

**REVIEW OF ENVIRONMENTAL FACTORS (REF)
BOAT RAMP REPAIR & TOE EXTENSION
RIVER RD, SHOALHAVEN HEADS**


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Document control

Item	Details
Project	Review of Environmental Factors – Boat Ramp Repair and Toe Extension – River Rd, Shoalhaven Heads
Client	Shoalhaven City Council
Prepared By	City Services, Shoalhaven City Council

Document status

Version	Author / Reviewer*	Name	Signed	Date
V1.0	Author	Jeff Bryant		12/10/2022
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***Review and endorsement statement:**

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

Assessment and approvals overview

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

1. PROPOSAL AND LOCATION

1.1 Overview

This Review of Environmental Factors (REF) addresses the potential environmental impacts of – and provides mitigation measures for – the repair and upgrade of a boat ramp at River Rd, Shoalhaven Heads.

The proposal involves repairs to the existing boat ramp surface and extension of the toe of the ramp to facilitate improved and safer launching and retrieval of boat vessels.

The existing ramp is in poor condition with large cracks, insufficient traction for tow-vehicles and unsound footing for pedestrians. The short length of the ramp results in trailers being reversed off the toe edge, causing damage to trailers and the boat ramp itself.

Proposed improvements shall comply with NSW Boat Ramp Facility Guidelines (RMS 2015) including toe depth; ramp slope, width, length and material (including moulded grooves for improved traction and drainage); provision of a compacted foundation course over geotextile fabric underlay; and rock scour protection to protect the ramp to and prevent the formation of a ‘drop-off’ at the toe of the ramp.

Works would include:

- Excavation and subbase construction:
 - Excavation and off-site disposal of material
 - Installation of A64 geofabric
 - Install and compact 250 mm layer of 75 mm-150 mm basalt aggregate
 - Install and compact 50 mm layer of 20 mm basalt aggregate
- Installation of 4500 mm wide by 3500 mm long by 250 mm thick, pre-cast concrete panel toe extension, secured with 6 x N12 gal bar dowel connections and cohesive marine mix.
- Installation of 400 mm rock scour protection over geofabric.
- Establishment of a site compound
- Night work to optimise (low) tides
- Safeguards and mitigation measures including Acid Sulfate Soil management

Figure 2 below shows the site with approximate location of works.

Shoalhaven City Council (SCC) is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This Review of Environmental Factors (REF) provides an assessment of the proposed activity and associated impacts on the environment, in the context of Division 5.1 of the Act and section 171 of the *Environmental Planning and Assessment Regulation 2021*, and in doing so, satisfies the requirement of section 5.5 of the Act, that SCC examines and takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

1.2 Location

The proposed works would occur within Part Lot 7005 DP 1075719 (Crown Land for which Shoalhaven City Council is the Land Manager) and within the Shoalhaven River waterway (refer to Figures 1 and 2).

Details of affected land are provided in Table 1.

Table 1. Property affected by the proposal

Lot / DP	Description	Land owner / manager	Other pertinent information
-	Shoalhaven River waterway	Crown Lands	Crown Licence is required for works in this area
Part Lot 7005 DP 1075719	Jerry Bailey Reserve	Crown Land - Shoalhaven City Council is Land Manager	Crown Reserve R52855 - Community Land: General Community Use / Natural Area / Park

Photo 1. Site showing existing concrete boat ramp and adjacent floating jetty



Figure 1. Site location



Legend

Shoalhaven Heads Boat Ramp site

Figure 2. Site overview showing suitable potential construction compound area

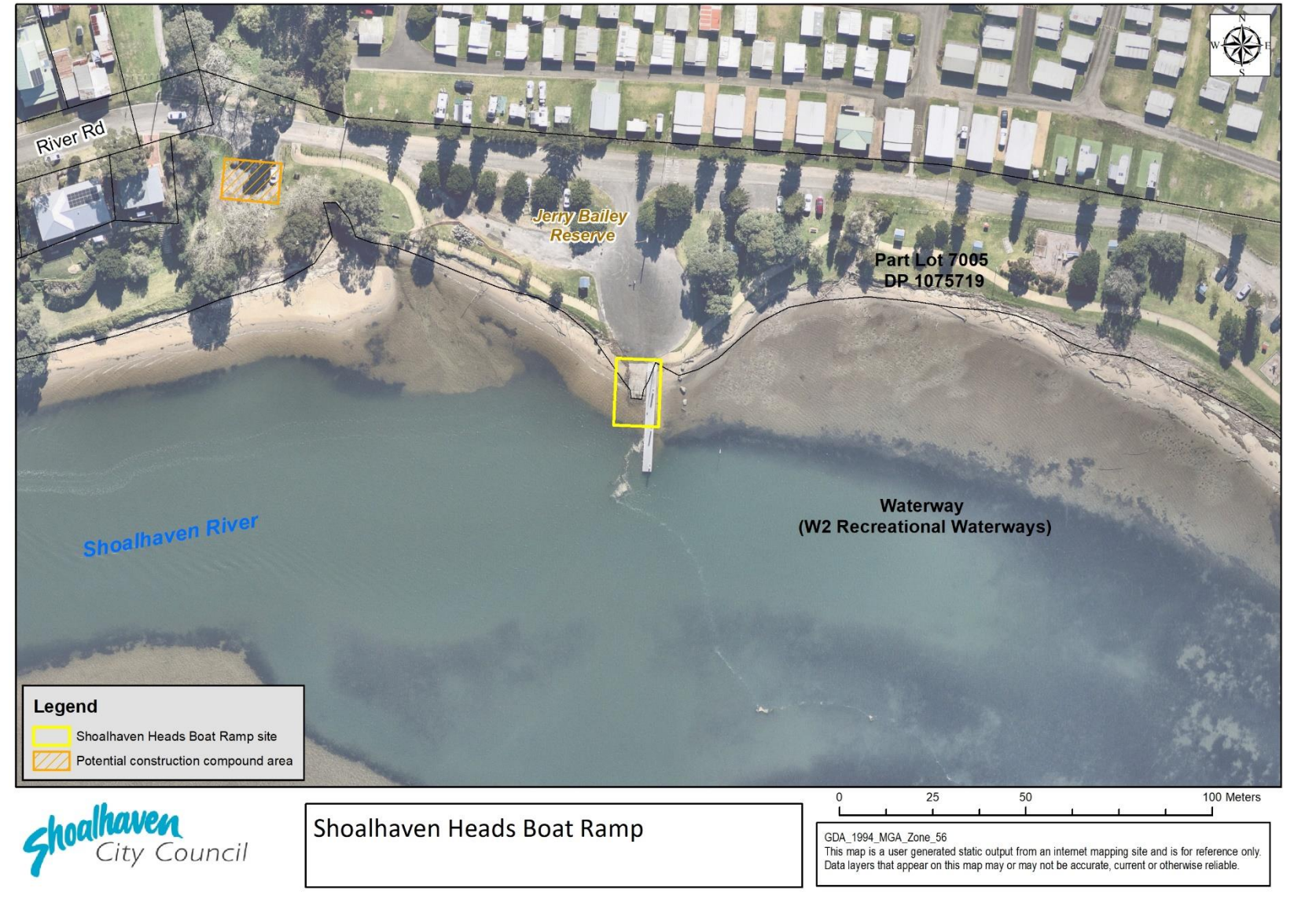
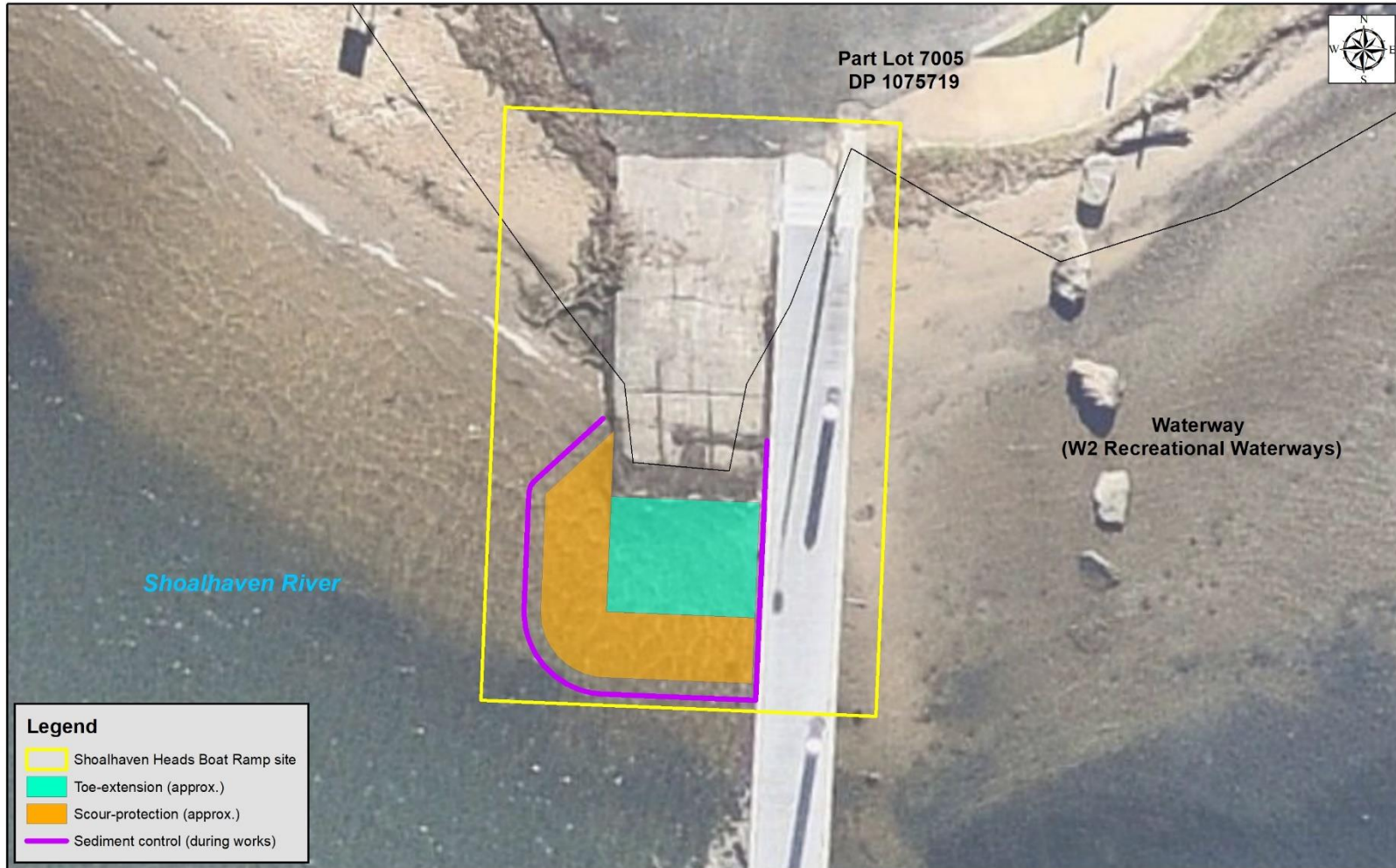


Figure 3. Indicative site plan



Legend

- Shoalhaven Heads Boat Ramp site
- Toe-extension (approx.)
- Scour-protection (approx.)
- Sediment control (during works)

2. EXISTING ENVIRONMENT

2.1 Habitat and vegetation assessment

The site was assessed by a Council Environmental Officer on 19th September and 4th October 2022 in consideration of the current proposal and has previously been investigated in relation other projects in the locality, including on 12th August 2021 which involved investigations of Seagrass in proximity to the site during low-tide (SCC 2021).

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

The site comprises a cleared and modified foreshore access area on the north side of the Shoalhaven River estuary, roughly opposite the Shoalhaven River entrance approximately 900 m – 1.2 km to the south-east.

The site contains an existing, dilapidated concrete boat ramp (approx. 10 m long x 4.5 m wide) adjacent to a floating jetty. The boat ramp is accessed via a sealed road and turning circle within Jerry Bailey Reserve.

The reserve in proximity to the site comprises a cleared and modified parkland containing playground and exercise equipment and a shared-user path, with managed turf of Kikuyu (*Cenchrus clandestinus*) and planted Tuckeroo (*Cupaniopsis anacardioides*) and Moreton Bay Fig (*Ficus macrophylla*) trees.

A sandy, river foreshore beach (typically 3 – 5 m wide on mid- to high-tide) stretches either side of the boat ramp and jetty, containing no vegetation, but with variable, patchy areas of shore wrack (predominantly Seagrass) and woody debris.

No naturally occurring native terrestrial vegetation occurs in proximity to the site.

The sandy beach slopes gently to shallow sand-flats / mud-flats, which are partially exposed at low tide and appear to be of a finer sediment grain size than the beach material. In some locations there are sparse pebble or shell deposits over the sand-flats.

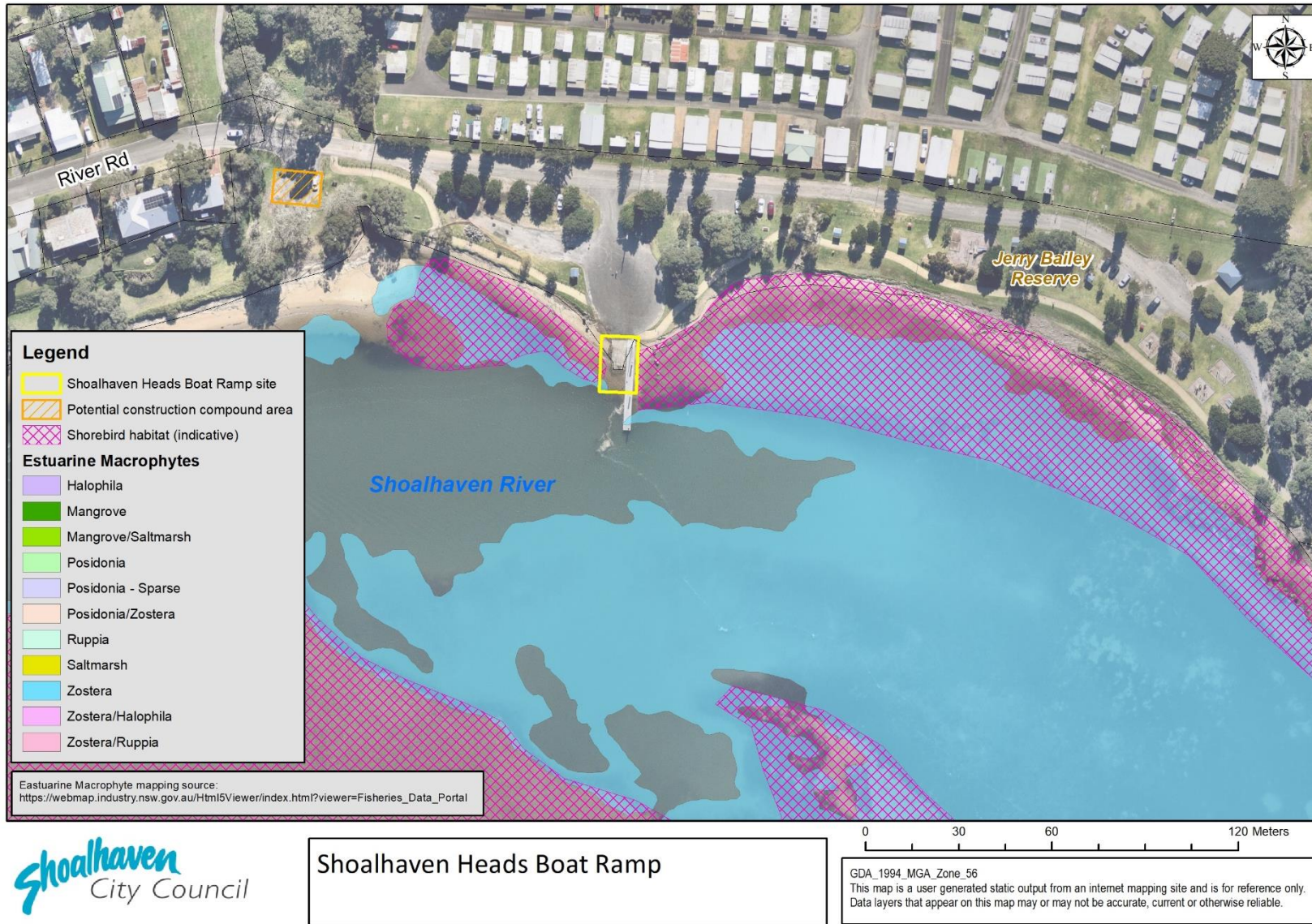
The sand-flats give way to a deeper channel, generally occurring 15-25 m from the top of the beach, with wider areas occurring where existing storm-water pipes have caused sand-fans (deltas) of sand extending further into the river channel.

The edges of the deeper channel support extensive areas of Seagrass – Eelgrass (*Zostera capricorni*) which extends sparsely onto the sand-flats and mud-flats in some locations.

The eastern portion of the estuary (east of the site) is a broad embayment, approx. 300 m across with extensive shallow mudflats along the shoreline, broad shoals to the south and west, and sprawling seagrass meadows through slightly deeper parts of the western portion of the embayment.

The area immediately south and west of the existing boat ramp was not observed to contain any seagrass during site investigations, noting that visibility into the water was somewhat inhibited by turbidity and water movement. Seagrass was readily visible on the east side of the jetty, despite these limitations.

Figure 4. Site showing nearby environmental constraints



It is likely that historic and ongoing localised disturbance associated with launching and retrieval of boats and other water vessels, has resulted in colonisation and survival of Eelgrass in this location being suppressed. It also appears that river and coastal processes, affected by the nearby drainage outlet and the jetty acting as a barrier, have resulted in sand deposition in proximity to the boat ramp, which is increased relative to other nearby areas.

Threatened species and habitat resources on site

No threatened flora including *Chamaesyce psammogeton*, or suitable habitat for other locally occurring threatened flora species (including *Solanum celatum*) was identified on site during vegetation surveys.

No hollow-bearing trees, Glossy Black Cockatoo (*Calyptorhynchus lathami*) feed tree species (i.e. *Allocasuarina littoralis*), Glider feed tree species (e.g. *Corymbia gummifera* or *Eucalyptus punctata*) occurs within or in proximity to the site.

The mudflats of the Shoalhaven River estuary edges are known to be important habitat for numerous shorebirds, with resident and migratory species utilising the estuary to the east and south-east of the subject site for foraging and nesting. Pied Oystercatchers (*Haematopus longirostris*) and Bar-tailed Godwits (*Limosa lapponica*), have been observed during site investigations associated with recent environmental assessments (SCC 2021). Nesting Little Terns (*Sternula albifrons*) and Pied Oystercatchers have been recorded near the river entrance under the NPWS Shorebird Recovery Program and have been observed by the author during previous site visits.

The former NPWS Shorebird Recovery Coordinator (South Coast Branch) previously provided the advice that while shorebird nesting habitat does occur in proximity to the estuary entrance, important threatened shorebird foraging and roosting habitat occurs from the river entrance, around 'Shorebird Park' (the north-eastern corner of the embayment) and to approximately 50m west of the River Rd jetty (refer Figure 4), and that these areas should not be affected by proposals. The risk of impact on the shorebird ecology resulting from altering sediment grain size and invertebrate assemblages was also raised (Jodie Dunn *pers. comm.* 26/06/2019 and 28/05/2019 – Council reference D19/211274 and D19/177852).

It is considered that the area immediately south and west of the existing boat ramp provides lower quality habitat for shorebirds than adjacent areas either side of the boat ramp and jetty, as a result of ongoing disturbance and higher levels of sand deposition over mudflats.

Photos 1 through 7 show the site, available habitat and relevant features.

Photo 2. Existing boat ramp showing adjacent beach with wrack



Photo 3. Existing boat ramp showing adjacent waterway and algae on ramp



Photo 4. Existing boat ramp facing toward sealed road access within Jerry Bailey Reserve



Photo 5. Eelgrass visible to the east of jetty. No Eelgrass or other estuarine macrophytes were visible on the west side



Photo 6. Mudflats at low-tide to the east of the site



Photo 7. Site at low-tide



3. ASSESSMENT OF LIKELY IMPACTS ON THE ENVIRONMENT

3.1 Impacts associated with the proposal

Direct and indirect impacts on vegetation and other habitat as a result of the proposal

Direct impacts of the proposal may occur associated with machinery access, excavation of sand substrate and construction of the toe extension and scour protection:

- Machinery access to site.
- Excavation of up to 5 m³ sand at the toe and side of the existing boat ramp.
- Installation of 14 tonne (approx. 4.67 m³) basalt.
- Removal of up to 37 m² potential shorebird foraging habitat.
- Potential disturbance of migratory and threatened shorebirds.
- Potential impact to marine habitat including beach wrack and possibly Eelgrass.

Machinery access would be via the sealed access road and turning circle immediately adjacent to the site.

The construction compound and stockpile area would be located on existing, level, cleared and disturbed land, away from the beach.

No native vegetation occurs along the upper foreshore beach where access and works would occur. No removal or disturbance of native vegetation would occur as a result of the proposed works.

Machinery operation shall be undertaken from the existing boat ramp to every practical extent, to minimise compaction of beach sand and mudflats. Machinery operation from the foreshore would be minimal and if required, would occur only immediately adjacent to the existing boat ramp. While sand compaction due to trampling has been shown to cause significant declines in invertebrate abundance and species richness (Schlacher *et al* 2016), the area where compaction would occur has been subject to historic and ongoing trampling as a popular walking destination, in addition to historic and recent machinery access for foreshore management works. The proposed works are considered unlikely to further degrade the sand as habitat for invertebrates.

Machinery operation would occur during lower tides. No machinery would operate from within the water.

Excavation and construction works would involve the installation and maintenance of sediment and erosion controls (including combination hydrocarbon boom and sediment curtain) to minimise impacts associated with water contamination and sediment movement and deposition.

The site is not regarded as containing suitable habitat for nesting threatened shorebirds and works would not impact on areas considered to be important foraging habitat for shorebirds (refer to Sections 2.1, 3.2.2 and 3.3).

There is potential however, for noise, movement and vibration disturbance to foraging and roosting threatened shorebirds from machinery, depending on the timing works. Any disturbance would be temporary, localised and within a small area of sub-optimal habitat, where similar disturbance regularly occurs from launching and retrieval of water vessels.

Ideally, the timing of works would be scheduled between May and July (inclusive) to avoid important migratory bird foraging periods (August through April inclusive) to ensure disturbance is

minimised. If works cannot be scheduled between May and July, pre-works surveys by Council's Environmental Officer shall be undertaken to ensure resident and transitory shorebirds are not at risk of impact from works activities.

No seagrass was visible immediately adjacent to the existing boat ramp during site investigations (refer to Section 2.1). It is assumed that marine vegetation that would be impacted within the development footprint, is limited to scattered, minor Eelgrass (*Zostera capricorni*) plants.

The boat ramp and associated rock scour protection would be constructed in line with the gradient of the existing boat ramp, and be excavated into the river substrate, not extending into the deeper river channel and not protruding beyond the existing jetty. It is therefore considered unlikely that the structure would lead to an increase in sand deposition relative to that already caused by the existing barriers.

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 proposed works would involve excavation and construction of a boat ramp extension and associated rock scour protection in the Shoalhaven River estuary waterway. Minimal vehicle and machinery access along the foreshore may also be involved.

Safeguards including use of a hydrocarbon boom and sediment curtain would minimise impacts associated with water contamination and sediment movement and deposition.

Works shall be scheduled to occur during low-tides and would not involve machinery operation within the water.

It is assumed that marine vegetation that would be impacted within the development footprint, is limited to scattered, minor Eelgrass (*Zostera capricorni*) plants and wrack.

Construction of the rock scour protection would provide structural habitat for small marine fauna.

It is considered unlikely that marine fauna would be directly impacted by the proposal.

Part 1 In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is to be placed at risk of extinction.

No threatened species listed under the Act, or their habitats, are likely to be directly or indirectly impacted by the proposal.

Several saltwater species listed in the schedules of the Act are known to have occurred on the south coast of NSW¹:

- Grey Nurse Shark (*Carcharias taurus*) and Blind Slug (*Smeagol hilaris*) are listed as Critically Endangered.
- Southern Bluefin Tuna (*Thunnus maccoyii*) and Scalloped Hammerhead Shark (*Sphyrna lewini*) are listed as Endangered.
- Great White Shark (*Carcharodon carcharia*) and Black Rockcod (*Epinephalus daemeli*) are listed as Vulnerable.
- Green Sawfish (*Pristis zijsron*) is listed as Presumed Extinct.

Populations of these species have primarily been reduced by over-harvesting, habitat degradation and human interference or hazards (e.g. nets) in habitat.

Grey Nurse Shark

Grey Nurse Sharks are found predominantly in inshore coastal waters. They have been recorded at various depths, but mainly found in waters between 15 and 40 metres deep. Grey Nurse Sharks gather at a number of key sites along the coast of NSW and southern Queensland. These sites have gravel or sand filled gutters, rocky reefs or caves, and are called aggregation sites. The site does not provide suitable habitat for this species. As such, the proposed activity would have no effect on the life cycle of the species.

Blind Slug

This is a pulmonate (with lung) slug. It has only been collected from a small, isolated location at Merry Beach, south of Ulladulla. The species lives in gravel and cobble filled rocky crevices and beaches at Merry Beach. The proposal would therefore have no effect on the lifecycle of this species.

Southern Bluefin Tuna

The Southern Bluefin Tuna are pelagic fish occurring in the oceanic waters normally on the seaward side of the continental shelf. The proposal would therefore have no effect on the lifecycle of this species.

Scalloped Hammerhead Shark

The Scalloped Hammerhead Shark is a coastal pelagic species with a circum-global distribution in warm temperate and tropical coastal areas. They are known to form large migratory schools and in Australia tend to move as far south as Sydney during the warmer months. The proposal would therefore have no effect on the lifecycle of this species.

¹ All threatened species information in Section 3.2.1 sourced from NSW DoPI Threatened Species database:
<https://www.dpi.nsw.gov.au/fishing/threatened-species/what-current>

Great White Sharks

Great White Sharks are normally found in inshore waters around rocky reefs and islands and often near seal colonies. They have been recorded at varying depths down to 1,200 metres. The proposal would therefore have no effect on the lifecycle of this species.

Black Rockcod

Black Rockcod live in relatively shallow rocky reefs where they are usually found in caves, ledges, gutters and beneath bommies. Small juveniles are often found in coastal rocky pools, and larger juveniles around rocky shores in estuaries. The site of the proposed activity does not provide suitable habitat for any life stage of the Black Rockcod.

Green Sawfish

Green Sawfish (presumed extinct in NSW) are bottom dwelling rays commonly found in near-coastal environments including estuaries, river mouths, embankments and along sandy and muddy beaches. It has been recorded in Jervis Bay, but the last confirmed sighting of the species in NSW was in 1972 from the Clarence River at Yamba. It is unlikely that the Green Sawfish would occur within or in proximity to the site. The proposal would not directly impact the species, would not remove habitat, and is unlikely to negatively affect suitable habitat for the Green Sawfish, such that the species (if not already extinct) would be impacted.

Part 2 In the case of an endangered population, whether the proposed development or activity is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

The endangered populations listed under the Act are:

- Western population of Olive Perchlet (*Ambassis agassizii*);
- Darling River Hardyhead (*Craterocephalus amniculus*) population in the Hunter River catchment;
- Snowy River population of River Blackfish (*Gadopsis marmoratus*);
- Murray-Darling Basin population of Eel-tailed Catfish (*Tandanus tandanus*);
- *Posidonia australis* seagrass – Port Hacking, Botany Bay, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie populations.

None of these areas is in proximity to the site. No endangered populations would therefore be affected by the proposed activity.

Part 3 In the case of an endangered ecological community or critically endangered ecological community whether the proposed development or activity:

- 1. 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.

The endangered ecological communities listed under the Act are:

- Aquatic ecological community in the natural drainage system of the lower Murray River catchment
- Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River
- Aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan River
- Aquatic ecological community in the catchment of the Snowy River in NSW

These areas would be unaffected by the proposed activity.

Part 4 In relation to the habitat of a threatened species or ecological community:

I. The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

II. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

III. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The area affected by the activity does not provide habitat for threatened species, populations or ecological communities (refer responses to Part 1 through Part 3 above)

Part 5 Whether the proposed development or activity is likely to have an adverse effect on any critical habitat (either directly or indirectly),

The only critical habitat currently on the register is “*Critical Habitat of Grey Nurse Shark*” with listed and mapped areas of:

1. Bass Point (Shellharbour)
2. Big and Little Seal Rocks
3. Fish Rock (South West Rocks)
4. Green Island (South West Rocks)
5. Julian Rocks (Byron Bay)
6. Little Broughton Island (Port Stephens)
7. Magic Point (Maroubra)
8. Montague Island (Narooma)
9. The Pinnacle (Forster)
10. Tollgate Islands (Batemans Bay)

These areas would be unaffected by the proposed activity.

Part 6 *Whether the proposed development or activity is consistent with a Priorities Action Statement*

Of the species listed in Part 1 above, Priority Action Statements (PAS) have been prepared for Grey Nurse Sharks, Blind Slug, Scalloped Hammerhead, Southern Bluefin Tuna, Black Rockcod, and Great White Shark. As demonstrated in Part 1 above, the proposed activity would have no effect on these species. Similarly, the proposed activity are unlikely to be inconsistent with relevant PASs.

Part 7 *Whether the proposed development constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process*

Table 2. Fisheries Management Act – Key Threatening Process Assessment

Key Threatening Process	Assessment
Degradation of native riparian vegetation along NSW water courses	Not applicable – the proposal would not involve removal or other impacts on riparian vegetation.
Hook and line fishing in areas important for the survival on threatened fish species	Not applicable – proposal does not comprise or facilitate hook and line fishing.
Human-caused climate change	Not applicable – the proposal does not contribute to human-cause climate change.
Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams	Applicable. Impacts negligible. The proposal would involve construction of a fixed structure within Shoalhaven River. The boat ramp and associated rock scour protection would be constructed in line with the gradient of the existing boat ramp, and be excavated into the river substrate, not extending into the deeper river channel and not protruding beyond the existing jetty. The impact of the proposal on flow regimes of the river would therefore be negligible.
Introduction of fish to waters within a river catchment outside their range	Not applicable – the proposal does not involve releasing fish.
Introduction of non-indigenous fish and marine vegetation to the coastal waters of NSW	Not applicable – the proposal does not involve the introduction of non-indigenous fish.

Key Threatening Process	Assessment
Removal of large woody debris from NSW rivers and streams	Not applicable – the proposal does not involve the removal of woody debris.
The current shark meshing program in NSW waters	Not applicable – the proposal does not involve shark meshing.

3.2.2 Part 7 Biodiversity Conservation Act 2016

An assessment of the potential for NSW threatened flora and fauna species occurring on-site or otherwise being impacted by the proposal was undertaken (refer to Appendix B). The following species and endangered ecological communities are known to occur on-site or are considered to have some potential to occur on-site or be otherwise impacted by the proposal, and therefore required further assessment under Part 7 of the NSW *Biodiversity Conservation Act 2016*:

- Beach Stone-curlew *Esacus magnirostris*
- Black-tailed Godwit *Limosa limosa*
- Broad-billed Sandpiper *Limicola falcinellus*
- Curlew Sandpiper *Calidris ferruginea*
- Eastern Hooded Dotteral *Thinornis cucullatus cucullatus*
- Great Knot *Calidris tenuirostris*
- Greater Sand-plover *Charadrius leschenaultia*
- Lesser Sand-plover *Charadrius mongolus*
- Little Tern *Sternula albifrons*
- Pied Oystercatcher *Haematopus longirostris*
- Sanderling *Calidris alba*
- Terek Sandpiper *Xenus cinereus*

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.

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

Beach Stone-curlew: 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 2017a).

SAII: Breeding - Clearing in mapped areas could constitute a Serious and Irreversible Impact (SAII).

Black-tailed Godwit: is a migratory wading bird that breeds in Mongolia and Eastern Siberia and flies to Australia for the southern summer, arriving in August and leaving in March. 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. Frequently recorded in mixed flocks with Bar-tailed Godwits (OEH 2019a).

SAII: N/A

Broad-billed Sandpiper: The eastern form of this species breeds in northern Siberia before migrating southwards in winter to Australia. In Australia, Broad-billed Sandpipers overwinter on the northern coast, particularly in the north-west, with birds located occasionally on the southern coast. In NSW, the main site for the species is the Hunter River estuary, with birds occasionally reaching the Shoalhaven estuary. 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 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. Individuals are strongly migratory and only mildly gregarious when not breeding. Large flocks are seldom recorded and birds are often either encountered alone or feeding with other waders such as Red-necked Stints or Curlew Sandpipers (OEH 2019b).

SAII: N/A

Curlew Sandpiper: Distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in

freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. The Curlew Sandpiper breeds in Siberia and migrates to Australia (as well as Africa and Asia) for the non-breeding period, arriving in Australia between August and November, and departing between March and mid-April. It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds. Birds breed at 2 years of age and the oldest recorded bird is 19 years old. Most birds caught in Australia are between 3 and 5 years old (OEH 2019c).

SAIL: Breeding - While this species breeds in Siberia, it relies on successful feeding to migrate for this purpose. Important feeding areas are mapped and include the entire Shoalhaven River / Crookhaven River estuary.

Eastern Hooded Dotteral (Hooded Plover): 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 Eastern Hooded Dotteral 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 Eastern Hooded Dotterals 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 Eastern Hooded Dotterals 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. Eastern Hooded Dotterals 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. Eastern Hooded Dotterals 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 Eastern Hooded Dotteral diet consists mainly of marine worms, molluscs, crustaceans, insects, water plants and seeds. In eastern Australia, Eastern Hooded Dotterals 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. Eastern Hooded Dotterals display high

nest site fidelity and nest solitarily. On mainland Australia, nests may be 2-5 km apart (OEH 2017b).

SAIL: Breeding - Clearing in mapped areas could constitute a Serious and Irreversible Impact.

Great Knot: In NSW, the species has been recorded at scattered sites along the coast down to about Narooma. Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms. Migrates to Australia from late August to early September, although juveniles may not arrive until October-November. Most birds return north in March and April, however some individuals may stay over winter in Australia. Forages for food by methodically thrusting its bill deep into the mud to search for invertebrates, such as bivalve molluscs, gastropods, polychaete worms and crustaceans (OEH 2019e).

SAIL: Breeding - While this species breeds outside NSW, it relies on successful feeding to migrate for this purpose. Important feeding areas are mapped.

Greater Sand-plover: 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 2019d).

SAIL: N/A

Lesser Sand-plover: 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 2019f).

SAIL: N/A

Little Tern: 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 2019g).

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 the past three seasons at least (NPWS 2019; South Coast Shorebird Recovery Program 2021).

SAIL: N/A

Pied Oystercatcher: 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 2017c).

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

SAIL: N/A

Sanderling: 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 2019h).

SAII: N/A

Terek Sandpiper: A rare migrant to the eastern and southern Australian coasts, being most common in northern Australia, and extending its distribution south to the NSW coast in the east. The two main sites for the species in NSW are the Richmond River estuary and the Hunter River estuary. The latter has been identified as nationally and internationally important for the species. In Australia, the species has been recorded on coastal mudflats, lagoons, creeks and estuaries. Favours mudbanks and sandbanks located near mangroves, but may also be observed on rocky pools and reefs, and occasionally up to 10 km inland around brackish pools. Generally roosts communally amongst mangroves or dead trees, often with related wader species. Breaks up into smaller flocks or even solitary birds when feeding in open intertidal mudflats. The diet includes worms, crabs and other crustaceans, small shellfish and the adults and larvae of various flies, beetles and water-bugs. Feeding is undertaken by moving rapidly and erratically over soft, wet mud, pecking or probing at the surface (OEH 2017e).

SAII: N/A

Test of significance

Suitable foraging habitat exists in the intertidal sand-flats and mud-flats of the estuary and the beach, in proximity to the site, for Beach Stone-curlew, Black-tailed Godwit, Broad-billed Sandpiper, Curlew Sandpiper, Eastern Hooded Dotteral (Hooded Plover), Great Knot, Greater Sand-plover, Lesser Sand-plover, Little Tern, Pied Oystercatcher, Sanderling and Terek Sandpiper in addition to numerous other shorebirds (including migratory and threatened shorebirds listed under the EPBC Act – refer to Section 3.3 below).

The Shoalhaven Estuary is considered an important foraging area for many shorebirds including Curlew Sandpiper and Great Knot, in addition to EPBC listed Bar-tailed Godwit and Eastern Curlew among others, that rely on successful feeding to migrate as far as Siberia and Alaska for breeding (Birdlife Shoalhaven 2021; Scholten *et al* 2012).

The potential for a significant impact on Beach Stone-curlew, Black-tailed Godwit, Broad-billed Sandpiper, Curlew Sandpiper, Eastern Hooded Dotteral (Hooded Plover), Great Knot, Greater Sand-plover, Lesser Sand-plover, Little Tern, Pied Oystercatcher, Sanderling and Terek Sandpiper, is considered unlikely due to the following factors:

- No works would occur that would directly or indirectly impact on a nesting site for any threatened shorebird species:

- Black-tailed Godwit, Broad-billed Sandpiper, Curlew Sandpiper, Great Knot, Greater Sand-plover, Lesser Sand-plover, Sanderling and Terek Sandpiper do not breed in Australia, so no direct impacts to nesting or breeding activities are likely.
- Little Terns and Pied Oystercatchers have been known to nest on the sand flats of the Shoalhaven River entrance, particularly over lower elevation areas strewn with shell, small debris and seaweed in the north-western portion of the entrance – over 500 m away from the current proposal. Works would therefore not occur in close proximity to known breeding habitat for Little Terns and Pied Oystercatchers.
- 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. No such habitat exists within or in close 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. No such habitat exists within or in close proximity to the site.
- The existing beach adjacent to the site contains no sand banks or dunes. The location is also a popular walking and dog-walking area. There are no records of any threatened shorebird species nesting within or adjacent to the site.
- Impacts on foraging habitat or foraging activities of threatened shorebird species would be minimal and minimised by safeguards and mitigation measures:
 - Any disturbance would be temporary, localised and within a small area of sub-optimal habitat, where similar disturbance regularly occurs from launching and retrieval of water vessels.
 - Machinery access to the site would be via the existing sealed access road and turning circle. Machinery operation shall be undertaken from the existing boat ramp to every practical extent, to minimise compaction of beach sand and mudflats. Machinery operation from the foreshore would be minimal and if required, would occur only immediately adjacent to the existing boat ramp.
 - Ideally, the timing of works would be scheduled between May and July (inclusive) to avoid important migratory bird foraging periods (August through April inclusive) to ensure disturbance is minimised. If works cannot be scheduled between May and July, pre-works surveys by Council's Environmental Officer shall be undertaken to ensure resident and transitory shorebirds are not at risk of impact from works activities. Note that August to April covers the breeding period for locally nesting threatened shorebirds in addition to the main foraging period for migratory shorebirds.
 - These species are highly mobile and transient and unlikely to visit or remain within the site, or in close proximity, during machinery operation.

- The footprint of the boat ramp extension and associated rock-scour protection would remove up to 37 m² potential shorebird foraging habitat adjacent to the existing boat ramp. This habitat is considered sub-optimal due to disturbance; higher levels of sand deposition and lack of mudflats; and gradient and depth of water in affected areas not providing for shallows or exposed mudflats / sandflats during low tides.
- In the immediate Shoalhaven estuary from the entrance to Berry's Bay and around to the north-western corner of Comerong Island there is over 4.5 km of sandy foreshore and extensive tidal flats (this varies with tide and entrance opening). The area of potential foraging habitat that would be affected by disturbance during machine operation is therefore relatively small and vast alternative areas of foraging and roosting habitat would remain available during works.
- The boat ramp and associated rock scour protection would be constructed in line with the gradient of the existing boat ramp, and be excavated into the river substrate, not extending into the deeper river channel and not protruding beyond the existing jetty. It is therefore considered unlikely that the structure would lead to an increase in sand deposition relative to that already caused by the existing barriers, and it is unlikely that the availability of macroinvertebrate prey assemblages and quality of foraging habitat for different shorebird species would be affected as there is no anticipated change to the depth and composition of the intertidal sand-flats and mud-flats.

It is therefore considered unlikely that Beach Stone-curlew, Black-tailed Godwit, Broad-billed Sandpiper, Curlew Sandpiper, Eastern Hooded Dotteral (Hooded Plover), Great Knot, Greater Sand-plover, Lesser Sand-plover, Little Tern, Pied Oystercatcher, Sanderling and Terek Sandpiper would be impacted on by the proposed works and the proposed activity is unlikely to have an adverse effect on the lifecycle of a species such that a viable local population of any of these species is likely to be placed at risk of extinction.

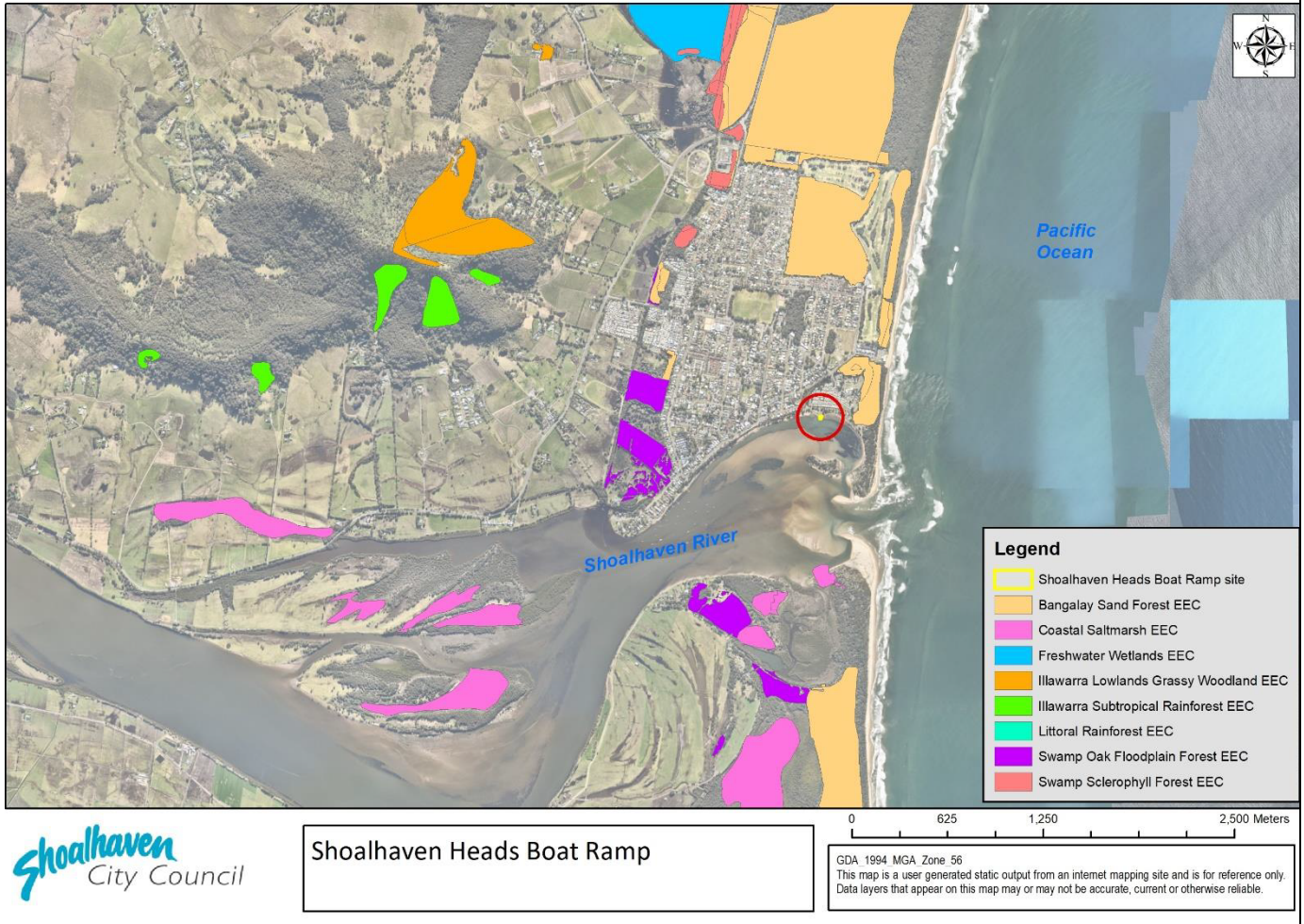
Part B - In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

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

Eight (8) endangered ecological communities (EECs) are mapped as occurring in the landscape surrounding the site (refer to Figure 5 below).

Each of the EECs mapped as occurring in the surrounding locality was confirmed through vegetation survey as not occurring within the site, nor in close proximity such that there is any risk of impact as a result of the proposal.

Figure 5. Endangered ecological communities mapped (Biometric) as occurring in proximity to the site



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

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

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

No EEC would 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 as listed in Schedule 4 of the *Biodiversity Conservation Act 2016* are considered relevant to the proposal.

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 15th September 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:

- Bar-tailed Godwit *Limosa lapponica* – M
- Caspian Tern *Hydroprogne caspia* – M
- Common Greenshank *Tringa nebularia* – M
- Common Tern *Sterna hirundo* – M
- Crested Tern *Thalasseus bergii* – M
- Curlew Sandpiper *Calidris ferruginea* – CE
- Eastern Curlew *Numenius madagascariensis* – CE
- Eastern Hooded Plover (Dotteral) *Thinornis cucullatus cucullatus* – V
- Great Knot *Calidris tenuirostris* – CE
- Greater Sand-plover *Charadrius leschenaultia* – V
- Grey Plover *Pluvialis squatarola* – M
- Grey-tailed Tattler *Tringa brevipes* – M
- Gull-billed Tern *Gelochelidon nilotica* – M
- Lesser Sand-plover *Charadrius mongolus* – E
- Little Tern *Sternula albifrons* – M
- Marsh Sandpiper *Tringa stagnatilis* – M
- Pacific Golden Plover *Pluvialis fulva* – M
- Red Knot *Calidris canutus* – E
- Red-necked Stint *Calidris ruficollis* – M
- Ruddy Turnstone *Arenaria interpres* – M
- Sharp-tailed Sandpiper *Calidris acuminata* – M
- Short-tailed Shearwater *Ardenna tenuirostris* – M
- Terek Sandpiper *Xenus cinereus* – M
- Wedge-tailed Shearwater *Ardenna pacificus* – M
- Whimbrel *Numenius phaeopus* – M

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

Refer also to Likelihood of Occurrence Table in Appendix B.

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

Table 3. EPBC Significant impact assessment

<i>Critically endangered and endangered species - Significant impact criteria</i>	
Species to consider: Curlew Sandpiper, Eastern Curlew, Great Knot, Lesser Sand Plover, Red Knot	
<i>Criteria</i>	<i>Assessment</i>
lead to a long-term decrease in the size of a population	The proposed activity will not directly impact on the Curlew Sandpiper, Eastern Curlew, Great Knot, Lesser Sand Plover or Red Knot, will not affect or disrupt breeding and will not impact on breeding habitat or important foraging habitat. Disturbance of foraging threatened shorebirds would be temporary, localised and within sub-optimal habitat where similar disturbance regularly occurs. Refer to Section 3.2.2 for more information.
reduce the area of occupancy of the species	No
fragment an existing population into two or more populations	No
adversely affect habitat critical to the survival of a species	No important habitat will be impacted.
disrupt the breeding cycle of a population	Works would not affect breeding habitat. The main period for migratory birds activity in the locality is August through to April. Works shall be scheduled to avoid this time if possible or pre-works survey and monitoring of birds undertaken otherwise.
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. Refer to Section 3.2.2 for more information
result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	No invasive species will be introduced
introduce disease that may cause the species to decline	No disease will be introduced
interfere with the recovery of the species	No
<i>Vulnerable species - Significant impact criteria</i>	
Species to consider: Greater Sand Plover Eastern Hooded Plover (Eastern Hooded Dotteral)	

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 Hooded Plover, will not affect or disrupt breeding and will not impact on breeding or foraging habitat. Refer to Section 3.2.2 for more information.
reduce the area of occupancy of an important population	No
fragment an existing important population into two or more populations	No
adversely affect habitat critical to the survival of a species	No important habitat will be impacted by the proposed activity
disrupt the breeding cycle of an important population	Works would not affect breeding habitat. The main period for migratory birds activity in the locality is August through to April. Works shall be scheduled to avoid this time if possible or pre-works survey and monitoring of birds undertaken otherwise.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No important habitat will be impacted by the proposed activity. Refer to Section 3.2.2 for more information.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No invasive species will be introduced
introduce disease that may cause the species to decline	No disease will be introduced
interfere substantially with the recovery of the species	No

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.

The footprint of the boat ramp extension and associated rock-scour protection would remove up to 37 m² potential shorebird foraging habitat adjacent to the existing boat ramp. This habitat is considered sub-optimal due to disturbance; higher levels of sand deposition and lack of mudflats; and gradient and depth of water in affected areas not providing for shallows or exposed mudflats / sandflats during low tides.

In the immediate Shoalhaven estuary from the entrance to Berry's Bay and around to the north-western corner of Comerong Island there is over 4.5 km of sandy foreshore and extensive tidal flats (this varies with tide and entrance opening). The area of potential foraging habitat that would be affected by disturbance during machine operation is therefore relatively small and vast alternative areas of foraging and roosting habitat would remain available during works.

Any disturbance would be temporary, localised and within a small area of sub-optimal habitat, where similar disturbance regularly occurs from launching and retrieval of water vessels.

Ideally, the timing of works would be scheduled between May and July (inclusive) to avoid important migratory bird foraging periods (August through April inclusive) to ensure disturbance is minimised. If works cannot be scheduled between May and July, pre-works surveys by Council's Environmental Officer shall be undertaken to ensure resident and transitory shorebirds are not at risk of impact from works activities. Note that August to April covers the breeding period for locally nesting threatened shorebirds in addition to the main foraging period for migratory shorebirds.

Refer to Section 3.2.2 for more information.

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 Wales* (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 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 is located within and immediately adjacent to the Shoalhaven River.

A search on the Aboriginal Heritage Information Management System (AHIMS) on 31 August 2022 returned one record occurring approximately 1km to the west-south-west of the site, in the vicinity of [REDACTED] (refer to Figure 6 below).

Note that this AHIMS search was undertaken associated with a different project, centred on River Rd between Jerry Bailey Rd and McIntosh St, but including the location of the current proposal. A current search was unable to be carried out due to the AHIMS online search tool being unavailable during the preparation of this report and as of 10th October 2022.

The Due Diligence Guidelines define disturbed land as follows:

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

The site of the proposed works is within a dynamic area of the Shoalhaven River foreshore which has been subject to ongoing, regular disturbance through natural processes of accretion and scouring, in addition to disturbance associated with construction of the existing boat ramp and jetty and use of the site for launching and retrieval of boats and other water vessels. 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.

3.5 Non-indigenous heritage

No items of local heritage significance or any items on the State Heritage Register or listed in the Shoalhaven Local Environmental Plan occur in close proximity to the site such that the proposed works might impact them.

Figure 6. Results of AHIMS Aboriginal heritage search



**AHIMS Web Services (AWS)
Search Result**

Your Ref/PO Number : River Rd SUP
Client Service ID : 687027

Shoalhaven City Council - Nowra
PO Box 42 Bridge Rd
Nowra New South Wales 2541
Attention: Jeff Bryant

Date: 31 May 2022

Email: jeff.bryant@shoalhaven.nsw.gov.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -34.8602, 150.732 - Lat, Long To : -34.8514, 150.7474, conducted by Jeff Bryant on 31 May 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:

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

3.6 Acid Sulfate Soils

The site is mapped as containing Class 1 and Class 5 Acid Sulfate Soils (refer to Figure 7).

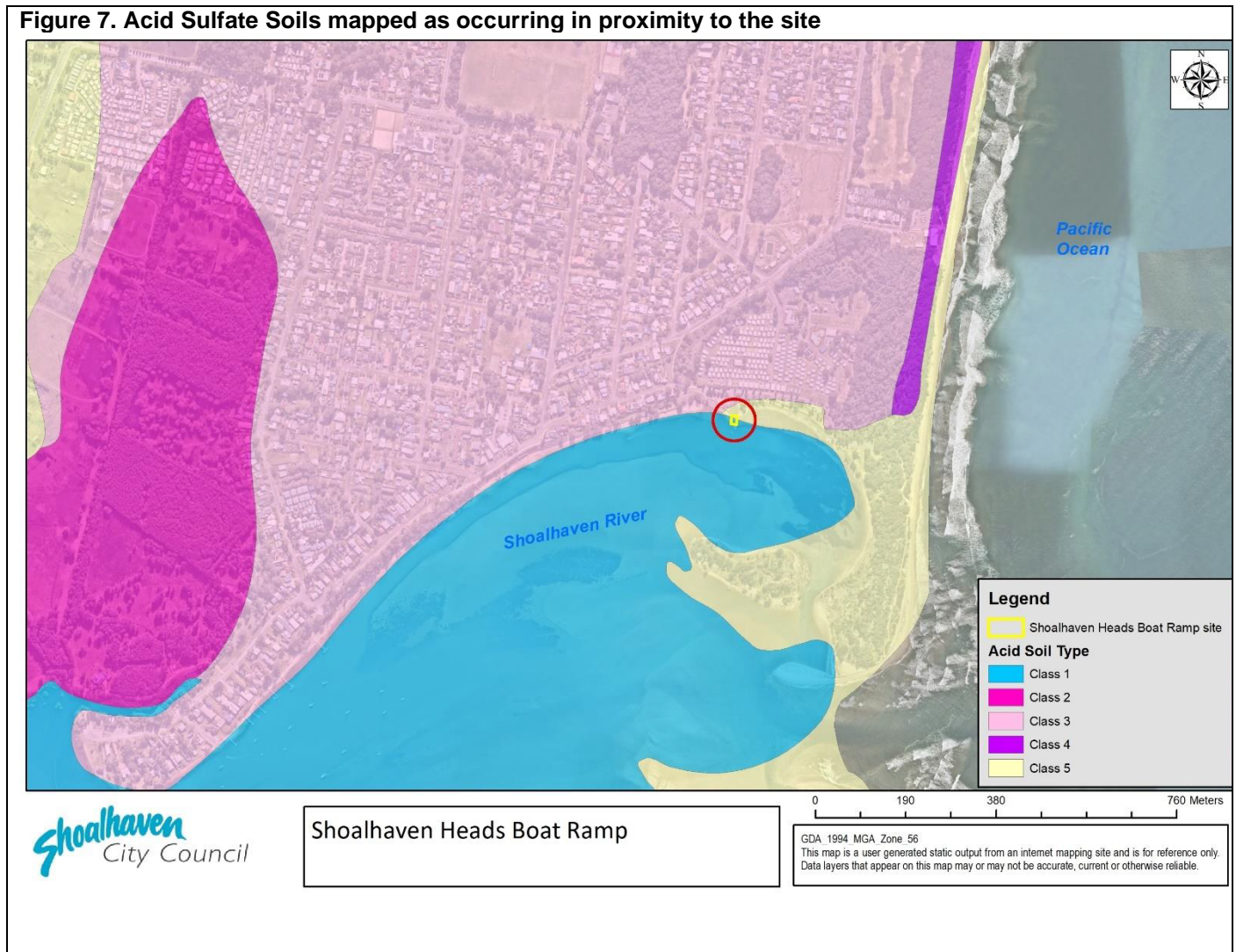
The Shoalhaven Local Environment Plan 2014 suggests that a risk of exposure of Class 1 Acid Sulfate Soils exists where works would involve any excavation of the ground surface.

Depth of excavation for the boat ramp toe extension and construction of rock scour protection is not currently known, but it is assumed that it would be in the vicinity of 1.0m in sandy soils with potential for mud-flats comprised of fine sediment.

A suitably qualified environmental consultant shall be engaged to undertake sampling and analysis of the substrate in the location of excavation, and if required, develop an Acid Sulfate Soil Management Plan which provides for management, treatment and disposal of excavated material.

A treatment area for Acid Sulfate Soil (if required) shall be bunded and located on level ground at least 20m from the river embankment and any other watercourse.

Figure 7. Acid Sulfate Soils mapped as occurring in proximity to the site



3.7 Riparian corridors

A Category 1 riparian corridor is associated with Shoalhaven River in the vicinity of the proposal, occurring along the river embankment, adjacent to the site.

No naturally occurring, terrestrial native vegetation occurs in proximity to the site.

No terrestrial vegetation would be removed or otherwise impacted as a result of the proposal and no activities would occur which are likely to destabilise the foreshore or river embankment.

The proposal would therefore not result in impacts on riparian corridors

3.8 Key Fish Habitat and Protected Marine Habitat

The site is mapped as containing Key Fish Habitat. Protected marine habitat (Eelgrass *Zostera capricorni*) occurs in proximity to and potentially within the site as scattered, minor plants and as shore wrack (refer to Figure 4 above and Figure 8 below).

The estuary embayment contains extensive shallow mudflats along the shoreline, broad shoals to the south and west, and sprawling seagrass meadows through slightly deeper parts of the western portion of the embayment. The edges of the deeper channel in proximity to the site also support extensive areas of Seagrass – Eelgrass (*Zostera capricorni*) which extends sparsely onto the sand-flats and mud-flats in some locations.

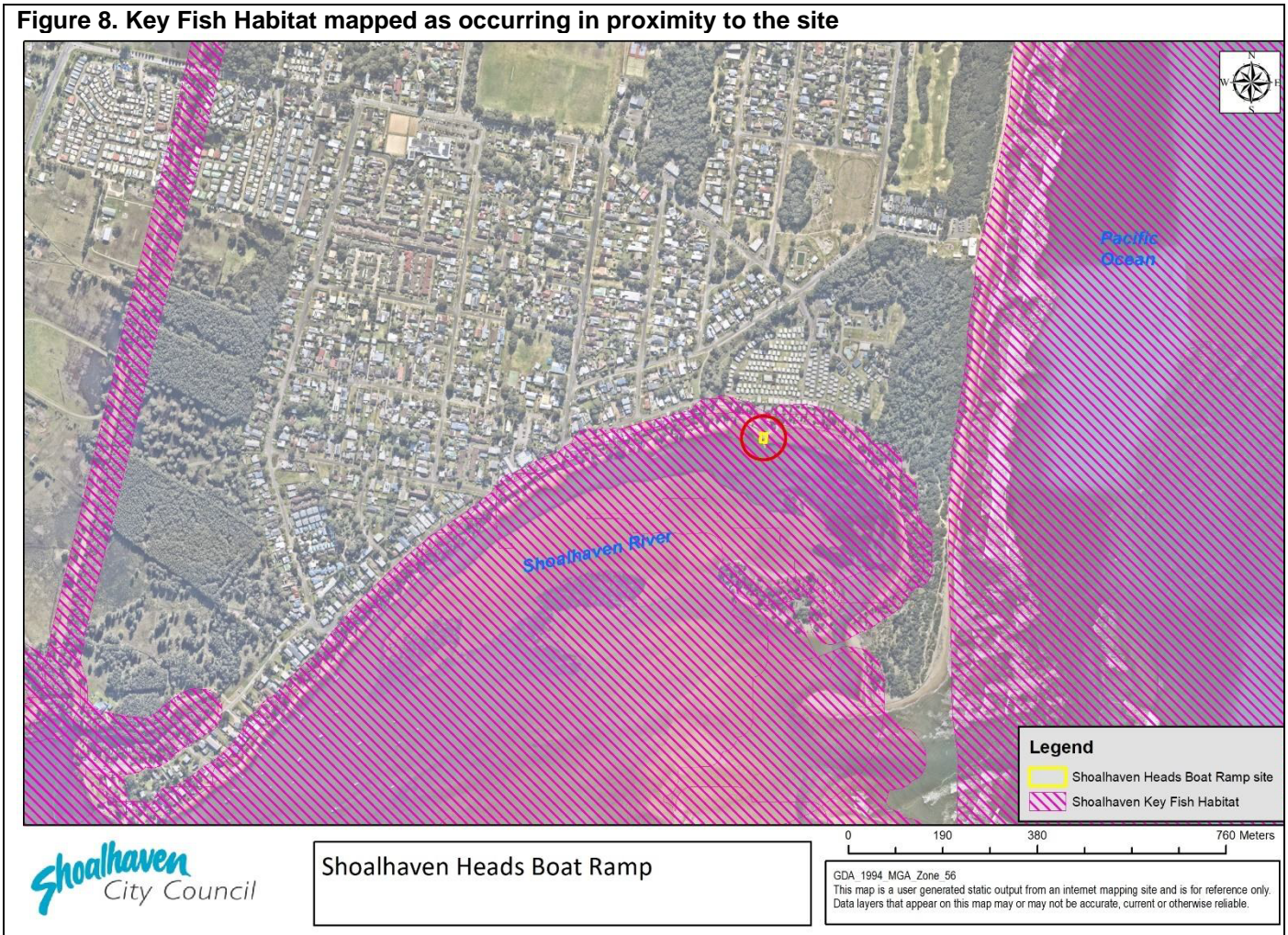
The area immediately south and west of the existing boat ramp was not observed to contain any seagrass during site investigations, noting that visibility into the water was somewhat inhibited by turbidity and water movement. Seagrass was readily visible on the east side of the jetty, despite these limitations (refer to Section 2.1).

It is assumed that scattered, minor Eelgrass (*Zostera capricorni*) plants may occur within the site that were not readily visible during site investigations, and that may be impacted within the development footprint as a result of works.

Machinery operation shall be undertaken from the existing boat ramp to every practical extent, to minimise compaction of beach sand and mudflats. Machinery operation from the foreshore would be minimal and if required, would occur only immediately adjacent to the existing boat ramp. Shore wrack in proximity to the boat ramp may be disturbed and trampled. This would be limited to the immediate west side and within 10 m of the boat ramp.

A Permit for harm to marine vegetation under the *Fisheries Management Act 1994* shall be obtained prior to works commencing. Refer to Section 4.3 for more information.

Figure 8. Key Fish Habitat mapped as occurring in proximity to the site



3.9 Potentially Contaminated Land (PCL)

A potentially contaminated land record (PCL452) exists over Part Lot 7004 DP 94785, west of and adjacent to Part Lot 7005 DP 1075719, for exposed asbestos fragments noted as occurring over the river foreshore, related to uncontrolled land-fill dumping occurring on the embankment opposite 51 River Rd and just west of Renown Ave.

Laboratory analysis of the material confirmed the fragments were non-friable asbestos.

Several operations have occurred between 2019 and 2021 involving the removal of cement sheeting fragments by licenced asbestos removal contractors in accordance with relevant NSW Government and Safe Work Australia legislative requirements (Optera 2019b; ENRS 2020a; ENRS 2020b; ENRS 2021).

It is possible that residual asbestos sheeting or fragments may occur within or in proximity to the site, having been washed along the foreshore from deposits upstream.

In the event that any residual asbestos is found to occur in the soil, the unexpected finds protocol (Appendix A, D19/19654) shall be enacted, and remediation by a suitably licenced hygiene specialist and/or development of a management plan or shall be undertaken.

Any residual asbestos present within the site shall therefore be managed appropriately.

3.10 Flood liable land

The site occurs on land and within a waterway which is mapped as flood-liable, however the proposal would not adversely affect flood behaviour other than to a negligible extent and would not exacerbate flooding risks.

The proposal would involve construction of a fixed structure within Shoalhaven River. The boat ramp and associated rock scour protection would be constructed in line with the gradient of the existing boat ramp, and be excavated into the river substrate, not extending into the deeper river channel and not protruding beyond the existing jetty.

The impact of the proposal on flow regimes of the river would therefore be negligible.

Further consideration is not required or warranted.

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. The following assessment in Table 3 deals with each of the factors in relation to the proposed activity.

Table 3. Section 171 Matters of consideration

Does the proposal:	Assessment	Reason
a) Have any environmental impact on a community?	Positive	<p>The proposal involves repairs to the existing boat ramp surface and extension of the toe of the ramp at River Rd, Shoalhaven Heads, to facilitate improved and safer launching and retrieval of boat vessels.</p> <p>Temporary closure of the boat ramp would be required for the construction process, but adjacent foreshore access areas would remain open and accessible to the public.</p> <p>Other public boat ramps exist on the Shoalhaven River including Wharf Rd, Shoalhaven Heads (1.28 km SW of site); Greenwell Point Rd, Greenwell Point (5.8 km S of site); Crookhaven Heads Boat Ramp (5.8km SSE of site); Greys Beach, Fairway Dr, North Nowra (13.5km W of site).</p> <p>The proposed activity would not have any impact on other community services and infrastructure such as wastewater, waste management, educational, medical or social services.</p>
b) Cause any transformation of a locality?	Positive	<p>The locality’s current use would remain unchanged, with enhanced access, safety and aesthetic appeal.</p>
c) Have any environmental impact on the	Low adverse	<p>The five-part test of significance (Section 3.2) concludes that the proposed activity would not have a significant</p>

<p>ecosystem of the locality?</p>		<p>impact upon threatened species or endangered ecological communities.</p> <p>Refer to Sections 3.2.2 and 3.3 for more information.</p> <p>No significant habitat features would be removed or otherwise impacted. No food resources critical to the survival of a particular species would be removed.</p> <p>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.</p> <p>Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.</p>
<p>d) Cause a diminution of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</p>	<p>Negligible</p>	<p>The proposal involves extension of the toe of the boat ramp and construction of rock scour protection, both of which would occur in the waterway and not be strongly visible.</p> <p>Scientific and environmental qualities of the site would not be affected. The proposed activity would have no impact on these values.</p>
<p>e) Have any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, or social significance or other special value for present or future generations?</p>	<p>Positive</p>	<p>The site of the proposed activity has no significant architectural, cultural, historical, scientific values, but is highly valued regionally for aesthetic and social values. Social values are anticipated to be enhanced and would have improved access and safety as a result of the proposal.</p> <p>No items in the vicinity of the work site which are listed on the State Heritage Register and the Shoalhaven Local environmental Plan would be impacted by the proposal.</p> <p>The site is not within an Aboriginal Place declared under the <i>National Parks and Wildlife Act 1974</i>.</p> <p>In accordance with the NSW Department of Environment, Climate Change and Water's Due Diligence Code of Practice, the proposed activity does not require an Aboriginal Heritage Impact Permit as the activity is unlikely to harm an Aboriginal artefact (refer to Section 3.4).</p>
<p>f) Have any impact on the habitat of protected fauna (within the meaning of the Biodiversity Conservation Act 2016)?</p>	<p>Negligible</p>	<p>No terrestrial vegetation would be removed or otherwise impacted.</p> <p>No important habitat will be removed or otherwise impacted. The footprint of the boat ramp extension and associated rock-scour protection would remove up to 37 m² potential shorebird foraging habitat adjacent to the existing boat ramp. This habitat is considered sub-optimal due to disturbance; higher levels of sand deposition and lack of mudflats; and gradient and depth of water in</p>

		<p>affected areas not providing for shallows or exposed mudflats / sandflats during low tides.</p> <p>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.</p> <p>The specified environmental mitigation measures (Section 7 of this REF) would mitigate indirect impacts to fauna and habitat including through control of sediment.</p>
<p>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?</p>	<p>Low-adverse</p>	<p>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.</p> <p>The proposal would not directly impact on threatened or migratory shorebirds; would not affect or disrupt their breeding, or impact on breeding habitat; and would not impact on their important foraging habitat. Potential impacts on foraging activities are anticipated to be minimal and would be further reduced by prescribed safeguards and mitigation measures. Refer to Sections 3.2.2 and 3.3 for more information.</p> <p>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.</p>
<p>h) Have any long-term effects on the environment?</p>	<p>Low-adverse</p>	<p>Works would be relatively short term and the noise generated will occur during normal working hours.</p> <p>The proposed activity would not use hazardous substances or use or generate chemicals which may build up residues in the environment.</p> <p>The proposal would involve construction of a fixed structure within Shoalhaven River. The boat ramp and associated rock scour protection would be constructed in line with the gradient of the existing boat ramp, and be excavated into the river substrate, not extending into the deeper river channel and not protruding beyond the existing jetty. The impact of the proposal on flow regimes of the river would therefore be negligible.</p> <p>The possible impacts have been discussed in detail under Section 3. Refer also to the conclusions and recommendations in Section 7.</p>
<p>i) Cause any degradation of the quality of the environment?</p>	<p>Low-adverse</p>	<p>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.</p>

		<p>The proposal would not intentionally introduce noxious weeds, vermin, or feral animals into the area or contaminate the soil.</p> <p>Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.</p>
j) Cause any risk to the safety of the environment?	Negligible	<p>The proposed activity would not involve hazardous wastes and would not lead to increased bushfire or landslip risks.</p> <p>The proposal would not adversely affect flood or tidal regimes, or exacerbate flooding risks.</p>
k) Cause any reduction in the range of beneficial uses of the environment?	Negligible	<p>The proposal is consistent with the existing site use.</p> <p>The site and local environment will remain relatively unchanged.</p>
l) Cause any pollution of the environment?	Low adverse	<p>The proposal would involve a temporary and local increase in noise during the construction phase due to the use of machinery. However, this will not affect any sensitive receivers such as residential areas, schools, childcare centres and hospitals.</p> <p>Sediment and erosion control in accordance with the Blue Book will be implemented to minimise movement of sediment into waterways.</p> <p>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.</p> <p>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.</p> <p>The risk of contamination and spills from machinery including fuel and hydraulic fluids would be minimised through safeguards and mitigation measures (Section 7).</p>
m) Have any environmental problems associated with the disposal of waste?	Negligible	<p>There would be no trackable waste, hazardous waste, liquid waste, or restricted solid waste as described in the <i>NSW Protection of the Environment Operations Act 1997</i>.</p>
n) Cause any increased demands on resources (natural or otherwise) which are, or are	Low adverse	<p>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.</p>

likely to become, in short supply?		
o) Have any cumulative environmental effect with other existing or likely future activities?	Negligible	<p>The assessed low adverse or negligible impacts of the proposal are not likely to interact.</p> <p>Other ongoing and future foreshore management and enhancement activities in proximity to the site include sand nourishment. It is acknowledged that the presence of the existing boat ramp and particularly, the jetty, appear to act as a barrier causing build-up of sand. This process may interact with sand nourishment activities to impact on seagrass, however, it is considered that the current proposal would not exacerbate this process because the boat ramp and associated rock scour protection would be constructed in line with the gradient of the existing boat ramp, and be excavated into the river substrate, not extending into the deeper river channel and not protruding beyond the existing jetty.</p>
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	Low adverse	<p>The proposed activity would have no effect on coastal processes including those projected under climate change conditions.</p> <p>The site is not located in a coastal hazard area.</p>
q) Any applicable local strategic planning statement, regional strategic plan or district strategic plan made under Division 3.1 of the Act	Positive	<p>The proposed activity meets Planning Priority 2 (Delivering Infrastructure) of the <i>Shoalhaven 2040</i> Strategic Land-use Planning Statement https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D20/437277</p> <p>The proposed activity is not inconsistent with the Illawarra Shoalhaven Regional Plan 2041 (ISRP): 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</p>
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 2.80(4) of the *NSW State Environmental Planning Policy (Transport and Infrastructure) 2021* (Infrastructure SEPP) provides that:

“Development for the purpose of wharf or boating facilities may be carried out by or on behalf of a public authority without consent on any land. However, such development may be carried out on land reserved under the National Parks and Wildlife Act 1974 only if the development is authorised by or under that Act.”

The proposed boat ramp repair and toe extension constitutes an ‘activity’ for the purposes of Part 5 of the EP&A Act, and can be carried out by (or on behalf of) a public authority as development without consent. Environmental impact assessment under Part 5 of the EP&A Act is required, including consideration of matters outlined in Section 171 of the EP&A Regulation 2021. 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.

The EP&A Act provides that exempt development can be carried out without requirement for environmental impact assessment under Division 5.1 (EP&A Act Section 1.6).

4.2 *Crown Land Management Act 2016*

Works would be undertaken on Crown Land for which Shoalhaven City Council is the appointed Crown Land Manager, in addition to within the Shoalhaven River waterway which is managed by NSW Planning, Industry & Environment – Crown Lands.

As such, SCC is required to obtain a licence (or other lawful authorisation) from NSW Planning, Industry & Environment – Crown Lands prior to the commencement of works.

4.3 *Fisheries Management Act 1994*

The proposed works would involve dredging and reclamation on water land which is regulated under Part 7 of the *Fisheries Management Act 1994*. Section 200 of the Act prescribes circumstances where a local government can carry out dredging, *i.e.*:

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

A permit issued under section 200 of the Act by NSW Department of Primary Industries (Fisheries) would ordinarily be required prior to commencing any works.

As the proposed activity would require authorisation by licence under the *Crown Land Management Act 2016*, a separate Fisheries Permit associated with dredging and / or reclamation is not required. It is understood that Crown Lands consults the NSW Department of Primary Industries (Fisheries) prior to issuing the licence.

The proposal would also require a Fisheries Permit under section 205 of the Act for impact on scattered seagrass (*Zostera capricorni*), in addition to wrack along the foreshore beach (shore-wrack), which is listed as protected marine vegetation under the *Fisheries Management (General) Regulation 2019*.

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

The proposed activity would be undertaken in an area mapped for the purposes of this SEPP as “Coastal Use Area” and “Coastal Environment Area”. The provisions of the SEPP for these areas relate to development consent considerations. As the proposed activity does not require development consent, these provisions do not need addressing.

There are no areas of Coastal Wetland or Littoral Rainforest mapped in the vicinity of the works (refer to Figure 10).

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

Figure 9. Coastal Wetlands mapped in proximity to the site



4.5 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	
<i>Environmental Planning and Assessment Act 1979 (EP&A Act)</i>	
Permissible <input checked="" type="checkbox"/>	Not permissible <input type="checkbox"/>
<p>Justification:</p> <p>The Transport and Infrastructure SEPP provides for the proposed works to be undertaken without development consent (refer above). In circumstances where development consent is not required, the environmental assessment provisions outlined in Part 5 of the Act are required to be complied with. This REF fulfils this requirement.</p>	
<i>Shoalhaven Local Environmental Plan 2014 (SLEP)</i>	
Permissible <input checked="" type="checkbox"/>	Not permissible <input type="checkbox"/>
<p>Justification:</p> <p>Under the SLEP the proposed activity may have required development consent. The provisions of SEPP Infrastructure, however, prevail over the SLEP where there is an inconsistency by virtue of Section 3.28 of the EP&A Act. Consequently, development consent is not required.</p>	
<i>Protection of the Environment Operations Act 1997</i>	
Permissible <input checked="" type="checkbox"/>	Not permissible <input type="checkbox"/>
<p>Justification:</p> <p>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.</p>	
<i>National Parks and Wildlife Act 1974 (NP&W Act)</i>	
Permissible <input checked="" type="checkbox"/>	Not permissible <input type="checkbox"/>
<p>Justification:</p> <ul style="list-style-type: none"> • 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 knowingly 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 involve dredging or reclamation in Key Fish Habitat (Part 7, Division 3);
- would not involve or result in the blocking the passage of fish (s.219);
- may 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 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*).

A Fisheries Permit may be required. Refer to Section 4.3 for more information.

Heritage Act 1977

Permissible Not permissible

Justification:

- The proposed activity would not disturb an item of state heritage significance.
- The Act also provides statutory protection to relics, archaeological deposits, artefacts or deposits. Section 139 to 146 of the Act require that excavation that is likely to contain, or is believed may contain, archaeological relics is undertaken in accordance with an excavation permit issued by the Heritage Council. The Act defines an archaeological relic as “*any deposit, artefact, object or material evidence that:*
 - a) *relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement; or*
 - b) *is of state and local heritage significance*”

As the site has little to no archaeological potential, a permit is not required.

Biodiversity Conservation Act 2016

Permissible Not permissible

Justification:

- The proposed activity is unlikely to have a significant impact on species and communities listed in the schedules of the Act (refer to Section 3.2).
- The proposed development is not within an area declared to be of “outstanding biodiversity value” as defined in the Act.
- 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 therefore is not deemed to be *likely to significantly affect threatened species* and an environmental impact statement (EIS) or a Biodiversity Development Assessment Report (BDAR) is not required.

It is also a defence to a prosecution for an offence under Part 2 of the Act (harming animals, picking plants, damaging the habitat of threatened species or ecological communities etc) if the work was essential for the carrying out of an activity by a determining authority within the meaning of Part 5 of the Environmental Planning and Assessment Act 1979 after compliance with that Part. The activity will not remove vegetation that is listed under Schedule 1 Threatened Species, Schedule 2 Threatened ecological communities and Schedule 6 Protected Plants. Therefore the activity is considered permissible as this REF has been prepared and determined in accordance with the EP&A Act.

Water Management Act 2000

Permissible Not permissible

Justification:

- Local councils are exempt from s.91E(1) of the Act in relation to all controlled activities 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

Justification:

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

Commonwealth *Native Title Act 1993*

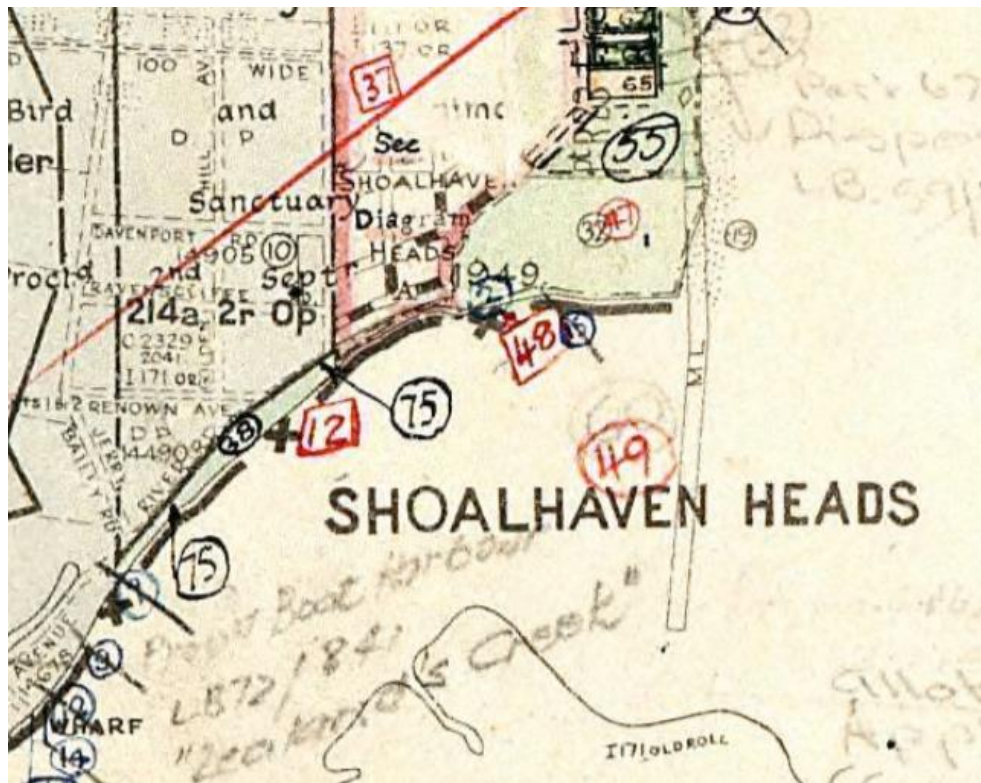
Permissible Not permissible

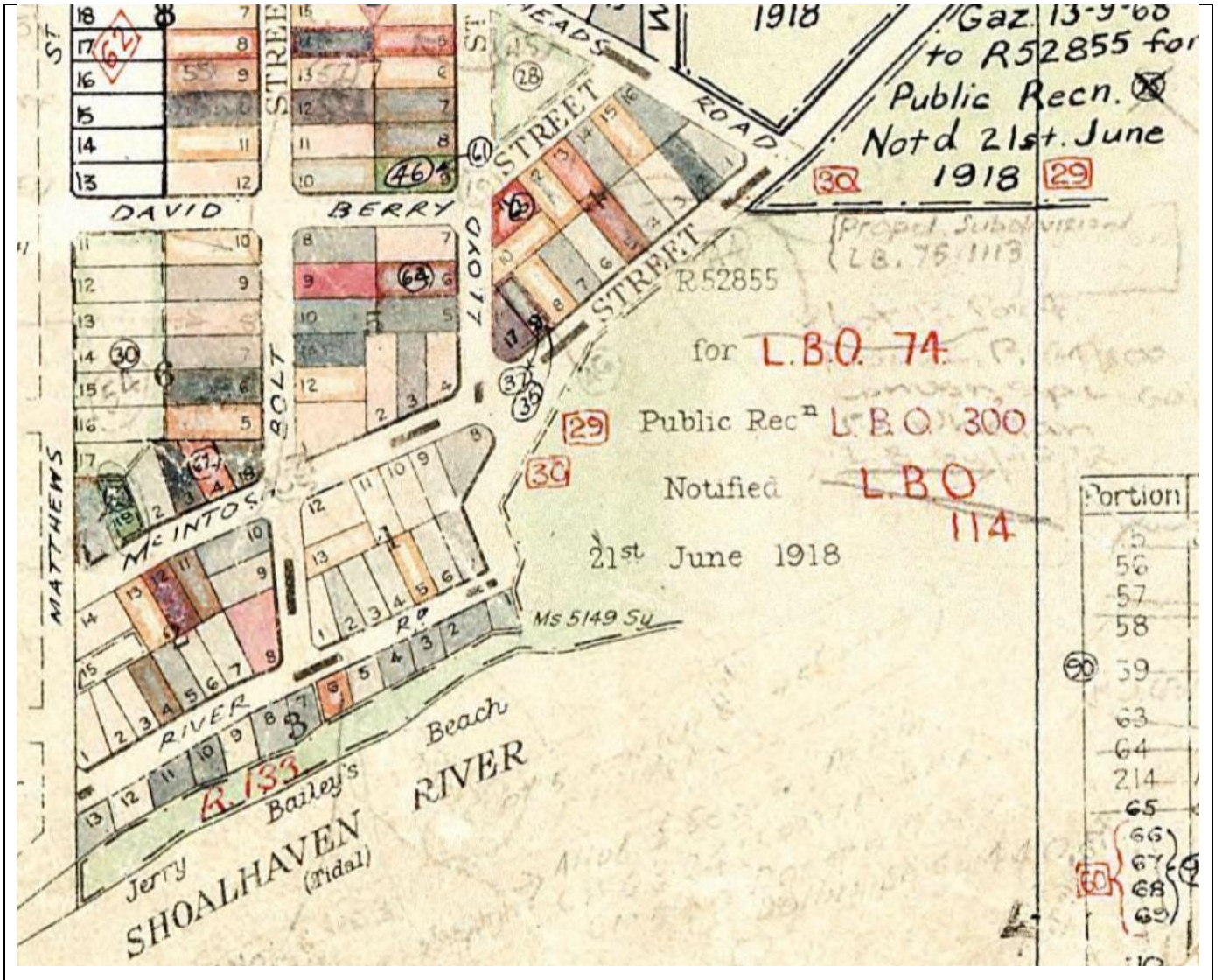
Justification:

Works would occur on Crown Land Part Lot 7005 DP 1075719 and the Shoalhaven River waterway. Native Title applies to both areas.

Native Title assessment as a Future Act under Subdivision J (note that Subdivision K may apply to the waterway area, not being a reserve) has been undertaken (D22/428874), as the proposal would be for a Public Work which is consistent with the reserve purpose (R52855: General Community Use / Natural Area / Park). A 28-day notification and opportunity for comment period applies as a procedural obligation to Subdivision J.

Clips below from Coolangatta Parish Map 6th edn showing R52855 as having been gazetted in 1918.





5. CONSULTATION WITH GOVERNMENT AGENCIES

5.1 Transport & Infrastructure SEPP

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

The proposal would not involve changes to or impacts on: stormwater; traffic generation; the sewerage system; or the water supply system; and would involve excavation of a footpath or public road.

The proposal would involve the temporary closure of a public place (i.e. the boat ramp) that is under a council's management and control. The proponent of the proposal (Works & Services, Shoalhaven City Council) is also the asset custodian.

Consultation under clause 2.10 is therefore not required.

Clause 2.11 – Development with impacts on local heritage

No impacts to any local heritage item would occur. Consultation under Clause 2.11 is therefore not required.

Clause 2.12 – Development with impacts on flood liable land

The site occurs on land and within a waterway which is mapped as flood-liable, however the proposal would not change flood patterns other than to a minor extent and would not exacerbate flooding risks.

Refer to Section 3.10 for more information.

Consultation under clause 2.13 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 purposes of cl. 2.13.

Consultation under Clause 2.13 is therefore not required.

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

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

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 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*

Consultation with Transport for New South Wales (TfNSW) Maritime Division is required. Refer to Section 7 *Environmental Safeguards and Mitigation Measures*.

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

Consultation with Transport for New South Wales (TfNSW) Maritime Division is required pursuant to clause 2.15 for development in or over navigable waters.

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

6. COMMUNITY ENGAGEMENT

During the initial project concept and grant application process, the following community groups were identified as stakeholders: Shoalhaven Heads Community Forum, Shoalhaven Heads Fishing Club, Shoalhaven Heads Chamber of Commerce & Tourism and Holiday Haven Caravan Park. These groups shall be kept informed during planning and development of the project.

Signage shall be installed on site (minimum 6 weeks prior to works commencing), advising of the project, timing of works, required closures, and advising of alternative public boat ramp facilities along the Shoalhaven River and Crookhaven River, which provide alternative water vessel access during closure

7. ENVIRONMENTAL SAFEGUARDS AND MEASURES TO MINIMISE IMPACTS

Note that safeguards are prescribed unless stated otherwise.

Safeguard / Measure	Responsibility
Works planning, approvals, consultation & notification	
1. Council shall obtain a licence (or other lawful authorisation) from NSW Planning, Industry & Environment – Crown Lands prior to the commencement of works.	Project Manager; SCC Environmental Officer
2. Council shall provide written notice of intention to carry out the proposal (development comprising a fixed or floating structure in or over navigable waters), and Marine Traffic Management Plan (refer Safeguard 7 below) to Transport for New South Wales (TfNSW) Maritime Division at least 28 days prior to undertaking works, and shall consider any response received within 21 days after the notice is given.	Project Manager; SCC Environmental Officer
3. Council shall obtain a DPI Fisheries Permit (or confirmation that a permit is not required), for potential harm to marine vegetation including shore wrack.	Project Manager; SCC Environmental Officer
4. A suitably qualified environmental consultant shall be engaged to undertake sampling and analysis of the substrate in the location of excavation to at least the depth of proposed excavation, and if required, develop an Acid Sulfate Soil Management Plan which provides for management, treatment and disposal of excavated material.	Project Manager; Designer
5. The following stakeholder groups shall be kept informed during planning and development of the project: Shoalhaven Heads Community Forum, Shoalhaven Heads Fishing Club, Shoalhaven Heads Chamber of Commerce & Tourism and Holiday Haven Caravan Park.	Project Manager;
6. Signage shall be installed on site (minimum 6 weeks prior to works commencing), advising of the project, timing of works, required closures, and advising of alternative public boat ramp facilities along the Shoalhaven River and Crookhaven River, which provide alternative water vessel access during closure, including: Wharf Rd, Shoalhaven Heads (1.28 km SW of site); Greenwell Point Rd, Greenwell Point (5.8 km S of site); Crookhaven Heads Boat Ramp (5.8km SSE of site); Greys Beach, Fairway Dr, North Nowra (13.5km W of site).	Project Manager;

Safeguard / Measure	Responsibility
Site Establishment	
7. A Marine Traffic Management Plan shall be developed and implemented in accordance with TfNSW <i>Generic Provisions for a Marine Traffic Management Plan</i> .	
8. An appropriate traffic management plan shall be developed and implemented to minimise disruption and reduce risk of incident along River Rd during works.	Site Manager; Construction Contractor
9. Construction compounds, machinery, vehicles and stockpiles shall be located within the construction footprint, or otherwise in existing cleared areas, and shall not encroach into native vegetation, including the drip zone of trees. Refer to Figure 2 for suggested location.	Site Manager; Construction Contractor
10. Staff working on site shall be notified of the potential for residual asbestos fragments in the soil and shall be advised of management processes / unexpected finds protocol as appropriate.	Site Manager;
11. 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. A combination hydrocarbon boom and silt curtain shall be installed in the waterway, encompassing the works area.	Site Manager; Construction Contractor
12. A treatment area for Acid Sulfate Soil (if required) shall be bunded and located on level ground at least 20m from the river embankment and any other watercourse.	Site Manager; Construction Contractor
Construction works	
13. A site induction attended by Council's Project Manager, Council's Environmental Officer, the Site Manager (if applicable) and the Construction Contractor shall occur prior to commencement of works to ensure understating of site constraints and compliance with the requirements of the REF and relevant permits and licences covering the works.	Project Manager; SCC Environmental Officer; Site Manager; Construction contractor
14. If works cannot be scheduled between May and July, pre-works surveys by Council's Environmental Officer shall be undertaken to ensure resident and transitory shorebirds are not at risk of impact from works activities.	SCC Environmental Officer

Safeguard / Measure	Responsibility
<p>15. Construction works shall be timed to every practical extent to coincide with lower tides.</p> <p>Where this involves night-work, notification shall be provided to landowners and residents within 200 m of the site (including Holiday Haven Caravan Park).</p>	<p>Site Manager, Construction contractor</p>
<p>16. Any lighting utilised to illuminate the site for night work, shall face down and into the site, to minimise disturbance to the nocturnal activities of fauna in proximity to the site.</p>	<p>Site Supervisor; Construction Contractor</p>
<p>17. All machinery to be used shall be cleaned, degreased and in good working order prior to entering the site.</p>	<p>Site Supervisor; Construction Contractor</p>
<p>18. 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.</p>	<p>Construction Contractor</p>
<p>19. No major equipment maintenance works shall be undertaken on-site.</p>	<p>Construction Contractor</p>
<p>20. 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.</p>	<p>Construction Contractor</p>
<p>21. If engineering fill is imported to the site, all conditions prescribed in the applicable Resource Recovery Exemptions shall be complied with, including:</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> ○ the quantity of material received ○ the name and address of the supplier 	<p>Site Manager; Construction Contractor</p>
<p>22. If Virgin Excavated Natural Material (VENM) is taken to the site (i.e. without chemical testing and validation):</p> <ol style="list-style-type: none"> a. the material must meet the definition of VENM (refer to Section Error! Reference source not found.) b. the supplier must fill out and complete the <i>VENM Certificate</i> (http://www.epa.nsw.gov.au/waste/virgin-material.htm) c. The completed <i>VENM Certificate</i> shall be kept for at least six years and provided to the EPA upon any request. 	<p>Site Manager; Construction Contractor</p>

Safeguard / Measure	Responsibility
<p>23. 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, Heritage NSW (ph:131 555) shall be contacted.</p>	<p>Site Manager; Construction Contractor</p>
<p>24. Staff and contractors shall be made aware of the potential for asbestos containing material to occur within or in proximity to the site.</p> <p>In the event that any residual asbestos is found to occur in the soil, which is not identified during the preliminary asbestos investigation, the unexpected finds protocol (Appendix A, D19/19654) shall be enacted, remediation by a suitably licenced hygiene specialist and/or development of a management plan or shall be undertaken.</p>	<p>Site Manager; Construction Contractor</p>
<p>25. 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).</p>	<p>Site Supervisor; Contractor;</p>
<p>Post construction</p>	
<p>26. 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.</p>	<p>Project Manager</p>

8. SIGNIFICANCE EVALUATION & DECISION STATEMENT

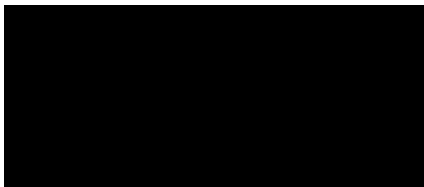
This Review of Environmental Factors has assessed the likely environmental impacts, in the context of Part 5 of the Environmental Planning and Assessment Act 1979, of a proposal by Shoalhaven City Council for the repairs to the existing River Rd, Shoalhaven Heads boat ramp surface and extension of the toe of the ramp.

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. The following statutory approvals, licences, permits and external government consultations are required:
 - a. Crown Licence for works in the Crown-managed waterway
 - b. DPI Fisheries Permit for impact on protected marine vegetation
 - c. Consultation with TfNSW Maritime Division
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:



Trevor Dando
Manager – Works and Services
Shoalhaven City Council

Date: 21.10.2022

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APPENDIX A – Asbestos Unexpected Finds Protocol

**“Asbestos Management Plan – River Road Foreshore, Shoalhaven
Heads NSW”**

Opterra, June 2019

Council reference: D19/196540

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).

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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 - <i>NSW BC Act</i>	Mapped as occurring in the surrounding area (approx. 200m to the east of the site), but site surveys confirmed that this EEC does not occur within the site or in close proximity such that it is at risk of being impacted by the proposal.
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions	Endangered - <i>NSW BC Act</i> Vulnerable - Commonwealth <i>EPBC Act</i>	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 950m to the south of the site).
Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - <i>NSW BC Act</i>	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 north-north-west of the site).
Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion	Endangered - <i>NSW BC Act</i> Critically Endangered - Commonwealth <i>EPBC Act</i>	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 2.19km to the north-west of the site).
Illawarra Subtropical Rainforest in the Sydney Basin Bioregion	Endangered - <i>NSW BC Act</i> Critically Endangered - Commonwealth <i>EPBC Act</i>	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 2.27km to the north-west of the site).
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Endangered - <i>NSW BC Act</i> Critically Endangered - Commonwealth <i>EPBC Act</i>	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 2.63km to the south of the site).

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Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - <i>NSW BC Act</i> Endangered - Commonwealth <i>EPBC Act</i>	Does not occur on-site and is not mapped as occurring in close proximity to the site (nearest records are approx. 1km 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 - <i>NSW BC Act</i>	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			
<i>Chamaesyce psammogeton</i> Sand Spurge	Endangered NSW BC Act	Grows on fore-dunes, pebbly strandlines and exposed headlands, often with Spinifex (<i>Spinifex sericeus</i>) and Prickly Couch (<i>Zoysia macrantha</i>). Sand Spurge seeds float, so some dispersal between beaches may occur.	Unlikely to occur. No suitable habitat present within the site. Surrounding beach area is disturbed.
<i>Solanum celatum</i>	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.	Unlikely to occur. No suitable habitat present within the site.
AMPHIBIANS			

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Green and Golden Bell Frog <i>Litoria aurea</i>	Vulnerable <i>EPBC Act</i> Endangered <i>NSW BC Act</i>	Marshes, dams and stream-sides, particularly those containing bullrushes (<i>Typha</i> spp.) or spikerushes (<i>Eleocharis</i> spp.). Optimum habitat for the species includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (<i>Gambusia holbrooki</i>), 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 Sheath-tail-bat <i>Saccolaimus flaviventris</i>	Vulnerable <i>NSW BC Act</i>	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	Possibly occurring transiently over or in proximity to the site. No habitat present.
BIRDS			
Arctic Jaeger <i>Stercorarius parasiticus</i>	Migratory <i>EPBC Act</i>	An inhabitant of oceans, coastal regions, boreal forest, grassland and tundra, the arctic 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, and outside of the breeding season is found mostly at sea.	Possibly occurring transiently in proximity to the site. Unlikely to use habitat within the site or be affected by proposal.
Australasian Bittern <i>Botaurus poiciloptilus</i>	<i>NSW BC Act</i> Endangered <i>EPBC Act</i> 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,	Unlikely to occur within the site. No suitable habitat present.

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		<p>Baumea, Bolboschoenus) or cutting grass (Gahnia) growing over muddy or peaty substrate.</p> <p>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 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.</p> <p>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.</p>	
<p>Bar-tailed Godwit <i>Limosa lapponica</i></p>	<p>Migratory EPBC Act</p>	<p>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.</p> <p>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. They also prefer soft mud; often with beds of eelgrass <i>Zostera</i> or other seagrasses. Occasionally they have been known to forage among mangroves, or on coral reefs or rock platforms among rubble, crevices and</p>	<p>Habitat is present within the site. Known to occur in close proximity to the site. Further assessment has been undertaken in Section 3.3.</p>

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		<p>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.</p> <p>Roosts on sandy beaches, sandbars, spits and also in near-coastal saltmarsh. In some conditions, waders may choose roost sites where a damp substrate lowers the local temperature.</p>	
<p>Beach Stone-curlew <i>Esacus magnirostris</i></p>	<p>Critically endangered NSW BC Act</p>	<p>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.</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.2.</p>
<p>Black-necked Stork <i>Ephippiorhynchus asiaticus</i></p>	<p>Endangered NSW BC Act</p>	<p>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.</p>	<p>Unlikely to occur. Sub-optimal habitat for species and too much disturbance.</p>

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		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 <i>Limosa limosa</i>	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.	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.2.
Blue-billed Duck <i>Oxyura australis</i>	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 <i>Limicola falcinellus</i>	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	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.2.

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		<p>sewage farms or within shallow freshwater lagoons. Broad-billed Sandpipers roost on banks on sheltered sand, shell or shingle beaches.</p> <p>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.</p>	
Bush Stone-curlew <i>Burhinus grallarius</i>	NSW BC Act Endangered	Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Nest on the ground in a scrape or small bare patch.	Unlikely to occur within the site. No suitable habitat present.
Caspian Tern <i>Hydroprogne caspia</i>	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.	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.
Common Greenshank <i>Tringa nebularia</i>	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 (<i>Himantopus himantopus</i>) in pasture, but are generally not found in dry grassland.	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.

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		<p>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 sedges or saltmarsh. It will occasionally feed on exposed seagrass beds.</p> <p>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.</p>	
<p>Common Tern <i>Sterna hirundo</i></p>	<p>Migratory EPBC Act</p>	<p>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.</p> <p>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</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.</p>

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		marine or in lakes, only sometimes on mainland beaches or promontories or salt or freshwater marshes.	
Crested Tern <i>Thalasseus bergii</i>	Migratory EPBC Act	Crested Terns inhabit coastal areas, offshore waters, beaches, bays, inlets, tidal rivers, salt swamps, lakes and larger rivers. The species breeds during Sep-Jan in the south and Mar-Jun in the north in large, dense colonies on small islands. Nesting occurs on sand or shingle among low vegetation behind the beaches (Pizzey & Knight 2012; Morcombe 2011)	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.
Curlew Sandpiper <i>Calidris ferruginea</i>	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.	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.2 and 3.3.

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<p>Eastern Curlew <i>Numenius madagascariensis</i></p>	<p>Critically Endangered <i>EPBC Act</i></p>	<p>Most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. 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.</p> <p>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.</p> <p>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.</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.</p>
<p>Eastern Hooded Dotteral (Hooded Plover)</p>	<p><i>NSW BC Act: Critically Endangered</i></p>	<p>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</p>	<p>Habitat is present within the site. Possibly occurring. Further</p>

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<p><i>Thinornis cucullatus cucullatus</i> (syn <i>Thinornis rubricollis</i>)</p>	<p>EPBC Act: Vulnerable</p>	<p>seaweed, and backed by sparsely vegetated sand-dunes for shelter and nesting. Occasionally Hooded Plovers are found on tidal bays and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs. They regularly use near-coastal saline and freshwater lakes and lagoons, often with saltmarsh. Hooded Plovers forage in sand at all levels of the zone of wave wash during low and mid-tide or among seaweed at high-tide, and occasionally in dune blowouts after rain. At night they favour the upper zones of beaches for roosting. When on rocks they forage in crevices in the wave-wash or spray zone, avoiding elevated rocky areas and boulder fields. In coastal lagoons they forage in damp or dry substrates and in shallow water, depending on the season and water levels. In eastern Australia, Hooded Plovers usually breed from August to March on sandy ocean 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.</p>	<p>assessment has been undertaken in Section 3.2 and 3.3.</p>
<p>Eastern Osprey <i>Pandion cristatus</i></p>	<p>NSW BC Act Vulnerable</p>	<p>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.</p>	<p>Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site.</p>
<p>Gang-gang Cockatoo <i>Callocephalon fimbriatum</i></p>	<p>Vulnerable NSW BC Act</p>	<p>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</p>	<p>Unlikely to occur within the site. No suitable habitat present.</p>

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Glossy Black-cockatoo <i>Calyptorhynchus lathami</i>	Vulnerable <i>NSW BC Act</i>	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 <i>Allocasuarina littoralis</i> , shredding the cones with their bill	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site. No suitable hollows or feed trees are present.
Great Knot <i>Calidris tenuirostris</i>	<i>NSW BC Act:</i> Vulnerable <i>EPBC Act:</i> Migratory	In Australasia, the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They 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.	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.2 and 3.3.
Greater Sand-plover <i>Charadrius leschenaultii</i>	<i>NSW BC Act:</i> Vulnerable <i>EPBC Act:</i> 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	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.2 and 3.3.
Grey Plover <i>Pluvialis squatarola</i>	<i>EPBC Act:</i> 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	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.

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		<p>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.</p> <p>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 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.</p>	
<p>Grey-tailed Tattler Tringa brevipes</p>	<p><i>Migratory EPBC Act</i></p>	<p>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.</p> <p>Usually roosts in the branches of mangroves or, rarely, in</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.</p>

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		<p>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 <i>Samolus</i>. Sightings also indicate it roosts on sand-dunes. It often perches on artificial structures. It is occasionally found in near-coastal saltworks and sewage 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.</p>	
<p>Gull-billed Tern <i>Gelochelidon nilotica</i></p>	<p><i>EPBC Act: Migratory</i></p>	<p>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</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.</p>
<p>Latham's Snipe <i>Gallinago hardwickii</i></p>	<p><i>EPBC Act: Migratory</i></p>	<p>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.</p> <p>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</p>	<p>Unlikely to occur. No suitable habitat present</p>

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		<p>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, 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).</p> <p>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.</p>	
<p>Lesser Sand-plover <i>Charadrius mongolus</i></p>	<p><i>EPBC Act:</i> Migratory <i>NSW BC Act:</i> Vulnerable</p>	<p>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.</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.2 and 3.3.</p>

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		<p>The species feeds mostly on extensive, freshly-exposed areas of intertidal sandflats and mudflats in estuaries or beaches, or in shallow ponds in saltworks. They roost near foraging areas, on beaches, banks, spits and banks of sand or shells and occasionally on rocky spits, islets or reefs.</p> <p>The species does not breed in Australia.</p>	
<p>Little Eagle <i>Hieraaetus morphnoides</i></p>	<p>Vulnerable NSW BC Act</p>	<p>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</p>	<p>Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site.</p>
<p>Little Lorikeet <i>Glossopsitta pusilla</i></p>	<p>Vulnerable NSW BC ACT</p>	<p>Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina</p>	<p>Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site.</p>
<p>Little Tern <i>Sternula albifrons</i></p>	<p>Endangered NSW BC Act Migratory EPBC Act</p>	<p>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.</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.2 and 3.3.</p>

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<p>Marsh Sandpiper <i>Tringa stagnatilis</i></p>	<p>Migratory EPBC Act</p>	<p>Lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, 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. Recorded roosting or loafing on tidal mudflats, near low saltmarsh, and around inland swamps.</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.</p>
<p>Orange-bellied Parrot <i>Neophema chrysogaster</i></p>	<p>Critically endangered NSW BC Act Critically Endangered EPBC Act</p>	<p>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</p>	<p>Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site.</p>

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		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.	
Pacific Golden Plover <i>Pluvialis fulva</i>	Migratory EPBC Act	<p>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.</p> <p>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.</p> <p>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 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.</p>	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.
Pied Oystercatcher <i>Haematopus longirostris</i>	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.	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.2.

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<p>Powerful Owl <i>Ninox strenua</i></p>	<p>Vulnerable NSW BC Act</p>	<p>Coastal Woodland, Dry Sclerophyll Forest, wet sclerophyll forest and rainforest- Can occur in fragmented landscapes Roosts in dense vegetation comprising species such as Turpentine <i>Syncarpia glomulifera</i>, Black She-oak <i>Allocasuarina littoralis</i>, Blackwood <i>Acacia melanoxylon</i>, Rough-barked Apple <i>Angophora floribunda</i>, Cherry Ballart <i>Exocarpus cupressiformis</i> 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</p>	<p>Unlikely to occur within the site. No suitable habitat present.</p>
<p>Red Knot <i>Calidris canutus</i></p>	<p>Migratory EPBC Act</p>	<p>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 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.</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.</p>
<p>Red-necked Stint <i>Calidris ruficollis</i></p>	<p>Migratory EPBC Act</p>	<p>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</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.</p>

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		<p>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.</p> <p>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.</p> <p>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.</p>	
<p>Ruddy Turnstone <i>Arenaria interpres</i></p>	<p>Migratory EPBC Act</p>	<p>In Australasia, the Ruddy Turnstone is mainly found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral. 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.</p> <p>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</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.</p>

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		<p>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. They have sometimes been known to forage in grassy areas above the tideline, in short pasture, or in ploughed paddocks.</p> <p>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</p>	
Sanderling <i>Calidris alba</i>	Vulnerable NSW BC Act	<p>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, behind clumps of beach-cast kelp or in coastal dunes. Breeding occurs in the Northern Hemisphere.</p>	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.2.
Scarlet Robin <i>Petroica boodang</i>	Vulnerable NSW BC Act	<p>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.</p>	Unlikely to occur within the site. No suitable habitat present.
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	Migratory EPBC Act	<p>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</p>	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.

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Short-tailed Shearwater <i>Ardenna tenuirostris</i>	Migratory EPBC Act	Coastal, oceanic.	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	Vulnerable NSW BC Act	Shore bird. Found around the entire Australian coast, including offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW coast. The availability of suitable nesting sites may limit populations. Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Forages on exposed rock or coral at low tide for foods such as limpets and mussels. Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks.	Possibly occurring in proximity to the site, but unlikely to utilise available habitat within the site.
Square-Tailed Kite <i>Lophoictinia isura</i>	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 100km ² . 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 <i>Lathamus discolor</i>	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 (<i>Eucalyptus robusta</i>), Spotted Gum (<i>Corymbia maculata</i>), Red Bloodwood (<i>C. gummifera</i>), Mugga Ironbark (<i>E. sideroxylon</i>), and White Box (<i>E. albens</i>). Commonly used lerp infested trees include Inland Grey Box <i>E. microcarpa</i> , Grey Box <i>E. moluccana</i> and Blackbutt <i>E. pilularis</i> . Return to some foraging sites on a cyclic basis depending on food	Unlikely to occur within the site. No suitable habitat present.

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		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 <i>Eucalyptus globulus</i> .	
Terek Sandpiper <i>Xenus cinereus</i>	NSW BC Act: Vulnerable EPBC Act: Migratory	<p>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 (<i>Halosarcia</i> spp.). Birds are seldom near the edge of water, however, birds may wade into the water.</p> <p>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.</p> <p>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 river-pools. Very occasionally, birds use swampy, grassy or cultivated paddocks near the coast.</p> <p>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.</p>	Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.2 and 3.3.
Varied Sittella <i>Daphoenositta chrysoptera</i>	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.

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<p>Wedge-tailed Shearwater <i>Ardenna pacificus</i></p>	<p>Migratory EPBC Act</p>	<p>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.</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.</p>
<p>Whimbrel <i>Numenius phaeopus</i></p>	<p>Migratory EPBC Act</p>	<p>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.</p> <p>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 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.</p> <p>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</p>	<p>Habitat is present within the site. Possibly occurring. Further assessment has been undertaken in Section 3.3.</p>

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		<p>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.</p>	
<p>White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i></p>	<p>NSW BC Act Vulnerable</p> <p>Migratory EPBC Act</p>	<p>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.</p>	<p>Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site.</p>
<p>White-fronted Chat <i>Epthianura albifrons</i></p>	<p>Vulnerable NSW BC Act</p>	<p>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.</p>	<p>Unlikely to occur within the site. No suitable habitat present.</p>
<p>White-throated Needletail <i>Hirundapus caudacutus</i></p>	<p>Migratory EPBC Act</p>	<p>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</p>	<p>Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site.</p>

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		<p>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.</p>	
MAMMALS			
<p>Australian Fur-seal <i>Arctocephalus pusillus doriferus</i></p>	<p>Vulnerable NSW BC Act</p>	<p>Prefers rocky parts of islands with flat, open terrain. They occupy flatter areas than do New Zealand Fur-seals where they occur together.</p>	<p>Unlikely to occur within the site. No suitable habitat present.</p>
<p>Greater Glider <i>Petauroides Volans</i></p>	<p>Vulnerable EPBC Act</p>	<p>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.</p>	<p>Unlikely to occur within the site. No suitable habitat present.</p>
<p>Grey-headed Flying-fox <i>Pteropus poliocephalus</i></p>	<p>Vulnerable EPBC Act Vulnerable NSW BC Act</p>	<p>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</p>	<p>Unlikely to occur within the site. No suitable habitat present.</p>

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		are commonly found in gullies, close to water, in vegetation with a dense canopy.	
Humpback Whale <i>Megaptera novaeangliae</i>	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 <i>Phascolarctos cinereus</i>	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 <i>Eucalyptus amplifolia</i> , <i>E.viminalis</i> , & <i>E.tereticornis</i> but numerous other species also known food trees.	Unlikely to occur within the site. No suitable habitat present.
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	Endangered EPBC Act Vulnerable NSW BC Act	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares. Are known to traverse their home ranges along densely vegetated creeklines.	Unlikely to occur within the site. No suitable habitat present.