACED IN SUCH A MANNER THAT THEY ARE STABLE AND INTERLOCKING AND LAID ROUGHLY COURSED AND BEDDED ON THEIR BROADEST BASE.

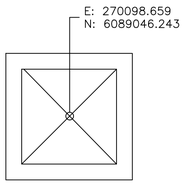
3) UNDERLAY ALL BOULDER WALLS WITH SYNTHETIC GEOTEXTILE – (SEE DETAIL THIS SHEET).

4) FOUNDATION TO BE APPROVED FOR A SAFE BEARING CAPACITY OF 200KPa PRIOR TO CONSTRUCTION

5) ROCK IS TO BE SOUND DURABLE SANDSTONE OR BASALT

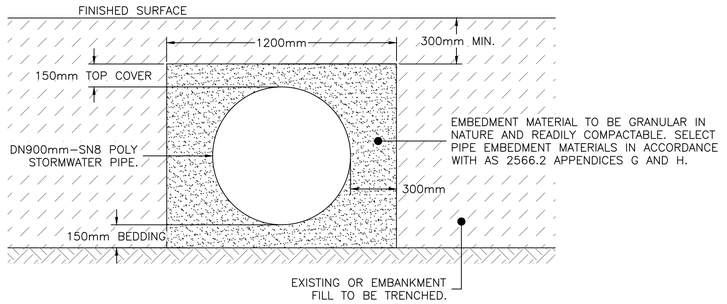
6) BACKFILL IS TO BE GRANULAR, FREE DRAINING AND COMPACTED.

7) PITCH OUT ALL GAPS IN BOULDER WALLS WITH SMALLER ROCK TO ENSURE A SECURE AND INTERLOCKING WALL. SYNTHETIC GEOTEXTILE SHOULD NOT BE VISIBLE WHEN THE WALL IS VIEWED FROM THE FRONT



NOM. JUNCTION PIT SETOUT

N.T.S

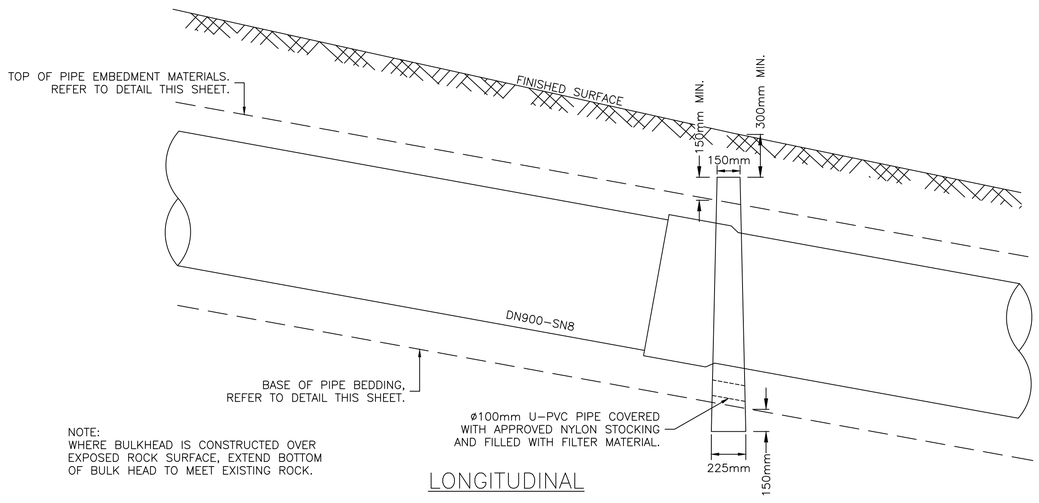


PIPE EMBEDMENT DETAIL

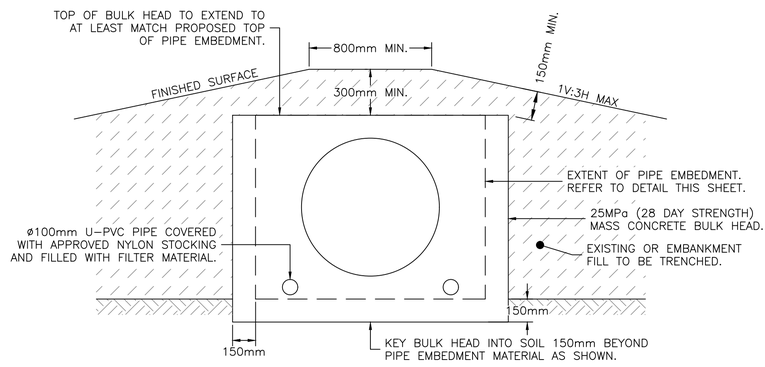
1:20

FLEXIBLE PIPE SUPPORT MIN COMPACTION (AS2566)

EMBEDMENT ZONE	COHESIONLESS SOILS (DENSITY INDEX)	COHESIVE SOILS (STANDARD MAXIMUM DRY DENSITY)
BEDDING ZONE	70%	95%
HAUNCH ZONE	70%	95%
SIDE SUPPORT ZONE	70%	95%
OVERLAY ZONE	70%	95%
BACKFILL	70%	95%



LONGITUDINAL



TRANSVERSE

CONCRETE BULK HEAD DETAIL

N.T.S

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	14/02/24

FOR CONSTRUCTION

FOOTPRINT (NSW) PTY. LTD. AUTHORISE THE USE OF THIS DRAWING ONLY FOR THE PURPOSE DEMONSTRATED BY THE STATUS STAMP SHOWN ABOVE.

SCALES	AS NOTED
ORIGINAL	A1
SURVEYOR:	SCC/KEATLEY
DATUM:	AHD
AZIMUTH:	GDA2020/ MGA56
DRAWN:	HB
DESIGNED:	HB
DESIGNED DATE:	APR 2023
CHECKED:	AB

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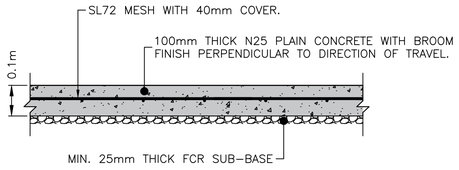
PROPOSED STORMWATER OUTLET REMEDIATION

VICTOR AVENUE, NARRAWALLEE

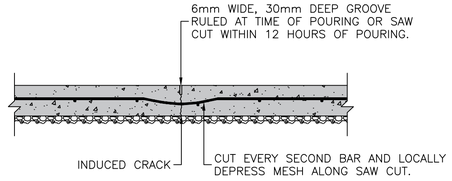
DETAILS - SHEET 1 OF 2

DRAWING NO.	2307-C05
ISSUE.	A
SHEET	5 OF 6
SCC PLAN REFERENCE	5583.05

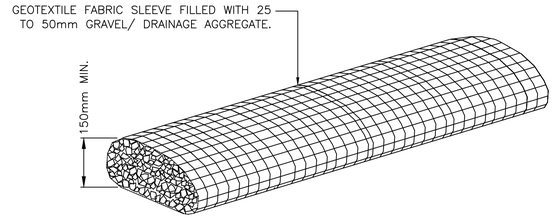
Shoalhaven City Council



CONCRETE PATH DETAIL
SCALE 1:10



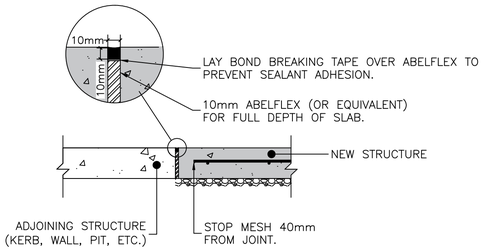
SAW CUT CONTRACTION JOINT DETAIL
SCALE 1:10



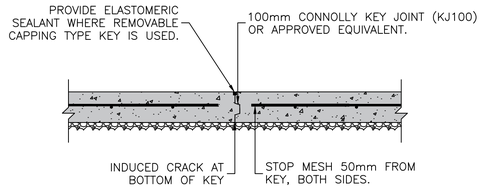
FILTER ROLL DETAIL
NOT TO SCALE

FILTER ROLL CONSTRUCTION NOTES

1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR USE PURPOSE MADE PROPRIETARY PRODUCT AND FILL IT WITH 25mm TO 50mm GRAVEL/ DRAINAGE AGGREGATE. SLEEVE TO BE 150mm HIGH WHEN FILLED.
2. FORM AN ELLIPTICAL CROSS SECTION.
3. ALTERNATIVELY UTILISE OVERLAPPING SANDBAGS.



ISOLATION JOINT DETAIL
SCALE 1:10



KEY CONTRACTION JOINT DETAIL
SCALE 1:10

JOINTING NOTES

1. JOINTING TO BE TO THE SATISFACTION OF THE SITE SUPERINTENDENT.
2. JOINTS TO BE PLACED TO KEEP CONCRETE ELEMENTS ROUGHLY EVEN IN LENGTH AND WIDTH (I.E. AS SQUARE AS POSSIBLE).
3. SAW CUT CONTRACTION JOINTS TO BE MADE AS SOON AS PRACTICABLE (4–6 HOURS POST POUR PREFERRED, 12 MAXIMUM). OTHERWISE SLAB SECTIONS TO BE FORMED USING KEY TYPE JOINTS TO ALLOW SECTIONS OF POURS TO CURE INDEPENDENTLY.

ISSUE	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	14/02/24

FOR CONSTRUCTION

SCALES
AS NOTED
ORIGINAL
A1

SURVEYOR:	SCC/KEATLEY
DATUM:	AHD
AZIMUTH:	GDA2020/ MGA56
DRAWN:	HB
DESIGNED:	HB
DESIGNED DATE:	APR 2023
CHECKED:	AB

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PROPOSED STORMWATER OUTLET REMEDIATION

VICTOR AVENUE, NARRAWALLEE

DETAILS - SHEET 2 OF 2

DRAWING NO.	ISSUE.	SHEET
2307-C06	A	6 OF 6

Shoalhaven City Council

SCC PLAN REFERENCE 5583.06

APPENDIX B - Likelihood of Occurrence Table (NSW Threatened Species)

NSW Threatened Species Likelihood of Occurrence Table

The table of likelihood of occurrence evaluates the likelihood of threatened species to occur on the subject site. This list is derived from previously recorded species within a 5 km radius (taken from NSW BioNet Atlas on 19/02/2024) 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/).

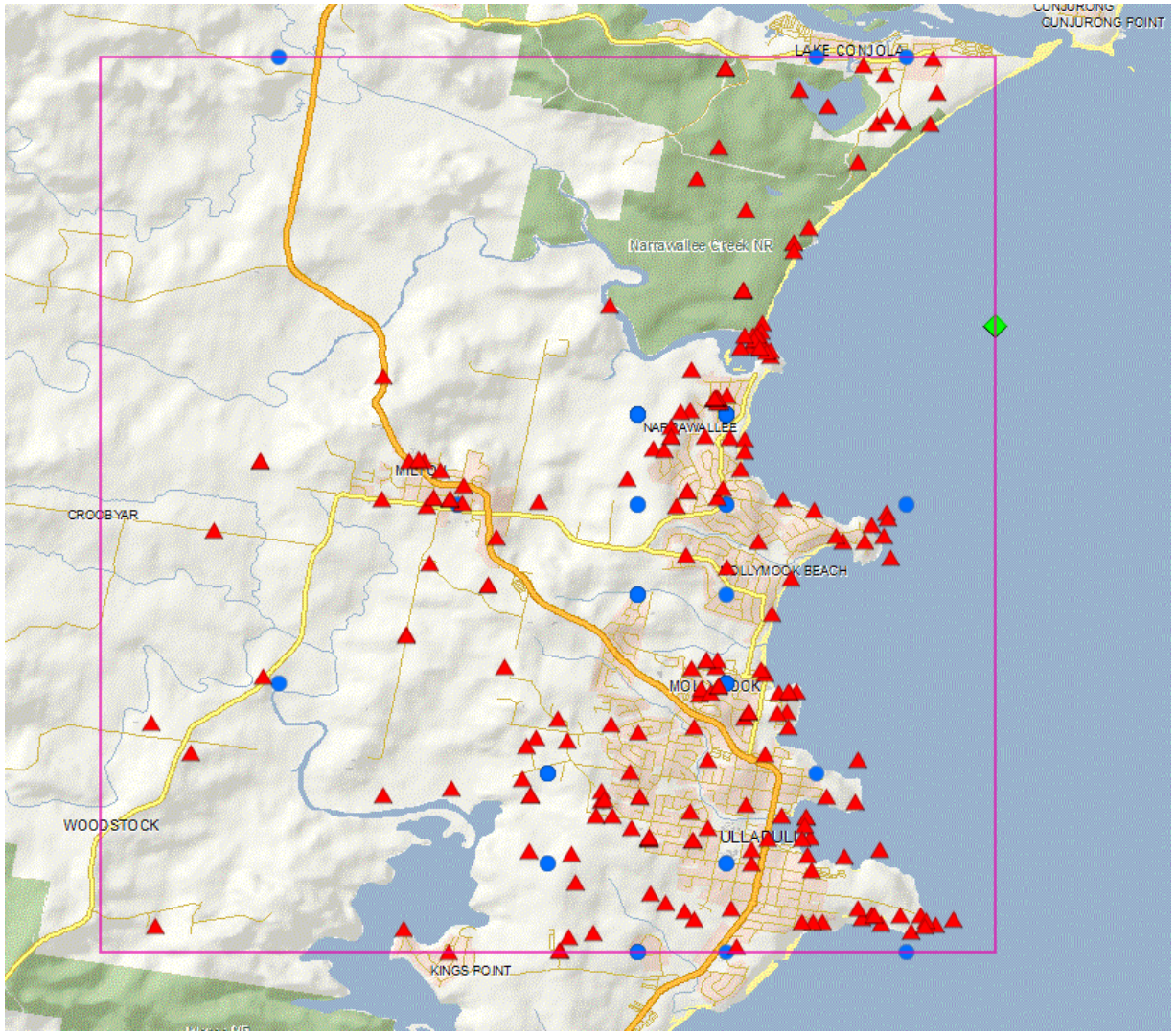
Likelihood of occurrence in study area

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).


CUNJUROONG POINT
LAKE CONJOLA
Narrawallee Creek NR
NARRAWALLEE
CROOBYAR
WOODSTOCK
KINGS POINT

Species name	***Status***	***Habitat requirements (www.environment.nsw.gov.au)***	***Likelihood of presence within areas impacted by the activity***
FLORA			
Scrub Turpentine *Rhodamnia rubescens*	Endangered NSW BC Act and Critically Endangered EPBC Act	Species is found in littoral, warm temperate and subtropical and wet sclerophyll forest usually on volcanic and sedimentary soils.	Unlikely to occur. No suitable habitat present within the site. Conspicuous species not observed during site inspections.
Magenta Lilly Pilly *Syzygium paniculatum*	Endangered NSW BC Act and Vulnerable EPBC Act	On the south coast the plant occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral rainforest.	Unlikely to occur. No suitable habitat present within the site. Conspicuous species mot observed during site inspections.
Thick Lip Spider Orchid *Caladenia tessellata*	Endangered NSW BC *Act* and Vulnerable EPBC Act	The species is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood. Populations in Kiama and Queanbeyan are presumed extinct. It was also recorded in the Huskisson area in the 1930s. It is generally found in grassy sclerophyll woodland on clay loam or sandy soils.	Unlikely to occur. No suitable habitat present within the site.
Leafless Tongue Orchid *Cryptostylis hunteriana*	Vulnerable EPBC Act and NSW BC Act	Predominantly occurs 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*).	Unlikely to occur. No suitable habitat present within the site.
AMPHIBIANS			
Stuttering Frog *Mixophyes balbus*	Endangered NSW BC Act, Vulnerable EPBC Act	Found in rainforest and wet, tall open forests in the foothills and escarpment on the eastern side of the Great Dividing Range. Breed in streams during summer after heavy rain.	Unlikely to occur. No suitable habitat present within the site.

Giant Burrowing Frog *Heleioporus australicus*	Vulnerable NSW BC Act and EPBC Act	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites. Whilst in non-breeding habitat it burrows below the soil surface or in the leaf litter. Individual frogs occupy a series of burrow sites, some of which are used repeatedly. Breeding habitat of this species is generally soaks or pools within first or second order streams. They are also commonly recorded from 'hanging swamp' seepage lines and where small pools form from the collected water.	Unlikely to occur. No suitable habitat present within the site. And no breeding habitat in proximity to the proposed activity area.
Green and Golden Bell Frog *Litoria aurea*	Endangered NSW BC Act, Vulnerable EPBC Act	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes or spikerushes.	Unlikely to occur. No suitable habitat present within the site. And no breeding habitat in proximity to the proposed activity area.
REPTILES			
Loggerhead Turtle *Caretta caretta*	Endangered EPBC Act, Endangered BC Act	The species is ocean-dwelling, foraging in deeper water for fish, jellyfish and bottom-dwelling animals. The female comes ashore to lay eggs in a hole dug on the beach in tropical regions during warmer months.	Unlikely to occur. No suitable habitat present within the site.
Green Turtle *Chelodia mydas*	Vulnerable EPBC Act and NSW BC Act	Ocean-dwelling species spending most of its life at sea. Eggs laid in holes dug in beaches throughout their range.	Unlikely to occur. No suitable habitat present within the site.
BIRDS			
Superb Fruit-Dove *Ptilinopus superbus*	Vulnerable NSW BC Act	Inhabits rainforest and similar closed forests where if forages high in the canopy, eating the fruits of may trees such as figs and palms.	Unlikely to occur. No suitable habitat present within the site.
White-throated Needletail *Hirundapus caudacutus*	Vulnerable EPBC Act	Migratory and usually seen in eastern Australia from October to April. Breeds in forests in south-eastern Siberia, Mongolia, the Korean Peninsula and northern Japan. In Australia, the species is mostly aerial.	Unlikely to occur. No suitable habitat present within the site. And no breeding habitat in proximity to the proposed activity area.

Shy Albatross *Thalassarche cauta*	Endangered NSW BC Act and Vulnerable EPBC Act	This pelagic or ocean-going species inhabits subantartic and subtropical marine waters, spending the majority of its time at sea.	Unlikely to occur. No suitable habitat present within the site.
Black-browed Albatross *Thalassarche melanophris*	Vulnerable NSW BC Act and Vulnerable EPBC Act	Inhabits antarctic, subantarctic, subtropical marine and coastal waters.	Unlikely to occur. No suitable habitat present within the site.
White-bellied Sea-Eagle *Haliaeetus leucogaster*	Vulnerable NSW BC Act	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, and the sea. Breeding habitat consists of mature tall open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.	Possibly occurring over or in proximity to the site, but unlikely to utilise the site for feeding or breeding. No breeding habitat or stick nests in the proposed activity area.
Square-Tailed Kite *Lophoictinia isura*	*Vulnerable NSW* BC *Act*	Summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses large hunting ranges of more than 100km2. Breeding is from July to February, with nest sites generally located along or within 200m of riparian areas, near watercourses, in a fork or on large horizontal limbs.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site. No stick nests in proposed activity area.
Eastern Osprey *Pandion cristatus*	Vulnerable NSW BC Act	Favours coastal areas, especially the mouths of large rivers, lagoons and lakes. Feeds on fish over clear, open water. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Possibly occurring over or in proximity to the site, but unlikely to utilise the site for feeding or breeding. No breeding habitat in the proposed activity area.
Sooty Oystercatcher *Haematopus fuliginosus*	Vulnerable NSW BC Act	Shore bird. Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Forages on exposed rock or coral at low tide for food such as limpets and mussels.	Possibly occurring in proximity to the site.

Pied Oystercatcher *Haematopus longirostris*	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.	Possibly occurring in proximity to the site.
Eastern Hooded Dotterel *Thinornis cucullatus cucullatus*	Endangered NSW BC Act and Vulnerable EPBC Act	In south-eastern the species prefer sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding, much beachcast seaweed, and backed by sparsely vegetated sand-dunes for shelter and nesting. Occasionally Hooded Plovers are found on tidal bays and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs. They regularly use near-coastal saline and freshwater lakes and lagoons, often with saltmarsh.	Possibly occurring in proximity to the site.
Eastern Curlew *Numenius madagascariensis*	Critically Endangered EPBC Act	It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in NSW is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts.	Unlikely to occur. No suitable habitat present within the site.
Little Tern *Sternula albifrons*	Endangered NSW BC Act Migratory EPBC Act	Almost 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 high tide mark near estuary mouths or adjacent to coastal lakes and islands.	Possibly occurring in proximity to the site.
Gang-gang Cockatoo *Callocephalon fimbriatum*	Vulnerable NSW BC Act	Tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. Favours old growth attributes for nesting and roosting	Possibly occurring over or in proximity to the site, but unlikely to utilise or rely on available habitat within the site. No hollow-bearing trees in the proposed activity area.
Glossy Black-cockatoo *Calyptorhynchus lathami*	Vulnerable NSW BC Act	The species inhabits open forest and woodlands of the coast where stands of she-oak occur. In the locality the species feed almost exclusively on the seeds of the black she-oak *Allocasuarina littoralis* shredding the cones with their bill.	Unlikely to occur within the site. No suitable habitat present. No breeding or foraging habitat present.

Little Lorikeet *Glossopsitta pusilla*	Vulnerable NSW BC Act	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large proportion of the species' core habitat. Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in *Angophora, Melaleuca* and other nectar and fruit bearing trees.	Unlikely to occur within the site. No suitable habitat present. No breeding or foraging habitat present.
Swift Parrot *Lathamus discolor*	Critically Endangered EPBC Act Endangered NSW BC Act	Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt E. pilularis. Return to some foraging sites on a cyclic basis depending on food availability. Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum Eucalyptus globulus.	Unlikely to occur within the site. No suitable habitat present. No breeding or foraging habitat present.
Eastern Ground Parrot *Pezoporus wallicus wallicus*	Vulnerable NSW BC Act	The Ground Parrot occurs in high rainfall coastal and near coastal low heathlands and sedgelands, generally below one metre in height and very dense (up to 90% projected foliage cover). These habitats provide a high abundance and diversity of food, adequate cover and suitable roosting and nesting opportunities for the Ground Parrot, which spends most of its time on or near the ground. When flushed, birds fly strongly and rapidly for up to several hundred metres, at a metre or less above the ground.	Unlikely to occur. No suitable habitat present within the site.
Powerful Owl *Ninox strenua*	Vulnerable NSW BC Act	Coastal Woodland, Dry Sclerophyll Forest, wet sclerophyll forest and rainforest- Can occur in fragmented landscapes Roosts in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina*	Possibly occurring over or in proximity to the site, but unlikely to utilise or rely on available habitat within the site. No hollow-

		littoralis, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda,* Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species. requires old growth elements-hollow bearing tree resources for nesting and prey resource. Nests in large tree hollows in large eucalypts that are at least 150yrs old. Often in riparian areas. Large home range.	bearing trees in the proposed activity area.
Sooty owl *Tyto tenebricosa*	Vulnerable NSW BC Act	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forest.	Possibly occurring over or in proximity to the site, but unlikely to utilise or rely on available habitat within the site. No hollow-bearing trees in the proposed activity area.
Regent Honeyeater *Anthochaera Phrygia*	Endangered NSW BC Act, Critically Endangered EPBC Act	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	Unlikely to occur. No suitable habitat present within the site.
White-fronted Chat *Epthianura albifrons*	Vulnerable NSW BC Act	Gregarious species, usually found foraging on bare or grassy ground in wetland areas.	Unlikely to occur. No suitable habitat present within the site.
Varied Sittella *Daphoenositta chrysoptera*	Vulnerable NSW BC Act	Inhabits eucalypt forest and woodlands especially those containing routh-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy.	Unlikely to occur. No suitable habitat present within the site.
Scarlet Robin *Petroica boodang*	Vulnerable NSW BC Act	The Scarlet Robin is primarily a resident in dry forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The understorey is usually open and grassy with few scattered shrubs.	Unlikely to occur. No suitable habitat present within the site.

MAMMALS			
Spotted-tailed Quoll *Dasyurus maculatus*	Vulnerable NSW BC Act and Endangered EPBC Act	The species has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites.	Unlikely to occur within the site. No suitable habitat present.
Southern Brown Bandicoot *Isoodon obesulus obesulus*	Endangered NSW BC Act and EPBC Act	The species is largely crepuscular (active mainly after disk and / or dawn). They are generally found in heath or open forest with a heathy understorey on sandy or friable soils	Unlikely to occur within the site. No suitable habitat present.
Koala *Phascolarctos cinereus*	Endangered NSW BC Act and EPBC Act	The koala inhabits eucalypt woodland and forests.	Unlikely to occur within the site. No suitable habitat present.
Yellow-bellied Glider *Petaurus australis*	Vulnerable NSW BC Act and Endangered EPBC Act	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein.	Unlikely to occur within the site. No suitable habitat present.
Southern Greater Glider *Petauroides Volans*	Endangered NSW BC Act and EPBC Act	The greater glider is an arboreal nocturnal marsupial, predominantly solitary and largely restricted to eucalypt forests and woodlands of eastern Australia. It is typically found in highest abundance in taller, montane eucalypt forests of fertile soils with relatively old trees and abundant hollows.	Unlikely to occur within the site. No suitable habitat present.
Grey-headed Flying-fox *Pteropus poliocephalus*	Vulnerable NSW BC Act and EPBC Act	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 kilometres of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. The species feeds on the nectar and pollen of native trees, in particular *Eucalyptus, Melaleuca* and *Banksia,* and fruits of rainforest trees and vines	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site to a significant extent. No roosting habitat or food resources affected.

Eastern Coastal Free-tailed Bat *Micronomus norfolkensis*	Vulnerable NSW BC Act	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark on in man-made structures.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site to a significant extent. No roosting habitat or food resources affected.
Large-eared Pied Bat *Chalinolobus dwyeri*	Vulnerable NSW BC Act and EPBC Act	Roosts in cave (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin, frequenting low to mid-elevation dry open forest and woodland close to those features.	Unlikely to occur within the site. No suitable habitat present.
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	Vulnerable NSW BC Act	Prefers moist habitats, with trees taller than 20m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Unlikely to occur within the site. No suitable habitat present.
Southern Myotis *Myotis macropus*	Vulnerable NSW BC Act	Generally roost in groups of 10 to 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.	Unlikely to occur within the site. No suitable habitat present.
Golden-tipped Bat *Phoniscus papuensis*	Vulnerable NSW BC Act	Found in rainforest and adjacent wet and dry sclerophyll forest up to 1000 m. Also recorded in tall open forest, Casuarina-dominated riparian forest and coastal *Melaleuca* forests.	Unlikely to occur within the site. No suitable habitat present.
Greater Broad-nosed Bat *Scoteanax rueppellii*	Vulnerable NSW BC Act	The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range. The species utilises a variety of habitats from woodland to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forests. Although this species usually roosts in tree hollows, it has been found in buildings.	Unlikely to occur within the site. No suitable habitat present.
Large Bent-winged Bat *Miniopterus orianae oceanensis*	Vulnerable NSW BC Act	Caves are the primary roosting habitat, but also use derelict mines, stormwater tunnels, buildings and other man-made structures. The species form discrete populations centred on a maternity cave that is used annually. At other times of the year, populations disperse within about 300 km range of maternity caves.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site. No roosting habitat or food resources affected.

Australian Fur-seal *Arctocephalus pusillus doriferus*	Vulnerable NSW BC Act	Prefers rocky parts of islands with flat, open terrain.	Unlikely to occur within the site. No suitable habitat present.
Southern Right Whale *Eubalaena australis*	Endangered NSW BC Act and EPBC Act	Marine whale	Unlikely to occur within the site. No suitable habitat present.
Sperm Whale *Physeter macrocephalus*	Vulnerable NSW BC Act	Marine whale	Unlikely to occur within the site. No suitable habitat present.