REVIEW OF ENVIRONMENTAL FACTORS (REF)
McINTOSH ST SHOALHAVEN HEADS VIEWING PLATFORM

Contents

Document control

Item	Details
Project	Review of Environmental Factors – McIntosh St Shoalhaven Heads Viewing Platform
Client	City Services, Shoalhaven City Council
Prepared By	City Services, Shoalhaven City Council

Document status

Version	Author / Reviewer*	Name	Signed	Date
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	Reviewer	Geoff Young		06/09/2022
	Amendments	Jeff Bryant		13/10/2022

*Review and endorsement statement:

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

Assessment and approvals overview

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

1. PROPOSAL AND LOCATION

1.1 Proposed activity and background information

The proposal involves the construction of a new viewing platform overlooking Seven Mile Beach at McIntosh St, Shoalhaven Heads.

The proposal includes demolition of an existing viewing platform; the relocation of an existing outdoor shower to an existing platform and replacement of decking with recycled composite mesh decking; and revegetation of adjacent dunes and parkland.

Works would involve:

- Demolition of existing timber viewing platform, and saw-cut and partial demolition of existing concrete path.
- Excavation and construction of footings (depth and type not yet determined).
- Construction of 56m^2 viewing platform with stairs and 20m long x 2.5m wide access ramp (including 2m landing) of recycled composite fibre mini-mesh decking with a fibre-reinforced plastic or steel frame; recycled composite or fibre reinforced plastic railing; and two recycled composite benches.
- Replacement of southern platform decking with recycled composite fibre mini-mesh.
- Relocation of existing outdoor shower to southern platform, including trenching to relocate water supply.
- Revegetation adjacent to ramp and new platform, in addition to revegetation of dunes, with endemic dune shrub and groundcover vegetation (including Spinifex, Lomandra, Coastal Wattle and Pigface) and associated sand-trap fencing on ocean side of plantings. Note that revegetation areas will need to be adapted from concept plan to reflect current landform and environment (refer to Figure 2) and may be undertaken as a separate stage.

Refer to Figure 3 and Appendix A for design plans.

Works would also involve the implementation of prescribed safeguards and mitigation measures (refer to Section 7).

The proposal is a community initiative and would be constructed by Council with grant funding obtained by Rotary, representing the local community.

It should be noted that the existing landform and environment has been changed markedly from that at conception of the proposal. The vegetated dune has receded by at least 25m, making the proposed revegetation of dunes as per the concept plan unfeasible, and the edge of the proposed platform is now less than 3m from edge of the existing dune.

The proposed location of the viewing platform was selected for enhanced views unimpeded by vegetation, and to provide improved connection to the existing beach access, surf club and parking.

The risk to the proposed viewing platform associated with coastal hazards, indicate that the location may not enable a design life of the structure beyond 8 years (refer to Section 3.9).

Council would seek however, to design and construct for a design life of 10 years for structural durability purposes, with construction anticipated to be complete within the programmed project timeframe, ending December 2022.

Possible alternatives to the proposal include:

1. Doing nothing – The community have acquired grant funding and have an expectation that Council delivers the project, making this option inappropriate.
2. Refurbish the existing viewing platform and develop adjacent dune vegetation to provide for improved stability and retained views – This is a feasible alternative but would require support from Rotary and the community, and may require a review of grant funding with potential delays affecting project timeframe.
3. Construct for a longer design life (25+ years) – It is expected that any long-term design solution would require piling as the footing solution, requiring full Geotech investigation and engaging of a Coastal / Marine Consultant Engineer to undertake structural design that takes into account loading parameters including sea level and predicted rise, wave runup, storm surge events and debris. For this option, the program for completion would be likely be delayed by 6 months or more and the necessary project budget is expected to exceed the available budget by more than $140,000.

   Additionally, constructing for a longer design life would likely create an impractical commitment to continually reinstate the coastal foreshore around the platform, as predicted shoreline recession progresses.

The proposal to construct a new "sacrificial" asset within an area subject to existing coastal hazards (which are predicted to worsen) is generally not consistent with strategic, regional and coastal planning that calls for adaptive, resilient and sustainable approaches to asset, resource and land management.

However, the proposal is partially consistent with the Shoalhaven Coastal Zone Management Plan 2018 actions specific to the site (refer to Section 3.9.1); the proposed structure could potentially be relocated or adapted to changing conditions; and the proposal is consistent with community values and expectations.

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 Review of Environmental Factors (REF) helps to fulfil the requirements of Section 5.5 of the Act that SCC examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

1.2 Location

The proposed activity would be undertaken within Gumly Reserve at McIntosh St, Shoalhaven Heads.

The site is Crown Land and was gazetted for public recreation in 1968. Shoalhaven City Council is the appointed Land Manager under the NSW *Crown Land Management Act 2014*. Refer to Table 1 for details of affected land.

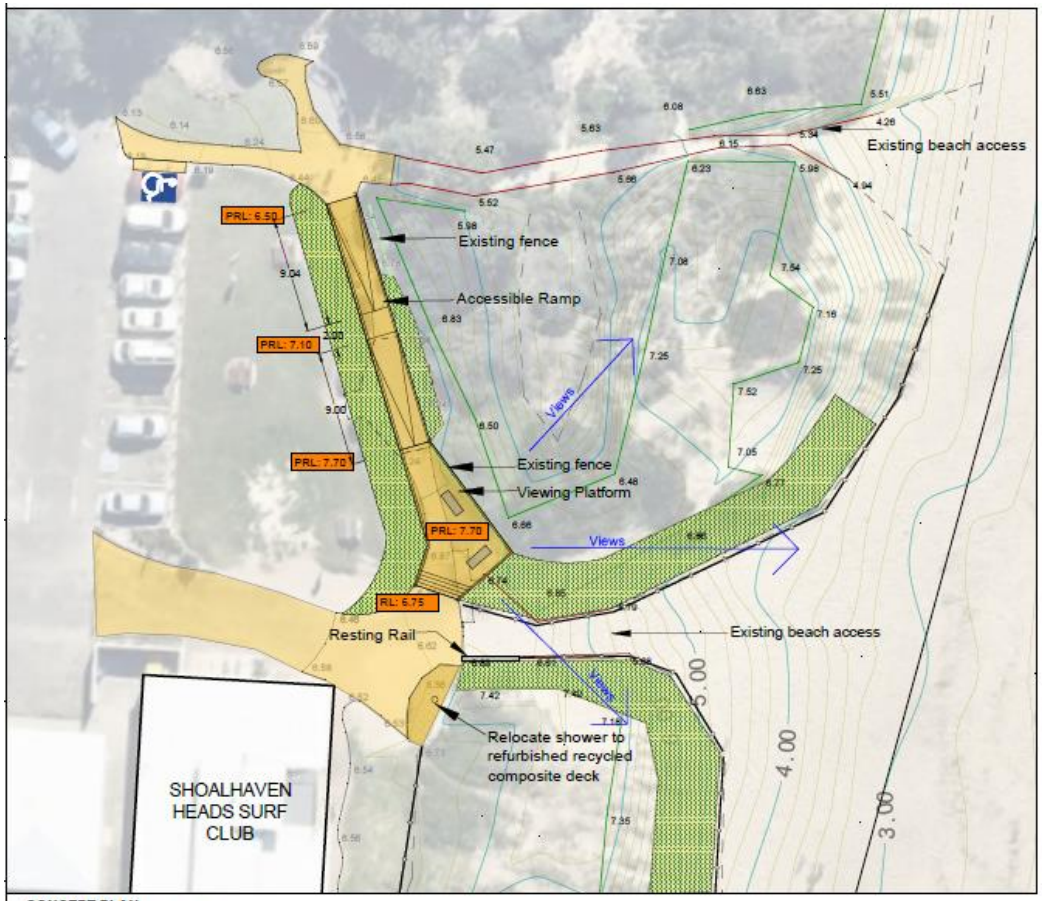
Table 1. Property affected by the proposal

Lot / DP	Description	Land owner / manager	Other pertinent information
Part Lot 7005 DP 1075719	Gumly Reserve, McIntosh St, Shoalhaven Heads	Crown Land for which Shoalhaven City Council is the Land Manager	Crown Reserve R52855: Community Land – General Community Use / Natural Area / Park (gazetted for public recreation 13/09/1968)

Figure 1. Site location

Figure 2. Site showing proposed footprints of viewing platform and revegetation (revegetation requires adapting to current landform)

Figure 3. Concept plan



LEGEND

REVEGETATION (approx.400m2)
Sand trapping and planting dunes with suitable dune plants such as Spinifex, Lomandra, Acacia. Carbotrutus et. Reserve plantings to be native landscape varieites such as Westringia, Callistemons, Lomandras etc.

EXISTING FENCING
7.18 EXISTING SPOT HEIGHTS
PRL PROPOSED REDUCED LEVEL
RL REDUCED LEVEL
FENCING (Approx.158m2)
Sand trap fencing to be installed to retain sand dunes and proposed vegetation

DESIGN NOTES

VIEWING PLATFORM (56m2 including stairs)

- The proposed location of the platform has enhanced views, unimpeded by existing vegetation.It is in line with the existing platform and does not encroach/impact onto existing dunes. - it borders on the existing fence line
- Improved connection to the existing or realligned beach access, surf club and parking.
- The height of the platform is PRL 7.70 and is higher than the existing dunes. The proposed height allows for the ramp to fit in the location of the existing concrete path and platform. Less construction cost and impact on grassed picnic/rigging area.
- Approx. 5 stairs @ 175mm from existing concrete to platform
- 2 x Wood Composite Plastic bench seats
- Railing with balustrade when over 1m drop

RAMP (50m2)

- Designed to AS 1428 with a gradient less than 1 in 14.
- Northern side - Existing concrete is to be saw cut at approx. 6.50 and ramp to start from this point. Connection to existing on grade concrete paths.
- The overall length of the ramp is 20m long and 2.5m wide and includes a 2m landing and 2 x 9m sections of ramp
- Railing and kickrail on ramp - Balustrade when over 1m drop.
- The location of the ramp has less impact on the grassed area and simply just replaces the existing concrete and deck.
- Vegetation is proposed adjacent to the ramp and viewing platform to soften the structure and screen sub-structure

CONCEPT PLAN
A1 SCALE 1:200 A3 SCALE 1:500

2. EXISTING ENVIRONMENT

2.1 Habitat and vegetation assessment

The site was assessed by a Council Environmental Officer on 19th and 23rd August 2022. Surveys involved vegetation and habitat assessment, recording all flora species within and immediately adjacent to the subject site, determination of vegetation communities, targeted survey for potentially occurring threatened flora species (including *Chamaesyce psammogeton*) and investigation of habitat availability on site for threatened fauna species.

The site comprises an existing, Council managed, public reserve with picnic area, concrete paths, and raised timber viewing platforms overlooking partially vegetated dunes above Seven Mile Beach. The site also contains two semi-formal beach access tracks, however, the primary beach access track at the south of the site was closed due to erosion at the time of survey.

The picnic area is largely grassed with *Cenchrus clandestinus* (Kikuyu) and *Trifolium repens* (White Clover), with planted *Lomandra* species bordering the eastern pathway.

Vegetation mapped as occurring within and in proximity to the site (refer to Figure 4) includes:

- PCT 3788 Coastal Foredune Wattle Scrub – no associated threatened ecological communities (TECs).
- PCT 3410 Spinifex Strandline Grassland – no associated TECs.
- PCT 3986 Coastal Sands Swamp Mahogany Rush Forest – associated with Swamp Sclerophyll Forest on Coastal Floodplains TEC.
- PCT 3638 South Coast Sands Bangalay Forest – associated with Bangalay Sand Forest TEC.

PCT 3788, mapped as occurring partially over the site, is a tall to very tall open to closed shrubland found on coastal foredunes along the entire NSW coastline. The shrub layer is variable in height and cover however almost always includes a patchy cover of *Acacia longifolia* very frequently with *Leptospermum laevigatum* and commonly a low cover of *Banksia integrifolia*. Other occasional shrub species include *Leucopogon parviflorus* and *Monotoca elliptica*. The ground covers are also highly variable in composition however include salt tolerant grasses and forbs. *Spinifex sericeus*, *Carpobrotus glaucescens, Ficinia nodosa* are occasionally recorded with hardy graminoids including *Lomandra longifolia* and rarely *Dianella caerulea* (NSW Government 2022a).

Native vegetation occurring within and immediately adjacent to the site is consistent with PCT 3788, featuring a low, narrow canopy (up to approx. 10m wide), extending partway along the adjacent (eastward) dune of *Banksia integrifolia* (Coastal Banksia) and *Leptospermum laevigatum* (Coastal Tea-tree), with a disturbed understorey consisting of *Lomandra longifolia* (Spiny Mat-rush)*, Rhagodia candolleana* (Coastal Saltbush)*, Solanum americanum* (Glossy Nightshade), occasional *Acacia longifolia* subsp. *sophorae* (Coastal Wattle), and invasive exotic species including *Cenchrus clandestinus* (Kikuyu), *Delairea odorata* (Cape Ivy), *Acetosa saggitata* (Turkey Rhubarb), *Ehrharta erecta* (Panic Grass), *Hydrocotyle bonariensis* (Beach Pennywort), *Avena* species (Wild Oat), *Sonchus* species (Sow Thistle), *Brassica* species (Wild Mustard) and *Cakile* species (Sea Rocket). Further north or south of the site, patches of *Spinifex sericea* (Coastal Spinifex) occur along the lower edge of vegetation above the beach.

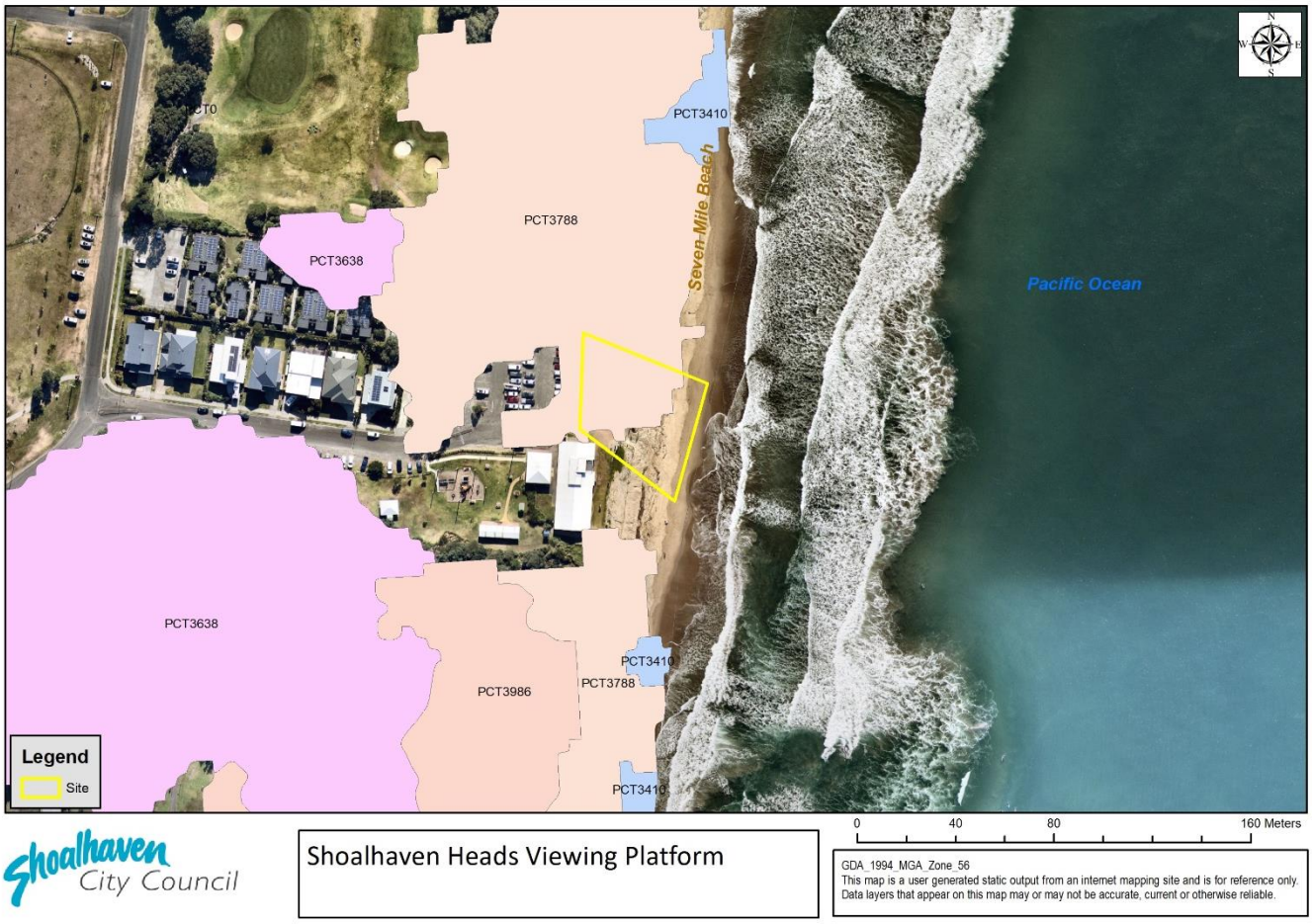
The southern portion of dune vegetation adjacent to the proposed location of the viewing platform is highly disturbed and dominated by invasive exotic groundcovers.

The vegetation type present on site is not consistent with any locally occurring endangered ecological community.

To the south of the site, revegetation of reinstated dunes has been undertaken in front of the Shoalhaven Heads Surf Club building.

The coastline and dunes in this location are known to be highly dynamic and subject to high levels of erosion or accretion. Refer to Section 3.9 for more information.

Figure 4. Vegetation mapped as occurring in the locality of the site



Threatened species, habitat resources and targeted survey findings

No threatened flora including *Chamaesyce psammogeton,* nor suitable habitat for locally occurring, cryptic, threatened flora species was identified on site during vegetation surveys.

No Glossy Black Cockatoo (*Calyptorhynchus lathami*) feed trees (i.e. *Allocasuarina littoralis* with characteristic chewed cones), nor Yellow-bellied Glider (*Petaurus australis*) feed trees (i.e. 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.

No hollow-bearing trees were found to occur within or in close proximity to the proposal footprint.

No other threatened fauna or signs of threatened fauna were detected during surveys.

Photos 1 through 6 below show the site, available habitat and relevant features.

Photo 1. Site facing south-east (approx.) showing existing paths, platforms and dune vegetation

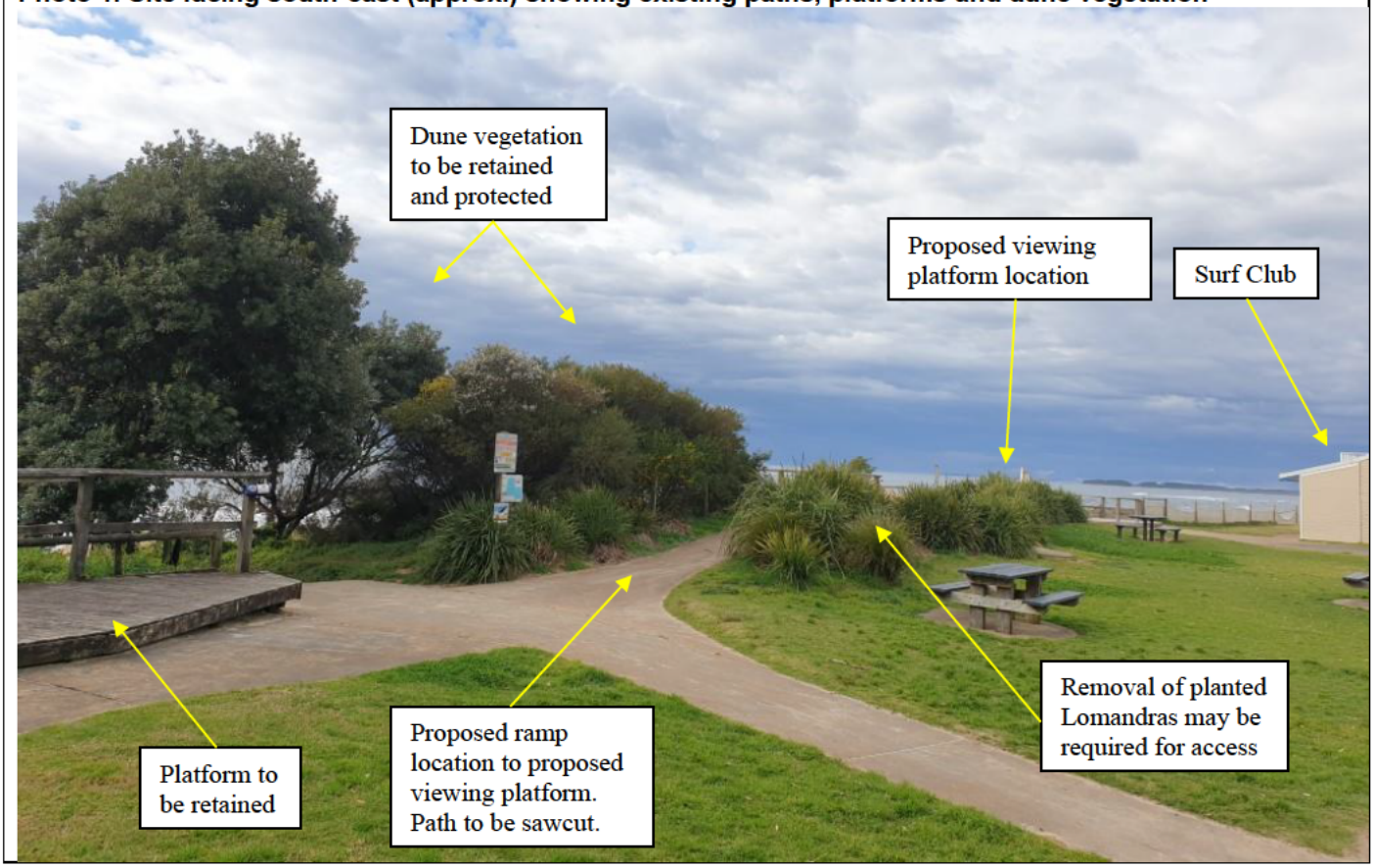


Photo 2. Site facing north showing location of proposed viewing platform and shower relocation

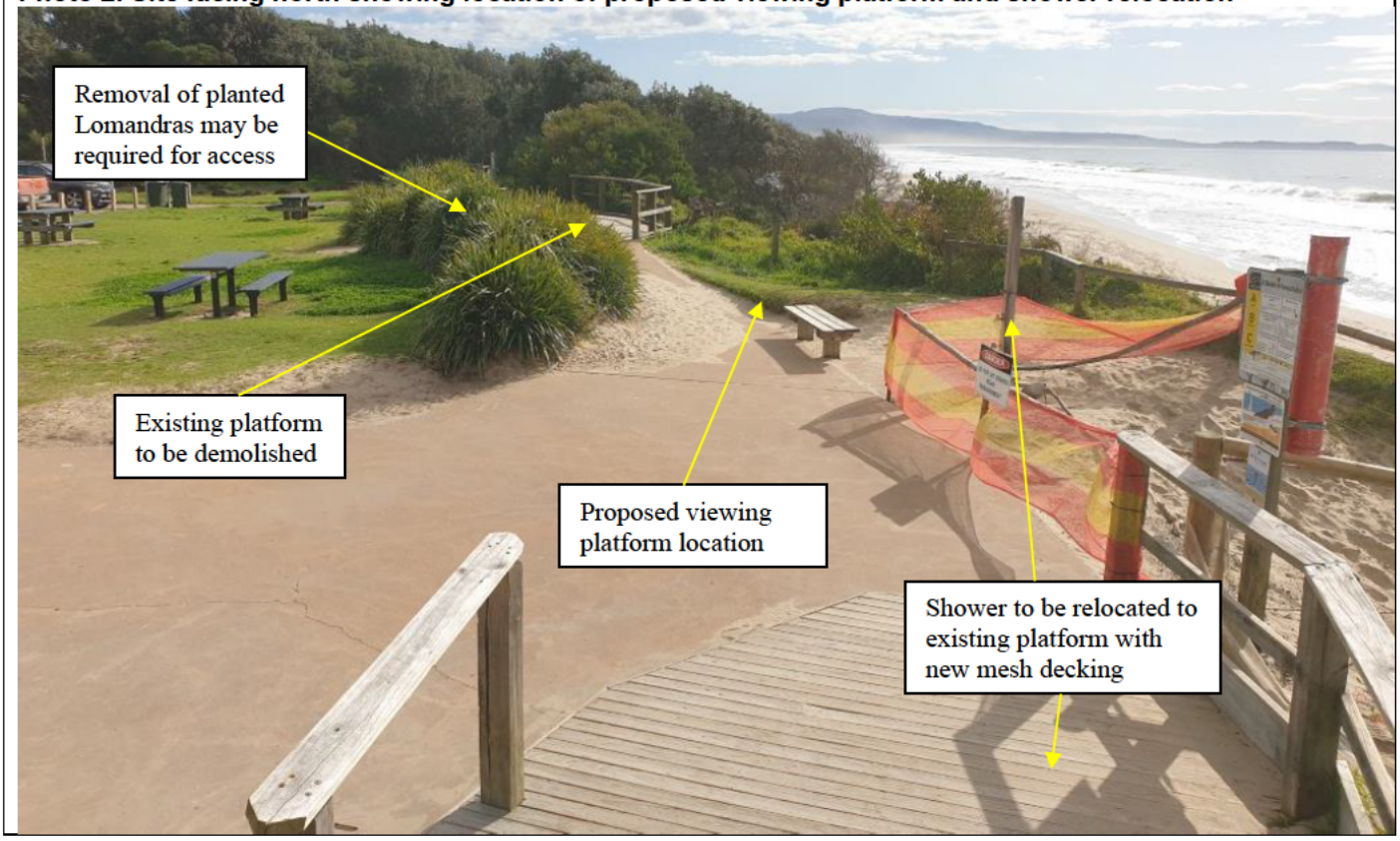


Photo 3. Location of proposed viewing platform showing proximity of dune scarp

Photo 4. Dune vegetation adjacent to proposed viewing platform – predominantly invasive exotic species

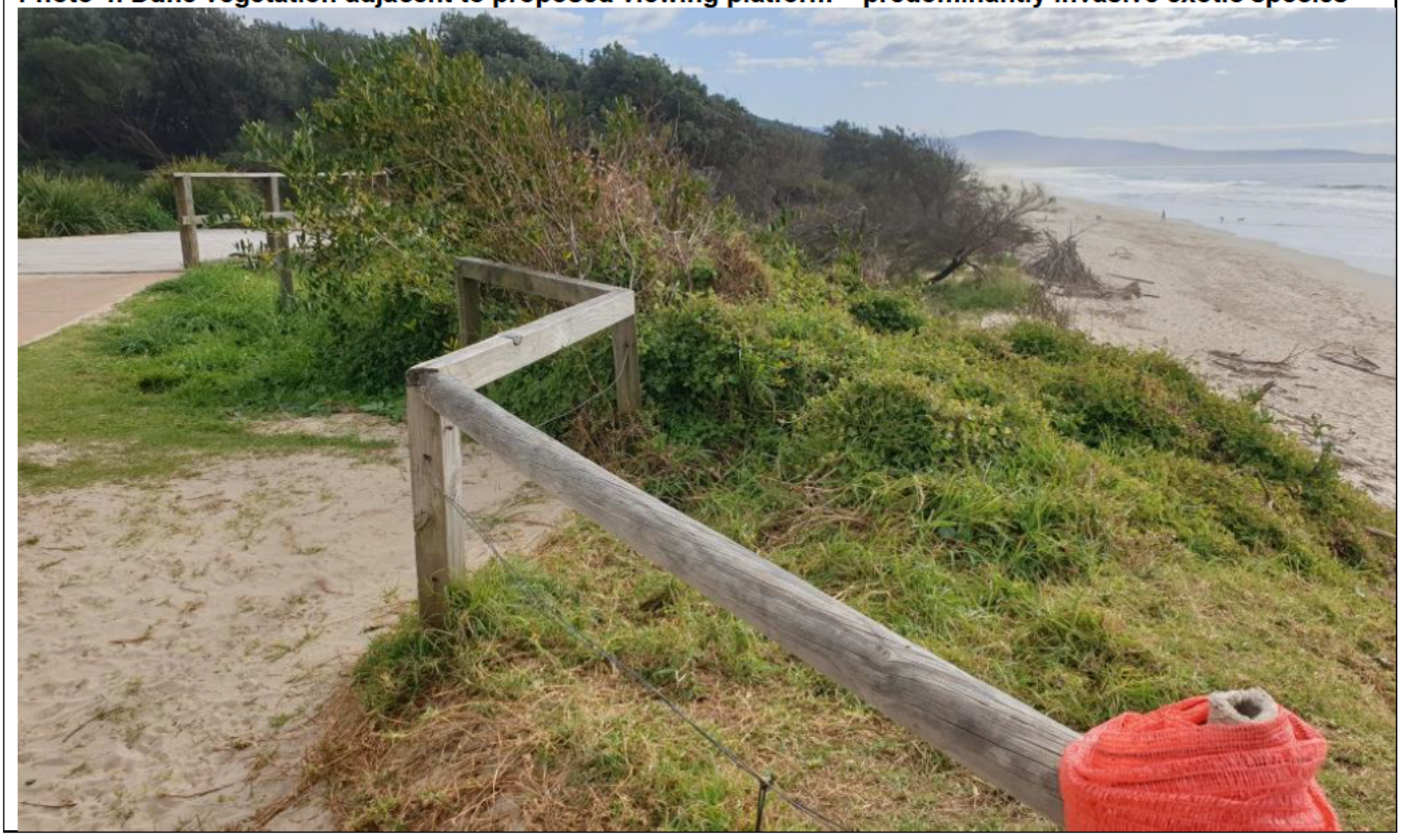


Photo 5. Existing viewing platform to be demolished

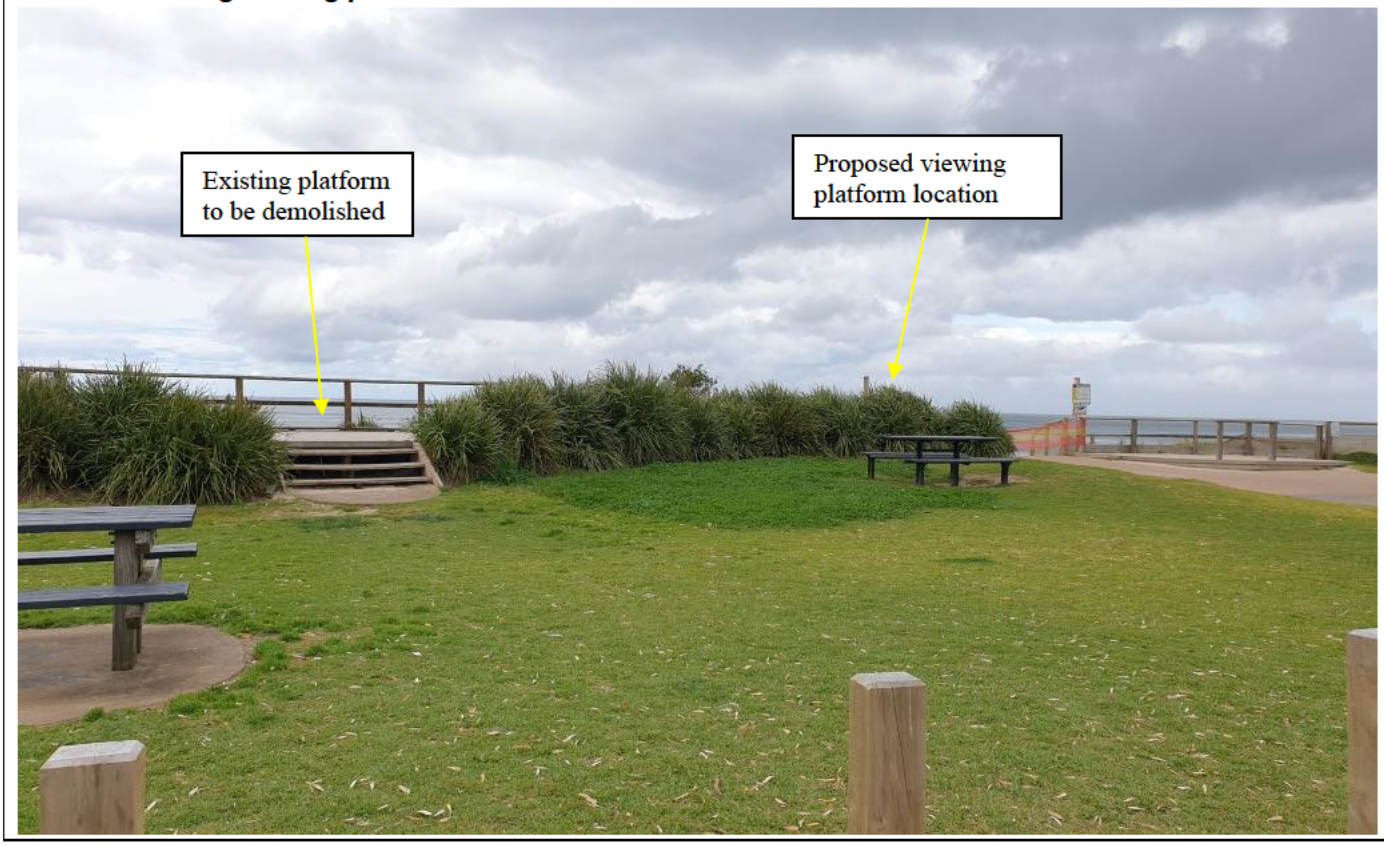


Photo 6. Beach and dune below proposal

2.2 Subsurface ground investigations

ENRS (2021) was engaged by Council to carry out limited geotechnical investigations within and in proximity to the proposed viewing platform footprint on 21 May 2001, involving test pitting to depths of 1.2m to 1.5m and Dynamic Cone Penetrometer (DCP) tests to depths of 1.6m to 2.3m.

The subsurface conditions encountered were summarised to comprise three material types:

- Upper layer of loose topsoil and fill of silty and clayey sand to a depth of 0.6m below ground level (BGL).
- Mid layer of compacted medium dense to dense fill of clays gravels and boulders from 0.6m to 1.2m BGL.
- Lower layer of loose, fine grained, dune sand deeper than 1.2m BGL and inferred to be in excess of several metres deep.

ENRS investigations also noted that part of historic rock revetment (circa 1978 – refer to Section 3.9.1) was visible in the dune scarp and ENRS suggested that the structure may exist at the southern end of the viewing platform towards the existing outdoor shower at the site.

ENRS provided recommendations regarding bearing capacity as follows:

> *"It is recommended based on the variability of the DCP test results that the proposed viewing platform is founded below the loose fill in the medium dense compacted fill at a depth of at least 0.9m BGL. At this depth an allowable bearing capacity of 100kPa (Stockwell, 1977) could be adopted. If the viewing platform if founded at a depth below 1.2m BGL in the loose clean dune sand, then an allowable bearing capacity of 70kPa (Stockwell, 1977) should be adopted for the site."*

In the event that excavation exceeding 2.0m is required, further analysis of soils for acid sulfate potential and appropriate management shall be required.

Design and construction shall ensure minimal impact on existing rock revetment. In the event that footing depth exceeding 1.2m below ground level, or piling is proposed, in the vicinity of existing revetment, it is recommended that further geotechnical and coastal engineering investigation shall be undertaken to develop a design which considers the impacts on existing rock revetment.

3. ASSESSMENT OF LIKELY IMPACTS ON THE ENVIRONMENT

3.1 Impacts associated with the proposal

The proposal would involve the following disturbance and direct impacts:

- Excavation and construction of footings (depth and type not yet determined).
    - This is currently anticipated to occur entirely within the existing modified footprint of the park reserve, with all construction undertaken from the upper, flat park area with no disturbance to dunes beyond the platform footprint.
    - Note that limited geotechnical investigations undertaken (refer to Section 3.9) indicated that rock revetment constructed eastward of the Surf Life Saving Club circa 1978 may exist beneath the proposed viewing platform footprint. There is therefore a risk that construction of footings for the proposal may impact on the existing revetment, with unknown consequences.
- Excavation (trenching) to relocate water supply to proposed outdoor shower relocation – approx. 8m from existing location or Surf Club building through cleared, modified land.
- No clearing of dune vegetation would occur.
- Removal of planted Lomandras may be required for access. This area is included in proposed revegetation.
- Relocation of the outdoor shower to existing platform with replacement mesh decking would provide for improved drainage of shower water through sand and is not anticipated to increase erosion.

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

- Impacts on threatened species;
- Impacts on indigenous and non-indigenous heritage;
- Impacts on water quality, the riparian zone and key fish habitat;
- Risks associated with coastal hazards.

Each of these is discussed below.

3.2 Threatened species impact assessment (NSW)

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

3.2.1 Part 7A *Fisheries Management Act 1994*

Part 7A relates to threatened species conservation.

The proposal would occur immediately landward of the foredune of a coastal beach (Seven Mile Beach) fronting the Pacific Ocean (refer to Figure 7).

The site is an existing, modified park reserve and the footprint of the proposed structure would occur over land which has been subject to historic clearing, fill and management (refer to Section 3.9 for more information).

It is anticipated that dune vegetation would not be removed and footing piles would be constructed by machinery from the upper, flat park area with no disturbance to dunes beyond the platform footprint.

Sediment and erosion controls would be installed and maintained to prevent movement of sediment into waterways.

No works or vehicle movement would occur on or near waterways or riparian corridors, and works are unlikely to result in erosion of sediment or other pollution affecting waterways.

Revegetation is proposed to be undertaken (possibly as a separate stage) to improve stability of the dune.

Marine environments would therefore not be directly impacted by the proposal and mitigation measures would ensure that the risk of indirect impacts, including as a result of sediment movement, would be minimal.

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

3.2.2 Part 7 *Biodiversity Conservation Act 2016*

An assessment of the potential for NSW threatened flora and fauna species occurring on-site or otherwise being impacted by the proposal was undertaken (refer to Appendix B). The following threatened species or endangered ecological communities are known to occur on-site or are considered to have some potential to occur on-site or be otherwise impacted by the proposal:

- Beach Stone-curlew *Esacus magnirostris* – CE
- Eastern Hooded Dotteral (Hooded Plover) *Thinornis cucullatus cucullatus* (syn*Thinornis rubricollis*) – CE
- Greater Sand-plover *Charadrius leschenaultia* – V
- Lesser Sand-plover *Charadrius mongolus* – V
- Little Tern *Sternula albifrons* – E
- Pied Oystercatcher *Haematopus longirostris* – E
- Sanderling *Calidris alba* – V

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

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.

<u>Shore-birds with potential breeding habitat and/or foraging habitat on or in proximity to the site</u>

Beach Stone-curlew *Esacus magnirostris:* Found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. They forage in the intertidal zone of beaches and estuaries, on islands, flats, banks and spits of sand, mud, gravel or rock, and among mangroves. Beach Stone-curlews breed above the littoral zone, at the backs of beaches, or on sandbanks and islands, among low vegetation of grass, scattered shrubs or low trees; also among open mangroves. Beach Stone-curlews are usually seen alone or in pairs, but sometimes occur in small groups. Birds forage by

stalking slowly like a heron or with quicker dashes after prey. The diet consists of crabs and other marine invertebrates. They are mainly active at dawn, dusk and at night, but birds are often seen when they shift or move about sedately during the day. Less strictly nocturnal than the related Bush Stone-curlew (*Burhinus grallarius*). In NSW, clutches have been recorded from early October to late March, but elsewhere in temperate Australia, breeding has been recorded from September. Their nests are just a shallow scrape in sand or gravel, above the tidal zone at the backs of beaches, or on sandbanks and islands or among open mangroves. Only one egg is laid, but birds will re-lay after the failure of a breeding attempt. Both parents defend the nest and care for the young. The young are precocial but appear not to be independent until they are 7-12 months old (OEH 2021a). SAII: Breeding - Clearing in mapped areas could constitute a Serious and Irreversible Impact (NSW Government 2022b).

Eastern Hooded Dotteral (Hooded Plover) *Thinornis cucullatus cucullatus* (syn*Thinornis rubricollis*): Endemic to southern Australia and is nowadays found mainly along the coast from south of Jervis Bay, NSW, south through Victoria and Tasmania to the western side of the Eyre Peninsula (South Australia). Presently the Hooded Plover occurs in NSW north to Sussex Inlet. Occasionally, individual birds are sighted slightly further north to the Shoalhaven River and Comerong Beach and one bird was sighted at Lake Illawarra in March 2001. In south-eastern Australia Hooded Plovers prefer sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding, much beachcast seaweed, and backed by sparsely vegetated sand-dunes for shelter and nesting. Occasionally Hooded Plovers are found on tidal bays and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs. They regularly use near-coastal saline and freshwater lakes and lagoons, often with saltmarsh. Hooded Plovers forage in sand at all levels of the zone of wave-wash during low and mid-tide or among seaweed at high-tide, and occasionally in dune blowouts after rain. At night they favour the upper zones of beaches for roosting. When on rocks they forage in crevices in the wave-wash or spray zone, avoiding elevated rocky areas and boulder fields. In coastal lagoons they forage in damp or dry substrates and in shallow water, depending on the season and water levels. Hooded Plovers are seen singly, in pairs, family groups or small flocks, with 16 birds at Cudmirrah Beach being the largest group recorded in NSW in recent years. During winter, very few birds are seen in pairs. The Hooded Plover diet consists mainly of marine worms, molluscs, crustaceans, insects, water plants and seeds. In eastern Australia, Hooded Plovers usually breed from August to March on sandy ocean beaches strewn with beachcast seaweed, in a narrow strip between the high-water mark and the base of the fore-dunes. They often nest within 6 m of the fore-dune, mostly within 5 m of the high-water mark, but occasionally among or behind dunes. The nest is a scrape in the sand near debris, making it vulnerable to predators and beach disturbance. Both parents incubate 2-3 eggs for a period of 28 days and share the care of the young. Hooded Plovers display high nest site fidelity and nest solitarily. On mainland Australia, nests may be 2-5 km apart (OEH 2021b). SAII: Breeding - Clearing in mapped areas could constitute a Serious and Irreversible Impact (NSW Government 2022b).

Greater Sand-plover *Charadrius leschenaultia:* Breeds in central Asia from Armenia to Mongolia, moving further south for winter. In Australia the species is commonly recorded in parties of 10-20 on the west coast, with the far northwest being the stronghold of the population. The species is apparently rare on the east coast, usually found singly. Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders. Diet includes insects, crustaceans, polychaete

worms and molluscs. Prey is detected visually by running a short distance, stopping to look, then running to collect the prey (OEH 2021c). SAII: N/A (NSW Government 2022b).

Lesser Sand-plover *Charadrius mongolus:* Breeds in central and north-eastern Asia, migrating further south for winter. In Australia the species is found around the entire coast but is most common in the Gulf of Carpentaria, and along the east coast of Queensland and northern NSW. Individuals are rarely recorded south of the Shoalhaven estuary, and there are few inland records. Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms. Highly gregarious, frequently seen in flocks exceeding 100 individuals; also often seen foraging and roosting with other wader species. Roosts during high tide on sandy beaches, spits and rocky shores; forage individually or in scattered flocks on wet ground at low tide, usually away from the water's edge. Diet includes insects, crustaceans, molluscs and marine worms. Prey is usually detected visually with the birds making short, quick runs, with abrupt stops to lunge at the ground or look for prey (OEH 2021d). SAII: N/A (NSW Government 2022b).

Little Tern *Sternula albifrons:* Migrates from eastern Asia and found on the north, east and south-east Australian coasts, from Shark Bay in Western Australia to the Gulf of St Vincent in South Australia. In NSW, it arrives from September to November, occurring mainly north of Sydney, with smaller numbers found south to Victoria. It breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months. 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. The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles. Both parents incubate up to three well-camouflaged eggs for up to 22 days, aggressively defending the nest against intruders until the young fledge at 17 - 19 days. Often seen feeding in flocks, foraging for small fish, crustaceans, insects, worms and molluscs by plunging 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 2021e). SAII: N/A (NSW Government 2022b).

The Little Tern is known to breed in the sand flats of the Shoalhaven River entrance with a small colony of two-pairs nesting consistently over recent seasons (NPWS 2019; South Coast Shorebird Recovery Program 2021).

Pied Oystercatcher *Haematopus longirostris:* 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. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones. Two to three eggs are laid between August and January. The female is the primary incubator and the young leave the nest within several days (OEH 2021f). SAII: N/A (NSW Government 2022b).

Pied Oystercatcher is known to breed in the vicinity of the Shoalhaven River entrance spit, with six pairs recorded nesting between the entrance berm and Comerong Island (NPWS 2019; South Coast Shorebird Recovery Program 2021).

Sanderling *Calidris alba:* A regular summer migrant from Siberia and other Arctic breeding grounds to most of the Australian coastline. It is uncommon to locally common, arriving from September and leaving by May (some may overwinter in Australia). Sanderlings occur along the NSW coast, with occasional inland sightings. Often found in coastal areas on low beaches of firm

sand, near reefs and inlets, along tidal mudflats and bare open coastal lagoons; individuals are rarely recorded in near-coastal wetlands. Generally occurs in small flocks and may associate freely with other waders. Individuals run behind receding waves, darting after insects, larvae and other small invertebrates in the sand, then dart back up the beach as each wave breaks. Also feeds on plants, seeds, worms, crustaceans, spiders, jellyfish and fish, foraging around rotting heaps of kelp, at the edges of shallow pools on sandspits and on nearby mudflats. Roosts on bare sand, behind clumps of beach-cast kelp or in coastal dunes. Breeding occurs in the Northern Hemisphere (OEH 2021g). SAII: N/A (NSW Government 2022b).

Test of significance

None of these species have been recorded nesting in proximity to the site.

Greater Sand-plovers, Lesser Sand-plovers and Sanderlings do not breed in Australia, so no direct impacts to nesting or breeding activities are likely.

Little Terns and Pied Oystercatchers are known to nest regularly on the sand flats of the Shoalhaven River entrance approx. 950m to the south of the site, showing a degree of fidelity to general nesting areas. No similar habitat (i.e. sand-flats) occurs in proximity to the site and it is therefore unlikely that available habitat would be used.

Eastern Hooded Dotterals nest on sandy ocean beaches strewn with beachcast seaweed, in a narrow strip between the high-water mark and the base of or behind the fore-dunes. Low-potential nesting habitat occurs along the incipient dunes in proximity to the site.

Beach Stone-curlews breed above the littoral zone, at the backs of beaches, or on sandbanks and islands, among low vegetation of grass, scattered shrubs or low trees and also among open mangroves, so could potentially utilise dunes in proximity to the site.

The breeding periods for Eastern Hooded Dotterals and Beach Stone-curlews are August – March and October – March respectively. Available potential habitat for these species in proximity to the site is sub-optimal and highly disturbed.

Construction of the viewing platform would occur entirely within existing cleared and modified park areas and would not impact on any potential breeding habitat or foraging habitat for these species.

Revegetation of the sand dunes may occur in – or in proximity to – areas that offer potential (albeit low-likelihood) nesting habitat for the Eastern Hooded Dotteral and Beach Stone-curlew. Revegetation of these areas is recommended to occur between April and July to provide greater opportunity for plant establishment. Planting in these months would avoid potential conflict with shorebird breeding. If revegetation must occur between August and March, pre-works investigation of potential habitat areas shall occur to ensure no works occur in nesting areas. Proposed revegetation of the dunes would improve potential habitat.

Suitable foraging habitat exists in the intertidal and wave-wash zone of the beach in proximity to the site. No works would impact on this habitat. Noise from machinery during construction would be localised and occur above and approx. 30m (average tide) from the immediate intertidal/wave wash zone and is therefore unlikely to disturb foraging activities of these highly mobile species.

It is therefore considered unlikely that and significant impact on Beach Stone-curlew, Eastern Hooded Dotteral, Greater Sand-plover, Lesser Sand-plover, Little Tern, Pied Oystercatcher or Sanderling would occur as a result of the proposed activity.

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

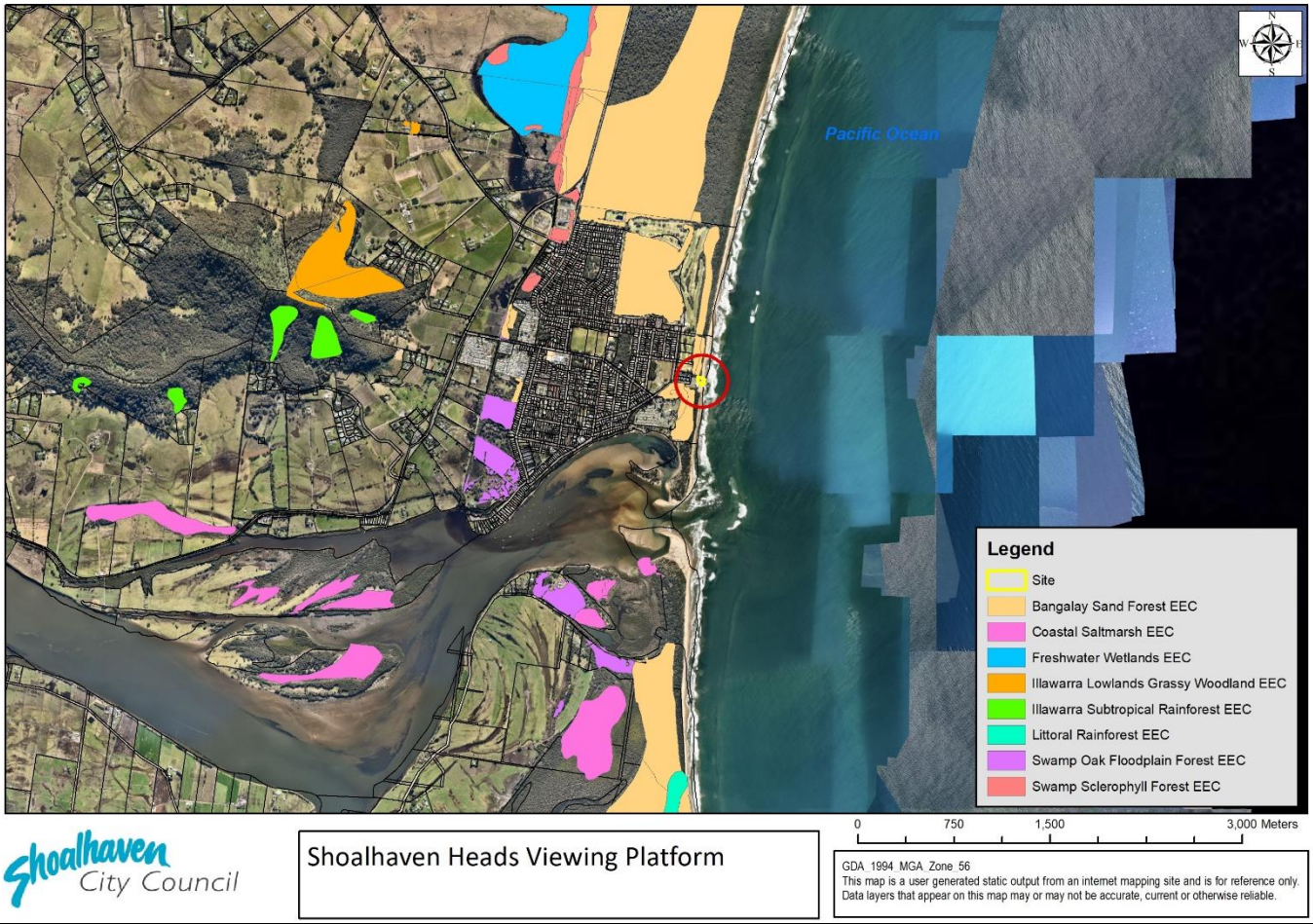
- ***(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or***
- ***(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction***

Eight endangered ecological communities are mapped as occurring in the landscape surrounding the site (refer to Figure 5).

Site assessment confirmed that no locally occurring EECs are present within or in proximity to the site such that there is any risk of impact as a result of the proposal. Refer to Section 2.1.

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

Figure 5. Endangered Ecological Communities (EECs) mapped as occurring in the surrounding locality



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

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

(iv)whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(v) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.

No important habitat for threatened species would be removed or otherwise significantly impacted (see Part A).

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

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

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

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

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

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

3.3 Threatened species impact assessment (Commonwealth EPBC Act 1999)

A Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Report was generated on 23rd August 2022. An EPBC Protected Matters Report provides general guidance on matters of national significance and other matters protected by the EPBC Act in the area selected. Of those threatened species and endangered ecological communities reported as likely occurring or having habitat within the area of the report, the following were considered to have potential habitat on the site and requiring of further assessment:

- Caspian Tern *Hydroprogne caspia* – M
- Common Tern *Sterna hirundo* – M
- Crested Tern *Thalasseus bergii* – M
- Eastern Curlew *Numenius madagascariensis* – CE
- Eastern Hooded Plover *Thinornis cucullatus cucullatus* (syn*Thinornis rubricollis*) – V
- Greater Sand-plover *Charadrius leschenaultia* – V
- Lesser Sand-plover *Charadrius mongolus* – E
- Little Tern *Sternula albifrons* – M
- Red Knot *Calidris canutus* – M
- Ruddy Turnstone *Arenaria interpres* – M
- Wedge-tailed Shearwater *Ardenna pacificus* – M

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

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

Table 2. EPBC Significant impact assessment

Critically endangered and endangered species - Significant impact criteria Species to consider: **Eastern Curlew** **Lesser Sand-plover**	
Criteria	***Assessment***
lead to a long-term decrease in the size of a population	No. The proposed activity would not directly impact on the Eastern Curlew or Lesser Sand Plover, would not affect or disrupt breeding and would not impact on breeding or foraging habitat.
reduce the area of occupancy of the species	No
fragment an existing population into two or more populations	No
adversely affect habitat critical to the survival of a species	No important habitat will be impacted.
disrupt the breeding cycle of a population	Eastern Curlew breeds primarily in Russia (DoE 2015). Lesser Sand Plover breeds in central and north-eastern Asia (OEHd). Works would therefore not affect breeding habitat.
modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No important habitat will be impacted Intertidal foraging habitat along the beach in proximity to the site would not be directly impacted. Noise from machinery during construction would be localised and occur above and approx. 30m (average tide) from the immediate intertidal/wave wash zone, and is therefore unlikely to disturb foraging activities of these highly mobile species.
result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	No invasive species will be introduced
introduce disease that may cause the species to decline	No disease will be introduced
interfere with the recovery of the species	No
Vulnerable species - Significant impact criteria Species to consider: **Greater Sand Plover** **Eastern Hooded Plover**	
Criteria	***Assessment***
lead to a long-term decrease in the size of an important population of a species	The proposed activity will not directly impact on the Greater Sand Plover or Eastern Hooded Plover, will not affect or disrupt breeding and will not impact on breeding or foraging habitat
reduce the area of occupancy of an important population	No
fragment an existing important population into two or more populations	No
adversely affect habitat critical to the survival of a species	No important habitat will be impacted by the proposed activity
disrupt the breeding cycle of an important population	Greater Sand Plover breeds in Central Asia (OEH 2021c). Construction of the viewing platform would occur entirely

	within existing cleared and modified park areas and would not impact on any potential breeding habitat or foraging habitat. Works will be undertaken outside breeding period for locally nesting shorebirds and will not affect breeding habitat.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No important habitat will be impacted by the proposed activity.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No invasive species will be introduced
introduce disease that may cause the species to decline	No disease will be introduced
interfere substantially with the recovery of the species	No

Additional consideration was given to the four principal threats determined by DEWHA (2009) to be most relevant to judgements on significance of impact on migratory shorebirds. These include:

- habitat loss
- habitat degradation
- disturbance, and
- direct mortality.

Degradation of shorebird habitat has a similar effect on populations as direct habitat loss. Many migratory shorebirds have specialised feeding techniques, making them susceptible to slight changes to prey sources and their foraging environments. Habitat degradation is associated with activities such as invasion of intertidal mudflats by exotic species. Other examples of activities that may cause degradation to shorebird habitats include water pollution and changes to the water regime; loss of marine or estuarine vegetation which helps stabilise mudflats and provides organic matter to support the invertebrates on which migratory shorebirds feed; expansion of mangroves; artificial changes to hydrological regimes that affect the productivity of the feeding environment; and exposure of acid sulphate soils (DEWHA 2009).

The proposal shall not involve or contribute to habitat loss or habitat degradation.

Construction of the viewing platform would occur entirely within existing cleared and modified park areas and would not impact on any potential breeding habitat or foraging habitat for these species.

Suitable foraging habitat exists in the intertidal and wave-wash zone of the beach in proximity to the site. No works would impact on this habitat. Noise from machinery during construction would be localised and occur above and approx. 30m (average tide) from the immediate intertidal/wave wash zone, and is therefore unlikely to disturb foraging activities of these highly mobile species.

Conclusion of EPBC Significant Impact Assessment

The proposal is therefore unlikely to have an adverse effect on a vulnerable, endangered, critically endangered or migratory species or its habitat, nor on the extent or integrity of an endangered ecological community such that its local occurrence is likely to be placed at risk of extinction. Further assessment and referral to the Commonwealth is therefore not required.

3.4 Indigenous heritage

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

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

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

The site occurs within a sand dune system and within 200m of waters (Pacific Ocean).

A search on the Aboriginal Heritage Information Management System (AHIMS) on 22nd August 2022 indicated that there are no recorded Aboriginal sites or places in the vicinity of the proposal (refer to AHIMS report in Figure 6).

The Due Diligence Guidelines define disturbed land as follows:

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

Figure 6. Results of AHIMS Aboriginal heritage search

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Shoal Heads Viewing
Client Service ID : 710716

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

Date: 22 August 2022

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -34.853, 150.7461 - Lat, Long To : -34.8486, 150.7538, conducted by Jeff Bryant on 22 August 2022.

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. *

The site of the proposed works is within a dynamic area of the coastal foreshore which has been subject to ongoing, regular disturbance through natural processes of accretion and scouring. Additionally, the managed parkland area is considered disturbed as a result of clearing, landfill (refer to Section 3.9), construction of the existing platforms and paths, and ongoing lawn and vegetation maintenance. As such, it is reasonable to conclude that there is a low probability of objects occurring in area.

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

However, given that the landscape features indicate a higher propensity for the presence of artefacts, an Aboriginal Heritage Site Officer shall be engaged from the traditional land custodians, Jerrinja Local Aboriginal Land Council, to monitor excavation works during construction.

3.5 Non-indigenous heritage

No heritage items listed on the NSW State Heritage Inventory or the *Shoalhaven Local Environment Plan 2014* occur within or in proximity to the site, such that there is any risk of impact as a result of the proposal.

3.6 Riparian corridors, Key Fish Habitat & Water quality

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

- Likely and potential impacts on vegetation as a result of construction activities;
- Sediment movement into waterways as a result of construction activities;
- Dredging and reclamation in proximity to key fish habitat.

The proposal would occur immediately landward of the foredune of a coastal beach (Seven Mile Beach) fronting the Pacific Ocean (refer to Figure 7).

The site is an existing, modified park reserve and the footprint of the proposed structure would occur over land which has been subject to historic clearing, fill and management (refer to Section 3.9 for more information).

It is anticipated that dune vegetation would not be removed and footing piles would be constructed by machinery from the upper, flat park area with no disturbance to dunes beyond the platform footprint.

Sediment and erosion controls would be installed and maintained to prevent movement of sediment into waterways.

Revegetation is proposed to be undertaken (possibly as a separate stage) to improve stability of the dune.

The footprint of the proposed viewing platform is partially within the mapped key fish habitat area (refer to Figure 7).

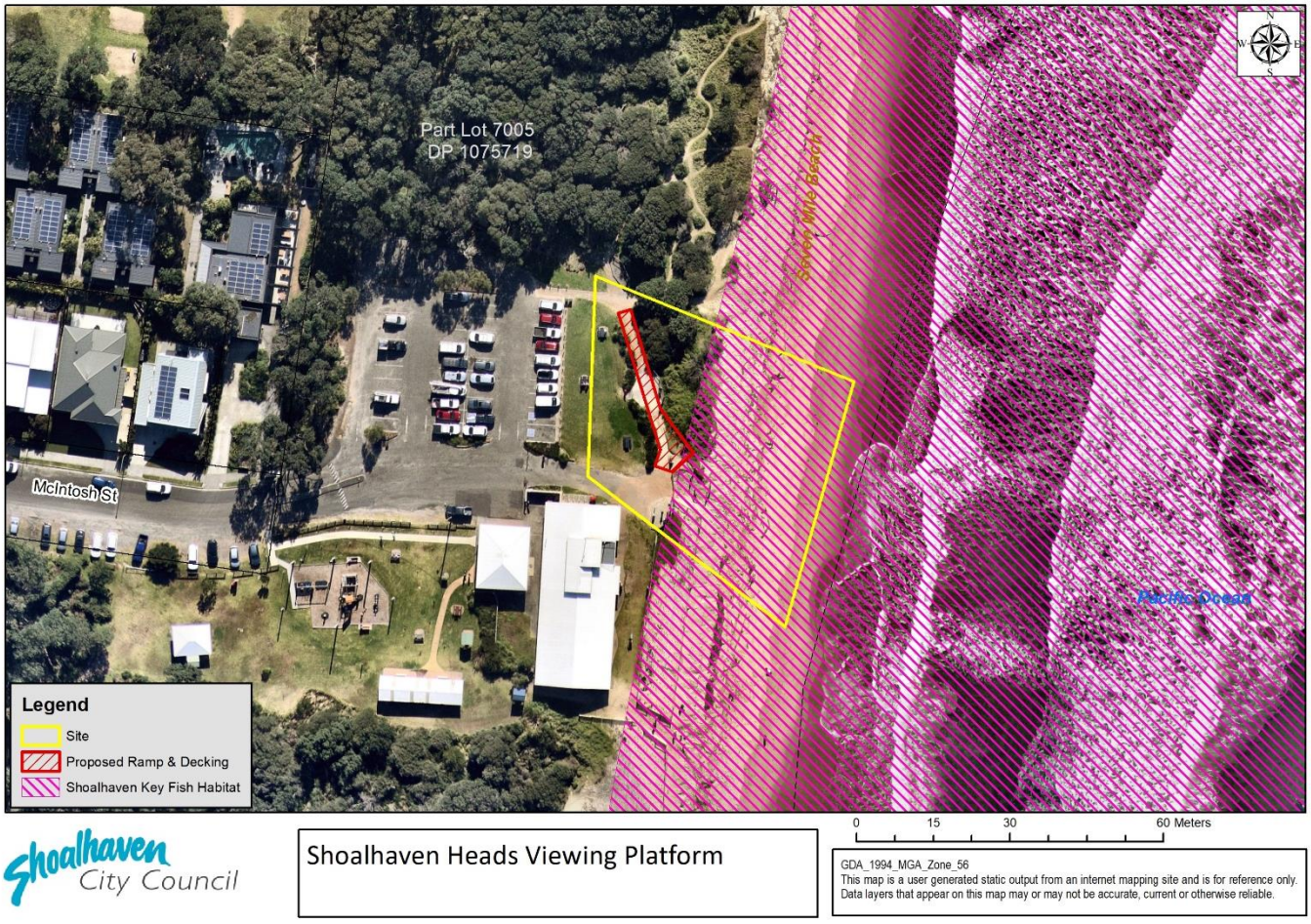
An enquiry was sent to NSW DPI Fisheries, seeking advice on whether a permit under the *Fisheries Management Act 1994* would be required for dredging and reclamation.

The response received from the Senior Fisheries Manager, Coastal Systems (Council reference D22/355500) confirmed that a permit is not required:

> *"Confirming that a permit under the Fisheries Management Act would not be required for these works.*
>
> *A buffer area has been applied to DPI Fisheries key fish habitat maps. I would consider this area to be within the buffer area and not within key fish habitat itself which what is below what is generally considered the highest astronomical tide mark."*

It is therefore concluded that sediment movement and the risk of impact on water quality, resulting from the proposal, would be negligible.

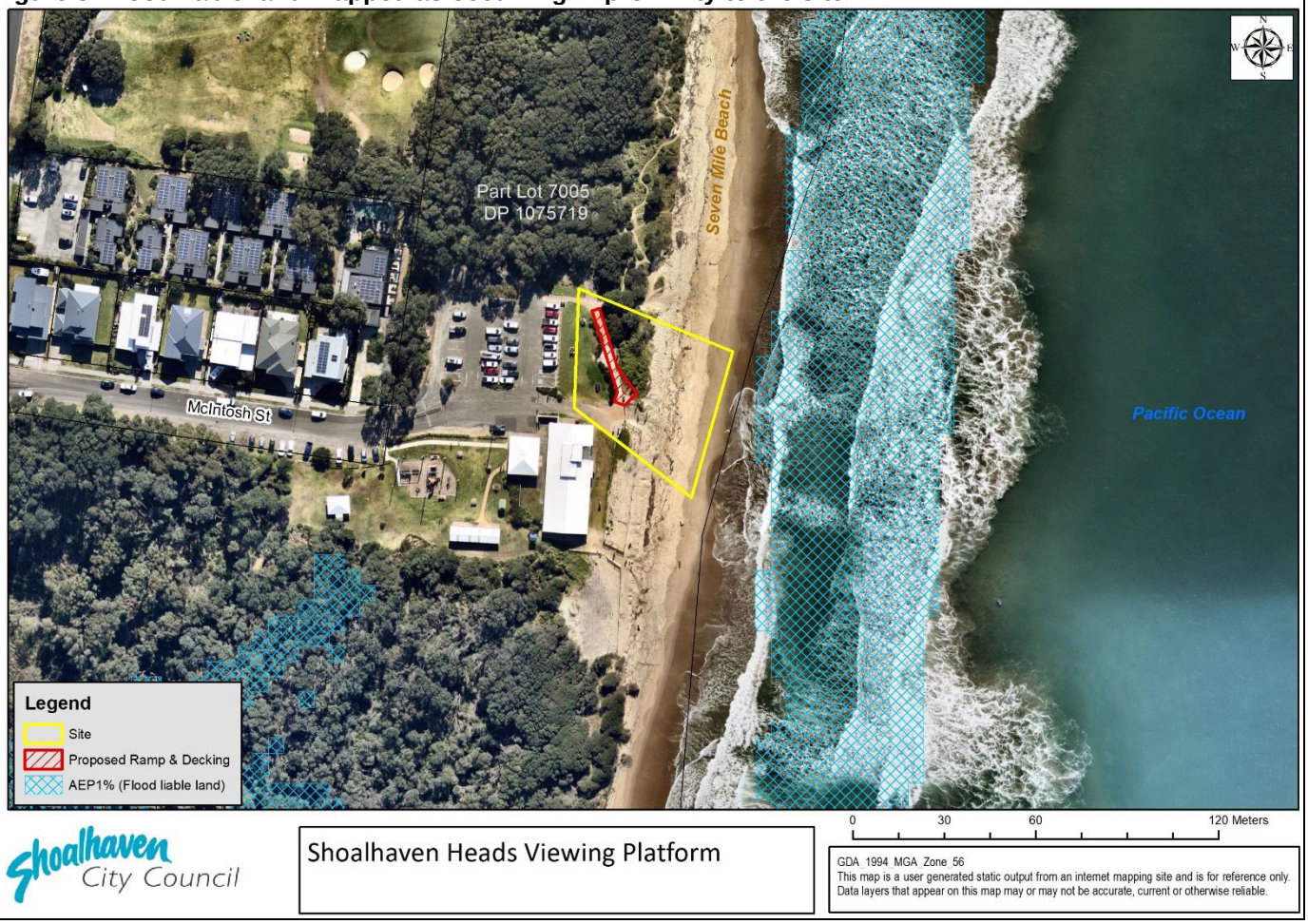
Figure 7. Riparian corridors and Key Fish Habitat (KFH) mapped as occurring in proximity to the site



3.7 Flood liable land

The land on which the proposal would occur is not mapped as being flood liable (refer to Figure 8) and the proposal is unlikely to affect flood behaviour except to a minor extent.

Figure 8. Flood liable land mapped as occurring in proximity to the site



3.8 Acid Sulfate Soil

The site is mapped as containing Class 4 and Class 5 Acid Sulfate Soils (refer to Figure 8 below).

The *Shoalhaven Local Environment Plan 2014* suggests that a risk of exposure of Class 4 Acid Sulfate Soils exists where works would exceed 2 metres in depth below the natural ground surface, or for works where the watertable is likely to be lowered more than 2 metres below the natural ground surface.

The proposal would not involve or result in lowering the watertable.

The depth of excavation for footings is not currently known.

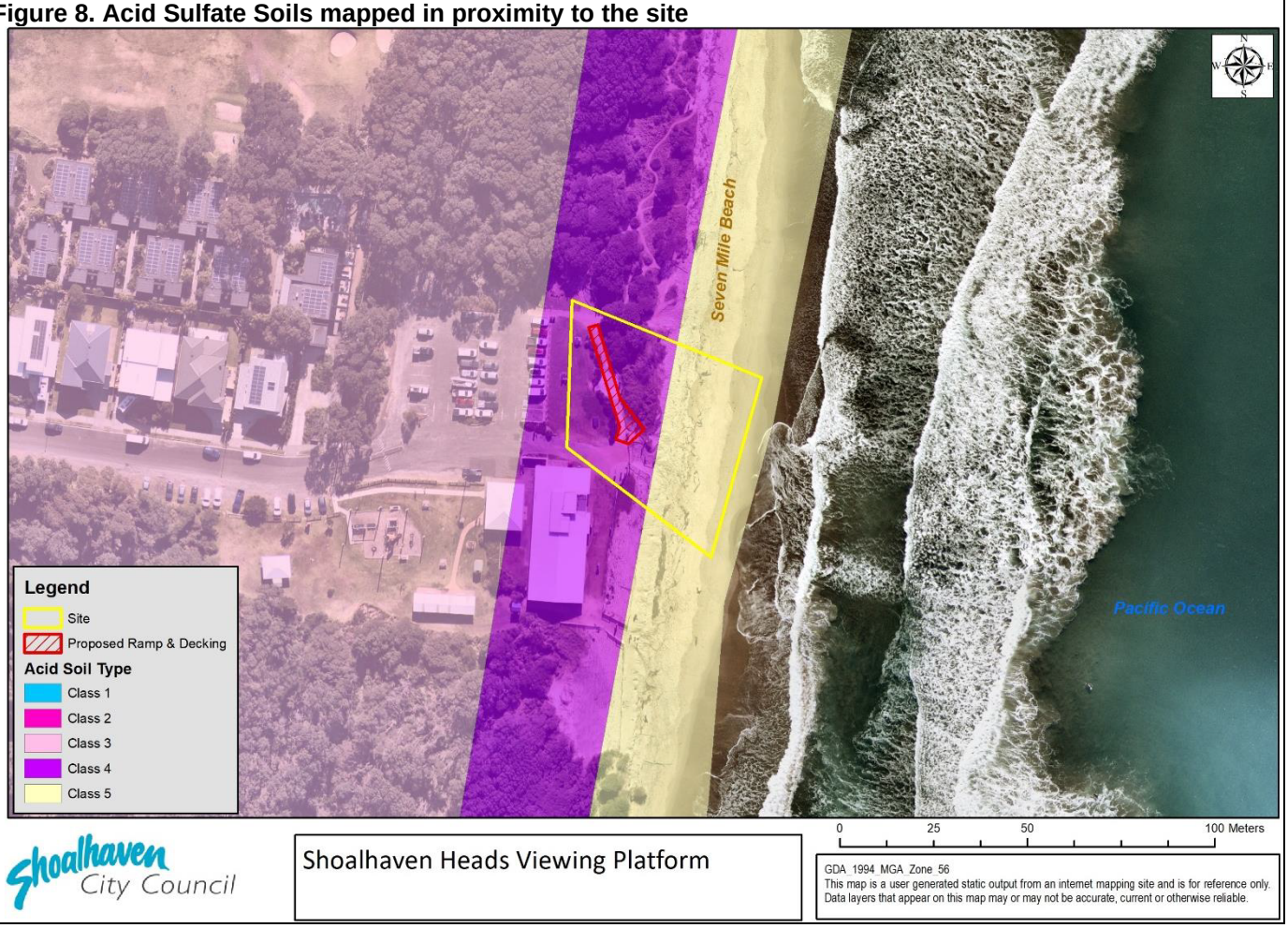
As part of limited geotechnical investigations, ENRS undertook pH and sulphate testing (at 0.5m depth) for the purpose of determining soil aggressivity toward concrete and steel structures, which indicated that acid sulfate soils were not present, with pH 8.8 to 8.9 and sulphate <10mg/kg (ENRS 2021). Furthermore, soils were described as consisting of topsoil and fill to depths of 1.2m, below which, loose, fine grained, dune sand occurred and was inferred to be in excess of several metres deep.

The site of the proposed works is within a dynamic area of the coastal foreshore which has been subject to ongoing, regular disturbance through natural processes of accretion and scouring.

If excavation depth for footings would not exceed 2.0m, it can be concluded that the proposed works are unlikely to lead to the exposure of any acid sulfate soil.

In the event that proposed footing construction requires excavation exceeding 2.0m, further analysis of soils for acid sulfate potential and appropriate management shall be required.

Figure 8. Acid Sulfate Soils mapped in proximity to the site



3.9 Coastal hazards

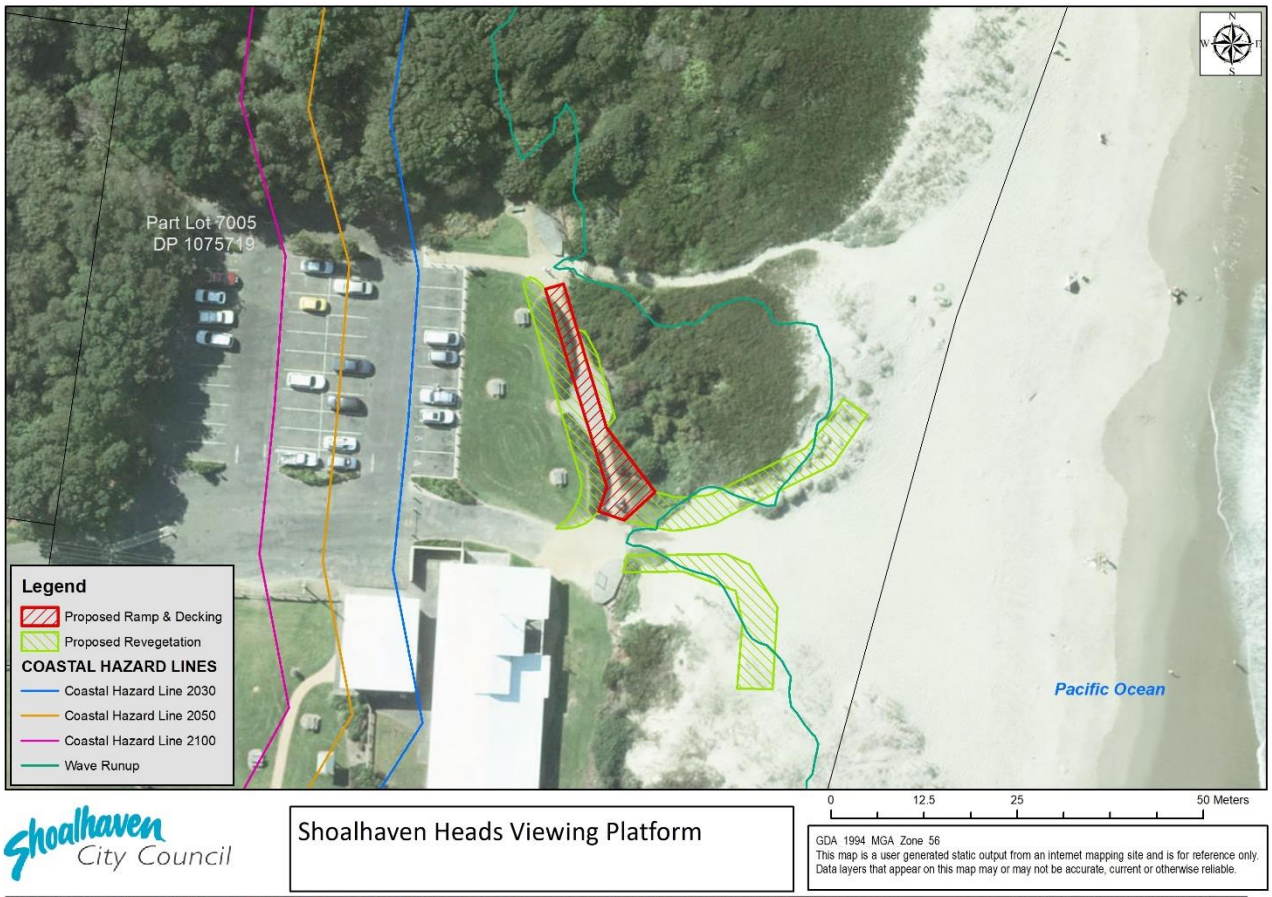
3.9.1 Existing coastal hazard studies

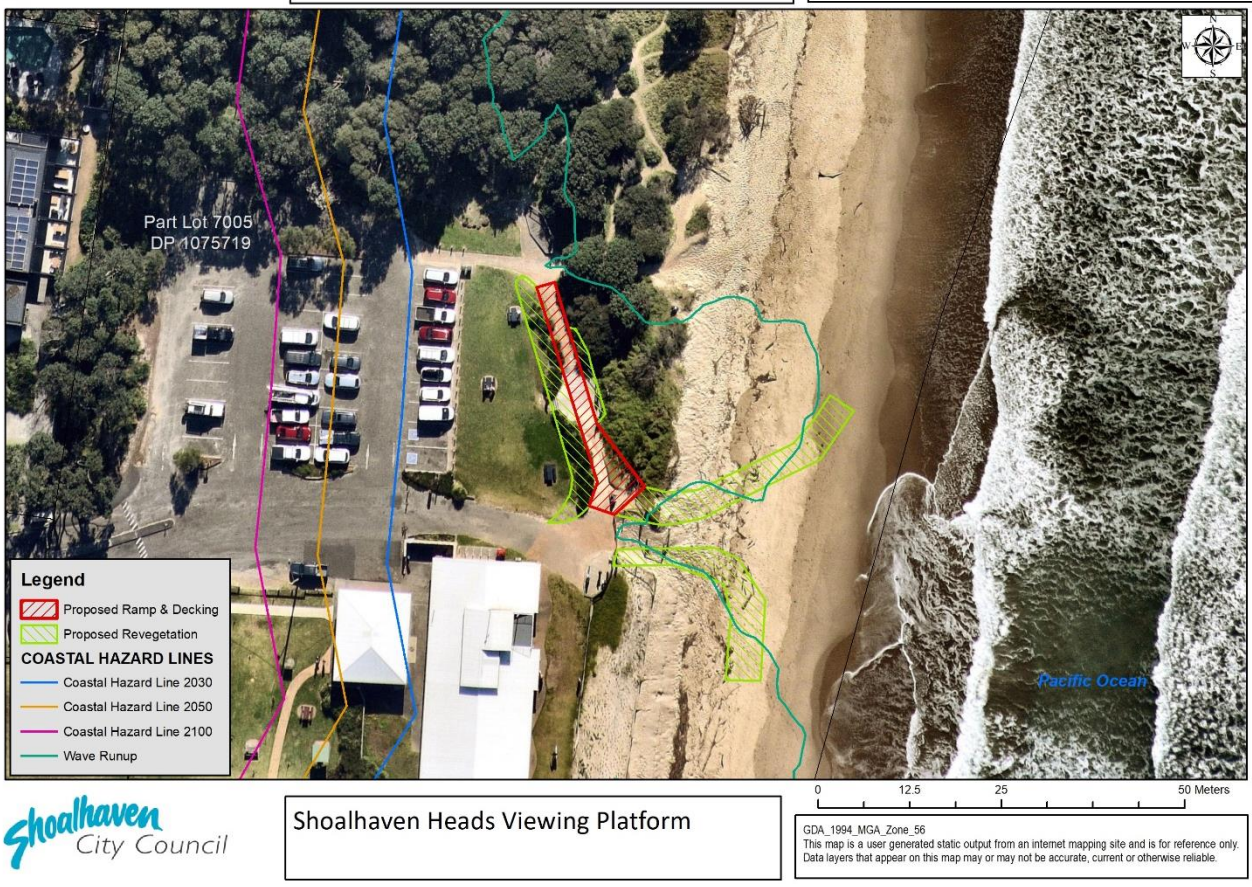
The *Shoalhaven Coastal Hazard Mapping Review* (Advisian 2016) provides mapped coastal hazard lines for the Shoalhaven local government area (LGA) for 2030, 2050 and 2100 planning periods, representing Zones of Reduced Foundation Capacity (ZRFC), i.e. the reduced bearing capacity of sand which is adjacent to the storm erosion escarpment.

The study considered the principal hazards induced by the coastal processes that are relevant for a coastal hazard risk assessment of the beaches in the study area, including (Advisian 2016):

- short-term coastal erosion from severe storms and consequent slope instability;
- long term coastline recession resulting from imbalances in the sediment budget, such as aeolian (wind-driven) sand transport, climate change and beach rotation; and
- oceanic inundation of low-lying areas.

Figure 9. Proposal showing Coastal Hazard Lines - 2014 (approx.) aerial (top) and 2022 aerial (bottom)





In general, without the protection of a terminal structure such as a seawall, dwellings or other structures which are not piled or otherwise founded to an adequate depth, and located with the Zone of Reduced Foundation Capacity, would be considered to have an inadequate factor of safety (Advisian 2016).

The site of the current proposal is located on the seaward side of the 2030 ZRFC hazard line (refer to Figure 9). Based on this, it must be assumed that the location of the proposed viewing platform may not enable a design life of the structure beyond 8 years.

The dune at Shoalhaven Heads has undergone significant erosion due to storms and associated flood events in the Shoalhaven River in the past. The largest recorded combined storm/river entrance instability at this location to date was a 1978 storm/flood event, with a combined storm/river entrance instability erosion demand of 350 m^3/m (Advisian 2016).

Historical photographs show rock revetment constructed circa 1978 to the east of the surf club in response to an erosion event that resulted in a significant scarp in close proximity to the building (refer to Figure 10).

More recent events, including August 2021 have resulted in significant erosion scarps and have exposed portions of the existing rock revetment (refer to Figure 11).

Figure 10. Shoalhaven Heads Surf Club construction of rock revetment, circa 1978 (source: BMT WBM 2012)

Figure 11. Shoalhaven Heads Surf Club dune following August 2021 event with part of historic rock revetment visible (source: Shoalhaven City Council Coastal Monitoring Viewer)

Advisian (2016) determined that the beach in proximity to the Shoalhaven Heads Surf Club has been increasing in volume on average and the dune has been prograding seaward, presumed as a result of sediment supply provided by the Shoalhaven River. However, sea level rise is projected to result in erosion and net recession of Shoalhaven Heads Beach.

It was assessed that for sea level rises of 0.10 m (2030), 0.23 m (2050) and 0.35 m (2100) (as per Council's adopted sea level rise projections), shoreline recession of 7.6 m, 17.4 m and 26.4 m respectively is projected for Shoalhaven Heads Beach (Advisian 2016).

It should be noted that the Advisian report did not consider predicted increased frequency of coastal storm surge events.

The Shoalhaven Public Asset Coastal Risk Management Review (BMT WBM 2012) was based on coastal hazard mapping undertaken by SMEC which predated the Advisian (2016) coastal hazard mapping review, but recommended that no major upgrading or refurbishing be undertaken at the Shoalhaven Heads Surf Life Saving Club and carpark, and more generally that consideration be given to relocation strategies and retrofitting or replacing assets with removable structures.

The Coastal Zone Management Plan (CZMP) (Shoalhaven City Council 2018) is the current primary plan for coastal management within the Shoalhaven City Council Local Government Area (LGA).

The CZMP notes Shoalhaven Heads Surf Life Saving Club, car park and viewing platform are noted as being at a high risk by 2050 and includes the following site specific actions:

- LA1.6 Maintain dune vegetation… to promote dune stability and minimise loss of sand from the littoral systems that would contribute to long term recession of the beach.
- LA1.8 Repair and replace or relocate the beach access infrastructure, including viewing platforms, if and when required following a large storm. Consider designing and installing a beach access and viewing platform for people with disabilities where possible as part of future upgrades or replacement where feasible.

It is noted that the construction of a viewing platform with accessible ramp is at least partly consistent with the CZMP.

3.9.2 Consultation regarding coastal hazards

Comments were provided by Council's Coastal Management Team Leader with contribution from Environmental Services regarding the proposal in relation to coastal hazards. Concern was expressed over the level of geotechnical investigation to date and the possibility of compromising appropriate technical investigation, design, asset resilience and design life, in order to deliver the proposal within the existing budget:

> *"Without undertaking coastal and geotechnical investigations, that are required as best practice engineering design for a structure such as this in a highly erodible coastal environment, I struggle to support the proposed pathway forward regarding the foundations. Other structures Council is investigating design solutions for (e.g., Collingwood Beach access ramp) will most likely require a piling rig. I understand the constraints with possible sandstone boulders, but the right coastal engineering working with a Geotechical engineering investigation and constraints assessment would be able to capture this in a detailed design and technical specification.*
>
> *It is crucial that any structure located in the active coastal erosion zone includes a foundation design - based on coastal & geotechnical engineering investigations - in order to ensure that the structure is has a cost-effective design life and is safe for public use. This is particularly important at Shoalhaven Heads, which has historically been prone to severe erosion events.*
>
> *I appreciate the tight timeframes on this project, but would rather see Council constructing assets for the community that are appropriate for the environment they are situated in, rather than rushing through a design and construction phase of works to meet community demands. A design solution that is too expensive and not feasible is still a solution that will enable us to reassess following an appropriate level of cost-benefit analysis.*
>
> *Having worked with a number of different grant bodies now, I am confident a grant timeframe of the end of FY23 would be approved if this extension of time was sought."*

Council's Coastal Management Team Leader also raised concerns over safety issues related to public access to the structure during or following a storm event, where members of the public may seek to use the platform as a vantage point from which to observe a storm and associated large waves, and the stability of the structure may have been compromised by the storm event:

"Consideration needs to be given to the fact that as the structure is proposed to be built in a highly erodible coastal dune environment, with minimal coastal engineering design parameters proposed in the design, that the structure could pose a risk to public safety during a significant storm event. The severity of the storm event that could impact on the structure and possibly public safety is difficult to determine without appropriate detailed engineering analysis and design being considered. As such, a rigorous safety in design report needs to be written in conjunction with the detailed engineering design to document how the ongoing monitoring and maintenance of the structure will be undertaken, with appropriate risk controls to mitigate public safety risks."

Water Technology (2021) were engaged by Council to review the proposal to construct the viewing platform, in addition to proposed dune rehabilitation.

The report noted that the structure would be exposed to coastal erosion over the course of its design life, due to the occurrence of extreme storm events. Furthermore, the exposure of the structure to coastal erosion would increase over time, as mean sea level rise will result in a gradual recession of the shoreline (Water Technology 2021).

The proposed structure was noted as being currently situated significantly seawards of the 2030 ZRFC: at its northern end being around 16 m seawards of the hazard line, and at its southern end, around 28 m seawards of the hazard line (Water Technology 2021).

The proposed structure would be expected to be periodically exposed to energetic wave conditions (and associated coastal erosion) during a storm event. Given the position of the viewing platform structure embedded in the local dune system, wave loads in the order of 15-40 kN/m^2, acting on the structures would likely initiate from wave run-up exerting horizontal and vertical loads acting on the boardwalk such as uplift (both the horizontal deck and the vertical supporting piles) (Water Technology 2021).

Water Technology (2021) advised that based on this high exposure to coastal hazards, the viewing platform structure would require piled foundations in order to prevent structural undermining in storm erosion scenarios.

Water Technology (2021) suggested that an alternative would be to consider the structure to be sacrificial in nature and accept that it will fail and need to be rebuilt after a design erosion event.

3.9.3 Conclusions regarding coastal hazards

The risk to the proposed viewing platform associated with coastal hazards, indicates that the location may not enable a design life of the structure beyond 8 years.

Council would seek however, to design and construct for a design life of 10 years for structural durability purposes.

The proposal to construct a new "sacrificial" asset within an area subject to existing coastal hazards (which are predicted to worsen) is generally not consistent with strategic, regional and coastal planning that calls for adaptive, resilient and sustainable approaches to asset, resource and land management (refer to Section 3.11(q)).

However, the proposal is at least partially consistent with the Shoalhaven Coastal Zone Management Plan 2018 actions specific to the site; the proposed structure could potentially be

relocated or adapted to changing conditions; and the proposal is consistent with community values and expectations.

It is also considered that constructing for a longer design life would likely create an impractical commitment to continually reinstate the coastal foreshore around the platform, as predicted shoreline recession progresses.

Design and construction shall ensure minimal impact on existing rock revetment. In the event that footing depth exceeding 1.2m below ground level, or piling is proposed, in the vicinity of existing revetment (refer to Section 2.2 and photos in Section 3.9.1), it is recommended that further geotechnical and coastal engineering investigation shall be undertaken to develop a design which considers the impacts on existing rock revetment.

It is also recommended that design consider and provide for possible future relocation of the structure.

Recommendations of Council's Coastal Management Team Leader to prepare a Safety in Design report shall be included in safeguards and mitigation measures (Section 7), in addition to the recommendation that a management plan of the asset be developed, informed by the recommended Safety in Design report, which provides for monitoring of the structure and closure as appropriate, with consideration of significant storm events.

3.10 Other considerations

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

- is not an Aboriginal Place in the context of the NSW National Parks and Wildlife Act 1974, nor is it known to contain Aboriginal artefacts
- is not mapped as "potentially contaminated land"

3.11 EP&A Regulation – Section 171 matters of consideration

Section 171(2) of the *Environmental Planning and Assessment Regulation 2021* lists the factors to be taken into account when consideration is being given to the likely impact of an activity on the environment under Part 5 of the EP&A Act. These matters are addressed in Table 3.

Table 3. Section 171 Matters of consideration

Does the proposal:	Assessment	Reason
a) Have any environmental impact on a community?	Low-positive	The proposal involves the construction of a new viewing platform as replacement for an existing platform in a nearby location. The proposed location of the new viewing platform was selected for enhanced views unimpeded by vegetation, and to provide improved connection to the existing beach access, surf club and parking. The existing landform and environment has changed markedly from that at conception of the proposal.

		The location of the proposed platform at present affords marginally more expansive views than that of the existing viewing platform (e.g. Photos 4 and 5). The risk to the proposed viewing platform associated with coastal hazards, indicate that the location may not enable a design life of the structure beyond 8 years (refer to Section 3.9), potentially providing poor value for investment. The proposed activity would not have any impact on community services and infrastructure such as power, water supply, wastewater, waste management, educational, medical or social services.
b) Cause any transformation of a locality?	Negligible	The locality's current use would remain relatively unchanged.
c) Have any environmental impact on the ecosystem of the locality?	Low-adverse	The five-part test of significance (Section 3.2) concludes that the proposed activity would not have a significant impact upon threatened species or endangered ecological communities. No food resources critical to the survival of a particular species would be removed. Aquatic ecosystems are not likely to be affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem (refer to Sections 3.2.1 and 3.6). Refer to prescribed environmental safeguards and mitigation measures (Section 7).
d) Cause a diminution of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	Negligible	Recreational values may be somewhat enhanced including through relocation of the outdoor shower to a platform with mesh decking, to achieve better management of water drainage. In the context of the locality, the visual impact of the proposal is considered to be minimal. Scientific and environmental qualities of the site would not be affected. 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	Low-positive	The site is considered to have high aesthetic values, which may be somewhat enhanced by the proposal. The site has no historical, social or scientific significance and does not contain, nor is associated with any heritage item listed on the NSW State Heritage Inventory. 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

special value for present or future generations?		unlikely to harm an Aboriginal artefact (refer to Section 3.4).
f) Have any impact on the habitat of protected fauna (within the meaning of the Biodiversity Conservation Act 2016)?	Negligible	Minor removal of planted vegetation may be required to facilitate access for works. No removal of dune vegetation or habitat would be required. Revegetation including to improve dune stability would occur (possibly as a separate stage). The five-part test of significance, provided in Section 3.2 above, concludes that the proposed activity would not have a significant impact upon threatened fauna. The prescribed environmental safeguards and mitigation measures (Section 7) would mitigate indirect impacts to fauna and habitat including through control of sediment.
g) Cause any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	Negligible	The five-part test of significance, provided in Section 3.2 above, concludes that the proposed activity would not have a significant impact upon threatened fauna. 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) would minimise the risk of impact to resident fauna including potentially occurring threatened microbat species.
h) Have any long-term effects on the environment?	Negligible / potentially low-adverse	The proposed activity would not use hazardous substances or use or generate chemicals which may build up residues in the environment. Note that Section 3.9 identifies a potential risk that construction of footings for the proposal may impact on existing rock revetment (constructed circa 1978 to protect the Surf Club), with unknown consequences. The possible impacts have been discussed in detail under Section 3. Refer also to the prescribed environmental safeguards and mitigation measures in Section 7.
i) Cause any degradation of the quality of the environment?	Negligible	The proposal does not require clearing of native vegetation or disturbance to dunes. All construction would be undertaken from the upper, flat park area with no disturbance to dunes beyond the platform footprint (refer to Section 3.1). Aquatic ecosystems are not likely to be affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem (refer to Sections 3.2.1 and 3.6).

		The proposal would not intentionally introduce noxious weeds, vermin, or feral animals into the area or contaminate the soil. Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.
j) Cause any risk to the safety of the environment?	Potentially moderate-adverse	The proposed activity would not involve hazardous wastes and would not lead to increased bushfire or landslip risks. The activity would not adversely affect flood or tidal regimes or exacerbate flooding risks (refer to Section 3.7). Note that Section 3.9 identifies a potential risk that construction of footings for the proposal may impact on existing rock revetment (constructed circa 1978 to protect the Surf Club), with unknown consequences. It is considered that the proposal may create a safety risk related to public access to the structure during or following a storm event, where members of the public may seek to use the platform as a vantage point from which to observe a storm and associated large waves and the stability of the structure may have been compromised by the storm event. It is recommended that a management plan of the asset be developed, informed by the recommended Safety in Design report, which provides for monitoring of the structure and closure as appropriate, with consideration of significant storm events. The prescribed environmental safeguards and mitigation measures in Section 7
k) Cause any reduction in the range of beneficial uses of the environment?	Negligible	The footprint of the proposal is entirely within modified and managed land of a park reserve.
l) Cause any pollution of the environment?	Low-adverse	The proposal would involve a temporary and local increase in noise during the construction phase due to the use of machinery. However, this is not anticipated to negatively affect any sensitive receivers such as residential areas, schools, childcare centres and hospitals. Sediment and erosion control in accordance with the Blue Book will be implemented to minimise movement of sediment into 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 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	There would be no trackable waste, hazardous waste, liquid waste, or restricted solid waste as described in the NSW *Protection of the Environment Operations Act 1997*.
n) Cause any increased demands on resources (natural or otherwise) which are, or are likely to become, in short supply?	Low-adverse	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. Recycled composite materials would be utilised where appropriate, including for decking.
o) Have any cumulative environmental effect with other existing or likely future activities?	Potentially low-adverse	The impacts of footing construction on the foreshore stability, including interaction with existing rock revetment are currently unknown, but design and construction would require that impacts be minimised. Prescribed environmental safeguards and 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.
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	Potentially low-adverse	The site occurs in a coastal hazard area, with the proposed viewing platform located seaward of the mapped 2030 Zone of Reduced Foundation Capacity (ZRFC), i.e. the reduced bearing capacity of sand which is adjacent to the storm erosion escarpment. The area is predicted to be subject to future beach recession due to sea level rise and related ongoing increase in wave runup (Advisian 2016). The proposal may not result in notable impacts on coastal processes and hazards (noting that the impacts of footing construction on the foreshore stability, including interaction with existing rock revetment are currently unknown), however the proposed viewing platform will undoubtedly be subject to coastal processes and coastal hazards which are considered likely to significantly reduce the design life of the structure. Refer to Section 3.9 for more information.

q) Any applicable local strategic planning statement, regional strategic plan or district strategic plan made under Division 3.1 of the Act	Low-adverse	The proposal to construct a new "sacrificial" asset within an area subject to existing coastal hazards (which are predicted to worsen) is generally not consistent with strategic, regional and coastal planning that calls for adaptive, resilient and sustainable approaches to asset, resource and land management. E.g.: *Shoalhaven 2040* Strategic Land-use Planning Statement, Planning Priority 11 *Adapting to natural hazards through building resilience,* states "Resilience to natural hazards is enhanced by the appropriate design, construction, and maintenance of development and public infrastructure"; and Planning Priority 12 *Managing Resources*, which states "Alongside our planning to build resilience and adapt to the future impacts of a changing environment, we are pursuing and implementing innovative sustainability practices and infrastructure." (https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D20/437277), and Illawarra Shoalhaven Regional Plan 2041, Objective 12: *Build resilient places and communities.* (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). However, the proposal is partially consistent with the Shoalhaven Coastal Zone Management Plan 2018 actions specific to the site: • LA1.6 Maintain dune vegetation… to promote dune stability and minimise loss of sand from the littoral systems that would contribute to long term recession of the beach. • LA1.8 Repair and replace or relocate the beach access infrastructure, including viewing platforms, if and when required following a large storm. Consider designing and installing a beach access and viewing platform for people with disabilities where possible as part of future upgrades or replacement where feasible. The proposed structure could potentially be relocated or adapted to changing conditions. The proposal is also in line with community values and expectations.
r) Any other relevant environmental factors	N/A	

4. PERMISSIBILITY

4.1 Environmental Planning & Assessment Act 1979

Section 4.1 (Development that does not need consent) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) states that:

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

In this regard, clause 2.73(3) of the NSW *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport & Infrastructure SEPP) provides that:

> *"Any of the following development may be carried out by or on behalf of a council without consent on a public reserve under the control of or vested in the council—*
>
> *(a) development for any of the following purposes—*
>
> *(i) roads, pedestrian pathways, cycleways, single storey car parks, ticketing facilities, viewing platforms and pedestrian bridges,*
>
> *(ii) recreation areas and recreation facilities (outdoor), but not including grandstands,*
>
> *…*
>
> *(v) landscaping, including landscape structures or features (such as art work) and irrigation systems,*
>
> *(b) environmental management works…*

The proposal would involve the construction of a viewing platform with access ramp, replacement of a viewing platform's decking, relocation of an outdoor shower, landscaping and revegetation with endemic vegetation. Each of these activities can be carried out under the provisions of clause 2.73(3) Transport & Infrastructure SEPP.

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

4.2 Biodiversity Conservation Act 2016

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

- The proposed activity is unlikely to have a significant impact on threatened species and/or threatened ecological communities listed in the schedules of the Act. There is, therefore, no requirement to 'opt in' to the Biodiversity Offset Scheme.
- The design and mitigation measures (Section 7) would ensure that no *serious and irreversible impacts on biodiversity values* (as defined by the BC Act) occur at the site of the proposed activity.

- The proposed activity is not within an area declared to be of "outstanding biodiversity value" as defined in the Act and Regulations.

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

It is also a defence to a prosecution for an offence under Part 2 of the Act (harming animals, picking plants, damaging the habitat of threatened species or ecological communities *etc*) if the work was essential for the carrying out of an activity by a determining authority within the meaning of Part 5 of the Environmental Planning and Assessment Act 1979 after compliance with that Part.

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

Refer to Section 3.2 for more information.

4.3 Other

A summary of other relevant legislation and permissibility is provided in Table 4 below.

Table 4. Summary of other relevant legislation and permissibility

NSW STATE LEGISLATION
***Environmental Planning and Assessment Act 1979* (EP&A Act)**
Permissible √ Not permissible ☐
The Transport & Infrastructure SEPP provides for the proposed works to be undertaken without development consent (refer above). In circumstances where development consent is not required, the environmental assessment provisions outlined in Part 5 of the Act are required to be complied with. This REF fulfils this requirement.
Shoalhaven Local Environmental Plan 2014 (SLEP)
Permissible √ Not permissible ☐
Under the SLEP the proposed activity may have required development consent. The provisions of Transport and Infrastructure SEPP however, prevail over the SLEP where there is an inconsistency by virtue of Section 3.28 of the EP&A Act. Consequently, development consent is not required.
State Environmental Planning Policy (Resilience and Hazards) 2021
Permissible √ Not permissible ☐
The proposed activity would be undertaken within an area which is not mapped as Coastal Wetlands or Littoral Rainforest for the purpose of the SEPP. The proposed activity does not comprise Coastal Protection Works as defined by the *Coastal Management Act 2016*. Other controls under the SEPP are not applicable.
Wilderness Act 1987

Permissible √ Not permissible ☐
The proposed activity is not located within a wilderness area declared under this Act.
Protection of the Environment Operations Act 1997
Permissible √ Not permissible ☐
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.
***National Parks and Wildlife Act 1974* (NP&W Act)**
Permissible √ Not permissible ☐
• The proposed activity would not encroach into National Park estate. • The Act provides the basis for the legal protection and management of Aboriginal sites in NSW. Under Sections 86 and 90 of the Act it is an offence to disturb an Aboriginal object or knowlingly destroy or damage, or cause the destruction or damage to, an Aboriginal object or place, except in accordance with a permit of consent under section 87 and 90 of the Act. • As there are no recorded sites or visible objects and as the site is on 'disturbed land', the Due Diligence Guidelines requires no further assessment as it is reasonable to conclude that there is a low probability of objects occurring in the area of the proposed activity and an AHIP is not required. Refer to Section 3.4 for more information.
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 mangroves and marine vegetation (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 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).*
Heritage Act 1977
Permissible √ Not permissible ☐
The proposed activity would not disturb an item of state heritage significance. The proposal would occur in a previously disturbed area and constitutes '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 valuesWorks can be undertaken with caution under an applicable exception from an excavation permit under s139(1) and (2) of the Heritage Act 1977.

Water Management Act 2000

Permissible √ Not permissible ☐

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

COMMONWEALTH LEGISLATION

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

Permissible √ Not permissible ☐

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

Commonwealth *Native Title Act 1993*

Permissible √ Not permissible ☐

The proposal would occur within Crown land (Part Lot 7005 DP 1075719).

Native Title assessment has been initiated on 25/08/2022 for the proposed works as a Future Act under Subdivision J (D22/357729). Procedural rights involve notification with request for comment to stakeholders.

5. CONSULTATION WITH GOVERNMENT AGENCIES

5.1 Transport & Infrastructure SEPP

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

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

The proposal would temporarily impact access to a public place for which Council who is undertaking the works, is the land and asset manager.

No impacts to public roads, sewerage systems, water infrastructure, nor excavation of footpaths, such as described under clause 2.10(1) would occur.

Consultation under clause 2.11 is therefore not required.

Clause 2.11 – Development with impacts on local heritage

No local heritage items are recorded as occurring in proximity to the proposal. Refer to Section 3.5 for more information.

Consultation under clause 2.11 is therefore not required.

Clause 2.12 – Development with impacts on flood liable land

The proposal would not occur on land which is mapped as being flood liable (refer to Section 3.7) and the proposal is unlikely to change flood patterns other than to a minor extent.

Consultation under clause 2.12 is therefore not required.

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

The proposal does not constitute a relevant provision for the clause and would not occur on land which is mapped as being flood liable (refer to Section 3.7).

Consultation under clause 2.13 is therefore not required.

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

The land on which the proposal would occur is mapped as being subject to coastal hazards (including beach erosion and shoreline recession), as defined by the *Coastal Management Act 2016*. Consultation with Council's Coastal Management Team has been undertaken.

Refer to Section 3.9 for more information.

Clause 2.15 – Consultation with public authorities other than councils

In consideration of the consultation requirements specified under Clause 2.15 of the Infrastructure SEPP, the proposed activity:

- would not be undertaken on adjacent to land reserved under the *National Parks and Wildlife Act 1974* or in Zone E1 or in equivalent zones.
- does not comprise a fixed or floating structure in or over navigable waters
- would not increase the amount of artificial light in the night sky and located on land within the dark sky region as identified on the dark sky region map
- would not be undertaken within Defence communications facility buffer (only relevant to the defence communications facility near Morundah)
- would not be undertaken on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*

The consultation requirements specified under Clause 2.15 of the Infrastructure SEPP therefore do not apply.

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

The proposed activity is not a type applicable to this clause *i.e.* health services facilities, correctional centres and residential accommodation. Consideration of PBP is therefore not required.

Summary

No consultation with government agencies under Part 2.2, Division 1 of the Transport & Infrastructure SEPP is required.

6. COMMUNITY ENGAGEMENT

The proposal is a community initiative and would be constructed by Council with grant funding obtained by Rotary representing the community.

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. Design and construction shall ensure minimal impact on existing rock revetment. In the event that footing depth exceeding 1.2m below ground level, or piling is proposed, in the vicinity of existing revetment, it is recommended that further geotechnical and coastal engineering investigation shall be undertaken to develop a design which considers the impacts on existing rock revetment.	Project Manager; Design Engineer; Construction contractor
2. It is recommended that design consider and provide for possible future relocation of the structure.	Project Manager; Design Engineer;
3. In the event that excavation exceeding 2.0m is required, further analysis of soils for acid sulfate potential and appropriate management shall be required.	Project Manager; Design Engineer
4. It is recommended that a Safety in Design report be prepared as part of any design solution in accordance with current NSW Legislation.	
5. This REF must be published on the determining authority's (Council's) website or the NSW planning portal, in accordance with clause 171(4) EP&A Regulation 2021 (as a matter of "public interest").	Project Manager / Environmental Officer
Site Establishment	
6. An appropriate traffic management plan shall be developed and implemented to minimise disruption and reduce risk of incident along McIntosh St and the Surf Club carpark during works.	Site Manager; Construction Contractor
7. Machinery access, construction compound (if required), vehicles and stockpiles shall be located within existing cleared areas of the grassed reserve or carpark in areas approved by Council's Works and Services Manager (or delegate) only.	Site Manager; Construction Contractor
8. Machinery, vehicles and stockpiles shall not encroach into native vegetation. A buffer of minimum 3m to tree trunks shall be maintained.	Site Manager; Construction Contractor

Safeguard / Measure	Responsibility
9. 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.	Construction contractor
10. No major equipment maintenance works shall be undertaken on-site.	Construction contractor
11. To avoid the risk of pollution from machinery, refuelling shall generally be done off site, however if refuelling on site is required, due care shall be taken to avoid spilling fuel and a tray shall be used to catch any accidentally spilt fuel.	Construction contractor
12. Erosion and sediment controls in accordance with the 'Blue Book' (Landcom 2004) shall be installed and maintained to prevent the entry of sediment into waterways. Erosion and sediment controls shall be maintained in good working order for the duration of the works and subsequently until the site has been stabilised and the risk of erosion is minimal.	Site Manager; Construction Contractor
Construction works	
13. An Aboriginal Heritage Site Officer shall be engaged from Jerrinja Local Aboriginal Land Council to monitor excavation works during construction.	Site Manager; Construction contractor
14. Vegetation removal shall be limited to minor pruning and removal of planted shrubs to facilitate access only.	Construction Contractor
15. Tree protection measures in accordance with AS4970 – *Protection of trees on development sites* shall be implemented to minimise the risk of impact to the structural root zones of trees to be retained.	Site Manager; Construction contractor
16. Pruning of trees where required is to be undertaken in accordance with AS 4373-1996 "Pruning of Amenity Trees".	Construction Contractor;
17. In the event that any wildlife be significantly disturbed or injured during works, Council's Environmental Officers are to be contacted on 4429 3405, or if unavailable, Wildlife Rescue – South Coast should be contacted on 0418 427 214, to rescue and relocate the animal(s).	Construction Contractor
18. If engineering fill is imported to the site, all conditions prescribed in the applicable Resource Recovery Exemptions shall be complied with, including: • ensuring the producer of the waste has complied with the applicable Order such as testing and validation • ensuring the material has met all chemical and other material requirements specified in the applicable Order • keeping a written record of the following for a period of six years:	Site Manager; Construction contractor

Safeguard / Measure	Responsibility
○ the quantity of material received ○ the name and address of the supplier	
19. If Virgin Excavated Natural Material (VENM) is taken to the site (*i.e.* without chemical testing and validation): a. the material must meet the definition of VENM (http://www.epa.nsw.gov.au/waste/virgin-material.htm) b. the supplier must fill out and complete the *VENM Certificate* The completed *VENM Certificate* shall be kept for at least six years and provided to the EPA upon any request.	Site Manager; Construction contractor
20. Any waste generated on site shall be reused in accordance with relevant Resource Recovery Orders and Exemptions, or otherwise disposed of at a licenced waste facility.	Construction Contractor
21. Staff working at the site will be instructed to stop work immediately on identification of any suspected Aboriginal heritage artefact. If any objects are found, NSW Department of Planning, Industry and Environment (ph:131 555) shall be contacted.	Construction Contractor
22. Remediation of access, compound and stockpile areas shall involve removal of all stockpiled material, dressing and turfing or seeding of grassed areas, and repair to pavement and path surfaces as appropriate to return the area to its existing state prior to works.	Site Manager; Construction Contractor;
23. Any fencing removed for access shall be reinstated or replaced to at least the same standard as existing prior to works, unless otherwise agreed by the relevant Council asset custodian.	Site Manager; Construction Contractor;
24. Proposed revegetation planning shall be adapted to existing landform and involve planting of locally endemic coastal species. Dune revegetation shall be planned to provide for appropriate zonation of plants in accordance with best practice dune revegetation and shall ensure that species' selection and location shall avoid future obstruction of views from viewing platforms and the Surf Life Saving Club monitoring vantage points.	Project Manager; Revegetation Contractor;
25. Dune revegetation works are recommended to occur between April and July (inclusive) to promote plant establishment. If revegetation must occur between August and March, pre-works investigation of potential shorebird nesting habitat areas shall be undertaken by Council's Environmental Officer.	Project Manager; Revegetation Contractor; SCC Environmental Officer.

Safeguard / Measure	Responsibility
Post construction	
26. It is recommended that a management plan of the asset be developed, informed by the recommended Safety in Design report, which provides for monitoring of the structure and closure as appropriate, with consideration of significant storm events.	
27. An asset form shall 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 the construction of a new viewing platform and upgrade of facilities overlooking Seven Mile Beach at McIntosh St, Shoalhaven Heads.

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

1. It is unlikely that there will be any significant environmental impact as a result of the proposed activity and an Environmental Impact Statement is not required.
2. The proposed activity will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats, and a Species Impact Statement / BDAR is not required.
3. No statutory approvals, licences, permits or further 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:

[redacted]

Trevor Dando

Manager – Works & Services

Shoalhaven City Council Date: 13.10.2022

9. REFERENCES

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APPENDIX A – Concept Plans

"SHOALHAVEN HEAD SURF LIFE SAVING CLUB VIEWING PLATFORM CONCEPT PLAN"

Shoalhaven City Council

Plan No. 5537_02

Council reference D21/287155

APPENDIX B – Threatened Species Likelihood of Occurrence

NSW Threatened Species Likelihood of Occurrence Table

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

Likelihood of occurrence in study area

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

Possibility of impact

1. Unlikely – The proposal would be unlikely to impact this species or its habitats. No NSW *Biodiversity Conservation Act 2016* "Test of Significance" or EPBC Act significance assessment is necessary for this species.
2. Likely – The proposal could impact this species, population or ecological community or its habitats. A NSW *Biodiversity Conservation Act 2016* "Test of Significance" and/or EPBC Act significance assessment is required for this species, population or ecological community.

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

Endangered Ecological Community name	***Status***	***Likelihood of presence within areas impacted by the activity***
Bangalay Sand Forest of the Sydney Basin and South East Corner Bioregions	Endangered - *NSW* BC *Act*	Is mapped in association with old Biometric vegetation classification, as occurring within 10m to the north of the site. Current NSW PCT vegetation mapping classifies the mapping occurring partially over and in proximity to the site (including to the north) to be PCT3788 *Coastal Foredune Wattle Scrub* (refer to Section 2.1) – which is not associated with Bangalay Sand Forest or any other threatened ecological communities (TECs). The vegetation in proximity to the site is not consistent with Bangalay Sand Forest EEC.
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions	Endangered - *NSW* BC *Act* Vulnerable - Commonwealth *EPBC Act*	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 1.4m to the south of the site).
Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - *NSW* BC *Act*	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 2.1km to the north-west of the site).
Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 2.4km to the west-north-west of the site).
Illawarra Subtropical Rainforest in the Sydney Basin Bioregion	Endangered - *NSW* BC *Act* Critically Endangered - Commonwealth *EPBC Act*	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 2.5km to the west of the site).
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 3km to the south of the site).

Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - *NSW* BC *Act* Endangered - Commonwealth *EPBC Act*	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 1.4km to the west of the site).
Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - NSW BC Act	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 1.4km to the north-west of the site).

Species name	***Status***	***Habitat requirements (www.environment.nsw.gov.au)***	***Likelihood of presence within areas impacted by the activity***
FLORA			
Chamaesyce psammogeton Sand Spurge	Endangered NSW BC Act	Grows on fore-dunes, pebbly strandlines and exposed headlands, often with Spinifex (Spinifex sericeus) and Prickly Couch (Zoysia macrantha). Sand Spurge seeds float, so some dispersal between beaches may occur.	Site survey did not detect species within or in proximity to the site. Unlikely to occur. Habitat available is degraded and sub-optimal.
Solanum celatum	NSW BC Act Endangered	Grows in rainforest clearings or in wet sclerophyll forests. Flowers August to October and produces fruit between December and January. Normally recorded in disturbed margins and clearings.	Does not occur. No suitable habitat present within the site.
AMPHIBIANS			
Green and Golden Bell Frog *Litoria aurea*	Vulnerable *EPBC Act* Endangered *NSW* BC *Act*	Marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat for the species includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), with a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas (OEH 2017).	Unlikely to occur. No suitable habitat present within the site.

MICRO-CHIROPTERAN BATS			
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*	Vulnerable *NSW* BC *Act*	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn	Unlikely to occur. No suitable habitat present within the site.
BIRDS			
Arctic Jaeger *Stercorarius parasiticus*	Migratory EPBC Act	An inhabitant of oceans, coastal regions, boreal forest, grassland and tundra, the artic jaeger shows a great ability to live in windy, wet climates as well as extremely dry and cold ones. The arctic jaeger breeds both on islands and on mainland coasts of the arctic, and outside of the breeding season is found mostly at sea.	May occur transiently in proximity to the site. Unlikely to occur within the site.
Australasian Bittern *Botaurus poiciloptilus*	*NSW* BC *Act* Endangered *EPBC Act* Endangered	Occurs in terrestrial freshwater wetlands and, rarely, estuarine habitats. It favours wetlands with tall, dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. The species favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and/or reeds (e.g. Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus) or cutting grass (Gahnia) growing over muddy or peaty substrate. Knowledge of the breeding ecology of the Australasian Bittern is relatively poor. Available data indicate that the Australasian Bittern breeds in relatively deep, densely vegetated freshwater swamps and pools, building its nests in deep	Unlikely to occur within the site. No suitable habitat present.

		cover over shallow water. In rushland, it may avoid breeding in the densest areas; alternatively, this may simply reflect the accessibility of the few nests that have been found. If population density is high, it may resort to open wetlands for nesting, e.g. in stunted Acacia, but this may be exceptional behaviour. It is clear that a complexity of habitat is required in order for foraging and breeding to occur in one location. The species requires shallow water, less than 30 cm deep with medium to low density reeds, grasses or shrubs for foraging and needs deeper water, with medium to high density reeds, rushes or sedges for nesting.	
Bar-tailed Godwit *Limosa lapponica*	Migratory EPBC Act	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips, although it is commonly recorded in paddocks at some locations overseas. Forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. They appear not to forage at high tide and prefer exposed sandy substrates on intertidal flats, banks and beaches. The also prefer soft mud; often with beds of eelgrass Zostera or other seagrasses. Occasionally they have been known to forage among mangroves, or on coral reefs or rock platforms among rubble, crevices and holes. They rarely forage in grassy or vegetated areas. On Heron Island they have been seen feeding on insect larvae among the roots of Casuarina. Roosts on sandy beaches, sandbars, spits and also in near-coastal saltmarsh. In some conditions, waders may choose	Unlikely to occur within the site. No suitable habitat present.

		roost sites where a damp substrate lowers the local temperature.	
Beach Stone-curlew *Esacus magnirostris*	Critically endangered NSW BC Act	They are found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. They forage in the intertidal zone of beaches and estuaries, on island, flats, banks and spits of sand, mud, gravel or rock, and among mangroves. Beach stone curlews breed above the littoral zone, at the backs of beaches, or on sandbanks and islands, among low vegetation of grass, scattered shrubs or low trees; also among open mangroves.	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.
Black Bittern *Ixobrychus flavicollis*	Vulnerable *NSW* BC *Act*	Terrestrial and estuarine wetlands generally in areas of permanent water and dense vegetation that may comprise grassland, woodland forest rainforest and mangroves. Roosts in trees or on ground amongst dense reeds, nests in branches overhanging water	Unlikely to occur within the site. No suitable habitat present.
Black-necked Stork *Ephippiorhynchus asiaticus*	Endangered *NSW* BC *Act*	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Storks usually forage in water 5-30cm deep for vertebrate and invertebrate prey. Eels regularly contribute the greatest biomass to their diet, but they feed on a wide variety of animals, including other fish, frogs and invertebrates (such as beetles, grasshoppers, crickets and crayfish). Black-necked Storks build large nests high in tall trees close to water. Trees usually provide clear observation of the surroundings and are at low elevation (reflecting the floodplain habitat). In NSW, breeding activity occurs May - January; incubation May - October; nestlings July - January; fledging from September. Parents share nest duties and in one study about 1.3-1.7 birds were fledged per nest.	Unlikely to occur within the site. No suitable habitat present.

		The NSW breeding population has been estimated at about 75 pairs. Territories are large and variable in size. They have been estimated to average about 9,000ha, ranging from 3,000-6,000ha in high quality habitat and 10,000-15,000ha in areas where habitat is poor or dispersed.	
Black-tailed Godwit *Limosa limosa*	Vulnerable *NSW* BC *Act*	Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps. Individuals have been recorded in wet fields and sewerage treatment works. Forages for insects, crustaceans, molluscs, worms, larvae, spiders, fish eggs, frog eggs and tadpoles in soft mud or shallow water. Roosts and loafs on low banks of mud, sand and shell bars.	Unlikely to occur within the site. No suitable habitat present.
Blue-billed Duck *Oxyura australis*	Vulnerable *NSW* BC *Act*	Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached. Blue-billed Ducks will feed by day far from the shore, particularly if dense cover is available in the central parts of the wetland. They feed on the bottom of swamps eating seeds, buds, stems, leaves, fruit and small aquatic insects such as the larvae of midges, caddisflies and dragonflies. Blue-billed Ducks are partly migratory, with short-distance movements between breeding swamps and overwintering lakes with some long-distance dispersal to breed during spring and early summer. Blue-billed Ducks usually nest solitarily in Cumbungi over deep water between September and February. They will also nest in trampled vegetation in Lignum, sedges or Spike-rushes, where a bowl-shaped nest is constructed.	Unlikely to occur within the site. No suitable habitat present.
Broad-billed Sandpiper *Limicola falcinellus*	Vulnerable *NSW* BC *Act*	Broad-billed Sandpipers favour sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayments, lagoons, saltmarshes and reefs as feeding and roosting habitat. Occasionally, individuals may be recorded in	Unlikely to occur within the site. No suitable habitat present.

		sewage farms or within shallow freshwater lagoons. Broad-billed Sandpipers roost on banks on sheltered sand, shell or shingle beaches. The species is an active forager, typically feeding by rapidly and repeatedly jabbing its bill into soft wet mud. Feeding also occurs while wading, often in water so deep that they have to submerge their heads and necks in order to probe the underlying mud. Their diet includes insects, crustaceans, molluscs, worms and seeds.	
Caspian Tern *Hydroprogne caspia*	Migratory EPBC Act	Occur along the Australian coastline, and also occur inland along major rivers, especially in the Murray-Darling and Lake Eyre drainage basins, preferring wetlands with clear water to allow easy prey detection.	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.
Common Greenshank *Tringa nebularia*	Migratory *EPBC Act*	Found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with emergent or fringing vegetation, including short sedges and saltmarsh, mangroves, thickets of rushes, and dead or live trees. It was once recorded with Black-winged Stilts (Himantopus himantopus) in pasture, but are generally not found in dry grassland. This species is known to forage at edges of wetlands, in soft mud on mudflats, in channels, or in shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as	Unlikely to occur within the site. No suitable habitat present.

		sedges or saltmarsh. It will occasionally feed on exposed seagrass beds. Roosts and loafs round wetlands, in shallow pools and puddles, or slightly elevated on rocks, sandbanks or small muddy islets. Occasionally the species will perch and roost on stakes (Higgins & Davies 1996). The species is known to have roosted on an inland claypan near Roebuck Bay, Western Australia; this site may be an important roost site for this species at least during the non-breeding season.	
Common Tern *Sterna hirundo*	Migratory EPBC Act	Common Terns are marine, pelagic and coastal. In Australia, they are recorded in all marine zones, but are commonly observed in near-coastal waters, both on ocean beaches, platforms and headlands and in sheltered waters, such as bays, harbours and estuaries with muddy, sandy or rocky shores. Occasionally they are recorded in coastal and near-coastal wetlands, either saline or freshwater, including lagoons, rivers, lakes, swamps and saltworks. Sometimes they occur in mangroves or saltmarsh and, in bad weather, in coastal sand-dunes or coastal embayments. Common Terns forage in marine environments, often close to the shore, including sheltered embayments and in the surf-zone, but also well out to sea. They also forage in near-coastal terrestrial wetlands, including estuaries, rivers and swamps. Common Terns roost on unvegetated, intertidal sandy ocean beaches, sandy islands, shores of estuaries or lagoons, and sandbars, as well as on rocky shores, rock platforms or rocks protruding above the surface of the water Common Terns nest on the ground in the open, usually on bare substrates, occasionally near vegetation or in it, or on a floating mat of vegetation. They usually nest on islands, either marine or in lakes, only sometimes on mainland beaches or promontories or salt or freshwater marshes.	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.
Crested Tern *Thalasseus bergii*	Migratory EPBC Act	Crested Terns inhabit coastal areas, offshore waters, beaches, bays, inlets, tidal rivers, salt swamps, lakes and larger rivers. The species breeds during Sep-Jan in the south	Possibly occurring within or in close proximity to the site. Further

		and Mar-Jun in the north in large, dense colonies on small islands. Nesting occurs on sand or shingle among low vegetation behind the beaches (Pizzey & Knight 2012; Morcombe 2011)	assessment has been undertaken in Section 3.2.
Curlew Sandpiper *Calidris ferruginea*	*EPBC Act:* Migratory *NSW BC Act:* Endangered	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Forages on mudflats and nearby shallow water. In non-tidal wetlands, they usually wade, mostly in water 15–30 mm, but up to 60 mm, deep. They forage at the edges of shallow pools and drains of intertidal mudflats and sandy shores. At high tide, they forage among low sparse emergent vegetation, such as saltmarsh, and sometimes forage in flooded paddocks or inundated saltflats. Occasionally they forage on wet mats of algae or waterweed, or on banks of beachcast seagrass or seaweed. They rarely forage on exposed reefs. In Roebuck Bay, northern Western Australia, they are also said to feed on part of the mudflats that have been exposed for a longer period, foraging in small groups. Roosts on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh. They have also been recorded roosting in mangroves in Inverloch, Victoria.	Unlikely to occur within the site. No suitable habitat present.
Eastern Curlew *Numenius madagascariensis*	Critically Endangered *EPBC Act*	Most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.

		saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms (Marchant & Higgins 1993). The numbers of Eastern Curlew recorded during one study were correlated with wetland areas. Mainly forages on soft sheltered intertidal sandflats or mudflats, open and without vegetation or covered with seagrass, often near mangroves, on saltflats and in saltmarsh, rockpools and among rubble on coral reefs, and on ocean beaches near the tideline. The birds are rarely seen on near-coastal lakes and in grassy areas. Roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. It occasionally roosts on reef-flats, in the shallow water of lagoons and other near-coastal wetlands. Eastern Curlews are also recorded roosting in trees and on the upright stakes of oyster-racks. At Roebuck Bay, Western Australia, birds fly from their feeding areas on the tidal flats to roost 5 km inland on a claypan. In some conditions, waders may choose roost sites where a damp substrate lowers the local temperature. This may have important conservation implications where these sites are heavily disturbed beaches. It may be possible to create artificial roosting sites to replace those destroyed by development. Eastern Curlews typically roost in large flocks, separate from other waders.	
Eastern Hooded Dotteral (Hooded Plover) *Thinornis cucullatus cucullatus* (syn *Thinornis rubricollis*)	*NSW* BC *Act:* Critically Endangered *EPBC Act:* Vulnerable	In south-eastern Australia Hooded Plovers prefer sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding, much beachcast seaweed, and backed by sparsely vegetated sand-dunes for shelter and nesting. Occasionally Hooded Plovers are found on tidal bays and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs. They regularly use near-coastal saline and freshwater lakes and lagoons, often with saltmarsh. Hooded	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.

		Plovers forage in sand at all levels of the zone of wave wash during low and mid-tide or among seaweed at high-tide, and occasionally in dune blowouts after rain. At night they favour the upper zones of beaches for roosting. When on rocks they forage in crevices in the wave-wash or spray zone, avoiding elevated rocky areas and boulder fields. In coastal lagoons they forage in damp or dry substrates and in shallow water, depending on the season and water levels. In eastern Australia, Hooded Plovers usually breed from August to March on sandy ocean beaches strewn with beachcast seaweed, in a narrow strip between the high-water mark and the base of the fore-dunes. They often nest within 6 m of the fore-dune, mostly within 5 m of the high-water mark, but occasionally among or behind dunes.	
Eastern Osprey *Pandion cristatus*	*NSW* BC *Act* Vulnerable	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within 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. preferring more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. Favours old growth attributes for nesting and roosting	Unlikely to occur within the site. No suitable habitat present.
Glossy Black-cockatoo *Calyptorhynchus lathami*	Vulnerable *NSW* BC *Act*	The GBC inhabits open forest and woodlands of the coast where stands of she-oak occur. In the Jervis Bay region they feed almost exclusively on the seeds of the black she-oak *Allocasuarina littoralis*, shredding the cones with their bill	Unlikely to occur within the site. No suitable habitat present.
Great Knot *Calidris tenuirostris*	*NSW BC Act:* Vulnerable	In Australasia, the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They	Unlikely to occur within the site. No suitable habitat present.

	EPBC Act: Migratory	are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, saltlakes and non-tidal lagoons. The Great Knot rarely occurs on inland lakes and swamps. Typically, the Great Knot roosts in large groups in open areas, often at the waters edge or in shallow water close to feeding grounds. It is known that in hot conditions, waders prefer to roost where a damp substrate lowers the local temperature.	
Greater Sand-plover *Charadrius leschenaultii*	*NSW* BC *Act:* Vulnerable *EPBC Act:* Vulnerable	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders. Diet includes insects, crustaceans, polychaete worms and molluscs. Prey is detected visually by running a short distance, stopping to look, then running to collect the prey	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.
Grey Plover *Pluvialis squatarola*	*EPBC Act:* Migratory	Grey Plovers usually forage on large areas of exposed mudflats and beaches of sheltered coastal shores such as inlets, estuaries and lagoons. They also occasionally feed in pasture and at the muddy margins of inland wetlands such as lakes, swamps and bores. They usually roost in sandy areas, such as on unvegetated sandbanks or sand-spits on sheltered beaches or other sheltered environments such as estuaries or lagoons. In Port Phillip Bay, they roost on artificial sand islands created by dredge spoil. They less often roost on the muddy edges of estuaries or water storages such as reservoirs and salt-lakes. The species has also been recorded roosting in claypans 2 km from the sea. Grey Plovers breed in tundra, often at higher elevations (up to the tree-line), and generally in dry positions, such as on low ridges or bluffs, in areas vegetated with sedges, moss, lichen and stunted trees, and interspersed with large wetlands and	Unlikely to occur within the site. No suitable habitat present.

		patches of snow and unmelted ice. They may avoid moist areas, though they have been recorded breeding in the deltas of large rivers and in other lowland or coastal.	
Grey-tailed Tattler *Tringa brevipes*	Migratory *EPBC Act*	Often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. It has been found around shores of rock, shingle, gravel or shells and also on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves. In Moreton Bay, Queensland, it is most abundant in areas with dense beds of seagrass. In Tasmania it is also abundant in areas with seagrass beds. It is less often on open flat sandy beaches or sandbanks, especially around accumulated seaweed or isolated clumps of dead coral. It is occasionally found around near-coastal wetlands, such as lagoons and lakes and ponds in sewage farms and saltworks. Inland records for the species are rare with sightings on river banks and the edges of rock pools. Usually forages in shallow water, on hard intertidal substrates, such as reefs and rock platforms, in rock pools and among rocks and coral rubble, over which water may surge. It has also been recorded foraging on exposed intertidal mudflats, especially with mangroves and possibly seagrass nearby. Occasionally it forages on intertidal sandflats, around banks of seaweed or protruding rocks or lumps of coral. Usually roosts in the branches of mangroves or, rarely, in dense stands of other shrubs, or on snags or driftwood. Where mangroves are not present, it roosts on rocks that are sometimes partly submerged. It is also known to roost on beaches and reefs; however, it is rarely reported roosting on bare sandy beaches or sandbanks. It occasionally roosts among beds of *Samolus*. Sightings also indicate it roosts on sand-dunes. It often perches on artificial structures. It is occasionally found in near-coastal saltworks and sewage	Unlikely to occur within the site. No suitable habitat present.

		ponds and once recorded at a bore-drain. It may roost on or feed among oyster-racks and other artificial structures, such as seawalls, rocky causeways and boats. It breeds in montane taiga and the forest tundra of northern Siberia, along rivers and streams and on the stone or pebble shorelines of lakes.	
Gull-billed Tern *Gelochelidon nilotica*	*EPBC Act:* Migratory	Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats, floodwaters, sewage farms, irrigated croplands and grasslands. They are only rarely found over the ocean	Unlikely to occur within the site. No suitable habitat present.
Latham's Snipe *Gallinago hardwickii*	*EPBC Act:* Migratory	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. In Australia, Latham's Snipe occurs in a wide variety of permanent and ephemeral wetlands. They usually occur in open, freshwater wetlands that have some form of shelter (usually low and dense vegetation) nearby. They generally occupy flooded meadows, seasonal or semi-permanent swamps, or open waters, but various other freshwater habitats can be used including bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains. The structure and composition of the vegetation that occurs around these wetlands is not important in determining the suitability of habitat. As such, snipe may be found in a variety of vegetation types or communities including tussock grasslands with rushes, reeds and sedges, coastal and alpine heathlands, lignum or tea-tree scrub, button-grass plains, alpine herbfields and open forest. Latham's Snipe sometimes occur in habitats that have saline or brackish water, such as saltmarsh, mangrove creeks,	Unlikely to occur within the site. No suitable habitat present.

		around bays and beaches, and at tidal rivers. These habitats are most commonly used when the birds are on migration. They are regularly recorded in or around modified or artificial habitats including pasture, ploughed paddocks, irrigation channels and drainage ditches, ricefields, orchards, saltworks, and sewage and dairy farms. They can also occur in various sites close to humans or human activity (e.g. near roads, railways, airfields, commercial or industrial complexes). The foraging habitats of Latham's Snipe are characterized by areas of mud (either exposed or beneath a very shallow covering of water) and some form of cover (e.g. low, dense vegetation). The snipe roost on the ground near (or sometimes in) their foraging areas, usually in sites that provide some degree of shelter, e.g. beside or under clumps of vegetation, among dense tea-tree, in forests, in drainage ditches or plough marks, among boulders, or in shallow water if cover is unavailable.	
Lesser Sand-plover *Charadrius mongolus*	*EPBC Act:* Migratory *NSW BC Act:* Vulnerable	In non-breeding grounds in Australia, this species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves. The species feeds mostly on extensive, freshly-exposed areas of intertidal sandflats and mudflats in estuaries or beaches, or in shallow ponds in saltworks. hey roost near foraging areas, on beaches, banks, spits and banks of sand or shells and occasionally on rocky spits, islets or reefs. The species does not breed in Australia.	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.

Little Eagle *Hieraaetus morphnoides*	Vulnerable *NSW* BC Act	Occupies open eucalypt forest, woodland or open woodland. She-oak or acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site.
Little Tern *Sternula albifrons*	Endangered NSW BC Act Migratory EPBC Act	Mostly exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above the high tide mark near estuary mouths or adjacent to coastal lakes and islands. Nests in a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles.	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.
Marsh Sandpiper *Tringa stagnatilis*	Migratory *EPBC Act*	Lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. In north Australia they prefer intertidal mudflats, although surveys in Kakadu National Park recorded more birds around shallow freshwater lakes than in areas influenced by tide. Three of the five sites with highest recorded numbers are saltwater habitats (Hunter Estuary, NSW; Port Hedland Saltworks, Western Australia; Tullakool Evaporation Ponds, NSW). In the south-east Gulf of Carpentaria they have been recorded round both saline and fresh waters. Elsewhere they said to avoid, or rarely occur in, tidal habitats, and rarely occur on beaches. In Western Australia they prefer freshwater to marine environments. In south-east Australia they prefer inland saline lakes and coastal saltworks. They are found infrequently around mangroves. Usually forages in shallow water at the edge of wetlands. They probe wet mud of mudflats or feed among marshy vegetation.	Unlikely to occur within the site. No suitable habitat present.

		Recorded roosting or loafing on tidal mudflats, near low saltmarsh, and around inland swamps.	
Orange-bellied Parrot *Neophema chrysogaster*	Critically endangered NSW BC Act Critically Endangered EPBC Act	On the mainland, the Orange-bellied Parrot spends winter mostly within 3 km of the coast in sheltered coastal habitats including bays, lagoons, estuaries, coastal dunes and saltmarshes. The species also inhabits small islands and peninsulas and occasionally saltworks and golf courses. Birds forage in low samphire herbland or taller coastal shrubland. Diet mainly comprises seeds and fruits of sedges and salt-tolerant coastal and saltmarsh plants. Occasionally, flowers and stems are eaten. Orange-bellied Parrots are known to forage among flocks of Blue-winged Parrots. Recent records from unexpected places, including Shellharbour and Maroubra suggest that the species may be expanding their selection of habitats and foraging plant species. Birds seen in NSW in 2003 were foraging on weed species several hundred metres from the coast.	Unlikely to occur within the site. No suitable habitat present.
Pacific Golden Plover *Pluvialis fulva*	Migratory EPBC Act	This species usually forages on sandy or muddy shores (including mudflats and sandflats) or margins of sheltered areas such as estuaries and lagoons, though it also feeds on rocky shores, islands or reefs. In addition, Pacific Golden Plovers occasionally forage among vegetation, such as saltmarsh, mangroves or in pasture or crops. They usually roost near foraging areas, on sandy beaches and spits or rocky points, islets or exposed reefs, occasionally among or beneath vegetation including mangroves or low saltmarsh, or among beachcast seaweed. They sometimes also roost on levee banks and islands in evaporation ponds in saltworks. Breeding occurs in dry areas of tundra away from the coast, including upland and montane tundra, usually on slopes of low hills, knolls or foothills vegetated with lichen and moss, or in bare, stony areas. Some sites are near vegetated areas	Unlikely to occur within the site. No suitable habitat present.

		with shrubs, and although usually above the treeline, they very occasionally breed in forest tundra. After the young hatch, they move to moister habitats, such as *Sphagnum* swamps.	
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. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones.	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.
Powerful Owl *Ninox strenua*	Vulnerable NSW BC Act	Coastal Woodland, Dry Sclerophyll Forest, wet sclerophyll forest and rainforest- Can occur in fragmented landscapes Roosts in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda,* Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species. requires old growth elements-hollow bearing tree resources for nesting and prey resource. Nests in large tree hollows in large eucalypts that are at least 150yrs old. Often in riparian areas. Large home range	Unlikely to occur within the site. No suitable habitat present.
Red Knot *Calidris canutus*	Migratory *EPBC Act*	Inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps. Forages in soft substrate near the edge of water on intertidal mudflats or sandflats exposed by low tide. At high tide the may feed at nearby lakes, sewage ponds and floodwaters. They have also been recorded foraging on beds of eelgrass on tidal sandflats, on a thick algal mat in shallow water, and in	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.

		shallow pools on crest of coral reef. Roosts on sandy beaches, spits and islets, and mudflats; also in shallow saline ponds of saltworks. They like to roost in open areas far away from potential cover for predators, but close to feeding grounds. In hot conditions, waders prefer to roost where a damp substrate lowers the local temperature.	
Red-necked Stint *Calidris ruficollis*	Migratory *EPBC Act*	The Red-necked Stint mostly forages on bare wet mud on intertidal mudflats or sandflats, or in very shallow water; mostly in areas with a film of surface water and mostly close to edge of water. During high tides they sometimes forage in non-tidal wetlands. Red-necked Stints may also forage in samphire, generally avoid beds of seagrass, but may feed along edges. On Lake Reeve, Victoria, they have been reported to occasionally feed on algal mats. On sandy ocean beaches they sometimes forage in beachcast seaweed. They have been recorded foraging in flooded paddocks and in a freshly cropped lucerne paddock near lagoons. Roosts on sheltered beaches, spits, banks or islets, of sand, mud, coral or shingle, sometimes in saltmarsh or other vegetation. They occasionally roost on exposed reefs or shoals. Large numbers sometimes roost on ocean beaches, though it is probably not a preferred habitat and use of this habitat may increase when high numbers of birds are present. They were once recorded roosting *c.* 1.5 km from an inland lake, in close-cropped grass. They also roost among beachcast seaweed or clods of mud or dried cow-pats. During very high tides they may use sand dunes or claypans. Large numbers (an estimated 7967 birds) were recorded roosting at an inland claypan near Roebuck Bay in north-west Western Australia.	Unlikely to occur within the site. No suitable habitat present.
Ruddy Turnstone *Arenaria interpres*	Migratory EPBC Act	In Australasia, the Ruddy Turnstone is mainly found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.

		dry ridges of sand or coral. It has occasionally been sighted in estuaries, harbours, bays and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats. In southern Australia the Ruddy Turnstone prefers rockier coastlines and is less numerous on large embayments with extensive mudflats. The Ruddy Turnstone mainly forages between lower supralittoral and lower littoral zones of foreshores, from strand-line to wave-zone. They often forage among banks of stranded seaweed or other tide-wrack. They are also known to forage on exposed rocky platforms, coral reefs and mudflats. In the south-east Gulf of Carpentaria they feed only on mangrove mudflats, especially those near shingle beaches. Sometimes they feed around coastal lagoons and sewage treatment ponds, occasionally among low vegetation in saltmarsh, on exposed beds of seagrass, or among dunes on coral cays. The have sometimes been known to forage in grassy areas above the tideline, in short pasture, or in ploughed paddocks. The Ruddy Turnstone roosts on beaches, above the tideline, among rocks, shells, beachcast seaweed or other debris. They have also been observed roosting on rocky islets among grassy tussocks, and on mudflats and sandflats. They sometimes fly around, or land on, ships at sea	
Sanderling *Calidris alba*	Vulnerable *NSW* BC *Act*	Often found in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats and bare open coastal lagoons; individuals are rarely recorded in near-coastal wetlands. Generally occurs in small flocks, however may associate freely with other waders. Individuals run behind receding waves, darting after insects, larvae and other small invertebrates in the sand, then dart back up the beach as each wave breaks. Also feeds on plants, seeds, worms, crustaceans, spiders, jellyfish and fish, foraging around rotting heaps of kelp, at the edges of shallow pools on sandspits and on nearby mudflats. Roosts on bare sand,	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.

		behind clumps of beach-cast kelp or in coastal dunes. Breeding occurs in the Northern Hemisphere.	
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.	Unlikely to occur within the site. No suitable habitat present.
Sharp-tailed Sandpiper *Calidris acuminata*	Migratory *EPBC Act*	Prefers grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches. Breeds in Siberia in the peat-hummock	Unlikely to occur within the site. No suitable habitat present.
Short-tailed Shearwater *Ardenna tenuirostris*	Migratory *EPBC Act*	Coastal, oceanic.	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.
Sooty Oystercatcher *Haematopus fuliginosus*	Vulnerable *NSW* BC *Act*	Shore bird. Found around the entire Australian coast, including offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW coast. The availability of suitable nesting sites may limit populations. Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Forages on exposed rock or coral at low tide for foods such as limpets and mussels. Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks.	Unlikely to occur within the site. No suitable habitat present.
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.

Swift Parrot *Lathamus discolour*	Endangered *EPBC Act* Endangered *NSW* BC *Act*	Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany (*Eucalyptus robusta*), Spotted Gum (*Corymbia maculata*), Red Bloodwood (*C. gummifera*), Mugga Ironbark (*E. sideroxylon*), and White Box (E. albens). Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey Box E. moluccana and 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.
Terek Sandpiper *Xenus cinereus*	*NSW BC Act:* Vulnerable *EPBC Act:* Migratory	The Terek Sandpiper mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire (*Halosarcia* spp.). Birds are seldom near the edge of water, however, birds may wade into the water. Occasionally, on sandy beaches, among seaweed and other debris and in rocky areas, Terek Sandpipers will use the supralittoral or upper littoral zone, where a film of water covers the sand. However, on exposed rock platforms, the species forages in the lower littoral zone and not the supralittoral or upper littoral zones. Less often seen on sandy or shingle beaches, or on rock or coral reefs or platforms, Terek Sandpipers are occasionally sighted around drying sewage ponds and saltpans if surrounded by mudflats. The species is also found around brackish coastal swamps, lagoons and dune-lakes; and also on gravel or rocky edges of estuarine pools and freshwater	Unlikely to occur within the site. No suitable habitat present.

		river-pools. Very occasionally, birds use swampy, grassy or cultivated paddocks near the coast. Preferring to roost in or among mangroves, birds may perch in branches or roots up to 2 m from the ground, or beneath them in the shade on hot days. Occasionally, they roost in dead trees or among tangled driftwood.	
Varied Sittella *Daphoenositta chrysoptera*	Vulnerable *NSW* BC *Act*	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland	Unlikely to occur within the site. No suitable habitat present.
Wedge-tailed Shearwater *Ardenna pacificus*	Migratory *EPBC Act*	A pelagic, marine bird known from tropical and subtropical waters. The species tolerates a range of surface-temperatures and salinities, but is most abundant where temperatures are greater than 21 °C and salinity is greater than 34.6 %. In tropical zones the species may feed over cool nutrient-rich waters. The species has been recorded in offshore waters of eastern Victoria and southern NSW, mostly over continental slope with sea-surface temperatures of 13.9–24.4 °C and usually off the continental shelf in north-west Australia.	Possibly occurring within or in close proximity to the site. Further assessment has been undertaken in Section 3.2.
Whimbrel *Numenius phaeopus*	Migratory *EPBC Act*	Often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. It has been infrequently recorded using saline or brackish lakes near coastal areas. It also used saltflats with saltmarsh, or saline grasslands with standing water left after high spring-tides, and in similar habitats in sewage farms and saltfields. There are a small number of inland records from saline lakes and canegrass swamps. It has also been recorded in coastal dunes and on a football field. Forages on intertidal mudflats, along the muddy banks of estuaries and in coastal lagoons, either in open unvegetated areas or among mangroves. They sometimes forage on	Unlikely to occur within the site. No suitable habitat present.

		sandy beaches or among rocks. It has occasionally been sighted feeding on exposed coral or rocky reefs and rock platforms. It is known to probe holes and crevices among rubble and on reef flats, but not on reef crests. It was once recorded feeding on a grassy football field. Regularly roost in mangroves and other structures flooded at high tide. They often roost in the branches of mangroves around mudflats and in estuaries and occasionally in tall coastal trees. They have also been observed to roost on the ground (sometimes under mangroves or in shallow water), on muddy, sandy or rocky beaches; rocky islets and coral cays. They were once recorded perched on upright stakes attached to oyster racks. On Rottnest Island, they have been seen perched on cliff-tops at high tide. Whimbrels were also recorded roosting at high tide on a claypan 2 km inland of Roebuck Bay, Western Australia. In some conditions, waders may choose roost sites where a damp substrate lowers the local temperature. This may have important conservation implications where these sites are heavily disturbed beaches.	
White-bellied Sea-Eagle *Haliaeetus leucogaster*	*NSW* BC *Act* Vulnerable Migratory *EPBC Act*	Found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The habitats occupied by the sea-eagle are characterized by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats. The species is mostly recorded in coastal lowlands, but can occupy habitats up to 1400 m above sea level on the Northern Tablelands of NSW and up to 800 m above sea level in Tasmania and South Australia. Birds have been recorded at or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs, saltmarsh and sewage ponds. They also occur at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site.

White-fronted Chat *Epthianura albifrons*	Vulnerable NSW BC Act	Commonly occurring in the saltmarshes of southern Australia, the White-fronted Chat is often seen foraging for insects and their larvae among the succulent leaves and stems of stunted saltmarsh plants.	Unlikely to occur within the site. No suitable habitat present.
White-throated Needletail *Hirundapus caudacutus*	Migratory *EPBC Act*	Almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps. When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks. In coastal areas, they are sometimes seen flying over sandy beaches or mudflats, and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes. They are sometimes recorded above islands well out to sea.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site.
MAMMALS			

Greater Glider *Petauroides Volans*	Vulnerable EPBC Act	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Occupy a relatively small home range with an average size of 1 to 3 ha. Give birth to a single young in late autumn or early winter which remains in the pouch for approximately 4 months and is independent at 9 months of age. Usually solitary, though mated pairs and offspring will share a den during the breeding season and until the young are independent. Can glide up to a horizontal distance of 100m including changes of direction of as much as 90 degrees. Very loyal to their territory.	Unlikely to occur within the site. No suitable habitat present.
Grey-headed Flying-fox *Pteropus poliocephalus*	Vulnerable *EPBC Act* Vulnerable *NSW* BC *Act*	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Unlikely to occur within the site. No suitable habitat present.
Humpback Whale *Megaptera novaeangliae*	Vulnerable EPBC Act Vulnerable NSW BC Act	The population of Australia's east coast migrates from summer cold-water feeding grounds in Subantarctic waters to warm-water winter breeding grounds in the central Great Barrier Reef. They are regularly observed in NSW waters in June and July, on northward migration and October and November, on southward migration	Unlikely to occur within the site. No suitable habitat present.
Koala *Phascolarctos cinereus*	Vulnerable NSW BC Act	Eucalypt woodland and forest Home range sizes vary with quality of habitat ranging from less than two ha to several hundred ha. Preferred tree species on the south coast are *Eucalyptus amplifolia, E.viminalis, & E.tereticornis* but numerous other species also known food trees.	Unlikely to occur within the site. No suitable habitat present.
Spotted-tailed Quoll *Dasyurus maculatus*	Endangered *EPBC Act* Vulnerable *NSW* BC *Act*	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Mostly	Unlikely to occur within the site. No suitable habitat present.

		nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares. Are known to traverse their home ranges along densely vegetated creeklines.	