Review of Environmental Factors

for

Demolition and Replacement of Existing Mangrove Boardwalk

Currambene Creek
Huskisson

PROPONENT: SHOALHAVEN CITY COUNCIL

REF PREPARED BY: PETER DALMAZZO

VERSION & DATE: 3 MAY 2023

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ATTACHMENTS

1 INTRODUCTION

1.1 Background

Peter Dalmazzo was engaged by the Jirgens Civil Pty Ltd to prepare this review of environmental factors for the proposed demolition and replacement of an existing boardwalk through mangroves in Currambene Creek at Huskisson. The existing boardwalk, constructed in 1988, is dilapidated and in need of replacement. Shoalhaven City Council is the proponent for the activity. NSW Department of Primary Industries is a determining authority for the activity. This review of environmental factors includes an assessment of potential environmental impacts and information on statutory requirements including approvals, licences and/or permits that need to be considered for completion of the project. A number of environmental safeguards are included in this report.

1.2 Location and Land Tenure

The site is located in the City of Shoalhaven on the south coast of NSW, approximately 24 kilometres by road southeast of central Nowra and 185 kilometres south of central Sydney. Figures 1, 2 and 3 show the location of the facility. The boardwalk is located on Crown land on the western shore of Currambene Creek, adjacent to the Jervis Bay Maritime Museum (formerly the Lady Denman Maritime Museum). It is approximately 650 metres upstream of where the Currambene Creek enters Jervis Bay.

Shoalhaven City Council has advised that the boardwalk is located on Crown land which was added to Reserve No. 96376, as notified in the Government Gazette on 21 May 1993 (Figure 4). The land is reserved for the public purpose of “public recreation” and the Crown Land Manager for the reserve is Shoalhaven City Council. Under section 3.23 of the Crown Land Management Act 2016 the land has been assigned to the “natural area” category of community land, as referred to in section 36 of the Local Government Act 1993.

The boardwalk is also located in the Currambene Creek Mudflats Sanctuary Zone of the Jervis Bay Marine Park (Figure 5).

Figure 1. Location of the site in regional context.
Source: © NSW Spatial Services www.six.nsw.gov.au

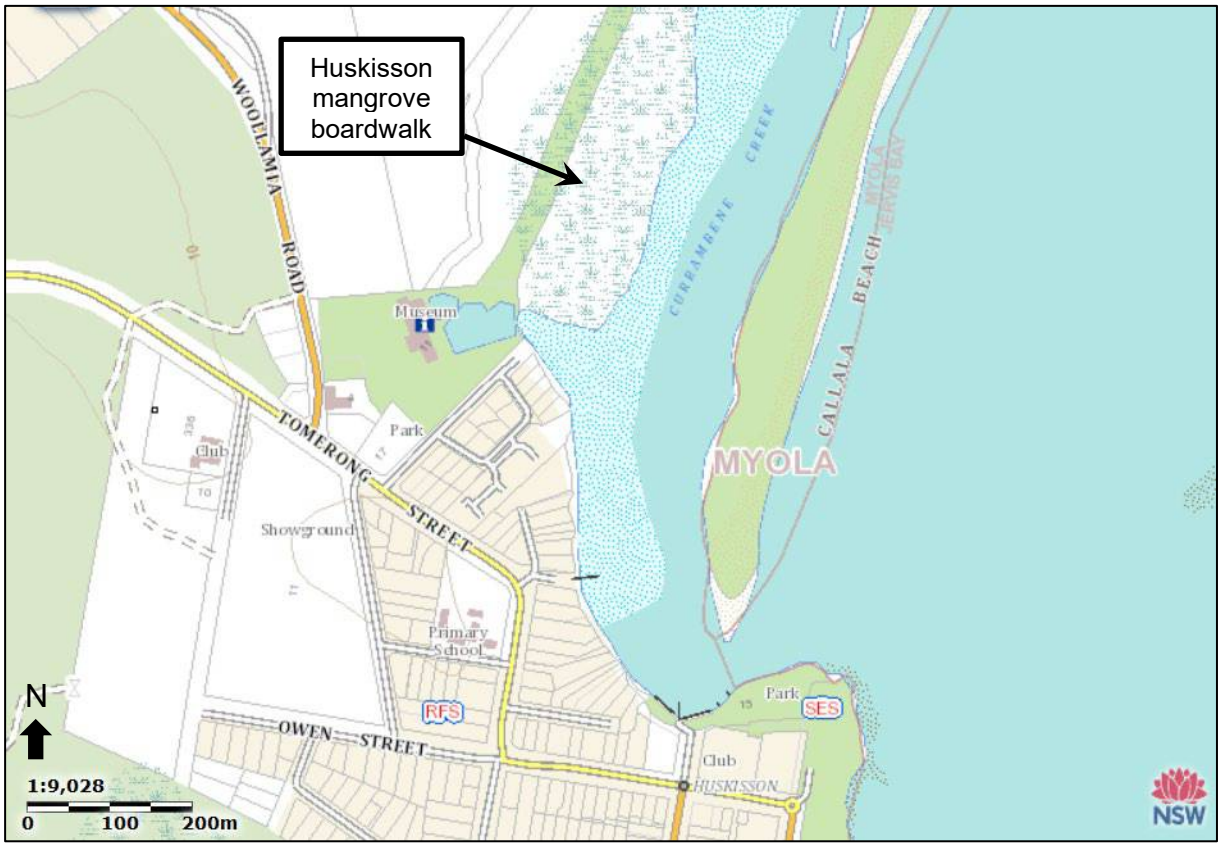


Figure 2. Location of the Huskisson mangrove boardwalk.
Source: © NSW Spatial Services www.six.nsw.gov.au

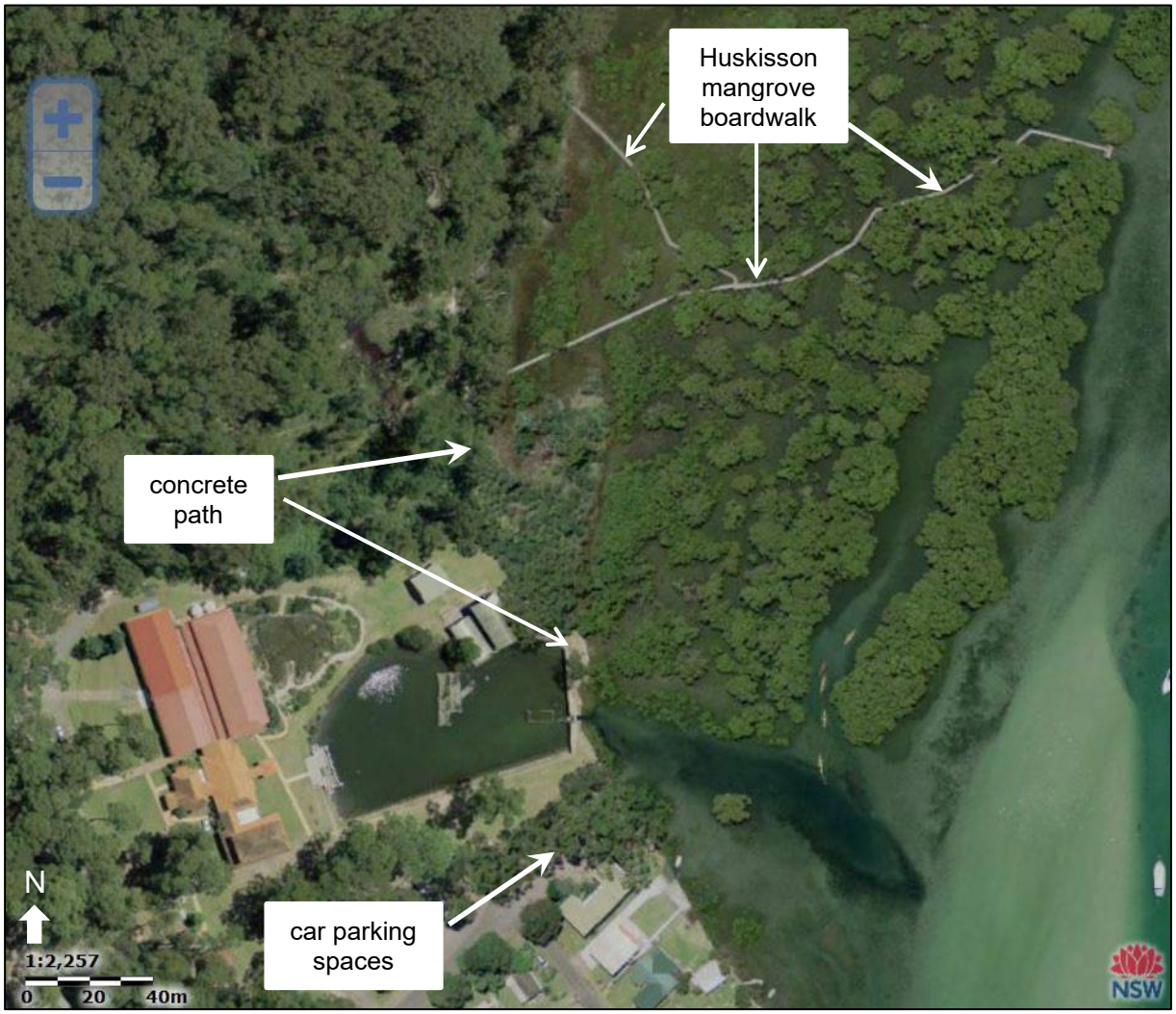


Figure 3. Location of the subject facility.
Source: © NSW Spatial Services www.six.nsw.gov.au

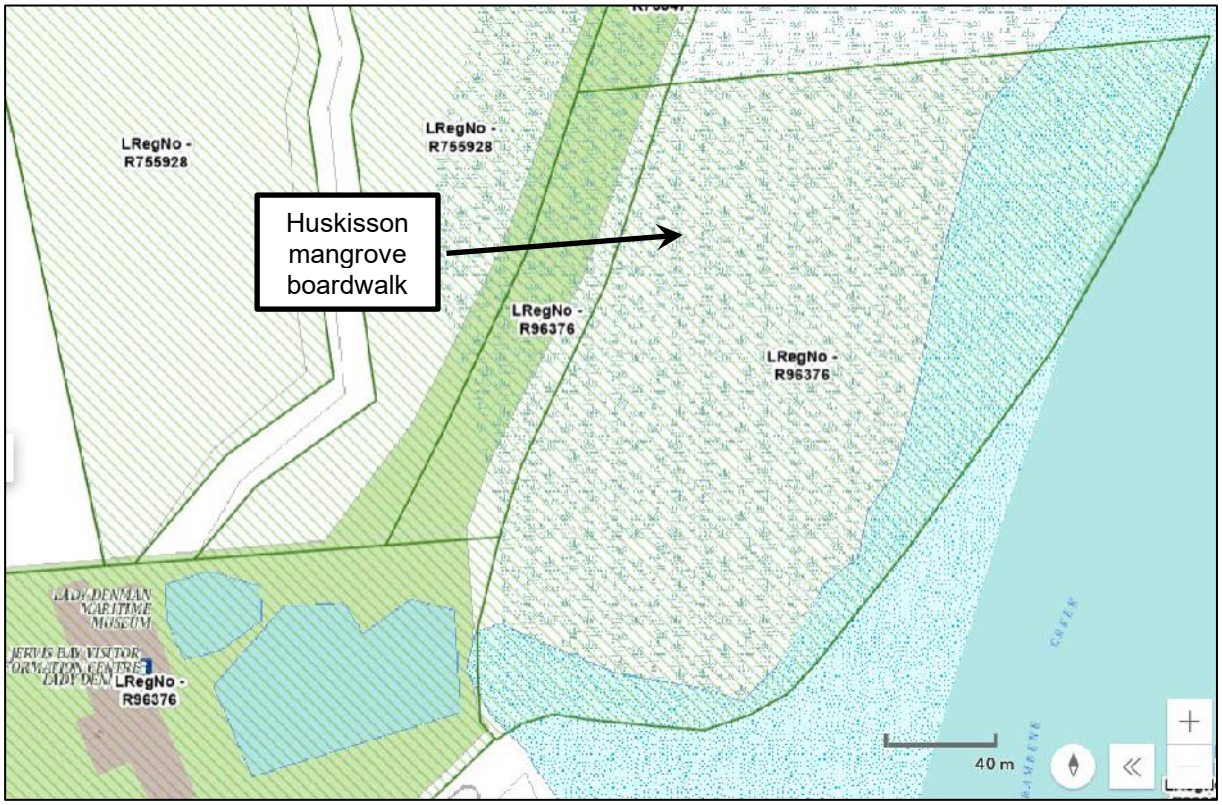


Figure 4. Crown Reserve No. 96376 for public recreation.
Source: ePlanning Spatial Viewer

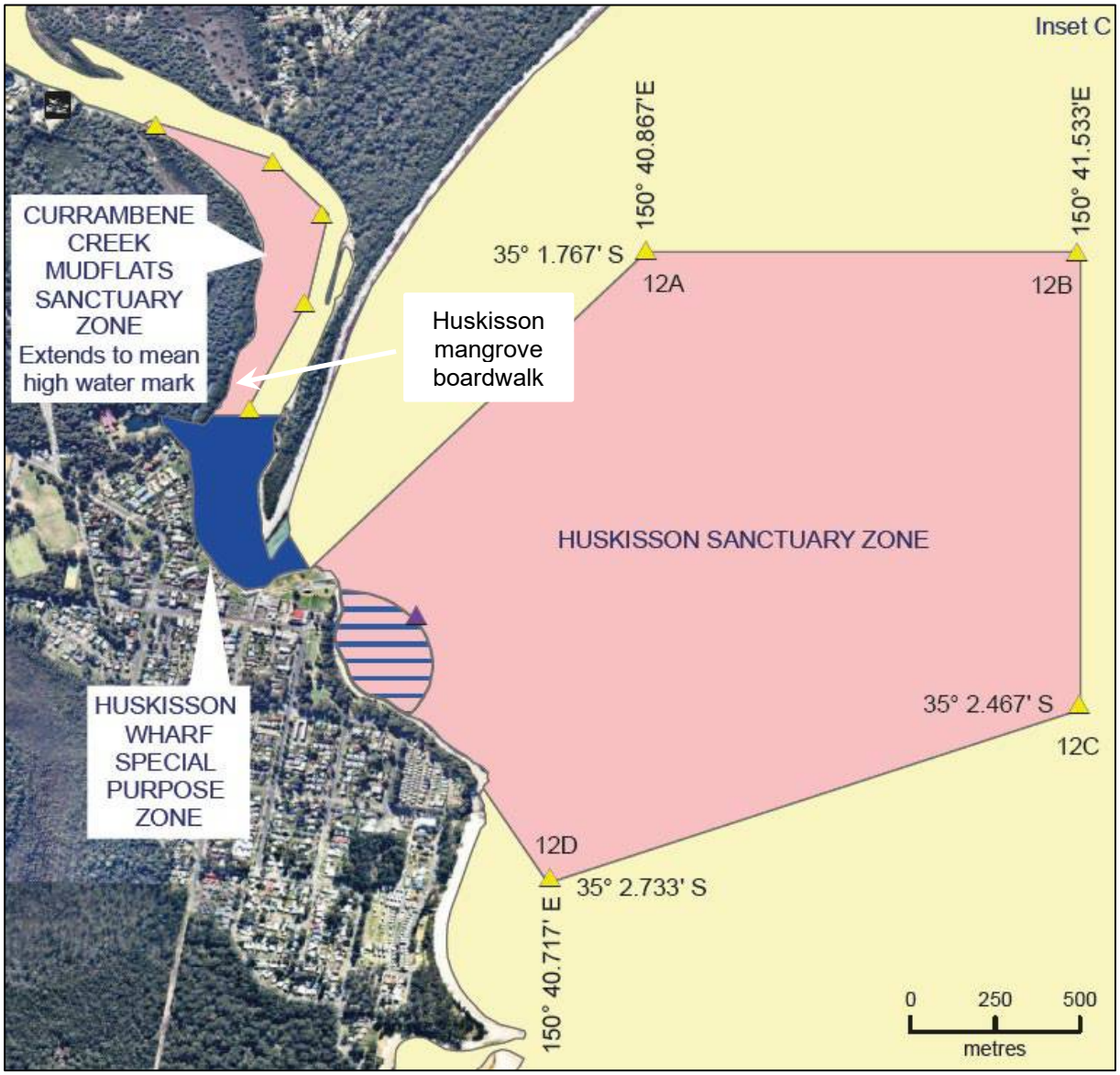


Figure 5. Zoning map for Jervis Bay Marine Park.

2 DESCRIPTION OF PROPOSED ACTIVITY

The proposed activity includes:

1. Demolition of an existing timber boardwalk, approximately 300m long x 1200mm wide constructed in 1988, and its replacement along with some design changes to bring it up to contemporary standards as described below.
2. Demolition and replacement of an existing concrete pathway from the eastern end of Dent Street to the start of the mangrove boardwalk, including a new bridge over the sluice structure of the existing saltwater pond at the museum.
3. Creation of accessibility line marking for two vehicles at existing parking bays at the eastern end of Dent Street.

Figure 6 shows the areas of work and Figure 7 is a site plan. Detailed plans are included in Attachment 1 and detailed descriptions of construction methodologies are in Attachment 2.

The new boardwalk alignment would generally follow the existing timber boardwalk, with two platforms at new locations and an enlarged terminal platform at the offshore end of the boardwalk. The platform areas would be suitable for groups to gather (educational areas) and include two seating bays. The northern spur of the boardwalk would be extended landward by approximately 22m through an intertidal area of saltmarsh vegetation. The replacement concrete pathway would be 1800mm wide in concrete. The new boardwalk and path are designed to include improved accessibility.

The materials used for the new boardwalk would predominantly be stainless steel and fibre reinforced plastic (frp) composite materials. The new boardwalk would be 1800mm wide. The boardwalk would be supported by stainless steel helical screw piles spaced at 1440mm from side to side and 3000mm along the boardwalk. Headstocks, joists, balustrades, etc. would be hollow section frp with stainless steel fixings. Decking would be 30 x 6.5mm mini-mesh frp.

Construction access to the boardwalk would be via an existing unsealed vehicle track that runs generally east-west, from the museum carpark then passing to the north of the museum building and past the boatsheds to meet the existing concrete pedestrian path. A small compound, approximately 15m x 6m, for assembly of the new boardwalk components would be established at the head of the main boardwalk. Vegetation would be cleared and geofabric emplaced, topped with DGS 20mm gravel. These materials would be removed at completion of construction.

The boardwalk demolition and construction will be a systematic process. Vegetation will be trimmed as necessary and removed from site as the boardwalk construction progresses. Several 4m x 0.6m aluminium working platforms will be installed either side of the boardwalk to provide safer access and reduce the impact to the soil profile and mangrove shoots. A silt curtain with a floating hydrocarbon boom will be installed around the section of boardwalk to be constructed prior to demolition. Demolition of the boardwalk will commence at the first set of piles, the decking and joists will be removed working back to the abutment. This material will be placed into a site transport trolley and taken to the hardstand area where it will be palletised for removal by the track loader. The piles will be cut off above the marine growth and will follow the same process.

All material required for the construction of the boardwalk will be delivered from the museum carpark to the construction hardstand using a track loader. Set out of the new pile location will be undertaken off the working platforms and the helical screw piles will be transported to site on the transport trolly. A screw pile installation jig will be installed and will require the installation of 4 x 900mm long positioning and securing stakes. A 3.8T Excavator with a hydraulic drive motor will pick up the screw piles and locate them to their installation position. The installation of the screw piles will be monitored for plumb and alignment quality assurance and will be driven to achieve 6kN. This information will be recorded in a pile log and provided to the certifying engineers. The post and headstock connections will be fully assembled at the hardstand. 2 x 154mm SHS frp posts and dual 200mm x 100m SHS frp headstocks and bracing will be brought to site via the transport trolley and installed with the 3.8T excavator. The SHS posts will be installed over the 600mm long screw pile stubs and pushed into the soil profile to ensure no pile steel is in the tidal exposure zone. The posts will be drilled onsite and 2 x 16mm SS bolts will be installed through both members of each post. The 154mm FRP posts will have 2mm clearance around the 141mm screw pile SHS section. There will be temporary longitudinal bracing installed at every fourth boardwalk section to ensure the boardwalk is adequately supported during construction.

Once the piles and headstocks are installed the joist will be cut at the hardstand area, transported by trolly and secured using Wagners proprietary SS angle brackets and SS fixing screws. In locations where the boardwalk is to change direction, the secondary headstock will carry the joist independently to the first allowing the realignment from one section to another. In locations where the alignment is to dramatically change ie. around a tree, the piles and headstock will be duplicated in parallel to whatever the required length of deviation is. This can be up to 1.6m.

Once the joists have been secured the mesh decking will be installed, this will be fastened adequately enough to continue with the installation of the substructure. Temporary decking protection ply will be installed prior to the excavator progressing and there will be 2 additional sheets behind it to manage material handling of the piles, joist and decking before installation. The first set of working platforms will be shifted to the next removal and Installation area followed by the silt curtain and floating hydrocarbon boom. This will be repeated throughout the entirety of the boardwalk installation.

The handrail installation will commence from the end of the new boardwalk and will progress back to the abutments. At the location of the boardwalk intersection, a second installation team will commence. The boardwalk decking will cut to suit the handrail post locations, the posts will be bolted with 12mm SS through the headstock and joists. The decking will be reinstated and permanently secured with Wagners SS decking fixings. The mid rail, top rail and SS handrail will be installed and secured with Wagners proprietary ss fixing brackets and SS rivets.

The interpretive signage will be installed on SS brackets which are to be connected to the handrail posts of the right side of the boardwalk. The SS brackets will be fabricated to display the sign ‘floating’ 400mm off the hand rail. The signs on the left-hand side of the boardwalk will be installed on driven 65mm x 4mm SHS SS post which will be powder coated to blend into the surrounding environment, again appearing to be floating. The sign design will involve members from the Wreck Bay and Jerrinja Aboriginal communities to provide indigenous cultural content as well as content

around hunting and gathering. Signage will also include information about the mangrove system and its life cycle, mud flats, fish species, mud crabs, crustaceans, shellfish and significant ecological communities.

Areas outside native vegetation areas which have been impacted will be topsoiled and grass seeded. The project site will subject to a final inspection from the SCC project manager and any defect notices issued will be rectified prior to demobilisation. All offices, site sheds, hardstands, temporary access, traffic controls and amenities will be removed from site prior to the final restoration works being completed.

Construction waste or packaging, if present, would be disposed of or recycled at an authorised waste disposal facility.

It is expected that the proposal would take 6 to 9 months to complete.

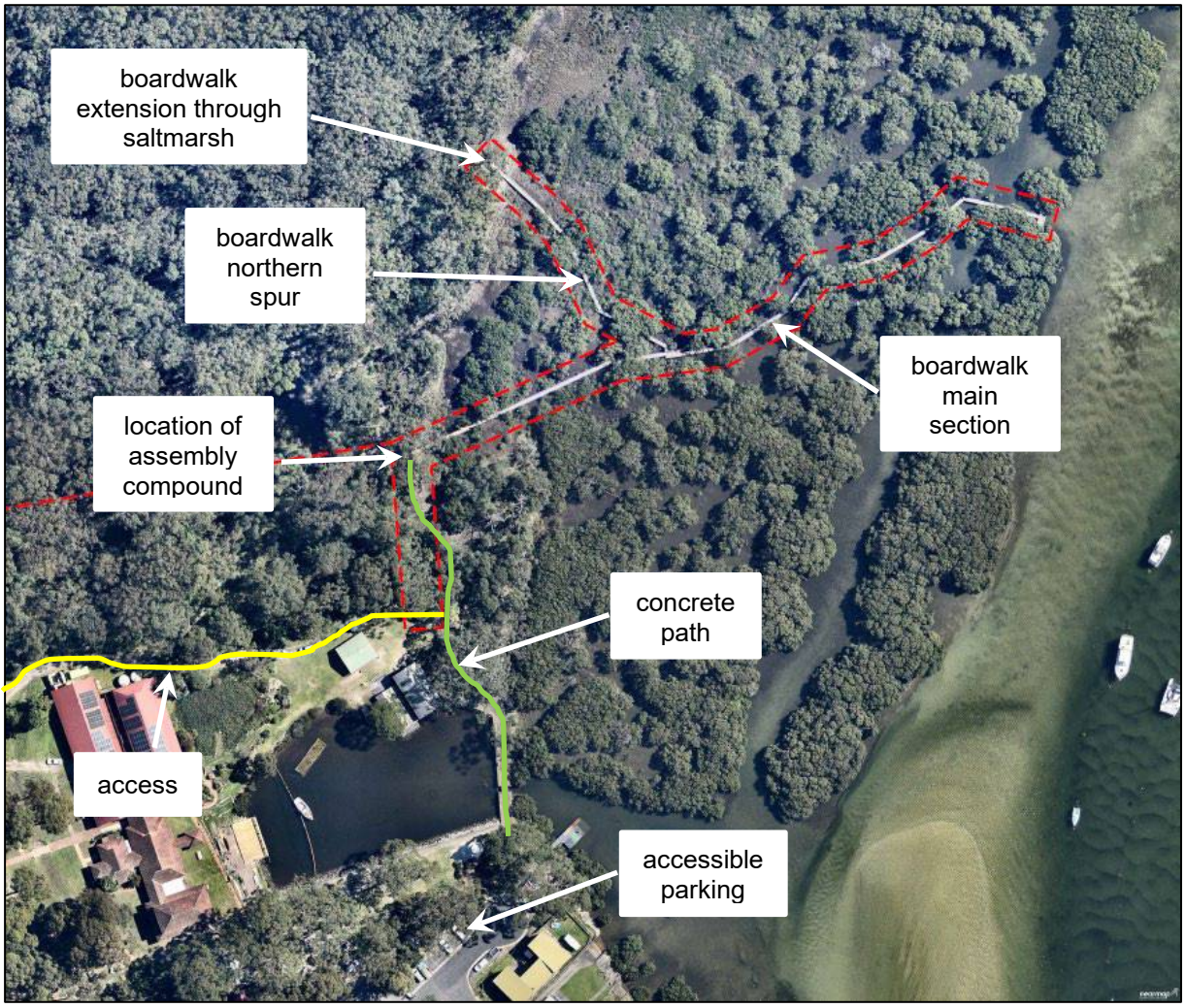


Figure 6. Areas of work.
Source: Modified from MIEngineers plans. Air Photo © Nearmap

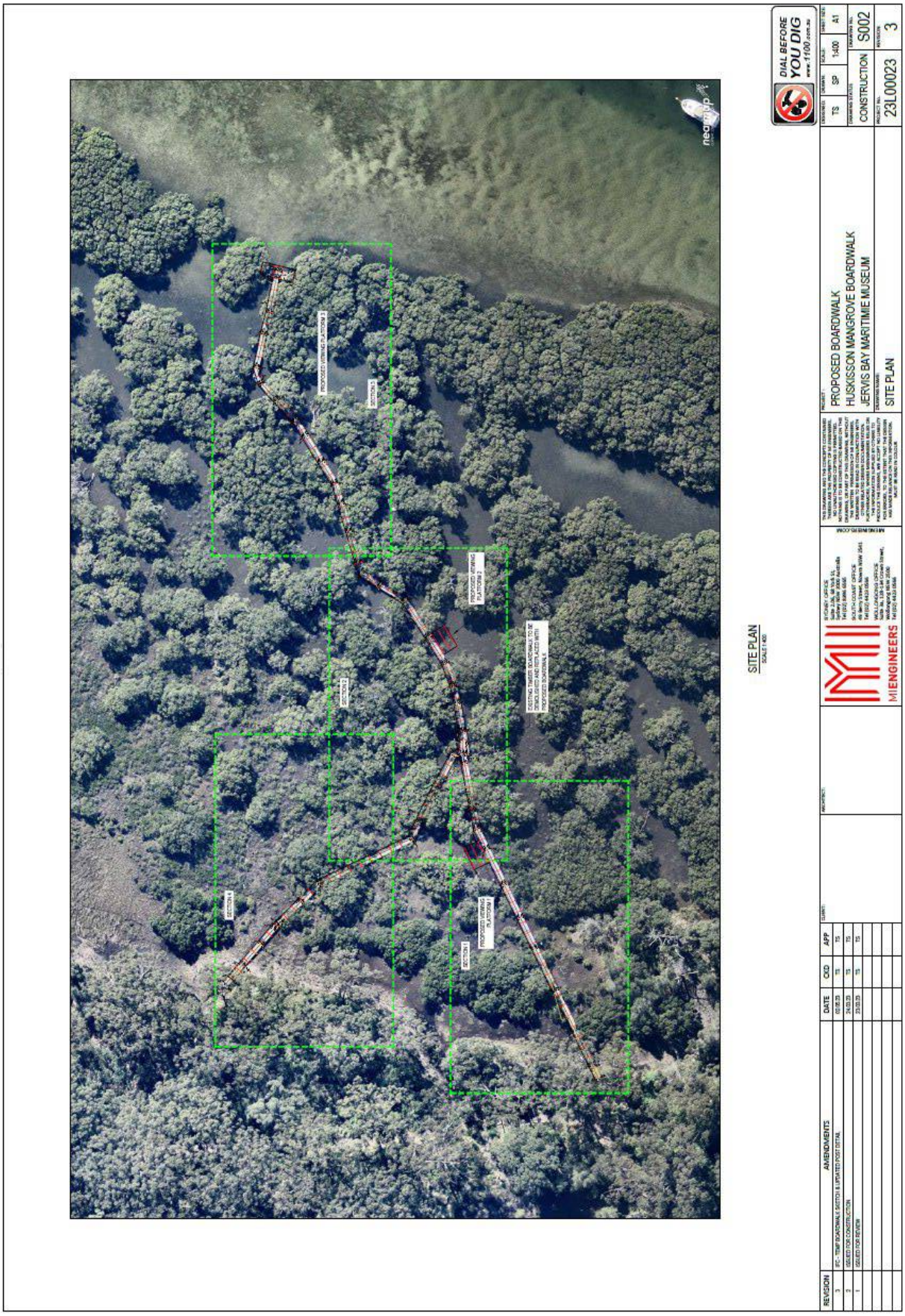


Figure 7. Site plan.
Source: plan MIEngineers Air Photo © Nearmap

3 LEGISLATION, APPROVAL PATHWAY AND PERMIT REQUIREMENTS

3.1 NSW Environmental Planning & Assessment Act 1979, Regulation 2021 and Associated Instruments

Shoalhaven City Council has advised that the project will proceed as exempt development under the provisions of Section 2.74(1)(a)(i) of State Environmental Planning Policy (Transport and Infrastructure) 2021 which provides for construction or maintenance of walking tracks, raised walking paths (including boardwalks), ramps, stairways or gates.

Sections 2.73(1)(b) and 2.74(2)(a)(i) together provide that the proposal may be carried out by or on behalf of a public authority on land declared under the Marine Estate Management Act 2014 to be a marine park if the development is for a use authorised under that Act (see section 3.2 of this review of environmental factors).

The proposed activity would be carried out in part on lands identified as “coastal wetlands” and in part as “proximity area” on the Coastal Wetlands and Littoral Rainforests Area Map of State Environmental Planning Policy (Resilience and Hazards) 2021 (Figure 8). However, Shoalhaven City Council has advised that they consider the requirements of Section 2.7 of State Environmental Planning Policy (Resilience and Hazards) 2021 for development consent and an environmental impact statement do not apply to this “exempt development” as provided for by Section 2.7(4) of State Environmental Planning Policy (Transport and Infrastructure) 2021, as long as any adverse effect on the land concerned is restricted to the minimum possible to allow the works to be carried out.

Although a public authority that is a proponent of exempt development is generally not required to prepare a review of environmental factors, in this case approvals are required under and the Marine Estate Management Act 2014 and the Fisheries Management Act 1994 (see sections 3.2 and 3.3 of this review of environmental factors). Therefore the Department of Primary Industries is a determining authority for the proposal and section 5.5 in Part 5 of the Environmental Planning and Assessment Act requires that a determining authority must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity. Section 5.7 requires that an assessment must also be made of whether the proposed activity is likely to have a significant effect on the environment and therefore whether or not an environmental impact statement is required. 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 Act. This review of environmental factors has been prepared to satisfy section 171(3) of the Environmental Planning and Assessment Regulation 2021 whereby a determining authority must prepare a review of the environmental factors that demonstrates how the environmental factors specified in subsection 171(2) were taken into account when considering the likely impact of an activity. These assessments are included in Section 7 of this review of environmental factors.

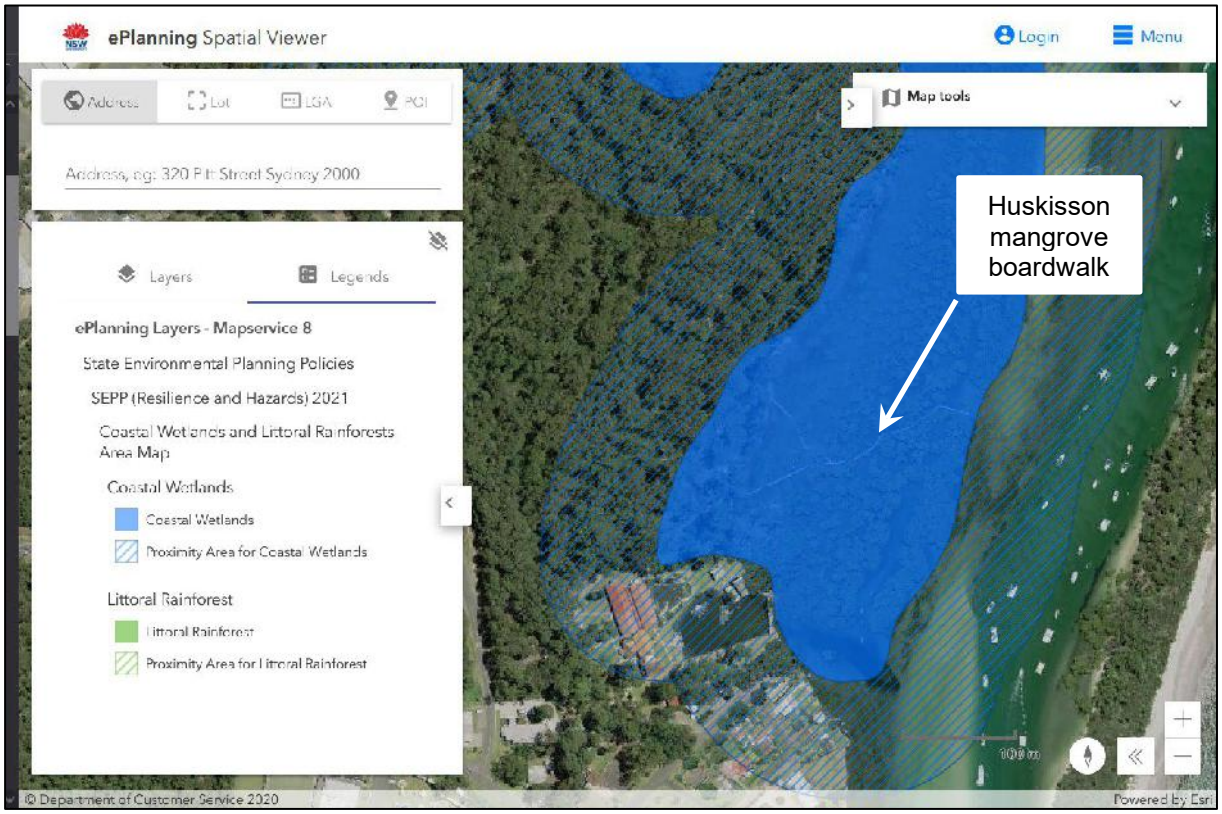


Figure 8. Extract from Coastal Wetlands and Littoral Rainforests Area Map of State Environmental Planning Policy (Resilience and Hazards) 2021.
Source: ePlanning Spatial Viewer

3.2 NSW Marine Estate Management Act 2014

NSW Department of Primary Industries has advised that a marine park permit under the Marine Estate Management Act 2014 will be required to harm habitat and vegetation in a sanctuary zone. This will require Director approval. Marine parks matters are dealt with in Section 7.1 of this report.

3.3 NSW Fisheries Management Act 1994

NSW Department of Primary Industries has advised that a permit under section 205 of the Fisheries Management Act 1994 will be required to harm marine vegetation. Marine vegetation matters are dealt with in Section 6.2 of this report.

3.4 NSW Biodiversity Conservation Act 2016

This Act lists threatened species and ecological communities, areas of outstanding biodiversity value and key threatening processes. If a significant impact on threatened species is likely, a determining authority may elect either to obtain a biodiversity development assessment report in connection with environmental impact assessment or a species impact statement must be completed and concurrence of the Environment Agency Head obtained. Biodiversity conservation matters are dealt with in Section 7.2 of this report.

3.5 NSW National Parks and Wildlife Act 1974

The National Parks and Wildlife Act protects all Aboriginal objects and Aboriginal places in NSW. It is an offence to dig up or damage any Aboriginal object or place without the permission of the NPWS. Aboriginal heritage matters, including an

assessment under the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales, are dealt with in Section 7.3.e of this report.

3.6 NSW Protection of the Environment Operations Act 1997 and Protection of the Environment Operations (Waste) Regulation 2014

Section 142A of the Act makes pollution of land an offence. The Act defines pollution of land as:

> *placing in or on, or otherwise introducing into or onto, the land (whether through an act or omission) any matter, whether solid, liquid or gaseous:*
> *(a) that causes or is likely to cause degradation of the land, resulting in actual or potential harm to the health or safety of human beings, animals or other terrestrial life or ecosystems, or actual or potential loss or property damage, that is not trivial, or*
> *(b) that is of a prescribed nature, description or class or that does not comply with any standard prescribed in respect of that matter.*

Potential pollution matters are dealt with in Section 7.3.k of this report.

3.7 NSW Aboriginal Land Rights Act 1983

The Aboriginal Land Rights Act recognises the rights of Aboriginal people in New South Wales and provides a vehicle for the expression of self-determination and self-governance. The Act provides that the New South Wales Aboriginal Land Council and Local Aboriginal Land Councils may make claim(s) to claimable Crown land(s). Aboriginal Land Claims are dealt with in Section 7.3.e of this report.

3.8 Australian Native Title Act 1993

The Native Title Act is Australian legislation that recognises and protects native title. It provides that native title cannot be extinguished contrary to the Act. The Act covers acts affecting native title and determining whether native title exists and compensation for acts affecting native title. For past acts and future acts, this Act deals with (a) their validity, (b) their effect on native title, (c) compensation for the acts. Native title is dealt with in Section 7.3.e of this report.

3.9 Australian Environment Protection & Biodiversity Conservation Act 1999

The EPBC Act is Australian legislation that protects matters of national environmental significance. It acts in parallel with the NSW legislation and requires separate assessments of significance should listed species or processes be potentially impacted by the works. Under Part 9 of the EPBC Act an action that could have a significant impact on a matter of national environmental significance may only be taken with approval of the Australian Government Minister for the Environment. EPBC Act matters are dealt with in Attachment 4 to this report.

4 CONSULTATION

Shoalhaven City Council consulted with the NSW Department of Primary Industries - in July 2022 because approvals for the works would be required from this agency. The Department's response is in Attachment 3. Issues raised by the agency have been addressed in appropriate sections of this review of environmental factors.

With regard to native title, Shoalhaven City Council sent a referral notice (Attachment 3) inviting comment to NTSCorp on 03/12/2020. No response was received.

Section 171(4) of the Environmental Planning and Assessment Regulation 2021 requires that this review of environmental factors must be published on the determining authority's (Department of Primary Industries) website or the NSW planning portal because the proposal requires an approval or permit under section 205 of the Fisheries Management Act 1994.

5 DESCRIPTION OF THE SITE AND SURROUNDING ENVIRONMENT

5.1 Methods

To inform the preparation of this review of environmental factors, relevant existing information was collated and reviewed, including previous studies, maps and air photographs. Initial assessment of habitats and vegetation communities was made by interpreting recent aerial photographs available on the Internet at nearmap.com.au and at NSW Spatial Information eXchange (SIX) Viewer. Measurements were made using the measurement tools on those web sites and by estimation on site. Ground-truthing of aerial photograph interpretation was carried out during field observations of terrestrial and aquatic habitats at the site and surrounding areas. The site was inspected by the author near local low tide on Tuesday 11 April 2023 between 6:30am and 9:00am AEST. The weather was mostly cloudy with light wind and cool to mild air temperature. Above-water observations were made from the shore and from the boardwalk, path and road. Records were made of the nature of the vegetation and habitats present at the site and of plant and animal species that were observed. A plant species list was compiled and targeted searches of suitable habitat were made for the following threatened plant species that appeared in NSW Bionet Atlas search results and/or are known to occur near estuary and foreshore areas in the Shoalhaven region:

Lepidium foliosum	Leafy Peppercress
Wilsonia backhousei	Narrow-leafed Wilsonia
Wilsonia rotundifolia	Round-leafed Wilsonia
Chamaesyce psammogeton	Sand Spurge
Distichlis distichophylla	Australian Saltgrass
Galium australe	Tangled Bedstraw
Thesium australe	Austral Toadflax
Syzygium paniculatum	Magenta Lilly Pilly

To establish whether or not vegetation types on the sites should be classed as endangered ecological communities, their characteristics (plant species, soil, landform) were compared with descriptions in relevant determinations of the threatened species scientific committee.

5.2 Habitats and Vegetation

Photographs showing the character of the site are in Figures 9 to 35.

The vegetation and habitat types observed at or near the site were:

- the water column (when the site is inundated by tide)
- mangroves
- saltmarsh
- aquatic unvegetated soft substrates (sand and mud)
- aquatic hard surfaces (mangrove trunks and boardwalk piles)
- terrestrial coastal sand forest.

A map of marine vegetation (seagrass, mangroves and saltmarsh) is in Figure 36.

The boardwalk is located amongst a sensitive ecosystem of mangroves and saltmarsh on the edge of Currambene Creek. This ecosystem is culturally and environmentally

important and the site is considered a sensitive marine environment which forms part of the Jervis Bay Marine Park.

Species of plants observed in the mangrove and saltmarsh area are in Table 1.

Coastal Saltmarsh occupied the highest intertidal areas nearer to shore. Saltmarsh plants included Sea Rush *Juncus kraussii*, Bare Twigrush *Machaerina juncea*, Knobby Club-rush *Ficinia nodosa*, Saltwater Couch *Sporobolus virginicus*, Prickly Couch *Zoysia macrantha* and Warrigal Cabbage *Tetragonia tetragonioides*. There was an informal pathway through the saltmarsh by which people accessed the northern spur boardwalk.

A little way offshore the vegetation transitioned to a mosaic of saltmarsh and mangroves and then further offshore was the Mangrove Forest. The mangrove forest at the site was part of a large stand of mainly Grey Mangrove *Avicennia marina*, along with a few River Mangrove *Aegiceras corniculatum*. The distribution of these vegetation types relates to elevation and therefore the extent and duration of tidal inundation.

There were various turfing algae growing on mangrove pneumatophores. On the intertidal mud there was unattached, brown macroalgae (Neptune's Necklace *Hormosira banksia*).

No seagrass was observed at the site.

At its landward ends, above the intertidal area, the boardwalk connected with terrestrial vegetation in the form of Coastal Sand Forest. The dominant tree species in the southern part of the site was Bangalay *Eucalyptus botryoides* but there was a transition northward to forest dominated by Blackbutt *Eucalyptus pilularis*. The forest had a moderately dense, shrubby understorey. Species of plants observed in the terrestrial parts of the site are in Table 2.

Areas that had be cleared of native vegetation at the southern part of the site, where the concrete path would be demolished and replaced, consisted of mown native and introduced grasses and other groundcover plants, including Common Couch *Cynodon dactylon*, Kikuyu *Cenchrus clandestinum* and Buffalo *Stenotaphrum secundatum*.

No threatened plant species were observed at the site.

5.3 Fauna

The pelagic and benthic communities associated with the water column, rock, sand and mud would include a variety of invertebrate animal species such as molluscs, crabs, prawns and worms.

On the intertidal mud amongst mangroves there were grazing gastropods Australian Mud Whelk *Batillaria australis* and Hercules Club Whelk *Pyrazus ebeninus* as well as burrowing crabs of various species, including Semaphore Crab *Heloecius cordiformis*. The author has also observed Red-fingered Marsh Crab *Parasesarma erythrodactyla* inhabiting mud nearby. In the more sandy subtidal, unvegetated sediment near the offshore end of the boardwalk there was a small number of burrows of invertebrate animals, most likely those of Callianassid shrimps (nippers) and polychaete worms.

Growing on some boardwalk piles, mangrove trunks and aerial roots there were invertebrates, including Sydney Rock Oyster *Saccostrea glomerata* and the grazing littorinid snails *Bembicium auratum* and *Austrocochlea porcata*. The author has also observed the Limpet *Patelloida mimula* inhabiting mangrove roots and other hard surfaces nearby.

The only fish observed during the site inspection was a small school of Toadfish *Tetractenos* sp. congregated in shallow water just offshore from the terminal platform. However, a range of common estuarine fish species, especially small species and juveniles of larger species, would be expected to utilise the shallow water habitat amongst the mangroves when the tide allowed. These would include Glassy Perchlet *Ambassis* sp., Luderick *Girella tricuspidata*, Yellowfin Bream *Acanthopagrus australis*, Silver Biddy *Gerres subfasciatus,* River Garfish *Hyporhamphus regularis*, Sea Mullet *Mugil cephalus*, Sand Mullet *Myxus elongatus*, Tailor *Pomatomus saltatrix*, Dusky Flathead *Platycephalus fuscus*, Estuary Catfish *Cnidoglanis microcephalus*, Porcupine Fish *Dicotylichthys punctulatus*, Fortescue *Centropogon australis* and Sandy Sprat *Hyperlophus vittatus*, Stripey *Microcanthus strigatus*, Silver Sweep *Scorpis lineolata*, Sand Whiting *Sillago ciliata*, Yellowfin Leatherjacket *Meuschenia trachylepis*, Stingaree *Urolophus* sp. and Smooth Stingray *Dasyatis brevicaudata*. The author has observed most of the above species at sites nearby in Currambene Creek. Many species that would inhabit the site at some stage in their life cycle are of recreational and commercial importance but there would also be a variety of smaller species (such as gobies, gudgeons and blennies) that are an integral part of the estuarine ecosystem.

No shorebirds were observed at the site but bird footprints were observed in the mud near the offshore end of the main boardwalk. It is expected that various species of shorebird including some threatened species would feed amongst the mangroves from time to time.

Table 1. Mangrove and saltmarsh plant species observed at the site, 11 April 2023.
* denotes introduced species

Family	Scientific Name	Common Name
Acanthaceae	*Avicennia marina*	Grey Mangrove
Aizoaceae	*Tetragonia tetragonioides*	Warrigal Cabbage
Cyperaceae	*Ficinia nodosa*	Knobby Club-rush
Cyperaceae	*Machaerina juncea*	Bare Twigrush
Juncaceae	*Juncus kraussii*	Sea Rush
Myrsinaceae	*Aegiceras corniculatum*	River Mangrove
Poaceae	*Sporobolus virginicus*	Saltwater Couch
Poaceae	*Zoysia macrantha*	Prickly Couch

Table 2. Terrestrial plant species observed at the site, 11 April 2023.
* denotes introduced species

Family	Scientific Name	Common Name
Apocynaceae	*Parsonsia straminea*	Common Silkpod
Asparagaceae	*Asparagus asparagoides* *	Bridal Creeper
Asparagaceae	*Asparagus scandens* *	Asparagus 'Fern' *
Asparagaceae	*Lomandra longifolia*	Spiny-headed Mat-rush
Asphodelaceae	*Geitonoplesium cymosum*	Scrambling Lily
Asteraceae	*Bidens pilosa* *	Cobbler's Pegs *
Asteraceae	*Conyza sp* *	Fleabane *
Casuarinaceae	*Casuarina glauca*	Swamp Oak
Commelinaceae	*Commelina cyanea*	Scurvy Weed
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge
Dennstaedtiaceae	*Pteridium esculentum*	Bracken Fern
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea Flower
Ericaceae - Epacridoideae	*Leucopogon parviflorus*	Coastal Beard-heath
Ericaceae - Epacridoideae	*Monotoca elliptica*	Tree Broom-heath
Fabaceae - Caesalpinioideae	*Senna pendula var. glabrata* *	Cassia *
Fabaceae - Faboideae	*Kennedia rubicunda*	Dusky Coral Pea
Fabaceae - Mimosoideae	*Acacia longifolia subsp. longifolia*	Sydney Golden Wattle
Fabaceae - Mimosoideae	*Acacia parvipinnula*	Silver-stemmed Wattle
Fabaceae - Mimosoideae	*Acacia ulicifolia*	Prickly Moses
Haloragaceae	*Gonocarpus teucrioides*	Raspwort
Iridaceae	*Crocosmia x crocosmiiflora* *	Montbretia *
Lamiaceae	*Plectranthus ciliatus* *	African spur flower *
Malvaceae	*Sida rhombifolia* *	Paddy's Lucerne *
Menispermaceae	*Stephania japonica*	Snake Vine
Myrtaceae	*Eucalyptus botryoides*	Bangalay
Myrtaceae	*Eucalyptus pilularis*	Blackbutt
Myrtaceae	*Eucalyptus sclerophylla*	Hard-leaved Scribbly Gum
Myrtaceae	*Leptospermum polygalifolium*	Tantoon
Myrtaceae	*Melaleuca hypericifolia*	Hillock Bush
Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum
Plantaginaceae	*Plantago lanceolata* *	Plantain *
Poaceae	*Cenchrus clandestinum* *	Kikuyu Grass *
Poaceae	*Cynodon dactylon*	Couch
Poaceae	*Echinopogon caespitosus*	Tufted Hedgehog Grass
Poaceae	*Ehrharta erecta* *	African Veldt Grass *
Poaceae	*Imperata cylindrica*	Blady Grass
Poaceae	*Paspalum dilatatum* *	Paspalum *
Poaceae	*Sporobolus africanus* *	Parramatta Grass *
Poaceae	*Stenotaphrum secundatum* *	Buffalo Grass *
Polygonaceae	*Rumex brownii*	Swamp Dock
Polygonaceae	*Rumex sagittatus* *	Turkey Rhubarb *
Proteaceae	*Banksia integrifolia*	Coastal Banksia
Rosaceae	*Rubus anglocandicans* *	Blackberry *
Rosaceae	*Rubus parvifolius*	Native Raspberry

Figure 9. View westward showing the track from the car park that would be used for construction access.

Figure 10. View eastward showing the track that would be used for construction access passing by northern side of museum building.

Figure 11. View westward from eastern end of track that would be used for construction access, where it passes boatsheds; museum building in background.

Figure 12. View northward showing typical section of existing concrete path that would be used for construction access.

Figure 13. Northern end of existing concrete path where it joins landward end of boardwalk (not visible on right). Hardstand for assembly of boardwalk components would be established in coastal sand vegetation here.

Figure 14. View northward at eastern end of Dent Street. Concrete path starts here. Accessible parking spaces to be marked at left of shot.

Figure 15. Existing pathway and bridge over sluice structure, to be replaced and widened to 1800mm.

Figure 16. Typical section of existing concrete path through coastal terrestrial vegetation; to be replaced with 1800mm wide new concrete path.

Figure 17. Junction of concrete path and landward end of main boardwalk. Some trimming of coastal sand vegetation will be required.

Figure 18. View landward at landward end of main boardwalk through saltmarsh (left) and mangroves. Some mangrove trimming will be required.

Figure 19. View landward at location of proposed new section of boardwalk through saltmarsh, connecting existing northern spur to ground above intertidal area.

Figure 20. Typical section of boardwalk northern spur.

Figure 21. Section of boardwalk northern spur where mangrove would need to be trimmed.

Figure 22. Examples of mangroves that would need to be trimmed: River Mangrove lighter green in foreground, Grey Mangrove darker green in background and on left.

Figure 23. Offshore section of northern spur, near junction with main boardwalk, is clear of large mature mangroves but small plants would be affected.

Figure 24. Most of the main boardwalk is clear of large mature mangroves but small plants would be affected.

Figure 25. One mature mangroves that is very close to main boardwalk would be removed.

Figure 26. View landward at junction of main boardwalk (left) with northern spur (right). The existing widened platform will not be replaced here.

Figure 27. Offshore section of main boardwalk with terminal platform near offshore edge of mangroves.

Figure 28. Typical intertidal substrate beside boardwalk consisting of mud with mangrove aerial roots (pneumatophores), mangrove seedlings and crab burrows.

Figure 29. Typical intertidal substrate beside boardwalk consisting of mud with mangrove aerial roots (pneumatophores) and unattached brown macroalgae *Hormosira banksii*.

Figure 30. Mangrove aerial roots with turfing algae, fallen timber and grazing snails.

Figure 31. Fallen timber and large mangrove trunks and limbs are to be left in place and protected from damage during construction.

Figure 32. Location of platform on upstream side of boardwalk.

Figure 33. Location of platform on downstream side of boardwalk.

Figure 34. Location of terminal platform, downstream part.

Figure 35. Location of terminal platform, upstream part.

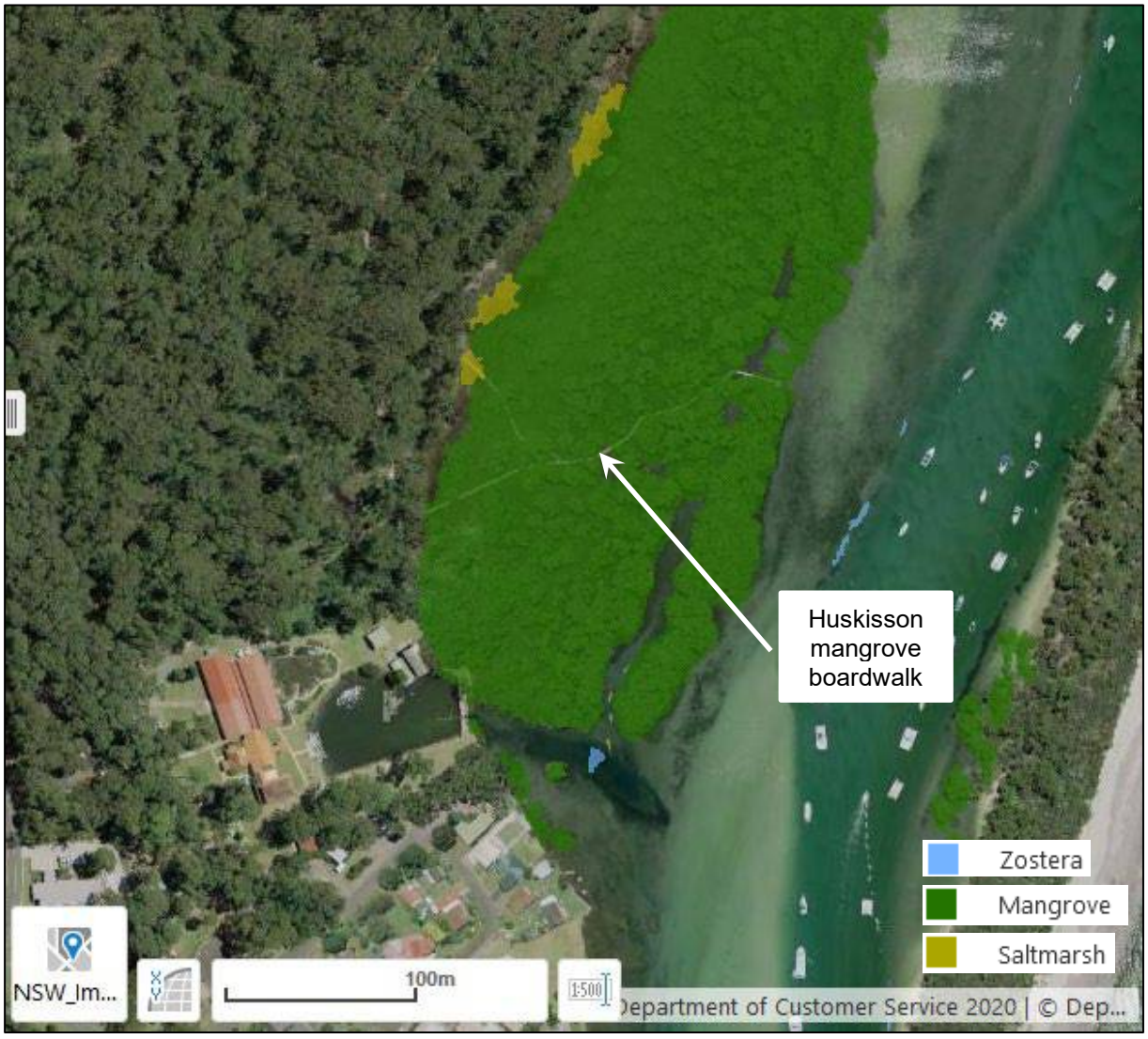


Figure 36. Marine vegetation mapping based on Aug 2019 air photo and May 2020 field survey.
source: NSW Department of Primary Industries - Fisheries NSW Spatial Data Portal
https://webmap.industry.nsw.gov.au/Html5Viewer/index.html?viewer=Fisheries_Data_Portal

6 POTENTIAL ENVIRONMENTAL IMPACTS

6.1 Types of Impacts

There are a number of potential permanent or ongoing impacts as well as temporary or construction impacts from the proposal that could affect the human environment or the aquatic or terrestrial plants or animals or their habitats.

Permanent and ongoing impacts are those that result in long term changes to the environment and could include removal or modification of habitat such as clearing of vegetation, changes to substrate composition and orientation, changes to flow regimes or barriers to fish passage.

Temporary or construction activities have the potential to cause shorter term impacts on the environment than those potential permanent or ongoing impacts described above. These could involve direct or indirect impacts on people, plants or animals, or effects on their habitats, for example from noise or impacts on water quality, and consequent impacts on ecology.

The potential impacts are considered in more detail by applying statutory assessment criteria in Section 7 of this review of environmental factors. However, impacts on mangroves, saltmarsh and other native vegetation are a critical matter for consideration by the determining authority so detailed assessments of these are included in Section 6.2 below.

6.2 Impacts on Mangroves, Saltmarsh and other Native Vegetation

Replacement of the southern part of the concrete path (approximately two thirds of path total length) would not require removal of native vegetation as it can be widened into already cleared areas. However, the northern part (approximately 50m in length) passes through coastal sand forest and to allow for construction of the widened path (from 1200 to 1800mm) some clearing of native vegetation and trimming of overhead branches would be required. Allowing for a 1000mm disturbed area on each side of the existing path, it is estimated that up to 100 square metres of vegetation would be affected, some of which would recover from damage. An additional area of approximately 100 square metres would be affected by construction of the small compound for assembly of the new boardwalk components at the head of the main boardwalk. Part of this would be on the existing path so the area of vegetation affected would be slightly less than the total footprint. As can be seen in Figures 12, 13, 16 and 17, the vegetation to be cleared would mostly be groundcover plants, small shrubs and small trees. No large tree limbs and no limbs or trunks with hollows would need to be removed. It is considered the affected areas form a very small proportion of the amount of unaffected vegetation in the local stand. Any pruning of vegetation shall be carried out in accordance with AS4373-2007 Australian Standard for the Pruning of Amenity Trees. Overall, the impacts on terrestrial native vegetation are not considered significant.

Some parts of the concrete path are inside the structural root zone of several large trees. Construction in this zone could lead to root damage that would impact on the health and stability of the trees leading to future issues with falling trees or branches. The trees shall be protected in accordance with AS-4970-2009 Australian Standard for Protection of Trees on Development Sites. If possible the path should be widened on the side away from the tree. If encroachment into the Tree Protection Zone cannot be avoided, root mapping and avoidance or protection of structural roots may be required.

At the nearshore end of the northern spur the boardwalk passes through saltmarsh. There would likely be minor damage to some saltmarsh plants from the legs of the temporary work platforms during construction but it is expected that the plants would recover within a few months. As can be seen in Figure 19, at the time of this assessment some damage to saltmarsh was occurring from foot traffic in this location and the proposed new section of boardwalk would protect the saltmarsh from this damage in future. However, the proposed new section of boardwalk would occupy a plan area of approximately 40 square metres and consequently there would be some shading effects on saltmarsh plants. This impact would be mitigated by use of mesh decking on the boardwalk. Overall, the impacts on saltmarsh are not considered significant.

Most of the length of the boardwalk passes through a mature mangrove forest. Demolition and replacement of the boardwalk has the potential to damage plants that are close to the footprint of the structure. Small or large mangrove plants should only be cut off if they would interfere with the boardwalk installation process or with the ongoing structural integrity or use of the new boardwalk. Fallen timber and large mangrove trunks, limbs and roots are to be left in place and protected from damage during construction. Some mangroves and algae are likely to have been affected by reduced photosynthesis resulting from light limitation when shaded by the boardwalk. An increase in the width of the boardwalk (by 600mm) has potential to increase the area of plants and substrate affected by shading but shading impacts would be reduced by using a mesh deck on the new boardwalk to allow for improved light penetration to the bed of the waterway.

A detailed assessment of mangrove plants that may need to be removed, trimmed or otherwise damaged was undertaken and the results are described in Table 3. Other damage to mangrove seedlings or roots may occur if workers were to walk or stand in mud beside the boardwalk. This would also likely lead to soil “pugging” and potentially to increased turbidity of estuarine waters or disturbance of acid sulfate soils. The use of temporary work platforms will minimise such damage. Any pruning mangroves shall be carried out in accordance with AS4373-2007 Australian Standard for the Pruning of Amenity Trees. Where temporary work platforms are to be placed over small mangrove plants care should be taken so that the plants are not damaged. Any limbs that are broken during the installation process should be trimmed back to a clean cut in accordance with AS4373-2007. It is considered the affected areas form a very small proportion of the amount of unaffected mangroves in the local stand. Overall, the impacts on mangroves are not considered significant.

Table 3. Mangrove plants within 1m of boardwalk that may need to be trimmed or removed (not including single-stemmed seedlings lower in height than boardwalk, other than at platforms where seedlings were counted).

Location - refer Fig. 37	Upstream	Downstream	Photo
1	1 river mangrove 2 grey mangrove to 2m tall	1 river mangrove 5 grey mangrove to 5m tall	Figure 20, 21
2	6 grey mangrove	6 grey mangrove	
3	1 river mangrove 10 grey mangrove	3 river mangrove 10 grey mangrove	
4	1river mangrove 5 grey		Figure 22, 26
5	5 grey small		
6	12 grey to 4m tall but small diameter trunks		
7		platform - 6 grey mangrove 1m or more in height 6 grey mangrove seedlings	Figure 33
8		1 medium sized grey mangrove approx. 8m tall dbh 15 cm some bark damage	Figure 24
9	4 grey mangrove approx. 1m tall small diameter trunks	1 grey mangrove several metres tall	
10	2 grey mangrove		
11		removal of grey mangrove limb over boardwalk if clearance required	Figure 23
12	trim back grey mangrove branch		
13	trim back grey mangrove branch		Figure 27
14		trim back grey mangrove branches	Figure 27
15	terminal platform upstream - trim back grey mangrove branches		Figure 35
16		terminal platform downstream - trim back grey mangrove branches	Figure 34
17	platform - 15 grey mangrove 0.5 – 1.5m or more in height, 20 grey mangrove seedlings		Figure 32
18	25 grey mangrove 1 – 5m tall	25 grey mangrove 1 – 6m tall	Figure 18

Figure 37. Locations described in Table 3, where mangrove plants within 1m of boardwalk may need to be trimmed or removed.
Air Photo Source: © Nearmap

7 STATUTORY ASSESSMENTS OF ENVIRONMENTAL IMPACTS

7.1 NSW Marine Estate Management Act 2014 and Regulations

7.1.a Matters for Consideration

Section 55(3)(a) of the Act requires that a determining authority (not being a Minister) must not carry out, or grant approval to carry out, an activity (within the meaning of Part 5 of the Environmental Planning and Assessment Act 1979) unless the determining authority has taken into consideration:

(i) if there are management rules for the marine park or aquatic reserve, the purposes of the zone within which the area concerned is situated as specified in those management rules

Comment: refer to assessment criterion (d) below

(ii) the permissible uses of the area concerned under the regulations or the management rules

Comment: refer to assessment criterion (d) below

(iii) if a management plan for the marine park or aquatic reserve has been made, the objectives of the marine park or aquatic reserve

Comment: No management plan has been prepared for the Jervis Bay Marine Park.

(iv) any relevant marine park or aquatic reserve notifications

Comment: No additional marine park notifications are known to be relevant to the proposal.

7.1.b Assessment Criteria

Section 9 of the Marine Estate Management Regulation 2017 sets out the following assessment criteria that must be considered in deciding whether or not to give consent to the carrying out of any activity in a marine park or an aquatic reserve.

(a) the objects of the Act (as specified in section 3 of the Act),

Section 3 sets out the following objects of the Act:

(a) to provide for the management of the marine estate of New South Wales consistent with the principles of ecologically sustainable development in a manner that -

(i) promotes a biologically diverse, healthy and productive marine estate

Comment: The proposed activity is consistent with promotion of the above values of the marine estate.

(ii) facilitates –

- economic opportunities for the people of New South Wales, including opportunities for regional communities

Comment: Replacement of the boardwalk would facilitate economic opportunities for several contractors, most of whom are regionally based.

- the cultural, social and recreational use of the marine estate

Comment: The proposed boardwalk would facilitate cultural, social and recreational uses of the marine estate.

- the maintenance of ecosystem integrity

Comment: Replacement of boardwalk has been designed to protect the ecosystem at the site. Ongoing use of the boardwalk would assist in maintaining ecosystem integrity.

- the use of the marine estate for scientific research and education,

Comment: The boardwalk is to be used for formal education (school groups) and informal education (educational signage provides opportunities for learning to all visitors to the boardwalk). The proposed boardwalk would not hinder scientific research.

(b) to promote the co-ordination of the exercise, by public authorities, of functions in relation to the marine estate

Comment: The proposed activity is consistent with exercise of functions in relation to the marine estate.

(c) to provide for the declaration and management of a comprehensive system of marine parks and aquatic reserves

Comment: The proposed activity would not affect declaration and management of a comprehensive system of marine parks.

(b) the purposes of marine parks and aquatic reserves (as specified in sections 22 and 33 of the Act respectively),

Section 22 of the Act sets out the following purposes of marine parks:

(1) The primary purpose of a marine park is to conserve the biological diversity, and maintain ecosystem integrity and ecosystem function, of bioregions in the marine estate

Comment: The proposed activity would not significantly affect the biological diversity, ecosystem integrity and ecosystem function of the Jervis Bay marine Park.

(2) The secondary purposes of a marine park are, where consistent with the primary purpose -

(a) to provide for the management and use of resources in the marine park in a manner that is consistent with the principles of ecologically sustainable development

Comment: The proposed activity is consistent with ecologically sustainable development. Replacement of boardwalk has been designed to protect the ecosystem at the site and provide opportunities for future generations. Ongoing use of the boardwalk would assist in maintaining ecosystem integrity.

(b) to enable the marine park to be used for scientific research and education

Comment: The proposed boardwalk provides for educational activities and would not hinder scientific research.

(c) to provide opportunities for public appreciation and enjoyment of the marine park

Comment: The proposed boardwalk provides an excellent opportunity for public appreciation and enjoyment of part of the marine park.

(d) to support Aboriginal cultural uses of the marine park
Comment: The proposed activity is consistent with Aboriginal cultural uses of the marine park.

(c) the objects of the zone in which the activity is proposed to be carried out,

The boardwalk is located in the Currambene Creek Mudflats Sanctuary Zone of the Jervis Bay Marine Park (Figure 5). Section 1.7 of the Marine Estate Management (Management Rules) Regulation 1999 sets out the following objectives of the sanctuary zone:

(a) to provide the highest level of protection for biological diversity, habitat, ecological processes, natural features and cultural features (both Aboriginal and non-Aboriginal) in the zone, and
Comment: The design and methodology for the proposed activity has been prepared to protect the values and features of the zone.

(b) where consistent with paragraph (a), to provide opportunities for the following activities in the zone—

(i) recreational, educational and other activities that do not involve harming any animal or plant or causing any damage to or interference with natural or cultural features or any habitat,
Comment: The proposed boardwalk provides for recreational and educational activities

(ii) scientific research.
Comment: The proposed boardwalk would not hinder scientific research.

(d) the activities that are permissible in the zone in which the activity is proposed to be carried out (as specified in the relevant management rules),

Section 1.11 of the Marine Estate Management (Management Rules) Regulation 1999 sets out the following relevant management rules in the sanctuary zone:
(1) A person must not, while in the sanctuary zone of a marine park -
(a) harm, or attempt to harm, any animal, or
(b) harm, or attempt to harm, any plant, or
(c) damage, take or interfere with, or attempt to damage, take or interfere with, any part of the habitat (including soil, sand, shells or other material occurring naturally within the zone), or
(d) clean any fish or fishing gear,
except with the consent of the relevant Ministers.
(2) Consent is only to be given under subclause (1) for research, environmental protection, public health, traditional use or public safety purposes.
Comment: The proposed activity is for public safety as the existing boardwalk present a number hazards to users. The proposal has been designed to ensure environmental protection.

(e) any operational plan for the marine park adopted by the Marine Parks Authority pursuant to section 25 (4) of the Marine Parks Act 1997 (before its repeal) that continues to have effect because of clause 5 of Schedule 2 to the Marine Estate Management Act 2014,

Comment: The Operational Plan for Jervis Bay Marine Park (Marine Parks Authority, 2003) continues to have effect. The proposed activity is consistent management actions in the operational plan in relation to management for conservation of biodiversity and maintenance of ecological processes, management for ecologically sustainable use, management for indigenous culture, management for non-indigenous heritage values, development within and adjacent to Marine Park boundaries, community education and permit systems.

(f) any management plan for the marine park or aquatic reserve,

Comment: No management plan has been prepared for the Jervis Bay Marine Park.

(g) any threatened species or other protected flora or fauna under the Fisheries Management Act 1994, the National Parks and Wildlife Act 1974 or the Threatened Species Conservation Act 1995 that may be affected by the proposed activity,

Comment: No threatened or protected fish would be affected by the proposal (see Attachment 4). Up to 40 square metres of threatened and protected saltmarsh plants would be affected by the installation of a new section of boardwalk at the northern end of the northern spur.

(h) the form of transport to be used to gain access to the zone in, on or from which the activity is proposed to be carried out, having regard to the adequacy of facilities for parking, mooring and landing vehicles, vessels and aircraft, and for loading and unloading them

Comment: A light impact tracked machine and small service vehicles would be used to remove demolition waste and deliver construction components between the landward end of the main boardwalk and the Jervis Bay Maritime Museum car park. Trollies would be used to progressively transport demolition waste and construction components along the boardwalk. As construction proceeds the machinery would operate from each newly built boardwalk section. No machinery would make contact with the bed of the marine park. No vessels or aircraft would be used.

(i) the type of equipment to be used in connection with the proposed activity

Comment: Four aluminium working platforms (6m long x 0.6m wide) would be placed along both sides (two each side) of the boardwalk installation area. These will have 500mm long ground spikes fabricated to the bottom of the platforms which will allow them to be installed with clearance above the fragile mangrove, roots, seedlings and shoots. This will prevent disturbance to the soil profile (“pugging”) and damage to mangrove roots caused by foot traffic during the demolition of the existing boardwalk and the installation of the replacement boardwalk. A light gauged; floating silt curtain will be installed around each work section after the working platforms have been installed. This will encompass the set of piles and decking section which is being constructed and the set of piles and existing boardwalk which is to be demolished. This will manage any minor sediment or soil disturbance created and will capture both demolition and

construction debris. The debris will be removed as soon as possible or as the tide permits.

A screw pile installation jig will be installed and will require the installation of 4 x 900mm long positioning and securing stakes. A 3.8T Excavator with a hydraulic drive motor will pick up the screw piles and locate them to their installation position. The installation of the screw piles will be monitored for plumb and alignment quality assurance and will be driven to achieve 6kN. This information will be recorded in a pile log and provided to the certifying engineers. The post and headstock connections will be fully assembled on land and brought to site via a transport trolley and installed with the 3.8T excavator. The posts will be installed over the 600mm long screw pile stubs and pushed into the soil profile to ensure no pile steel is in the tidal exposure zone. The posts will be drilled onsite and 2 x 16mm SS bolts will be installed through both members of each pile. There will be temporary longitudinal bracing installed at every fourth boardwalk section to ensure the boardwalk is adequately supported during construction.

(j) the arrangements that have been made for the prevention, mitigation and making good of any damage to the marine park or aquatic reserve arising from the proposed activity

Comment: Measures for the prevention, mitigation and making good of any damage to the marine park are specified in Section 8 of this review of environmental factors.

(k) such other requirements as the relevant Ministers consider appropriate to the proposed activity

Comment: No other requirements have been specified.

7.2 Biodiversity Conservation Act 2016

Under the NSW Biodiversity Conservation Act 2016, the impacts of clearing of native vegetation and the loss of habitat on biodiversity values are subject to assessment and offset under the biodiversity offsets scheme. If a proposed activity that is being assessed under Part 5 of the EP&A Act is likely to significantly affect threatened species based on any of the criteria below, the proponent must either apply the Biodiversity Offsets Scheme (BOS) or prepare a species impact statement (SIS). Section 7.2 of the Biodiversity Conservation Act states that development is likely to significantly affect threatened species if:

(a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3

It is concluded in the assessment in Attachment 4 to this review of environmental factors that the proposed activity is not likely to significantly affect threatened species or ecological communities, or their habitats.

(b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values

This subsection of the Act does not apply to development that is an activity subject to environmental impact assessment under Part 5 of the Environmental Planning and Assessment Act 1979 so entry to the biodiversity offsets scheme is not triggered even

though the subject site is included on the Biodiversity Values Map (Figure 38) with the reason for inclusion being "Coastal Management Act – Wetlands." An assessment on the impacts on wetlands is included elsewhere in this review of environmental factors.

(c) it is carried out in a declared area of outstanding biodiversity value

The subject site is not in a declared area of outstanding biodiversity value listed in the Register of Declared Areas of Outstanding Biodiversity Value.
(http://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/about-threatened-species/critical-habitats).

Based on the above criteria, the biodiversity offsets scheme does not apply and the determining authority does not need to consider obtaining a biodiversity development assessment report or to retire biodiversity credits to offset the residual impact on biodiversity values.

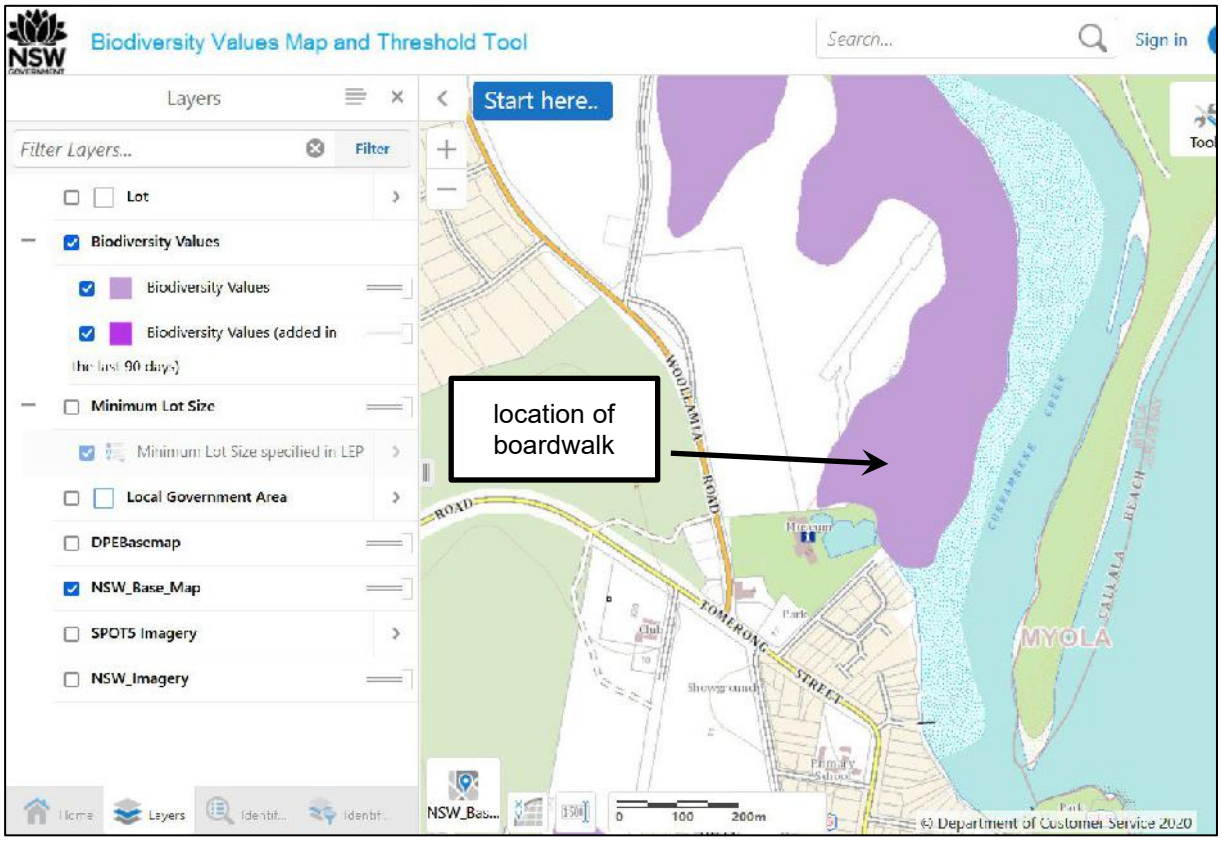


Figure 38. Biodiversity Values Map, generated 23 March 2023.
Source: Biodiversity Values Map and Threshold Tool

7.3 NSW Environmental Planning and Assessment Act 1979

Subsection 5.5(1) of the Environmental Planning and Assessment Act requires that a determining authority in its consideration of an activity shall examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

Subsection 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 the Act. The following subsections of

this review of environmental factors deal with each of the listed factors in relation to the proposed activity.

Subsection 5.5(3) of the Environmental Planning and Assessment Act requires that determining authorities consider the effect of an activity on any wilderness area (within the meaning of the Wilderness Act 1987) in the locality in which the activity is intended to be carried on. The site is not in or near a wilderness area and would not affect a wilderness area.

7.3.a The environmental impact on the community

The proposal would ultimately lead to beneficial impacts for users of the boardwalk. Negative impacts include short term traffic and pedestrian control, access restrictions and noise for the duration of the works.

Advance notification of the hours and days when access to the location would be closed and open shall be provided to community consultative bodies, the Jervis Bay Maritime Museum and to local schools that may use the facility from time to time.

Notification of works and timeframe shall be given to the general public via local media release and signage prior to works commencing.

The existing dirt road access link from the museum car park to the work site will be a shared accessway with Museum users and contractor vehicles, therefore the road must remain in a suitable condition for standard vehicular use, particularly on weekends when weddings and events are held on the Museum lawns. Upon completion of the project and disestablishment the dirt road must be left in an even, compacted drivable condition.

With regard to effects on public navigation past the boardwalk, there would not be any changes to the current conditions and no temporary signs or navigation aids are proposed.

It is concluded that negative impacts on the community would not be significant.

7.3.b The transformation of the locality

The general form of the locality would remain as a boardwalk through a mangrove forest with a concrete path leading to it. It is considered that any minor transformation of the locality would not be a significant impact the environment.

7.3.c The environmental impact on the ecosystems of the locality

Impacts on aquatic and terrestrial ecosystems could result from:

- direct loss of habitat and organisms
- changes to substrate composition and orientation
- shading.

Descriptions of potential loss or damage of mangroves, saltmarsh and other native vegetation are in Section 6.2 above.

The proposed activity would result in a decrease in the number of piles at the site and increase the spacing of piles, allowing for relatively free movement of tidal waters. The existing piles have been colonised by a range of algae, sessile invertebrates and small

fish and to retain these components of the aquatic ecosystem the lower parts of the piles would be left in place by cutting off existing piles above the marine growth. The new piles would soon also be colonised by aquatic plants and animals. Some benthic infauna may be killed during screwing of the new piles but areas of the estuary bed affected would be relatively small compared to the amount of surrounding habitat.

Mobile animals (including invertebrates, fish and birds) may be disturbed from their normal activities during construction or use of the facility. Some would flee and some would be attracted as food organisms are disturbed. The effects would be localised to within a few tens of metres of the work site and would be intermittent and short term as the work or use is carried out. Those organisms that flee or seek shelter may return to the area when construction or other human activity is not occurring. Any ongoing disturbance of fauna would be low key and similar to existing. The number of organisms potentially affected by the above impacts would not be large.

The vegetation that would be removed may provide fauna habitat resources such as shelter, food and/or nest sites for birds, arboreal and ground-dwelling mammals, reptiles and amphibians. No large trees, large tree limbs and no limbs or trunks with hollows would need to be removed. The habitat resources that could be affected are limited in extent and there are extensive amounts in surrounding areas that would not be affected. They are not likely to form a significant component of the requirements of any threatened animal species. The proposal is not likely to increase habitat fragmentation or isolation, nor impact on dispersal/migration routes.

In terms of direct impacts during removal of terrestrial vegetation, mobile animals are generally not likely to be directly harmed by proposed works. However, during disturbance of small areas of vegetation there is some potential that small birds, amphibians, reptiles or mammals that shelter in thickets of vegetation could be injured or killed. Prior to clearing, areas of dense vegetation should be thoroughly searched for nests or sheltering animals.

There is potential for contractors to inadvertently transport weeds to the area. Contractors should ensure that plant and equipment do not contain weeds or parts of weeds before entering the area. Any imported material must be weed free.

Regeneration of disturbed areas also has potential to introduce weeds. No exotic grass seed or turf shall be used adjacent to bushland areas. Excavated topsoil from disturbed areas either side of the path and assembly compound is likely to contain a local seed bank and it should be used in regeneration of these areas. To stabilise the soil a temporary cover can be established using sterile annual grass species, especially selections of forage sorghums, or species that will not survive or reproduce in the long term (eg. sterile annual ryegrass). These can be used for initial erosion control to act as a nurse or cover crop for the slower growing native plants.

Overall, the ecosystem impacts of the proposed works would be relatively small and localised. Provided the environmental safeguards set out in Section 8 below are followed the impacts on the ecosystems of the locality are not likely to be significant.

7.3.d Reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality

The subject site is not mapped as a scenic protection area the Shoalhaven Local Environmental Plan 2014. The presence of the machinery at the work site would

impact on the visual qualities of the site for a short period. The colours of new materials have selected to blend with the surrounding environment. In the long term, the replaced boardwalk would only be visible from close proximity and would not look very different to the existing. The current aesthetic quality of the area would generally be retained - that of a boardwalk through a mangrove forest with a concrete path leading to it. The recreational value of the waterway for navigation would not be affected and would continue unaffected including during construction. Recreational, scientific and educational uses of the boardwalk itself would be inhibited during construction but would be improved in the longer term. The aesthetic, recreational, scientific or other environmental quality or value would not be altered to any significant extent by the proposed works.

7.3.e The effects on any locality, place or building that has (i) aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance, or (ii) other special value for present or future generations

Based on the assessments in the following subsections, it is considered that there would not be any significant 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.

7.3.e.1 *Items of Environmental Heritage*

A search of the State Heritage Inventory database of heritage items in New South Wales showed the following items near the boardwalk:

No heritage conservation areas are present at or near the subject site.

Lady Denman (M.V.) is listed on the State Heritage Register under the NSW Heritage Act. An extract from the State Heritage Inventory is in Attachment 5. The record indicates that the curtilage boundary is limited to the item itself and does not include the land it is located on or the structure it is housed within. The ferry is inside the Jervis Bay Maritime Museum building and would not be affected by the proposed replacement of the boardwalk or path.

Lady Denman ferry is listed and mapped in Part 1 Schedule 5 of the Shoalhaven Local Environmental Plan 2014 as an item of environmental heritage with state significance (item 203). An extract from the State Heritage Inventory is in Attachment 5. The ferry is inside the Jervis Bay Maritime Museum building and would not be affected by the proposed replacement of the boardwalk or path.

Lady Denman heritage complex including relocated former St Georges Basin school buildings and relocated former Woollamia Union Church is listed and mapped in Part 1 Schedule 5 of the Shoalhaven Local Environmental Plan 2014 as an item of environmental heritage with state significance (item 202). Figure 39 shows the mapped area for the heritage item and an extract from the State Heritage Inventory is in Attachment 5. Council has advised for other recent projects that the area of the listing is the area mapped only. Part of the concrete path is within the mapped area. The item was heritage listed in 2007 and maintenance has been ongoing on this infrastructure. The replacement of the existing concrete path would replace some existing infrastructure in the same location. The path would continue to operate at the same location and in the same manner. It is considered unlikely that there would be any significant effect on the heritage value of the item which would not be affected in a way that is more than minor or inconsequential.

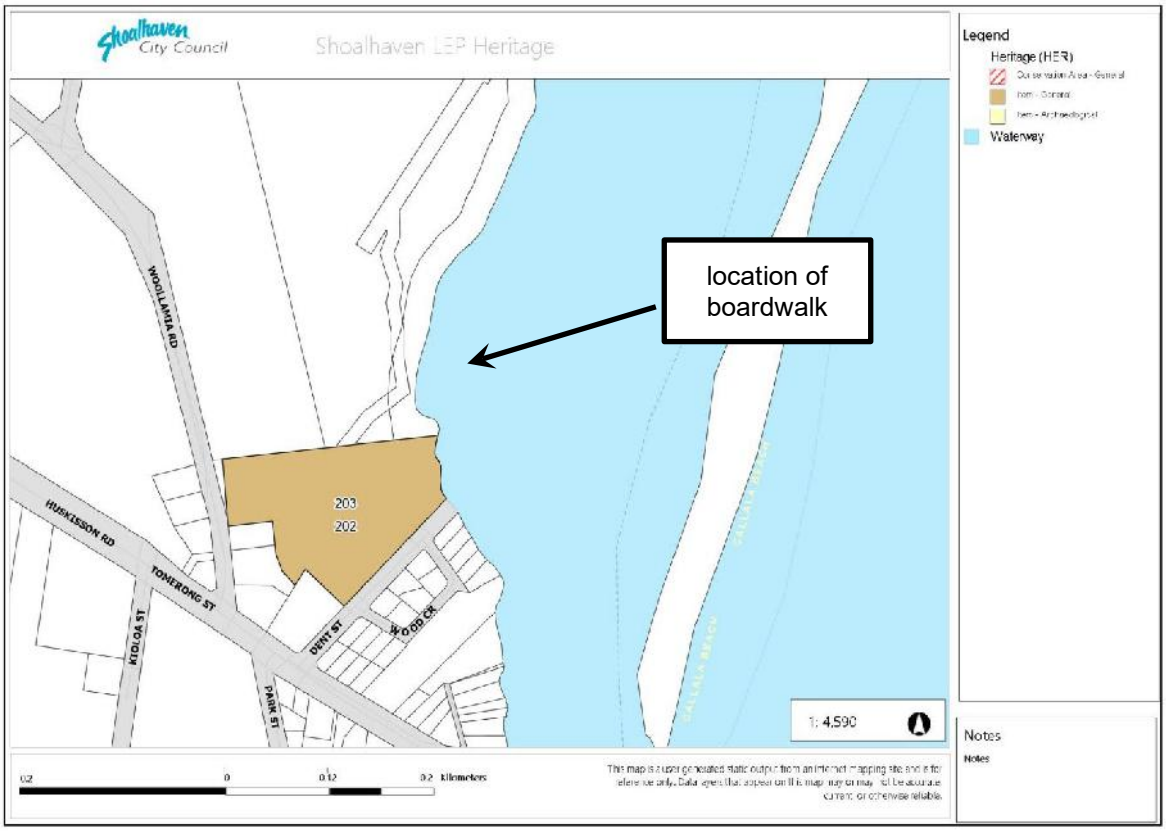


Figure 39. Heritage map from Shoalhaven LEP 2014.
Source: Shoalhaven City Council Maps Online

7.3.e.2 *Native Title*

The National Native Title Register (NNTR) is a register established under s. 192 of the Native Title Act 1993 (Cth). A search of the National Native Title Register on 21 March 2023 indicated that there have been no determinations that native title exists at the site.

The Register of Native Title Claims (RNTC) contains information about all claimant applications that have been registered. A search of the Register of Native Title Claims on 21 March 2023 indicated one application (Attachment 6) that is relevant to the site:
NC2017/003 - South Coast People
Tribunal file no. NC2017/003
Federal Court file no. NSD1331/2017
Application name South Coast People
http://www.nntt.gov.au/searchRegApps/NativeTitleRegisters/Pages/RNTC_details.aspx?NNTT_Fileno=NC2017/003

Shoalhaven City Council considered that the proposed activity can be authorised as a future act triggering procedural right of comment from claimants. A referral notice (Attachment 3) inviting comment was sent to NTSCorp on 03/12/2020. No response was received.

7.3.e.3 *Aboriginal Land Rights*

The entire Lady Denman Reserve is subject to aboriginal land claims lodged under the NSW Aboriginal Land Rights Act. Nothing in the Act prohibits the replacement of the boardwalk.

7.3.e.4 *Aboriginal Objects*

The National Parks and Wildlife Act protects all Aboriginal objects and Aboriginal places in NSW. It is an offence to harm or desecrate an Aboriginal object or Aboriginal place without the permission of the NPWS. A preliminary assessment of potential impacts on Aboriginal objects under the NSW Government's Due Diligence Code of Practice (NSW Department of Environment, Climate Change and Water, 2010) is set out below.

Preliminary Assessment under Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales

Step 1. Will the activity disturb the ground surface?
Yes.

Step 2a. Search the AHIMS database and use any other sources of information of which you are already aware
The results of an extensive search of the AHIMS database are attached to this report (Attachment 6). No Aboriginal places have been declared on or within 200 metres of the site. A number of Aboriginal sites (shell middens) have been recorded on the Lady Denman site but they are remote from the boardwalk and path.

Step 2b. Activities in areas where landscape features indicate the presence of Aboriginal objects
Even if an AHIMS search indicates no *known* Aboriginal objects at a site, it is necessary to consider whether Aboriginal objects are *likely* to be in the area having regard to landscape features. Aboriginal objects are often associated with particular landscape features as a result of Aboriginal people's use of those features in their everyday lives and for traditional cultural activities. Examples of such landscape features are rock shelters, sand dunes, waterways, waterholes and wetlands. The code indicates that the following generic list of landscape features should be considered:

Landscape Feature	Assessment for Boardwalk
1. within 200m of waters	the site is within 200m of Currambene Creek
2. located within a sand dune system	the site is not located within a sand dune system
3. located on a ridge top, ridge line or headland	the site is not located on a ridge top, ridge line or headland
4. located within 200m below or above a cliff face	the site is not located within 200m below or above a cliff face
5. within 20m of or in a cave, rock shelter, or a cave mouth	no caves or rock shelters were observed within 20 metres of the site

The code provides that if the proposal is on such landscape *and is not on disturbed land*, then the assessment must continue to step 3. Disturbed land or land already disturbed by previous activity is defined in the code 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 proposed works are generally within the alignment of the existing boardwalk and therefore is on land that has been subject to previous construction works. It is considered to be disturbed land.

Aboriginal Heritage Due Diligence Conclusion
Progression to step 3 is not considered warranted given that:

1. known Aboriginal objects are not within the site
2. the proposal is on disturbed land.

Nevertheless, workers involved in site works should be informed of the possible presence of Aboriginal objects at the site. If shell middens, stone artifacts, bone or any other significant item is identified, the work is to cease, the area be barricaded off and sign posted to ensure no further damage is incurred. The SCC project manager will be notified so the appropriate steps can be undertaken and an incident report will be generated. This information will be available in the construction environmental management plan and will form part of the site-specific induction.

7.3.f The impact on the habitat of protected animals, within the meaning of the Biodiversity Conservation Act 2016

With limited exceptions, all native mammals, birds, reptiles and amphibians in the subject area are protected under the Biodiversity Conservation Act. Most of the directly affected area provides marginal, artificial habitat for protected animals that is subject to regular disturbance by the boardwalk users. Foraging shorebirds are the most likely protected animals to utilise the site. The area of habitat affected by the proposed activity would be relatively small compared to the total amount of habitat in the vicinity of the proposal. Following completion of the works the habitat would be very similar to existing. It is concluded that the potential impacts would not be significant.

7.3.g The endangering of a species of animal, plant or other form of life, whether living on land, in water or in the air

Section 221ZV of the NSW Fisheries Management Act 1994 sets out the matters that are to be taken into account for the purposes of determining whether a proposed activity is likely to significantly affect threatened fish species, populations or ecological communities, or their habitats. Section 7.3 of the NSW Biodiversity Conservation Act 2016 sets out the test for determining whether a proposed activity is likely to significantly affect listed threatened species or ecological communities, or their habitats. The Australian Environment Protection and Biodiversity Conservation Act 1999 sets out the tests for determining whether a proposed action is likely to significantly affect nationally listed species or ecological communities. Assessments under the above provisions are included in Attachment 4. Provided the proposed environmental safeguards are employed, it is concluded that there is not likely to be a significant effect on aquatic or terrestrial threatened species, populations or ecological communities, or their habitats from the proposed activity.

7.3.h Long-term effects on the environment

Construction impacts would be short term and temporary. The replaced boardwalk and path would have an expected life of 30 to 40 years and could be removed and the area rehabilitated if that was considered necessary in the future. There would be no significant long term effects on the environment.

7.3.i Degradation of the quality of the environment

The replaced structures would not affect the 'natural' quality of the environment in the area to any great extent. The current overall quality of the site would be retained - that of a boardwalk through a mangrove forest with a concrete path leading to it. There would be no significant degradation of the quality of the environment.

7.3.j Risk to the safety of the environment

In the long term, there would be improved safety due to the replacement and widening of the failing boardwalk and path. The frp mesh decking would be suitable and comfortable for bare feet and not slippery when wet. The replacement boardwalk would have kerbs on both sides and safety would be improved by an increased length of handrail to one side.

During construction, there is a danger that people could be injured by working machinery or that they could drown if they fall into the waterway. All workers would be inducted in occupational health and safety requirements for the work site and traffic control. Access to the work site would be restricted.

With regard to effects on safety of public navigation past the boardwalk, there would not be any changes to the current conditions and no temporary signs or navigation aids are proposed. Current vessel speed restrictions and navigation aids are considered adequate.

There would be no significant increase in the risk to the safety of the environment.

7.3.k Reduction in the range of beneficial uses of the environment

Beneficial uses of the environment such as supply of water and food, availability of flowering plants for honey production, absorption and storage of carbon dioxide and production of oxygen would not be greatly affected. There are no priority oyster aquaculture areas in the near vicinity of the proposed activity. The proposed activity is not considered likely to have a significant impact on water quality and, consequently, on the health of seafood caught or produced in Currambene Creek or Jervis Bay. The environment would remain accessible for recreational and educational use in the long term. There would be no significant reduction in the range of beneficial uses of the environment.

7.3.l Pollution of the environment

Pollution of the human environment in the forms of noise, vibration, dust and diesel fumes may be experienced for several weeks while construction equipment operates to carry out the works. The boardwalk is located in a sparsely populated area and is approximately 200m from the nearest residences in Dent Street. However, a small number of these residences are less than 50m from the southern end of the concrete path so could be affected by noise for a short period during construction. These construction impacts are unlikely to be significant.

The plastic and stainless steel materials to be used are relatively inert and resistant to particles delaminating and entering into the marine environment. To reduce potential for pollution of the environment, materials have been selected so that above waterline parts do not require additional painted finish.

There is potential for indirect pollution effects on the natural environment during construction from uncontained debris, turbidity, fuel and oil. There could be pollution of the waterway by sediment, waste, packaging or other material falling, washing or blowing in from disturbed areas, stockpiles or site compounds. During demolition and construction, appropriate measures will need to be put in place to catch debris and prevent it from entering the waterway. Waste material should be contained within the construction site or site compound during the activity and then be reused or removed to an authorised waste disposal facility. No material should be placed in any location or in any manner that would allow it to escape from the site. Precautions will be in place in case there is a flood during demolition and construction.

Most cutting and drilling of materials would be done on land at the assembly compound where a layer of geofabric will be installed to capture all FRP debris which is generated. A floating silt curtain will be installed around each work section after the working platforms have been installed. This will encompass the set of piles and decking section which is being constructed and the set of piles and existing boardwalk which is to be demolished. This will manage any minor sediment or soil disturbance created and will capture both demolition and construction debris. The debris shall be removed as soon as possible or as the tide permits.

Erosion and sediment controls would be installed and maintained in accordance with an erosion and sediment control plan and the 'Blue Book' (Landcom 2004) to prevent the entry of sediment into the waterway. Prior to demolition or construction commencement, a silt curtain would be installed around work areas. Disturbed ground surfaces would be stabilised as soon as possible using appropriate methods as specified in the erosion and sediment control plan. Erosion and sediment controls would 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.

Fuel or oil from leaking machinery or during refuelling or maintenance could pollute the waterway. To avoid pollution from machinery, refuelling should generally be done off site, however if refuelling on site is required, due care should be taken to avoid spilling fuel and a tray should be used to catch any accidentally spilt fuel. A spill kit shall be kept on site for the duration of construction.

To prevent contaminated material being placed on the site, if any fill material is imported for the works it would need to be either 'virgin excavated natural material' or comply with a relevant Resource Recovery Order and Exemption. Otherwise, an environment protection licence or specific exemption would be required under the Protection of the Environment Operations Act.

The site is mapped as Class 2 for acid sulfate soil (Figure 40), which indicates potential to pollute waterways with acidic runoff and toxic metals, is known to occur at the site. The investigation of the geotechnical conditions and acid sulfate soils by Terra Insight (2022) has identified that acid sulphate soils are present at this site. Terra Insight (2022) prepared an Acid Sulfate Soil Management Plan which should be reviewed by the contractor to ensure it is appropriate given the construction methodology will limit

the amount of disturbed material by utilising helical screw piles for the boardwalk foundations. Additionally, installation of 4m x 0.6m aluminium working platforms placed to either side of the installation area will prevent disturbance to the soil profile (and damage to the mangrove roots) caused by foot traffic during the demolition of the existing boardwalk and the installation of the piles. This information will be available in the construction environmental management plan and will form part of the site-specific induction.

The environmental safeguards required for this proposal (listed in Section 8 of this review of environmental factors) include measures to protect the waterway and surrounding environment from pollution. The environmental safeguards include use of appropriate materials, managing machinery access and maintenance, waste management and erosion and sediment control. Overall, provided the environmental safeguards are complied with, the proposal would be unlikely to lead to significant pollution of the environment.

Figure 40. Acid sulfate soils map from Shoalhaven LEP 2014.
Source: Shoalhaven City Council Maps Online

7.3.m Environmental problems associated with the disposal of waste

Construction waste or packaging, if present, would be recycled or disposed of at an authorised waste disposal facility. The quantities are not expected to be large with less than 150 tonnes of timber and less than 100 tonnes of concrete to be removed, along with small amounts of plastic and steel offcuts. The proposal is unlikely to lead to significant problems associated with disposal of waste.

7.3.n Increased demands on natural or other resources that are, or are likely to become, in short supply

Some fuel would be used to run machinery and equipment and an amount of concrete, steel, plastics and other materials would be used but the amounts would be small and the proposal would not significantly increase demands on these resources such that they become in short supply.

7.3.o The cumulative environmental effect with other existing or likely future activities

Cumulative impacts relate to combined effects of different activities. No other major activities are known to be proposed for the area in the future. Future maintenance of the facilities would require some disturbance to surrounding vegetation. It is considered that the proposed activity would not lead to significant cumulative environmental effects.

7.3.p The impact on coastal processes and coastal hazards, including those under projected climate change conditions

Coastal hazards include beach erosion, shoreline recession, coastal lake or watercourse entrance instability, coastal inundation, coastal cliff or slope instability, tidal inundation, erosion and inundation of foreshores caused by tidal waters and the action of waves, including the interaction of those waters with catchment floodwaters. The site is not included on the Coastal Risk Planning map in the Shoalhaven Local Environmental Plan 2014. The entire site is subject to inundation during a 1% AEP flood event (Figure 41). The replacement boardwalk would be very similar to existing but with less piles and would not be expected to result in any increased impact on floodwater behaviour. Under the circumstances of rising sea level, the facility would maintain its function and achieve its intended design performance for a design life of 30 - 40 years. The proposed activity would not have any significant impact on coastal processes or coastal hazards.

Figure 41. Areas subject to flooding.
Source: Shoalhaven City Council Maps Online

7.3.q Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1

Relevant documents are:

- Shoalhaven 2040 Our Strategic Land-use Planning Statement (September 2020)
- Illawarra Shoalhaven Regional Plan 2041(May 2021)

The proposed activity is consistent with provisions of these documents relating to:

- protecting important environmental assets
- delivering infrastructure.

7.3.r Other relevant environmental factors

No other environmental factors are considered relevant.

8 ENVIRONMENTAL SAFEGUARDS

This review of environmental factors has been prepared based on information dated 2 May 2023 and on the work being carried out in accordance with the following environmental safeguards. The design and construction methodology has been devised to minimise environmental impacts. Any changes to design or methodology shall be referred to Shoalhaven City Council and the Department of Primary Industries and may require additional environmental assessment.

1. Section 171(4) of the Environmental Planning and Assessment Regulation 2021 requires that this review of environmental factors must be published on the determining authority's (Department of Primary Industries) website or the NSW planning portal.

2. Advance notification of the hours and days when access to the location would be closed and open shall be provided directly to community consultative bodies, to the Jervis Bay Maritime Museum and to local schools that may use the facility from time to time

3. Notification of works and timeframe shall be given to the general public via local media release and signage prior to works commencing.

4. Hours of work will be 0700 to 1800. Standard operating hours for the project would be Monday to Friday, with Saturday work conducted only if the program falls behind schedule due to rainfall closures or other unforeseen issues.

5. All workers shall be inducted in occupational health and safety requirements for the work site and traffic control. Access to the work site shall be restricted.

6. Prior to commencement of excavation or construction, boundaries of the development area shall be marked with temporary barrier fencing. Machinery shall only access the work site via clearly defined routes. The fencing shall be monitored daily by the site supervisor and immediately repaired or replaced if necessary and shall be removed when construction is completed.

7. When construction work is underway, the risks to members of the public shall be reduced by defining a no go area for public with hazard fencing and restricted area signs as appropriate. The safety fencing and signage shall be monitored daily by the contractor and immediately repaired or replaced if necessary and shall be removed when construction is completed.

8. As far as possible, machinery shall operate only within the footprint of the existing boardwalk and path. Work shall be carried out carefully so as not to damage trees in or beyond the development area. No machinery will enter the bed of the waterway including the intertidal area (mangroves, saltmarsh, mudflats).

9. The Contractor shall maintain the access road from the museum carpark past the museum in good trafficable conditions at all times. The road must remain in a suitable condition for standard vehicular use, particularly on weekends when weddings and events are held on the Museum lawns. Upon completion of the project and disestablishment the road must be left in an even, compacted drivable condition.

10. Workers involved in site works shall be informed of the possible presence of Aboriginal objects at the site and of their obligations and possible offences under the National Parks and Wildlife Act with respect to Aboriginal objects. If any Aboriginal object (being Aboriginal artefacts, shell middens, bones and/or burials), the work shall cease, the area shall be barricaded off and sign posted to ensure no further damage is incurred. The SCC project manager will be notified so the appropriate steps can be undertaken and an incident report will be generated. Work is not to resume until approval is obtained from NPWS. This information will be available in the construction environmental management plan and will form part of the site-specific induction.

11. Trees shall be protected in accordance with AS-4970-2009 Australian Standard for Protection of Trees on Development Sites. If possible the concrete path shall be widened on the side away from large trees. If encroachment into Tree Protection Zones cannot be avoided, root mapping and avoidance or protection of structural roots may be required.

12. Any pruning of trees should be carried out in accordance with AS4373-2007 Australian Standard for the Pruning of Amenity Trees. Small or large mangrove plants shall only be cut off if they would interfere with the boardwalk installation process or with the ongoing structural integrity or use of the new boardwalk. Fallen timber and large mangrove trunks, limbs and roots are to be left in place and protected from damage during construction. Temporary work platforms will be used to minimise damage to mangroves and soils. Where temporary work platforms are to be placed over small mangrove plants care should be taken so that the plants are not damaged. Any mangrove limbs that are broken during the installation process shall be trimmed back to a clean cut in accordance with AS4373-2007.

13. During demolition of the existing boardwalk the lower parts of the piles would be left in place by cutting off existing piles above the marine growth.

14. When native vegetation is removed, the plant material may be left on site as habitat or by local mulching or composting where it would not be considered a fire hazard. If removed from the site, it shall be recycled elsewhere in the Park or through Shoalhaven City Council's green waste facility. No material shall be burned or buried on site.

15. All reasonable care shall be exercised when clearing trees and other vegetation to avoid injury to native fauna which may be roosting or sheltering in the vegetation foliage. Prior to clearing, areas of dense vegetation shall be thoroughly searched for nests or sheltering animals. In cases where a native animal is injured, it shall be transferred with appropriate care as soon as possible to the care of a wildlife rescue service or veterinarian. If a marine reptile or mammal is present at the site when the work was being done, the advice of the Jervis Bay Marine Park office should be sought on an appropriate course of action

16. Erosion and sediment controls shall be installed and maintained in accordance with the Erosion and Sediment Control Plan and the 'Blue Book' (Landcom 2004) to prevent the entry of sediment and spread of turbid water into the waterway. Disturbed ground surfaces shall be stabilised as soon as possible using appropriate methods as specified in the plan. 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. Immediately following completion of works all disturbed areas shall be restored and stabilised with jute mesh or similar as specified in the plan.

17. No exotic grass seed or turf shall be used adjacent to bushland areas. Excavated topsoil from disturbed areas either side of the path and assembly compound is likely to contain a local seed bank and it should be used in regeneration of these areas. To stabilise the soil a temporary cover can be established using sterile annual grass species, especially selections of forage sorghums, or species that will not survive or reproduce in the long term (eg. sterile annual ryegrass). These can be used for initial erosion control to act as a nurse or cover crop for the slower growing native plants.

18. A construction environmental management plan shall be prepared by the construction company that addresses, amongst other things, ways in which pollution by noise, dust, waste, fuel and oil will be avoided. This shall include protocols for equipment maintenance, storage of fuel and other chemicals and materials, management of waste and refuelling procedures. Precautions shall be included in case there is a flood during demolition and construction.

19. To avoid 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. Spill kits are to be available on site at all times during works.

20. No major equipment maintenance works shall be undertaken on-site.

21. Waste material shall be contained within the land-based site during construction and then be removed to an authorised waste facility for recycling or disposal, or to an appropriate storage area for reuse elsewhere. During demolition and construction any debris that enters the waterway shall be removed as soon as possible or as the tide permits. No material shall be placed in any location or in any manner that would allow it to enter the waterway or escape from the site into adjoining areas. Stockpiles of debris and construction materials shall be stored at least 10 metres outside the top of the creek banks. General refuse shall be disposed of to a covered container stored at the site. This container, when full, shall be transported to an authorised waste disposal centre. No waste shall be burnt or buried on-site or disposed of in the waterway or adjacent land.

22. Acid sulfate soil, which has the potential to pollute waterways with acidic runoff and toxic metals, may occur at or near the site. The Acid Sulfate Soil Management Plan prepared by Terra Insight (2022) shall be reviewed by the contractor to ensure it is appropriate and appropriate measures implemented.

23. To prevent pollution at the site, if material placed at the site shall be either ‘virgin excavated natural material’ shall comply with relevant resource recovery orders and exemptions including those for:
    - excavated public road material (2014)
    - reclaimed asphalt pavement (2014)
    - excavated natural material (2014).

    Otherwise, an environment protection licence or specific exemption shall be obtained under the Protection of the Environment Operations Act.

9 CONCLUSIONS

Provided the environmental safeguards listed in Section 8 of this report are employed, the proposed demolition and replacement of an existing boardwalk through mangroves in Currambene Creek at Huskisson, as described in this review of environmental factors,:

- is not likely to have a significant effect on the environment and therefore an environmental impact statement is not required

- is not likely to significantly affect threatened species and therefore a biodiversity development assessment report or a species impact statement is not required

- is not likely to have a significant impact on a matter of national environmental significance and would not be undertaken on or have an effect on Commonwealth land; the action therefore does not need to be referred to the Australian Minister for the Environment.

10 REFERENCES

Australian Government, 2013. Matters of National Environmental Significance, Significant Impact Guidelines 1.1

Landcom, 2004. Managing Urban Stormwater: Soils and Construction

Marine Parks Authority, 2003. Operational Plan for Jervis Bay Marine Park, Marine Parks Authority, Jervis Bay.

NSW Department of Environment, Climate Change and Water, 2010. Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales.

Terra Insight, 2022. Jervis Bay Maritime Museum Mangrove Boardwalk Geotechnical and Acid Sulfate Soil Investigation Report. Prepared for Shoalhaven City Council.

11 DETERMINATION

I, *insert name*,

insert position

hereby determine that the proposed demolition and replacement of an existing boardwalk through mangroves in Currambene Creek at Huskisson, as described in this review of environmental factors, can proceed.

(i) I have determined that it is unlikely that there will be any significant environmental impact as a result of the proposed work. An environmental impact statement is not required.

(ii) The proposed activity is not likely to significantly affect threatened species and therefore the biodiversity offsets scheme does not apply and the determining authority does not need to consider obtaining a biodiversity development assessment report or to retire biodiversity credits to offset the residual impact on biodiversity values or to prepare a species impact statement.

(iii) The proposed action is not likely to have a significant impact on a matter of national environmental significance, nor would the action be undertaken on or have an effect on Commonwealth land. The proposed action therefore does not need to be referred to the Australian Minister for the Environment.

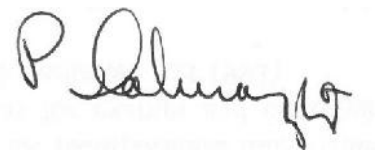
(iv) The environmental safeguards proposed in this review of environmental factors are to be implemented.

signature.....

name Craig Exton Date 2 June 2023

position Manager, Technical Services

REF prepared by:



Peter Dalmazzo Date: 3 May 2023

ATTACHMENTS

1. PLANS
2. CONSTRUCTION METHODOLOGY
3. CONSULTATION
4. THREATENED SPECIES ASSESSMENTS
5. STATE HERITAGE INVENTORY EXTRACTS
6. ABORIGINAL HERITAGE DOCUMENTATION

DO NOT SCALE

MIENGINEERS

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PROPOSED BOARDWALK

HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

LOCALITY PLAN
N.T.S.

DRAWING INDEX

GENERAL NOTES

1. REMOVE ALL TOPSOIL, SOFT GROUND, GRASS AND OTHER DELETERIOUS MATERIAL FROM UNDER NEW FOUNDATIONS PRIOR TO CONSTRUCTION.
2. THE INFORMATION CONTAINED ON THESE DRAWINGS IS FOR STRUCTURAL PURPOSES ONLY. IN ALL OTHER MATTERS, THE APPROVED ARCHITECTURAL DRAWING SHALL TAKE PRECEDENCE. ALL DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
3. ALL WORK SHALL BE PROTECTED FROM TERMITE ATTACK IN ACCORDANCE WITH AS3660.1 AND LOCAL AUTHORITY REQUIREMENTS.
4. DURING CONSTRUCTION, THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. THE DESIGN INSTALLATION AND MAINTENANCE OF ALL TEMPORARY PROPPING, BRACING AND SHORING SHALL BE PROVIDED BY THE CONTRACTOR TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES. THE COST OF ALL SUCH WORK SHALL BE DEEMED TO BE INCLUDED IN THE CONTRACTORS TENDER.
5. THE BUILDER SHALL ENSURE THAT THE GROUND SURROUNDING THE STRUCTURE SLOPES AWAY FROM THE BUILDING WITH IMPERVIOUS MATERIALS.
6. ALL WORKS CONDUCTED SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE RELEVANT AUSTRALIAN STANDARDS (INCLUDING ALL AMENDMENTS) AND THE CURRENT EDITION OF THE BUILDING CODE OF AUSTRALIA.
7. PROVIDE FINISHES AND FIXTURES THAT ALLOW FOR RELATIVE MOVEMENT BETWEEN OLD AND NEW STRUCTURES, TYPICAL.
8. WHERE ROCK IS ENCOUNTERED THE REMAINDER OF THE FOOTING SYSTEM SHALL BE FOUNDED ON ROCK AS APPROVED BY THE ENGINEER.
9. THE CONTRACTOR IS TO ENSURE THAT ALL WORK IS DONE IN A SAFE MANNER AND IN ACCORDANCE WITH ALL APPLICABLE SAFEWORK NSW REGULATIONS AND ANY OTHER APPLICABLE STATUTORY AUTHORITY REGULATIONS.
10. THE OWNERS ATTENTION IS DRAWN TO THE ACCEPTABLE LEVELS OF FOUNDATION PERFORMANCE AS OUTLINED BY AS 2870. ACCORDINGLY CATEGORY 1 OR 2 DAMAGE MAY BE EXPECTED UNDER SOME CONDITIONS. SHOULD A HIGHER LEVEL OF CRACK CONTROL BE REQUIRED THEN THE ENGINEER SHOULD BE NOTIFIED SO THAT THIS CAN BE INCORPORATED INTO THE DESIGN.
11. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CHECK THE LOCATION OF ALL EXISTING AND PROPOSED SERVICES PRIOR TO START OF CONSTRUCTION AND TO ALLOW TO ADJUST THESE AS REQUIRED TO PROVIDE FOR THE INTENT OF THE DESIGN.
12. WHERE MIENGINEERS RELIES ON THE INFORMATION SUPPLIED BY OTHERS TO PRODUCE THE DESIGNS, WE ACCEPT NO LIABILITY FOR ERRORS, TO THE EXTENT THAT THE DESIGN HAS MADE RELIANCE ON THIS INFORMATION.

COMPOSITE FIBRE NOTES

1. ALL MATERIAL AND WORKMANSHIP SHALL COMPLY WITH THE MANUFACTURER'S WORK INSTRUCTIONS AND QUALITY ASSURANCE STANDARDS.
2. UNLESS OTHERWISE NOTES OR APPROVED, COMPOSITE MATERIALS FOR USE IN THIS PROJECT SHALL BE MANUFACTURED FROM ECR GLASS AND VINYL ESTER RESIN CONFORMING WITH ISO 9001 STANDARD.
3. ALL MEMBERS SHALL BE IN SOUND CONDITION FREE FROM PITTING, DE-LAMINATIONS AND OTHER DEFECTS WHICH ARE LIKELY TO IMPAIR THE STRUCTURAL CAPACITY OF THE MEMBERS.
4. ALL COMPOSITE MEMBER PARTS OF THE HANDRAIL SYSTEM SHALL BE PAINTED USING URETHANE COATING TO PROVIDE EXTRA UV-RESISTENCE. COATING PROCEDURE SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S GUIDE APPLICATION OF PROTECTIVE COATINGS.
5. AT ALL FACTORY AND AT SITE DRILLED HOLES, AN APPROVED ANTICRUSH INSERT SHALL BE PUSHED TO THE CORRECT PLACEMENT. THIS PREVENTS CRUSHING OF THE SECTION AND PROVIDES A LARGE BEARING AREA FOR STRUCTURAL BOLTS.
6. AN ALTERNATIVE METHOD FOR ANTI-CRUSHING IS TO BOLT THROUGH ONE SIDE WALL OF THE PROFILE ONLY. TO PROVIDE ACCESS TO THIS BOLT, A LARGE OVERSIZED HOLE IN THE WALL THAT IS NOT BEING BOLTED IS REQUIRED.
7. USE OF A WATERPROOFING COMPOUND TO SEAL ANY END CUT FIBRES, AS A RESULT OF DRILLING OR CUTTING THE COMPOSITE FIBRE PROFILES IS REQUIRED.

STEEL SCREW PILING NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE THE CONTRACTOR SHALL ARRANGE FOR SCREW PILE LOCATIONS TO BE ACCURATELY SET OUT BY A SUITABLY QUALIFIED REGISTERED SURVEYOR.
2. REFER TO DRAWINGS FOR TYPE OF, AND LAYOUT AND SCHEDULING OF SCREW PILE FOUNDATIONS. SCREW PILES SHALL BE SPECIFIED BY OUTSIDE DIAMETER AND WALL THICKNESS OF SHAFT AND SHALL BE SUPPLIED BY THE NOMINATED PILING CONTRACTOR.
3. INDIVIDUAL SCREW PILE UNFACTORED LOADINGS (DL & LL) ARE SHOWN ON THE DRAWING.IT IS THE RESPONSIBILITY OF THE PILING CONSULTANT / CONTRACTOR TO ENSURE THE NOMINATED SCREW PILE SIZES AND ARRANGEMENT IS SUFFICIENT TO WITHSTAND THESE LOADINGS BOTH UNDER ULTIMATE (FACTORED) AND SERVICEABILITY CONDITIONS.
4. IT IS THE RESPONSIBILITY OF THE SCREW PILING CONSULTANT TO CERTIFY THE INSTALLED PILES FOR CAPACITY UNDER ULTIMATE AND SERVICEABILITY CONDITIONS. THE CERTIFICATION MUST BE COMPLETED PRIOR TO THE PLACEMENT OF ANY FOUNDATION CONCRETE.
5. TREATMENT OF EMBEDMENT & ANCHORAGE REINFORCEMENT OF SCREW PILE SHAFT AND CONCRETE PILE CAPS SHOWN IN THESES DRAWINGS IS INDICATIVE ONLY. THE SCREW PILING CONSULTANT SHOULD BE APPROACHED FOR CONFORMATION AND OR ALTERATIONS OF THESE DETAILS.
6. TOLERANCE OF CUT OFF LEVELS OF TOPS OF PILES AS NOTED IN THESE DRAWINGS SHALL BE ±25mm. SPECIFIED INCLINATION SHALL BE NOT MORE THAN 2%.
7. ALL PILING SHALL BE IN ACCORDANCE WITH PILING SPECIFICATION IF A PILE GROUP IS REQUIRED TO MEET THE NOMINATED LOADS, ADVICE MUST BE SOUGHT FROM THE CONTRACTORS CONSULTANT. ALL PILES SHALL BE SET OUT BY A REGISTERED SURVEYOR & BE INSTALLED WITHIN 75mm OF PLAN POSITION. AN AS INSTALLED SURVEY SHALL BE UNDERTAKEN BEFORE CONCRETE SLAB POUR OVER & SUBMITTED TO CONTRACTOR IMMEDIATELY , ANY PILES NOT CONFIRMING TO THIS LIMIT SHALL BE HIGHLIGHTED. ENGINEERING ADVICE SHALL BE SOUGHT FOR RECTIFICATION WORKS

SAFETY IN DESIGN NOTES

1. A SAFETY IN DESIGN REPORT HAS BEEN PREPARED BY MIE FOR THIS PROJECT. IF YOU ARE NOT IN RECEIPT OF MIE'S SAFETY IN DESIGN REPORT RELATING SPECIFICALLY TO THESE DRAWINGS FOR THIS PROJECT, PLEASE CONTACT US TO OBTAIN A COPY OF OUR CURRENT SAFETY IN DESIGN REPORT PRIOR TO UNDERTAKING THE CONSTRUCTION WORKS.

DIAL BEFORE YOU DIG www.1100.com.au

REVISION	AMENDMENTS	DATE	CKD	APP
3	IFC - TEMP BOARDWALK SKETCH & UPDATED POST DETAIL	02.05.23	TS	TS
2	ISSUED FOR CONSTRUCTION	24.03.23	TS	TS
1	ISSUED FOR REVIEW	23.03.23	TS	TS

CLIENT:

ARCHITECT:

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Tel (02) 4423 0566
WOLLONGONG OFFICE
Suite 3a, 128-134 Crown Street,
Wollongong NSW 2500
Tel (02) 4423 0566
MIENGINEERS.COM

PROJECT :
PROPOSED BOARDWALK
HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

DRAWING NAME:
COVER SHEET

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	-	A1

DRAWING STATUS: CONSTRUCTION
DRAWING No.: S001
PROJECT No.: 23L00023
REVISION: 3

DO NOT SCALE

SITE PLAN

SCALE 1:400

DIAL BEFORE YOU DIG www.1100.com.au

REVISION	AMENDMENTS	DATE	CKD	APP
3	IFC - TEMP BOARDWALK SKETCH & UPDATED POST DETAIL	02.05.23	TS	TS
2	ISSUED FOR CONSTRUCTION	24.03.23	TS	TS
1	ISSUED FOR REVIEW	23.03.23	TS	TS

CLIENT:

ARCHITECT:

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MIENGINEERS.COM

PROJECT :
PROPOSED BOARDWALK
HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

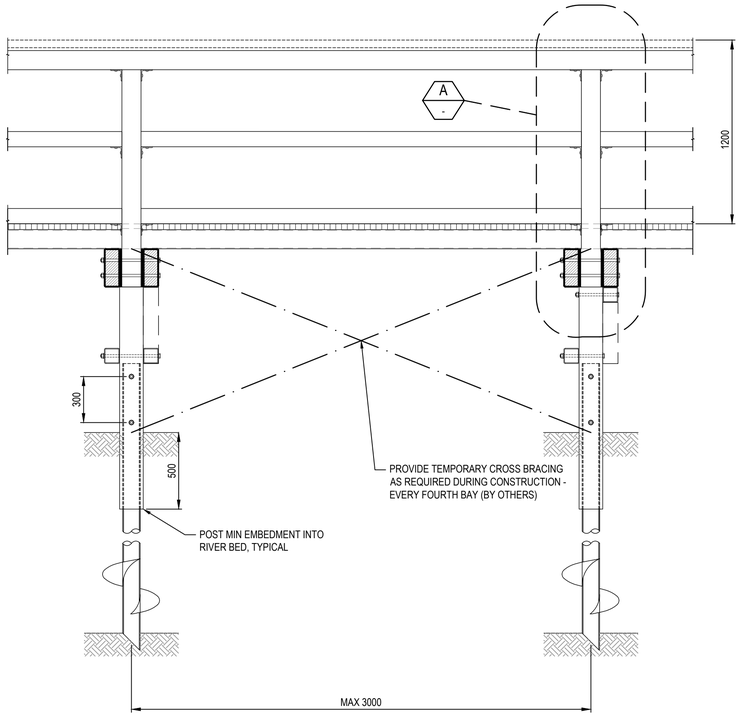
DRAWING NAME:
SITE PLAN

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:400	A1

DRAWING STATUS	DRAWING No.
CONSTRUCTION	S002

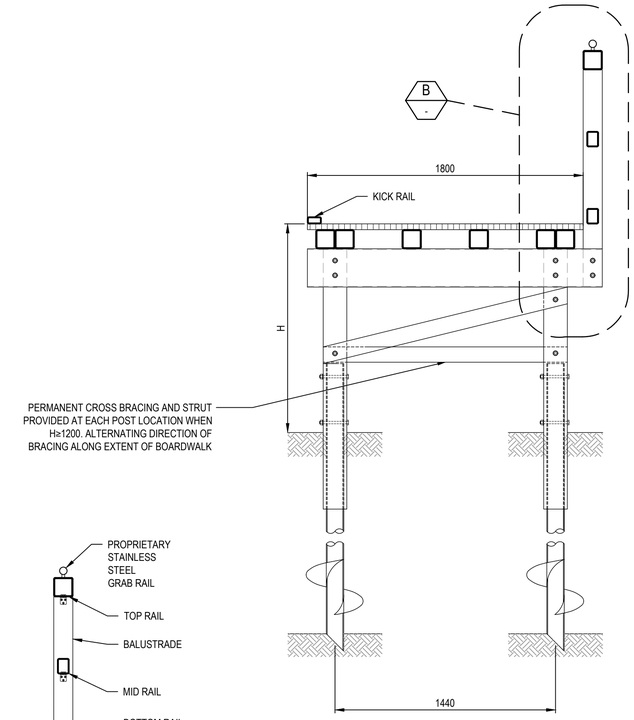
PROJECT No.	REVISION:
23L00023	3

DO NOT SCALE



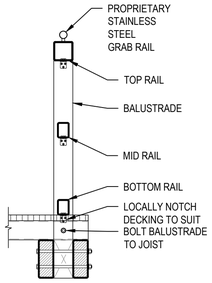
TYPICAL BOARDWALK ELEVATION

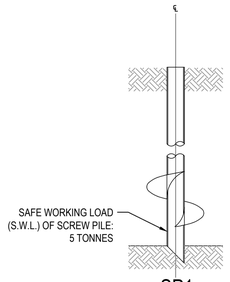
SCALE 1:20



TYPICAL BOARDWALK SECTION

SCALE 1:20

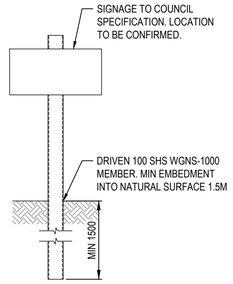




SP1

TYPICAL SCREW PILE DETAIL

SCALE 1:20



TYPICAL SIGN POST DETAIL

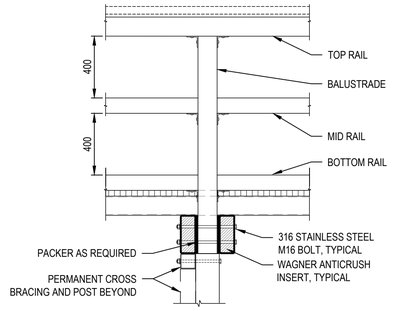
SCALE 1:20

NOTE:

REFER TO 23L00023/S001 FOR CONSTRUCTION NOTES

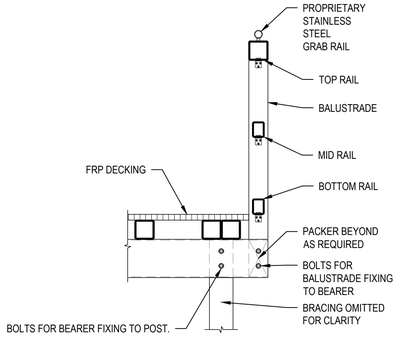
SCHEDULE		
MEMBER	SIZE	PRODUCT CODE
POST	154x5.8 CHS	WGN-C2000
BEARER	250x100 RHS	WGN-S5000
JOIST	125x6.4 SHS @450c/c MAX	WGN-S3000
TOP RAIL	125x6.4 SHS	WGN-S3000
MID RAIL	100x75 RHS	WGN-R1000
BOTTOM RAIL	100x75 RHS	WGN-R1000
KICK RAIL	90x75 RHS	REPLAS
BALUSTRADE	125x6.4 SHS	WGN-S3000
PERMANENT CROSS BRACING	100x5.2 SHS	WGN-S1000
FRP DECKING	30x6.5mm MINI-MESH DECKING	MIN30-XX

NOTE: THE PILING CONTRACTOR SHALL REMAIN RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF THE SCREW PILES. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE PILING SPECIFICATION. MINIMUM DESIGN LIFE OF THE SCREW PILES SHALL BE 40 YEARS.



DETAIL A

SCALE 1:20

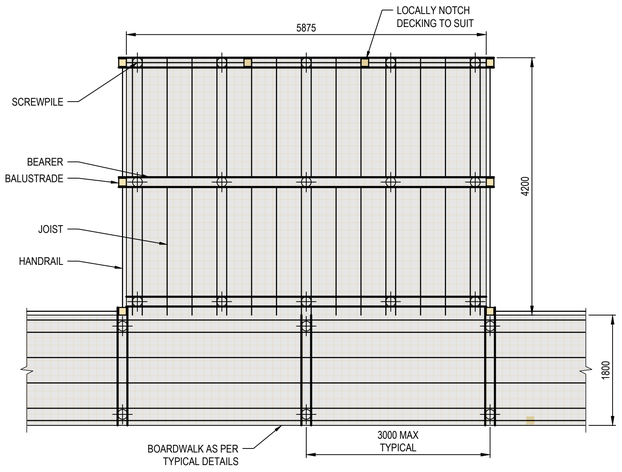


DETAIL B

SCALE 1:20

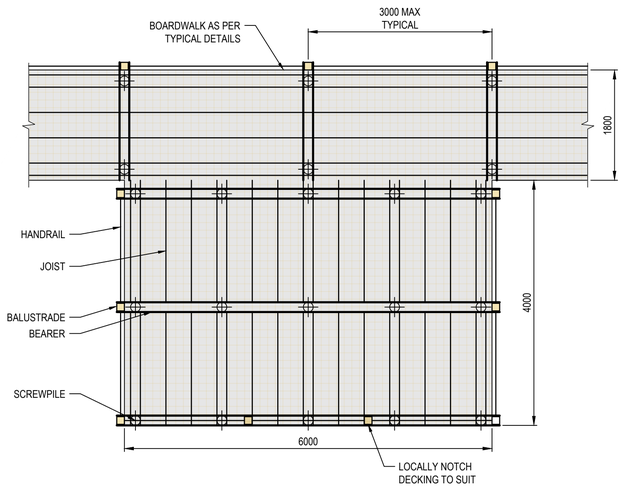
BEARER PARALLEL TO HANDRAIL DETAIL

SCALE 1:20



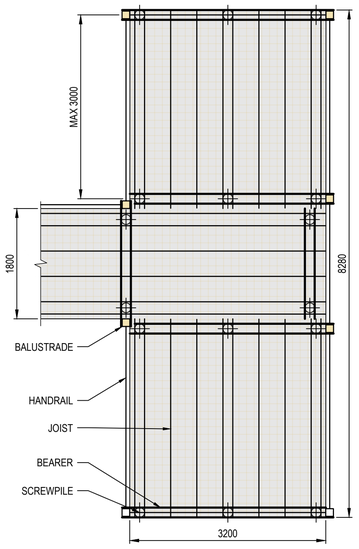
VIEWING PLATFORM 1 PLAN

SCALE 1:50



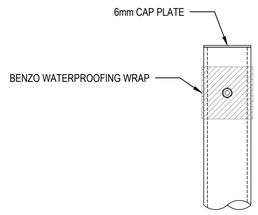
VIEWING PLATFORM 2 PLAN

SCALE 1:50



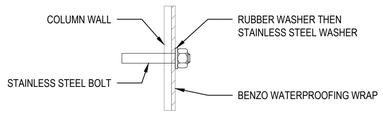
VIEWING PLATFORM 3 PLAN

SCALE 1:50



POST CONNECTION DETAIL

SCALE 1:10



BOLT CONNECTION DETAIL

SCALE 1:5

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REVISION	AMENDMENTS	DATE	CKD	APP
3	IFC - TEMP BOARDWALK SKETCH & UPDATED POST DETAIL	02.05.23	TS	TS
2	ISSUED FOR CONSTRUCTION	24.03.23	TS	TS
1	ISSUED FOR REVIEW	23.03.23	TS	TS

CLIENT:

ARCHITECT:

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PROJECT :

PROPOSED BOARDWALK
HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

DRAWING NAME:

BOARDWALK PLAN & SECTIONS

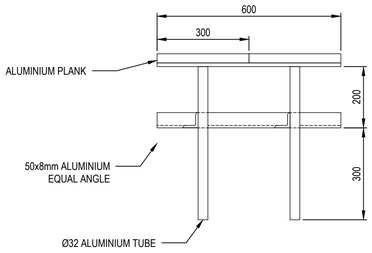
DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:20	A1

DRAWING STATUS	DRAWING No.
CONSTRUCTION	S003

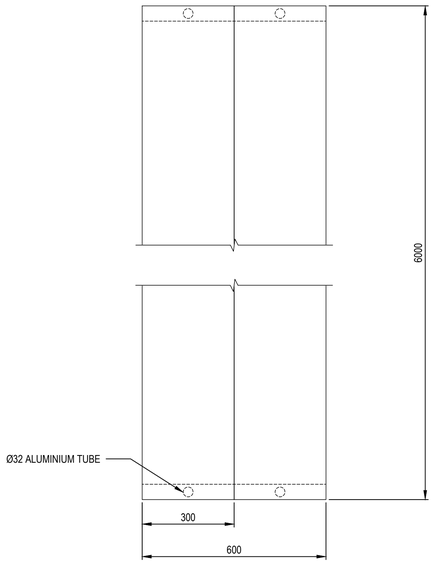
PROJECT No.	REVISION:
23L00023	3

DO NOT SCALE

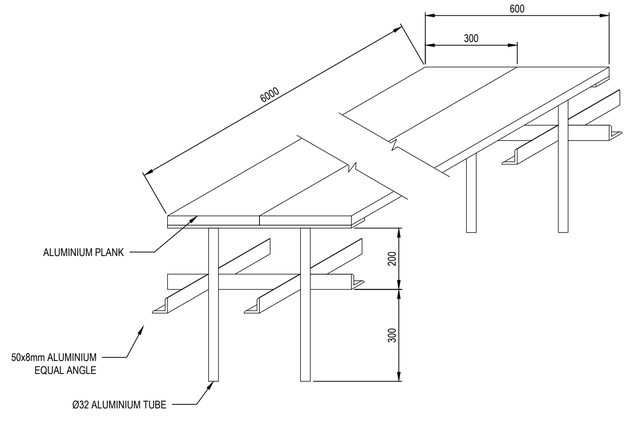
NOTE:
REFER TO 23L00023/S001 FOR CONSTRUCTION NOTES



TEMPORARY BOARDWALK
FRONT ELEVATION
SCALE 1:10



TEMPORARY BOARDWALK
PLAN VIEW
SCALE 1:10



TEMPORARY BOARDWALK
ORTHAGONAL VIEW
SCALE 1:10

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REVISION	AMENDMENTS	DATE	CKD	APP
1	IFC - TEMP BOARDWALK SKETCH & UPDATED POST DETAIL	02.05.23	TS	TS

CLIENT:

ARCHITECT:

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MIENGINEERS.COM

PROJECT :
PROPOSED BOARDWALK
HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

DRAWING NAME:
TEMPORARY BOARDWALK SKETCH

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:100	A1

DRAWING STATUS	DRAWING No.
CONSTRUCTION	S004

PROJECT No.	REVISION:
23L00023	1

DO NOT SCALE

NOTE:
REFER TO DN23L00023/S001 FOR CONSTRUCTION NOTES

BOARDWALK SECTION 1
SCALE 1:100

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REVISION	AMENDMENTS	DATE	CKD	APP
3	IFC - TEMP BOARDWALK SKETCH & UPDATED POST DETAIL	02.05.23	TS	TS
2	ISSUED FOR CONSTRUCTION	24.03.23	TS	TS
1	ISSUED FOR REVIEW	23.03.23	TS	TS

CLIENT:

ARCHITECT:

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MIENGINEERS.COM

PROJECT :
PROPOSED BOARDWALK
HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

DRAWING NAME:
BOARDWALK SECTION 1

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:100	A1

DRAWING STATUS	DRAWING No.
CONSTRUCTION	S005

PROJECT No.	REVISION:
23L00023	3

DO NOT SCALE

NOTE:
REFER TO DN23L00023/S001 FOR CONSTRUCTION NOTES

BOARDWALK SECTION 2

SCALE 1:100

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REVISION	AMENDMENTS	DATE	CKD	APP
3	IFC - TEMP BOARDWALK SKETCH & UPDATED POST DETAIL	02.05.23	TS	TS
2	ISSUED FOR CONSTRUCTION	24.03.23	TS	TS
1	ISSUED FOR REVIEW	23.03.23	TS	TS

CLIENT:

ARCHITECT:

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MIENGINEERS.COM

PROJECT :
PROPOSED BOARDWALK
HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

DRAWING NAME:
BOARDWALK SECTION 2

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:100	A1

DRAWING STATUS: CONSTRUCTION
DRAWING No.: S006
PROJECT No.: 23L00023
REVISION: 3

DO NOT SCALE

NOTE:
REFER TO DN23L00023/S001 FOR CONSTRUCTION NOTES

REFER SHEET S006

BOARDWALK SECTION 3

SCALE 1:100

REVISION	AMENDMENTS	DATE	CKD	APP
3	IFC - TEMP BOARDWALK SKETCH & UPDATED POST DETAIL	02.05.23	TS	TS
2	ISSUED FOR CONSTRUCTION	24.03.23	TS	TS
1	ISSUED FOR REVIEW	23.03.23	TS	TS

CLIENT:

ARCHITECT:

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WOLLONGONG OFFICE
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Wollongong NSW 2500
Tel (02) 4423 0566
MIENGINEERS.COM

PROJECT :
PROPOSED BOARDWALK
HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

DRAWING NAME:
BOARDWALK SECTION 3

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:100	A1

DRAWING STATUS	DRAWING No.
CONSTRUCTION	S007
PROJECT No.	REVISION:
23L00023	3

DO NOT SCALE

NOTE:
REFER TO DN23L00023/S001 FOR CONSTRUCTION NOTES

BOARDWALK SECTION 4
SCALE 1:100

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REVISION	AMENDMENTS	DATE	CKD	APP
3	IFC - TEMP BOARDWALK SKETCH & UPDATED POST DETAIL	02.05.23	TS	TS
2	ISSUED FOR CONSTRUCTION	24.03.23	TS	TS
1	ISSUED FOR REVIEW	23.03.23	TS	TS

CLIENT:

ARCHITECT:

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Tel (02) 4423 0566

MIENGINEERS.COM

PROJECT :
PROPOSED BOARDWALK
HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

DRAWING NAME:
BOARDWALK SECTION 4

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:100	A1

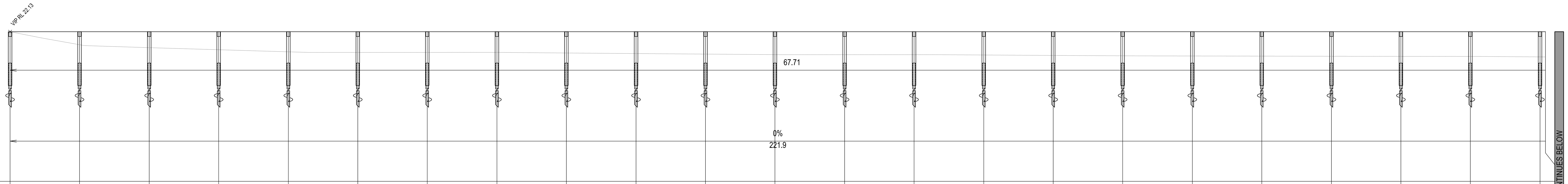
DRAWING STATUS	DRAWING No.
CONSTRUCTION	S008

PROJECT No.	REVISION:
23L00023	3

DO NOT SCALE

NOTE:
TOTAL POST LENGTH = 'H' + 500mm

HORIZONTAL SEGMENT LENGTH



VERTICAL GEOMETRY GRADE (%)
VERTICAL GEOMETRY LENGTH (m)

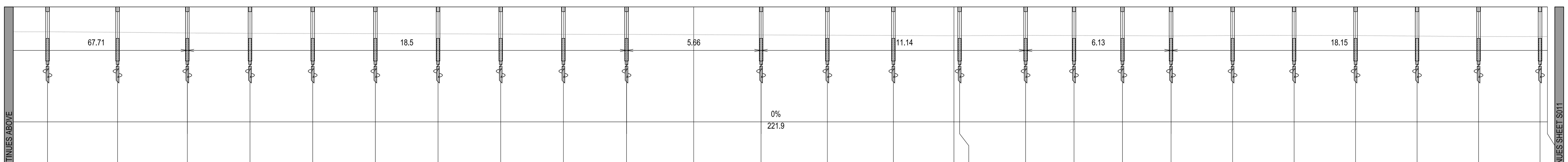
DATUM RL = 15.80

CONTROL LINE CHAINAGE	FINISHED SURFACE LEVEL	EXISTING SURFACE LEVEL	DEPTH TO NATURAL SURFACE LEVEL 'H'
0	22.13		
2.94	22.13	21.58	0.55
5.89	22.13	21.45	0.67
8.83	22.13	21.37	0.76
11.78	22.13	21.28	0.85
14.72	22.13	21.25	0.88
17.66	22.13	21.25	0.87
20.61	22.13	21.25	0.87
23.55	22.13	21.23	0.90
26.5	22.13	21.20	0.92
29.44	22.13	21.18	0.95
32.38	22.13	21.16	0.97
35.33	22.13	21.16	0.97
38.27	22.13	21.16	0.97
41.22	22.13	21.14	0.98
44.16	22.13	21.13	1.00
47.1	22.13	21.11	1.02
50.05	22.13	21.10	1.03
52.99	22.13	21.10	1.03
55.94	22.13	21.09	1.04
58.88	22.13	21.09	1.04
61.82	22.13	21.08	1.04
64.77	22.13	21.06	1.06
65	22.13	21.06	1.07

A1 SCALE: H 1:100, V 1:100

LONGITUDINAL SECTION MP10

HORIZONTAL SEGMENT LENGTH



VERTICAL GEOMETRY GRADE (%)
VERTICAL GEOMETRY LENGTH (m)

DATUM RL = 15.60

CONTROL LINE CHAINAGE	FINISHED SURFACE LEVEL	EXISTING SURFACE LEVEL	DEPTH TO NATURAL SURFACE LEVEL 'H'
60	22.13	21.09	1.04
61.82	22.13	21.08	1.04
64.77	22.13	21.06	1.06
67.71	22.13	21.03	1.10
70.35	22.13	21.02	1.11
72.99	22.13	21.01	1.11
75.63	22.13	21.01	1.12
78.27	22.13	21.00	1.13
80.91	22.13	20.99	1.14
83.55	22.13	20.98	1.15
86.21	22.13	20.97	1.16
89.04	22.13	20.96	1.17
91.88	22.13	20.95	1.18
94.67	22.13	20.94	1.19
97.45	22.13	20.93	1.20
100	22.13	20.92	1.21
100.24	22.13	20.92	1.21
103.02	22.13	20.93	1.20
105.06	22.13	20.93	1.20
107.1	22.13	20.92	1.21
109.15	22.13	20.91	1.22
111.74	22.13	20.92	1.20
114.33	22.13	20.93	1.20
116.92	22.13	20.92	1.20
119.51	22.13	20.90	1.22
122.1	22.13	20.89	1.24
124.69	22.13	20.89	1.24
125	22.13	20.89	1.24

A1 SCALE: H 1:100, V 1:100

LONGITUDINAL SECTION MP10

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REVISION	AMENDMENTS	DATE	CKD	APP
3	IFC - TEMP BOARDWALK SKETCH & UPDATED POST DETAIL	02.05.23	TS	TS
2	ISSUED FOR CONSTRUCTION	24.03.23	TS	TS
1	ISSUED FOR REVIEW	23.03.23	TS	TS

CLIENT:

ARCHITECT:

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Tel (02) 4423 0566
MIENGINEERS.COM

PROJECT :
PROPOSED BOARDWALK
HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

DRAWING NAME:
MP10 LONGSECTION SHEET 1

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:100	A1

DRAWING STATUS	DRAWING No.	PROJECT No.	REVISION:
CONSTRUCTION	S010	23L00023	3

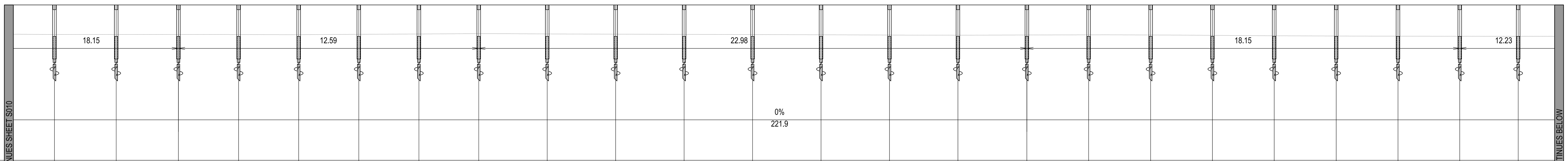
DO NOT SCALE

NOTE:
TOTAL POST LENGTH = 'H' + 500mm

HORIZONTAL SEGMENT LENGTH

VERTICAL GEOMETRY GRADE (%)
VERTICAL GEOMETRY LENGTH (m)

DATUM RL = 15.60



FINISHED SURFACE LEVEL	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13
EXISTING SURFACE LEVEL	20.90	20.89	20.89	20.89	20.88	20.88	20.89	20.91	20.92	20.91	20.90	20.89	20.88
DEPTH TO NATURAL SURFACE LEVEL 'H'	1.23	1.24	1.24	1.24	1.25	1.25	1.24	1.22	1.21	1.22	1.23	1.24	1.25
CONTROL LINE CHAINAGE	120	122.1	124.69	127.3	129.82	132.34	134.86	137.38	139.89	142.76	145.63	148.5	151.37

FINISHED SURFACE LEVEL	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13
EXISTING SURFACE LEVEL	20.87	20.86	20.86	20.86	20.87	20.86	20.85	20.83	20.82	20.81	20.81	20.81	20.81
DEPTH TO NATURAL SURFACE LEVEL 'H'	1.25	1.27	1.27	1.26	1.26	1.26	1.28	1.30	1.31	1.31	1.32	1.32	1.32
CONTROL LINE CHAINAGE	154.24	157.11	159.98	162.87	165.46	168.06	170.65	173.24	175.84	178.43	181.02	183.47	185

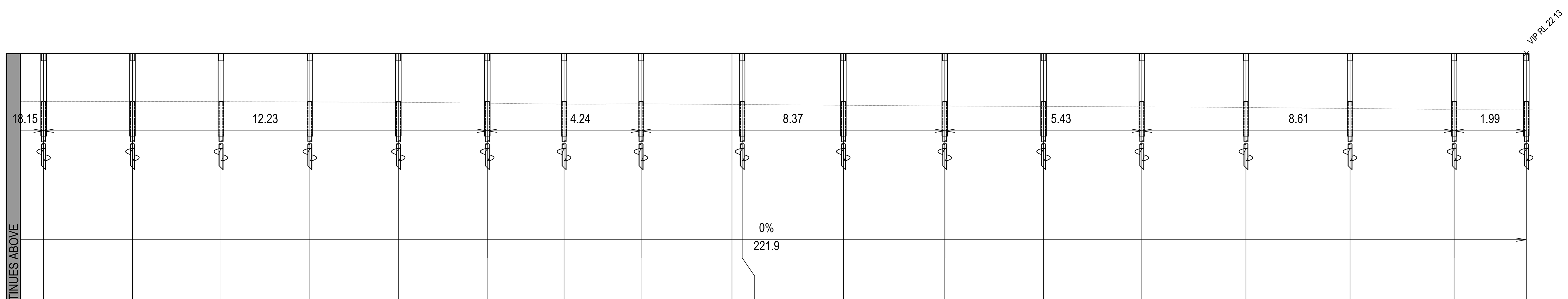
A1 SCALE: H 1:100, V 1:100

LONGITUDINAL SECTION MP10

HORIZONTAL SEGMENT LENGTH

VERTICAL GEOMETRY GRADE (%)
VERTICAL GEOMETRY LENGTH (m)

DATUM RL = 15.30



FINISHED SURFACE LEVEL	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13
EXISTING SURFACE LEVEL	20.81	20.81	20.81	20.80	20.80	20.79	20.76	20.74	20.74	20.73
DEPTH TO NATURAL SURFACE LEVEL 'H'	1.32	1.32	1.32	1.32	1.33	1.34	1.37	1.39	1.39	1.40
CONTROL LINE CHAINAGE	180	181.02	183.47	185.91	188.36	190.8	193.25	195.37	197.49	200

FINISHED SURFACE LEVEL	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13
EXISTING SURFACE LEVEL	20.72	20.70	20.68	20.67	20.66	20.64	20.61	20.59	20.60
DEPTH TO NATURAL SURFACE LEVEL 'H'	1.40	1.42	1.44	1.46	1.47	1.49	1.51	1.53	1.53
CONTROL LINE CHAINAGE	200.28	203.07	205.87	208.59	211.3	214.17	217.04	219.91	221.9

A1 SCALE: H 1:100, V 1:100

LONGITUDINAL SECTION MP10

DIAL BEFORE YOU DIG
www.1100.com.au

REVISION	AMENDMENTS	DATE	CKD	APP
3	IFC - TEMP BOARDWALK SKETCH & UPDATED POST DETAIL	02.05.23	TS	TS
2	ISSUED FOR CONSTRUCTION	24.03.23	TS	TS
1	ISSUED FOR REVIEW	23.03.23	TS	TS

CLIENT:

ARCHITECT:

MIENGINEERS

SYDNEY OFFICE
Suite 2.06, 68 York St,
Sydney NSW 2000 Australia
Tel (02) 8396 6565

SOUTH COAST OFFICE
49 Berry Street, Nowra NSW 2541
Tel (02) 4423 0566

WOLLONGONG OFFICE
Suite 3a, 128-134 Crown Street,
Wollongong NSW 2500
Tel (02) 4423 0566

MIENGINEERS.COM

PROJECT :
PROPOSED BOARDWALK
HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

DRAWING NAME:
MP10 LONGSECTION SHEET 2

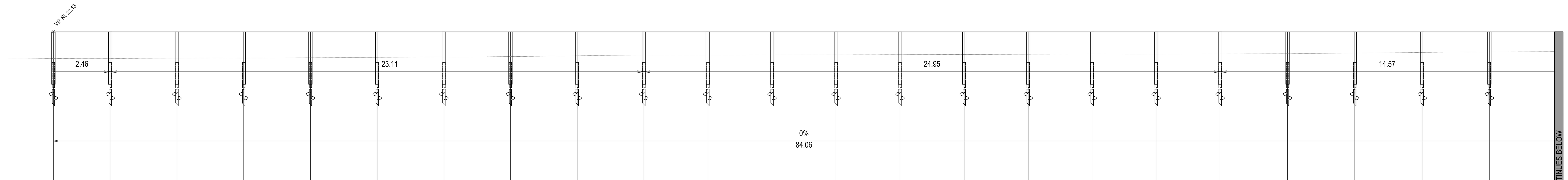
DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:100	A1

DRAWING STATUS	DRAWING No.
CONSTRUCTION	S011

PROJECT No.	REVISION:
23L00023	3

DO NOT SCALE

NOTE:
TOTAL POST LENGTH = 'H' + 500mm

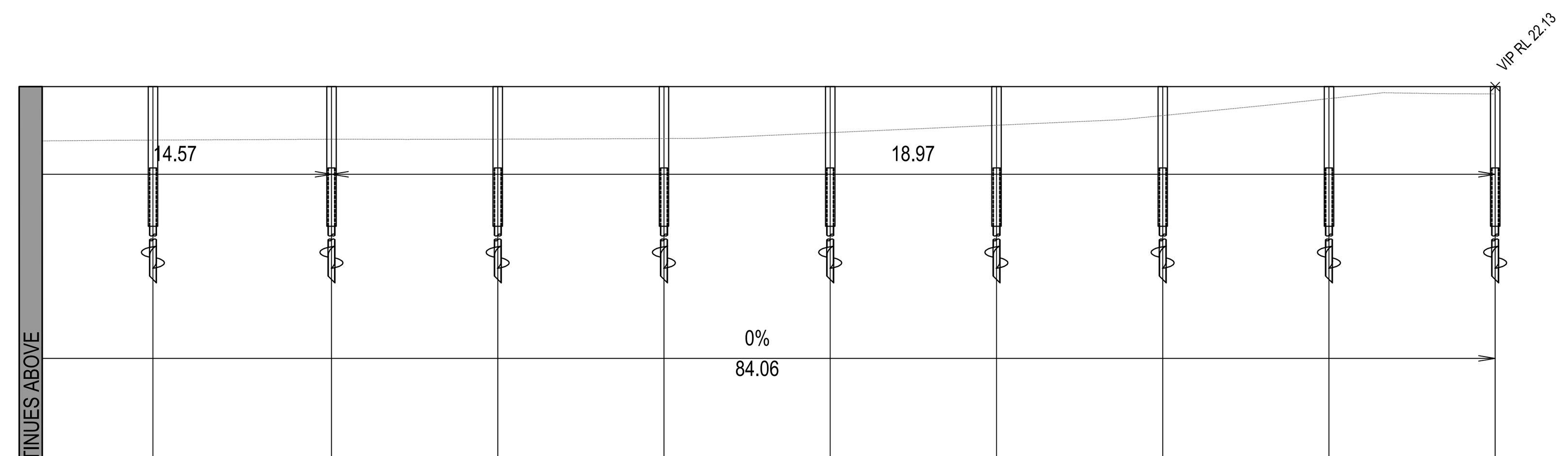


DATUM RL = 15.70

FINISHED SURFACE LEVEL	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13
EXISTING SURFACE LEVEL	20.97	20.98	20.98	20.99	21.01	21.02	21.04	21.06	21.09	21.12	21.12	21.13
DEPTH TO NATURAL SURFACE LEVEL 'H'	1.16	1.15	1.14	1.13	1.12	1.11	1.09	1.07	1.04	1.01	1.00	1.00
CONTROL LINE CHAINAGE	0	2.46	5.35	8.24	11.13	14.02	16.91	19.79	22.68	25.57	28.34	31.12

FINISHED SURFACE LEVEL	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13
EXISTING SURFACE LEVEL	21.13	21.14	21.15	21.15	21.16	21.17	21.17	21.18	21.21	21.23	21.26	21.27
DEPTH TO NATURAL SURFACE LEVEL 'H'	0.99	0.99	0.98	0.98	0.97	0.96	0.95	0.95	0.92	0.89	0.87	0.86
CONTROL LINE CHAINAGE	33.89	36.66	39.44	42.21	44.98	47.75	50.52	53.44	56.35	59.27	62.18	65

A1 SCALE: H 1:100, V 1:100
LONGITUDINAL SECTION MP20



DATUM RL = 16.00

FINISHED SURFACE LEVEL	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13	22.13
EXISTING SURFACE LEVEL	21.24	21.26	21.27	21.27	21.28	21.38	21.50	21.66	21.93	22.01
DEPTH TO NATURAL SURFACE LEVEL 'H'	0.89	0.87	0.86	0.86	0.85	0.75	0.63	0.47	0.19	0.12
CONTROL LINE CHAINAGE	60	62.18	65.09	67.8	70.51	73.22	75.93	78.64	81.35	84.06

A1 SCALE: H 1:100, V 1:100
LONGITUDINAL SECTION MP20

DIAL BEFORE YOU DIG
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REVISION	AMENDMENTS	DATE	CKD	APP
3	IFC - TEMP BOARDWALK SKETCH & UPDATED POST DETAIL	02.05.23	TS	TS
2	ISSUED FOR CONSTRUCTION	24.03.23	TS	TS
1	ISSUED FOR REVIEW	23.03.23	TS	TS

CLIENT:

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Suite 3a, 128-134 Crown Street,
Wollongong NSW 2500
Tel (02) 4423 0566
MIENGINEERS.COM

PROJECT :
PROPOSED BOARDWALK
HUSKISSON MANGROVE BOARDWALK
JERVIS BAY MARITIMIE MUSEUM

DRAWING NAME:
MP20 LONGSECTION SHEET 1

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:100	A1

DRAWING STATUS: CONSTRUCTION
DRAWING No.: S012
PROJECT No.: 23L00023
REVISION: 3

71175E – Lady Denman Reserve Mangrove Boardwalk

Task Appreciation

ALI Civil understands that the Shoalhaven city council has allocated funding for the design and construction of the mangrove Boardwalk at the Lady Denman site Dent St, Jervis Bay. This facility will be beneficial to the local community as it will provide a safer, more accessible boardwalk and will be a considerable draw card for tourist that visit the area. The site is located within the boundary of the Jervis Bay Marine Park and is adjacent to the Booderee National Park which is jointly managed by the Director of National parks and the Wreck Bay Aboriginal community council. The Boardwalk is located within a sanctuary zone which supports critical habitat for juvenile fishes, including the endangered Black cod, multiple species of crustaceans, shellfish, established mangroves and macrophyte communities. The waterway just outside the sanctuary zone of Currembene creek supports a commercial mussel farming operation. During this project, the protection of the aforementioned areas is to be prioritised over normal commercial practices as the natural value within these areas will offset the construction cost.
ALI Civil are aware of Shoalhaven City Councils desire to have this boardwalk constructed in a manner which is both environmentally sensitive but with assurance that the boardwalk will provide the longevity which an installation like this requires. The design which we are proposing will see the boardwalk last through a 40yr design life and will be constructed to ensure that maintenance of the facility is minimised. Maintenance construction within these types of environments carries significant environmental risk and cost to the asset owner.
The requirement of achieving a design which is environmentally sensitive, functional, aesthetically pleasing, and compliant has been undertaken by four local companies. ALI Civil, MI Engineers, Peter Dalmazzo – Environmental consultant and EFA piling. Collectively, we have developed a design and methodology which will ensure all of council's risk profiles are mitigated.
The project site is in a location that has high community visibility, we imagine considerable community communication will be required to ensure this project is delivered without undue impact to council or to the successful contractor's reputation. As part or our tender submission, we will allow to develop a project communication plan which will provide the council with a clearly defined process for community interactions. It will provide the community with a direct point of contact and will trigger notifications to the SCC project manager dependent upon the content.

Working within the Jervis Bay Marine Park comes with additional conditions and environmental responsibility.
Ali Civil are an environmentally aware company and we endeavour to undertake project works with minimal impact on the environment and the waterways in which we work. Our project teams undergo continual training in environmental management and risk minimisation. Our plant and equipment are late model and regularly maintained which limits the risk of a hydrocarbon release into the environment and all our employees are trained in the usage of spill kits and subsequent clean-up processes, procedures, and reporting.

Ali Civil is active in the identification and preservation of culturally significant European and Indigenous sites and artifacts which may be present within project sites. We have a comprehensive unexpected finds protocol which is implemented should an item of significance be identified during the works. We have a direct line of response for an Indigenous Cultural heritage officer which can significantly reduce impact to project timeframes and costs.

Risk Assessment

Ali Civil has undertaken a preliminary project risk assessment to highlight the potential construction, environmental and WHS risk which will require mitigation to keep the environment, public, visitors, our staff, and our subcontractors safe. This is provided for council to gauge the considerations taken in our methodology, task appreciation and risk analysis of the project works being undertaken at this site. Ali Civil implements an “Eliminate” approach to risk management when assessing project delivery and construction methodology.

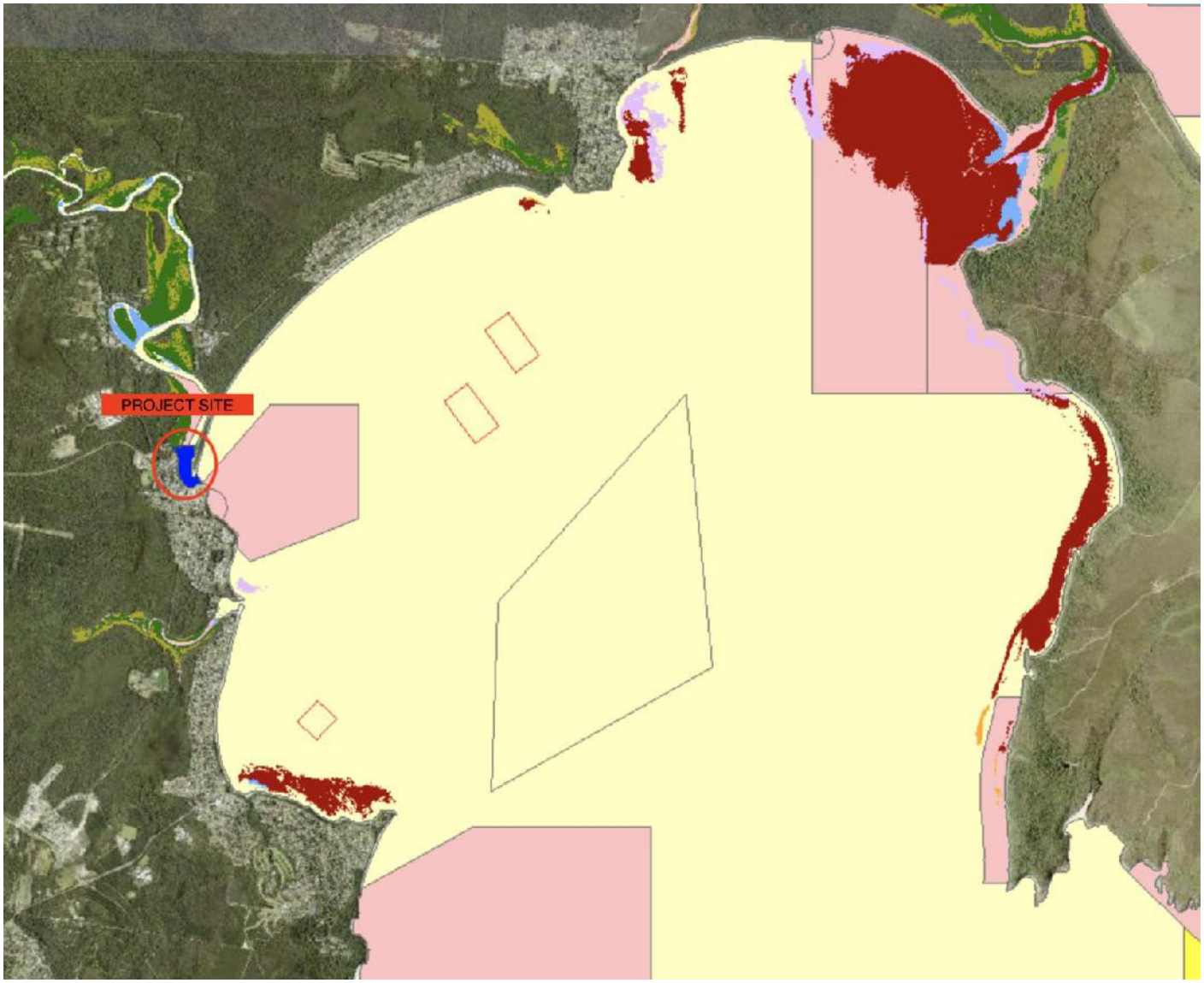
COVID -19

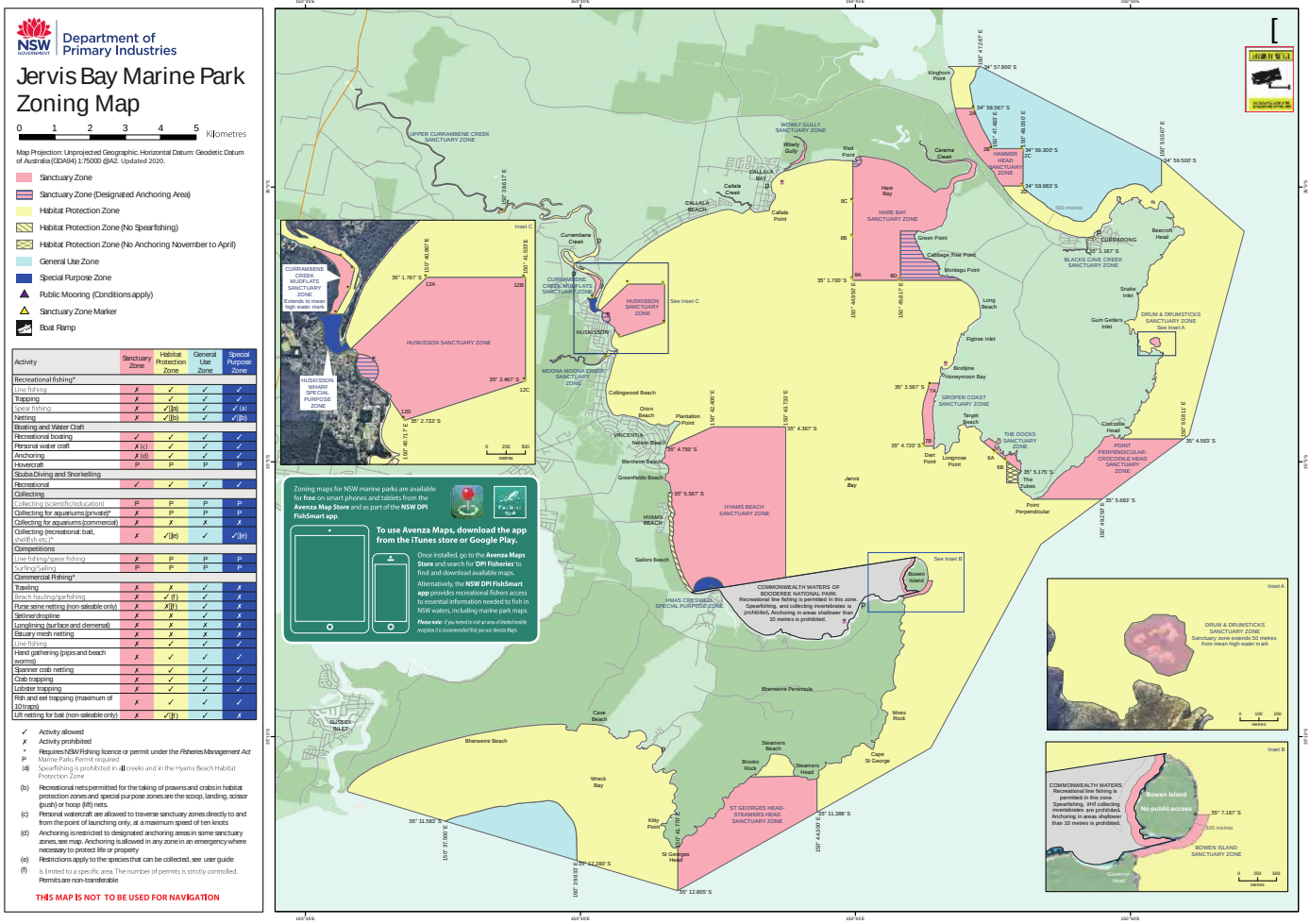
A site specific COVID-19 management plan will be developed which will provide daily site access procedures, infection/transmission risk mitigation procedures, subcontractor site access requirements, supply chain review, and NSW Covid restriction and directive updates. A Lockdown procedure will be developed to ensure the site, materials and works to date, are secured if an extended lockdown is issued. If any staff member or subcontractor that has been identified as Covid positive by NSW Health will be directed not to attended site or instructed to leave site immediately and undertake a rapid antigen test (RAT), If positive, they are to isolate for 5 days. If staff or subcontractors are exhibiting flu like symptoms, they will be required to undertake a RAT which will need to Return a negative result prior to returning to site. Ali Civil has ample stock of RAT tests to ensure we are compliant with the NSW Health orders and our staff have tests readily available if required. SWMS “COVID-19” will be presented in a manner which will enable all staff to understand, and accept the SWMS prior to commencing works onsite. This information will be available in the safety management plan and will form part of the site-specific induction.

Key Marine habitat:

The project site is within the Department of Primary Industries key marine habitat and sanctuary zone mapping. The Jervis Bay Marine Park is inhabited by the numerous endangered, threatened and venerable species including the Grey Nurse Shark, Weedy Seadragon, Blue Devil Fish, Black Cod and Macrophyte communities. Effective management of Sediment, erosion, construction debris and liquid materials such as hydraulic fluid or diesel during construction will be important to ensure that the project does not pollute the adjacent Marine Park. Ali Civil has extensive experience in undertaking construction projects in and around sensitive ecological and marine areas. We have developed safe work procedures to ensure the risk of accidental release of sediment or pollutant’s is minimised and will undertake continual site-specific assessments to implement a methodology which will have the least impact on the waterway. This information will be available in the Environmental management plan and will form part of the site-specific induction.

Jervis Bay Marine Park- Key Habitat and Sanctuary Zone Mapping:





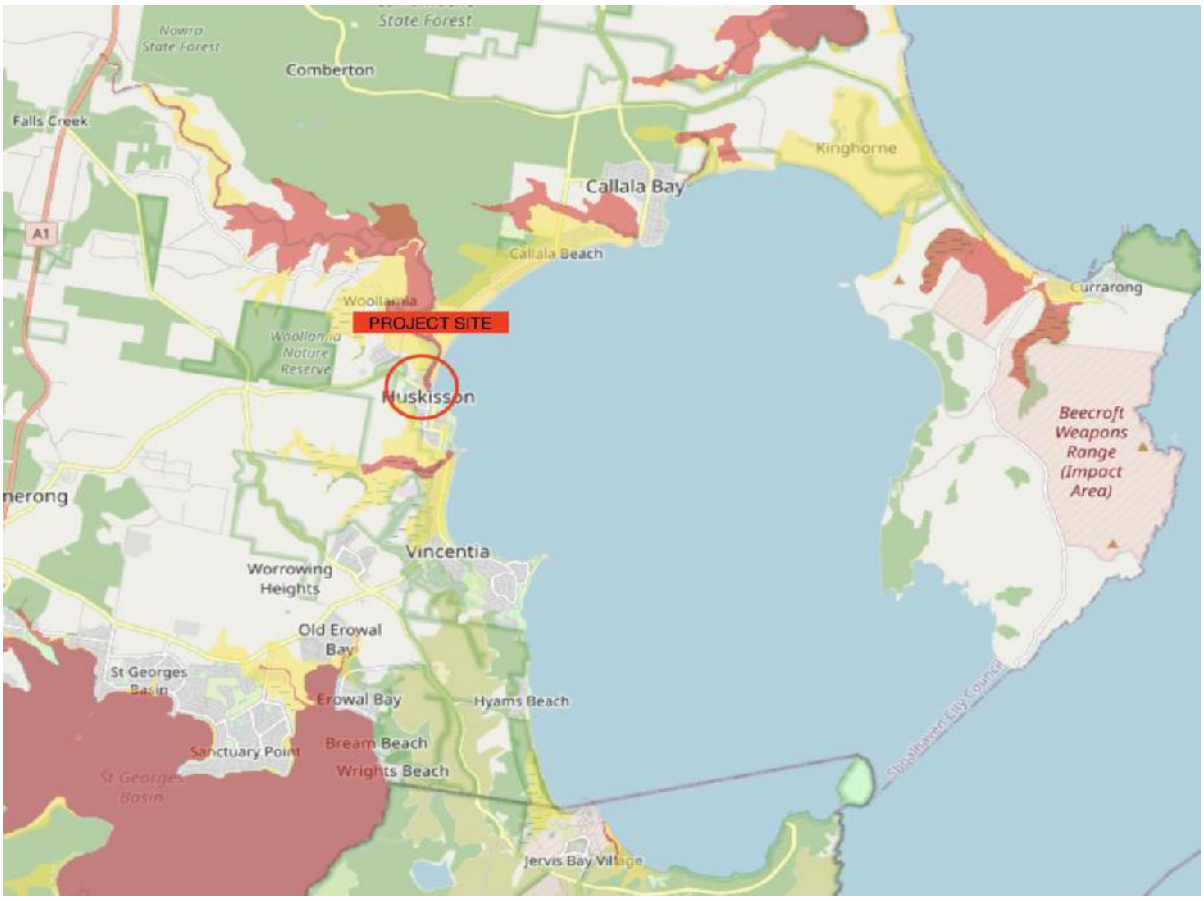
Acid Sulphate Soils

The project site is located within the ASS risk mapping of the NSW Department of planning, Industry and Environment 2011. Most of the current issues with acid sulphate soils in NSW have arisen from past practices in drainage and flood-mitigation. Major drainage works were built on floodplains from the Tweed to the Shoalhaven Rivers from the late 1800s until the mid-1970s. Drainage and excavation of acid sulphate soils remains a current issue for urban development, infrastructure, and sand mining. Left undisturbed, acid sulphate soils do not present any risk. But when they are exposed to air, the iron sulphides they contain react with oxygen to create sulfuric acid. The acid makes metals in the soil, such as iron and aluminium, more soluble. These metals can be released in toxic amounts.

The acid and released metals can have many damaging effects:

- Damaging waterways and killing aquatic life – Rainfall can wash acid and toxic metals into waterways, killing organisms that are immobile (such as Oysters or Mussels) or that live in sediment. It can also reduce survival and growth rates of plants and animals and promote outbreaks of disease (especially red-spot disease in fish).
- Killing plants – Very acidic soil can kill all plants growing in it.
- Corrosion – Sulfuric acid can corrode concrete, iron, steel, and some aluminium alloys.

Acid Sulphate Soils Mapping:



ALI Civil have extensive experience in managing acid sulphate soils which may be present within project sites. In consultation with Peter Dalmazzo, we will develop a project specific ASS management plan which will comply with NSW EPA Acid sulphate soils assessment and management guidelines 2004 and the Waste classification guidelines of the NSW EPA.

The investigation of the geotechnical conditions and acid sulfate soils by Terra Insight has identified that acid sulphate soils are present at this site and will need considered management of the risk generated by the construction process. Our construction methodology will limit the amount of disturbed material by utilising helical screw piles for the boardwalk foundations. Addtionally, installation of 6m x 0.6m aluminium working platforms placed to either side of the installation area will prevent disturbance to the soil profile and damage to the mangrove shoots caused by foot traffic during the demolition of the existing boardwalk and the installation of the Piles. This information will be available in the Environmental management plan and will form part of the site-specific induction.

Indigenous Cultural Heritage

The project site is adjacent to the Jervis Bay Marine Park and Booderee National Park, both of which have numerous sites of high cultural significance and value. The works will be undertaken in areas which may contain items of significant cultural value and will require the contractor to implement procedures and protocols to ensure all works are appropriately monitored to mitigate the risk of any unidentified items or artifacts being damaged. Ali Civil is a culturally aware, Local, Indigenous company and our staff understand the importance of preserving aboriginal heritage and culturally significant sites.

If shell middens, stone artifacts, or any other significant item is identified, the work is to cease, the area be barricaded off and sign posted to ensure no further damage is incurred. The SCC project manager will be notified so the appropriate steps can be undertaken and an incident report will be generated. This information will be available in the Environmental management plan and will form part of the site-specific induction.

Vegetation Removal

There is vegetation that will need to be trimmed or removed for the installation of the new boardwalk. ALI Civil will undertake a walk through with both DPI and Peter Dalmazzo to identify and tag the mangroves trees which are to be trimmed. Additionally, Mature trees which will require the boardwalk to deviate will also be tagged to assist the design team in compliance with the DPI permit conditions. A vegetation removal plan, with Nearmap imagery, and site photos will clearly identify the vegetation which has been approved for removal. The vegetation that is to be removed to facilitate the construction will be done so in accordance with AS4373-2007 and only vegetation identified by DPI and noted on the Vegetation removal plan will be removed. This will need to be undertaken prior to the development of the design.

These images identify locations where vegetation will need trimming or removal and where the boardwalk will need to deviate to accommodate mature Mangroves.

Sediment, Erosion and Water Quality

During construction it will be imperative to keep disturbance of the soils and mangrove mud flats to a minimum. The damaged caused by failing to manage this risk could cause irreparable effect to this fragile ecosystem. ALI Civil will be installing 2 x sets of 4m long x 0.6m wide aluminium working platforms along each side of the boardwalk. These will have 500mm long ground spikes fabricated to the bottom of the platforms which will allow them to be installed with clearance above the fragile mangrove, roots, seedlings and shoots. This will keep our staff from "pugging" the soil profile and potentially exposing the ASS soils to oxygen which could lead to environmental impact. A light gauged; floating silt curtain will be installed around each work section after the working platforms have been installed. This will encompass the set of piles and decking section which is being constructed and the set of piles and existing boardwalk which is to be demolished. This will manage any minor sediment or soil disturbance created and will capture both demolition and construction debris. The debris will be removed as soon as possible or as the tide permits.

The site compound and storage area will have a layer of geo fabric installed prior to the installation of a 150mm layer of DGS20mm road base hardstand. The perimeter of the compound will have temporary fencing installed and sediment fencing on three sides to contain any site runoff. A layer of geofabric will be installed on the hardstand and will be pinned down to ensure protection of the FRP material but also to capture all FRP debris which is generated from cutting, drilling and assembly prior to installation. During excavation of the new footpath sections, coir logs and silt traps will be installed at release points to capture any runoff sediment. The excavated material will be utilised onsite where practical, these reuse areas and either side of the footpath will be regenerated with topsoils and turf.

At the completion of the project work, sediment controls will remain in place until the regeneration work has established. All environmental controls will be in accordance with the blue book 2017. The above information will be available in the Environmental management plan and will form part of the site-specific induction.

Working Around Mobile plant

Working around moving plant will be one of the highest risk activities of this project. Due to the limited access that the "top down" construction methodology creates, our staff will have to work inside the swing radius of the screw piling excavator. The ground staff and operator will communicate directly through the open canopy excavator via the "Show hands" method. Our teams have been working together for over 8 years and they have developed an intuitive relationship with each other. They have the ability to predict movements or actions which allows them to be ahead of incident risk. All plant which will be used to facilitate the work will have a plant risk assessment available on site for the operator to review prior to commencement. All operators will have verification of competency via an independent assessor. Lifting equipment required to undertake the work will have current test and certification. This information will be available in the Safety management plan and will form part of the site-specific induction. Our SWP "working around mobile plant" will be implemented and discussed at the daily tool box meeting.

Fuel and Hydraulic Oil Spills

Due to proximity of the waterway, there is risk of an accidental hydrocarbon fluid release from hydraulic line ruptures on plant and machinery. Ali Civil operates a fleet of late model, well maintained, plant and equipment. Repair and maintenance records for all or plant and equipment are available from our onsite management system. Onsite fuel will be stored in a bunded area within the site compound or a service vehicle and removed at the completion of the day. A 270ltr marine spill kit will be available onsite for the duration of the works to react to a accidental Hydrocarbon fluid release. Ali Civil staff have undergone training in the deployment of Hydrocarbon spill kits and marine spill booms. All plant and equipment will be refuelled on hardstands away from the water with a 50ltr spill kit present. Any spill will be reacted to immediately, recorded via our environmental incident report and will be provided to the project manager. The above information will be available in the environmental management plan and will form part of the site-specific induction.

Interaction with the Public

The works will be undertaken within the Jervis Bay Maritime Museum Site. The boardwalk materials, demolition waste and staff access will be through the museum carpark and along the Shoalhaven water access track. All the construction materials will need to be unloaded in the museum carpark and transported to site via the access track. The museum see's considerable volumes of people attending the site both during the week and on weekends. ALI Civil will develop a Traffic control plan which will manage the traffic within the carpark as well as notification of truck movements on Woollamia Rd.
Pedestrian access to the boardwalk will be closed at both the Northern end of the JBMM fish pond and the museum access point. Signs notifying the public of the closures will be posted in both the museum carpark and the Dent St carpark, Further signage will be posted at the closure points. This information will be available in the safety management plan and will form part of the site-specific induction

Underground REMS Trunk Main

The access to and from the Boardwalk and the site compound is directly over the Myola recycled effluent management system trunk main which crosses Currambene creek. This main will require protection for the duration of the work to ensure it is not impacted. The main will be located electronically and potholed at 15m intervals via hydrovac methods to identify the mains depth and alignment. The boardwalk materials and compound materials will be transported to site with a forked Terex PT120 track loader which has a 600mm track width. The large track width will evenly distribute the machine and material loads. Service utes will be allowed to traverse the track but trucks will be excluded due to the point loading of narrow tyres.

Construction Methodology

Preliminaries

Execute contractual obligations.
Meeting with council staff and DPI to discuss requirements and expectations.
Site meeting with DPI, Council, Peter Dalmazzo to identify the alignment and tree trimming and/or removal.
Develop REF for consideration in design.
Safety in design report.
DDA Compliance report.
Undertake 50% design and review with Council and DPI.
Undertake 90% design and review with council and DPI.
Provide IFC drawing and design certifications
Develop comprehensive CEMP and a sediment and erosion control plan.
Assist Council with DPI application
Scheduling and procurement of critical path materials and subcontractors.
Develop Project WHSMP, QMP and ITP.
Create a Vegetation removal plan.
Create a comprehensive site-specific induction which highlights the WHS and environmental risk associated with working at this site.
Material certification.
Obtain DBYD plans.
Revised Program as required.
Ensure all safety, environmental and quality assurance controls have been made available to the project construction team.
Stake holder pre-commencement meeting.

Site Establishment

- Installation of traffic controls.
- Site fencing to site compound and high activity areas.
- Installation of Pedestrian controls and directional signage.
- Installation of sediment and erosion controls.
- Establishment of site office, amenities area and hardstands.
- Service locations and Hydrovac identification.
- Provision of power and water to the site for the project duration.
- Establishment of site storage container.
- Float of required plant and equipment.
- Identification of vegetation to be removed.
- Identification of vegetation to be preserved.

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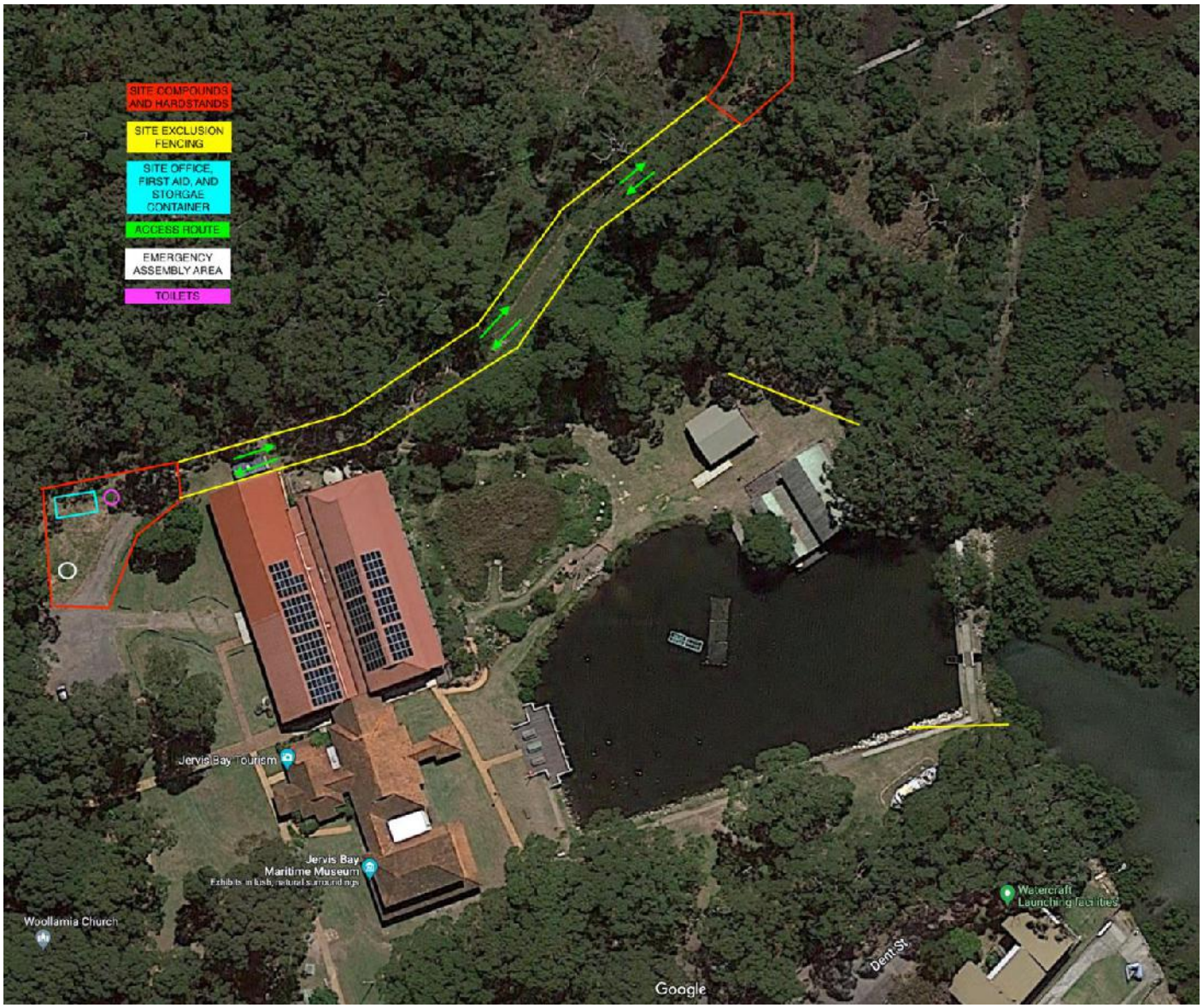
Site Layout Plan



Boardwalk Construction

The boardwalk construction will be a systematic process and will be compliant with the environmental conditions of construction that will be applied through the DPI permit.
All vegetation will be trimmed and removed from site as the boardwalk construction progresses.
The 4 x 4m x 0.6m aluminium working platforms will be installed either side of the boardwalk to provide safer access and reduce the impact to the Soil profile and mangrove shoots. A silt curtain with a floating hydrocarbon boom will be installed around the section of boardwalk to be constructed prior to demolition. Demolition of the boardwalk will commence at the first set of piles, the decking and joists will be removed working back to the abutment. This material will be placed into a site transport trolley and taken to the hardstand area where it will be palletised for removal by the track loader. The piles will be cut off above the marine growth and will follow the same process. All material required for the construction of the boardwalk will be delivered from the JBMM carpark to the construction hardstand via the Track loader. Set out of the new pile location will be undertaken off the working platforms and the SS helical screw piles will be transported to site on the transport trolly. A screw pile installation jig will be installed and will require the installation of 4 x 900mm long positioning and securing stakes. A 3.8T Excavator with a hydraulic drive motor will pick up the Screw piles and locate them to their installation position. The installation of the screw piles will be monitored for plumb and alignment quality assurance and will be driven to achieve 6kN. This information will be recorded in a pile log and provided to the certifying engineers. The Pile and headstock connections will be fully assembled at the hardstand. 2 x 154mm SHS FRP's and dual 200mm x 100m SHS FRP Headstocks and bracing will be brought to site via the transport trolley and installed with the 3.8T excavator. The SHS piles will be installed over the 600mm long screw pile stubs and pushed into the soil profile to ensure no pile steel is in the tidal exposure zone. The piles will be drilled onsite and 2 x 16mm SS bolts will be installed through both members of each pile. The 154mm FRP piles will have 2mm clearance around the 141mm screw pile SHS section. There will be temporary longitudinal bracing installed at every fourth boardwalk section to ensure the boardwalk is adequately supported during construction.

Once the piles and headstocks are installed the Joist will be cut at the hardstand area, transported by trolly and secured using Wagners proprietary SS angle brackets and SS fixing screws. In locations where the boardwalk walk is to change direction, the secondary headstock will carry the joist independently to the first allowing the realignment from one section to another. In locations where the alignment is to dramatically change ie. around a tree, the piles and headstock will be duplicated in parallel to whatever the required length of deviation is. This can be up to 1.6m. Once the joists have been secured the mesh decking will be installed, this will be fastened adequately enough to continue with the installation of the substructure. Temporary decking protection ply will be installed prior to the excavator progressing and there will be 2 additional sheets behind it to manage material handling of the piles, joist and decking before installation. The first set of working platforms will be shifted to the next removal and Installation area followed by the silt curtain and floating hydrocarbon boom. This will be repeated throughout the entirety of the boardwalk installation.

Viewing platform Construction

The viewing platforms will be constructed with a similar methodology. The section of boardwalk which will form part of the viewing platform will be constructed first enabling access to the viewing platform section. The aluminium working platforms will be installed to provide safe access and will limit impact to the mud flats and mangrove shoots.

The silt curtain and floating hydrocarbon boom will be installed allowing the set out and installation of the SS Screw piles at max 3m centres. The pre-assembled pile and headstock sections will be installed and fixed through the SS screw pile stub with 2 x 16mm SS bolts. The joist will be measured and cut back at the construction hardstand, transported to site, and fixed with the Wagners SS brackets and SS fixing screws. The viewing platform sections will be barricaded with temp fencing to allow construction to continue. The decking for these sections will be installed after the handrail has been completed.

Handrail Installation

The handrail installation will commence from the end of the new boardwalk and will progress back to the abutments. at the location of the Boardwalk intersection, a second installation team will commence. The boardwalk decking will cut to suit the handrail post locations, the posts will be bolted with 12mm SS through the headstock and joists. The decking will be reinstated and permanently secured with Wagners SS decking fixings. The mid rail, top rail and SS handrail will be installed and secured with Wagners proprietary ss fixing brackets and SS riverts.

Interpretive Signage

The interpretive signage will be installed on SS brackets which are to be connected to the Handrail posts of the right side of the boardwalk. The SS brackets will be fabricated to display the sign as its floating 400mm off the hand rail. The signs on the left-hand side of the boardwalk will be installed on driven 65mm x 4mm SHS SS post which will be powder coated to blend into the surrounding environment, again appearing to be floating. The sign design will be carried out by The Interpretative design company from Coffs Harbour and will involve members from the Wreck bay and Jerringa Aboriginal communities to provide indigenous cultural content as well has content around hunting and gathering. Signage will also include information about the mangrove system and its life cycle, mud flats, Fish species, mud crabs, crustaceans, shellfish and significant ecological communities.

Site Restoration, Defects and Demobilisation

Areas outside the revegetation area which have been impacted will be topsoiled and Grass seeded. The project site will subject to a final inspection from the SCC project manager and any defect notices issued will be rectified prior to demobilisation.
All offices, site sheds, hardstands, Temp access, traffic controls and amenities will be removed from site prior to the final restoration works being completed.

Project personnel

The project will be resourced entirely with Ali Civil staff who have comprehensive understanding and experience in these types of boardwalk installations. The following staff will be part of the Project team for the duration of the works. Additionally, 2 qualified subcontractor carpenters that have worked with us on previous boardwalks will form part of the team.

From: Marty Hing <marty.hing@dpi.nsw.gov.au>
Sent: Friday, 29 July 2022 3:01 PM
To: Roslyn Holmes; Matt Dasey; Carla Ganassin
Subject: HPECM: RE: Lady Denman Reserve Mangrove Boardwalk

Hi Ros,

A few points from DPI Fisheries perspective below. Also, the approval decision for the marine park permit will likely be made at director level, not director general. The process is to apply for a permit to harm marine vegetation and a marine park permit on the same application form. Please direct the successful tender to the application form here: https://www.dpi.nsw.gov.au/fishing/habitat/help/permit. The form can be submitted to ahp.central@dpi.nsw.gov.au. The marine park part of the application will be assessed locally and handed up to director level for approval. This all happens at our end, so the only thing the applicant's need to be aware of is the greater time factor – just get the application in ASAP. Apologies, I can't give a clear time frame.

The proposed boardwalk upgrade will occur in Currumbene Creek Sanctuary Zone of Jervis Bay Marine Park. This type of zone has the highest level of protection in the marine park and it is prohibited to harm plants, animals, or to disturb material in the zone without consent. Consent can be given for a limited range of purposes. The upgrade of the boardwalk for "public safety" would be a suitable purpose (MEM(MR)R 1999; s1.11 (2)) and the work proposal should be framed with this in mind.

The project seems to be mainly an upgrade of an existing facility for public safety and universal access. Separate to the upgrade, a proposed extension of the walkway with new platforms is also within the design brief. The relationship of the 'new work' will need to demonstrate a link to the provision or improvement of public safety. For example, universal access requiring the provision of spaces to ease congestion and for congregation.

A permit for the works will depend on an assessment of a detailed plan for the project. However, in general DPI Fisheries, would be more likely to support a structure that conforms with the following principles:

Approvals

- A marine park permit under the *Marine Estate Management Act 2014* will be required to harm habitat and vegetation in a sanctuary zone.
    - This will require Director approval which will take longer than the standard 6 week approval time for marine park permits
- A Fisheries permit under s.205 of the *Fisheries Management Act 1994* will be required to harm marine vegetation.

General Design Principles

- The upgrade follows the path of the existing boardwalk
- The deck of the walkway is composed of an appropriate mesh that allows light to pass through
- The works do not use antifoul preparations on any fixed structures or bio-toxic metals (such as copper, lead or tin) that are in contact with the substratum.
- Does not allow or encourage access onto the mudflats (i.e. below mean high water mark (MHWM)).
    - [Emergency egress ladders may be considered]
- The granting of approval of any new areas of walkway (the platforms) will depend on their purpose being for 'public safety'.
- For the new 'saltmarsh walkway'
    - For the purpose of 'environmental protection' DPI Fisheries is supportive in principle of the discussed additional ~20m of raised walkway across saltmarsh at the Northern entry/exit point of the current boardwalk.

Construction Method Principles

- Demolition and construction of new walkway must be conducted from above MHWM within the existing footprint of the boardwalk
- Existing piles should be cut at ground level and new piles screwed adjacent
    - An acid-sulphate soils management plan must be prepared for these works
- Construction waste (e.g offcuts) must be contained within the worksite and removed.
- Cutting or grinding swarf of any kind should not enter the intertidal areas (mudflat or waters).
- Waste or swarf that cannot be kept from entering the intertidal area will need to be retrieved in a timely manner
- Machines will not be permitted to traverse the mudflat / saltmarsh
- Trampling of the mudflat / saltmarsh is to be constrained to the work area

Environmental Harm Minimisation Principles

- Strategies for the minimisation of disturbance to sediment, plants and animals during the construction work will be required.
    - DPI / Fisheries will require a capacity to inspect the worksite to ensure these strategies are being implemented.
- Excavation of the mudflat must be avoided or minimised.
- Damage to mangroves and saltmarsh may be necessary, but must be minimised. An offset process will be considered for the removal of marine vegetation.
- For the upgrade of the *existing* boardwalk:
    - Removal of mature mangrove trees is not likely to be supported
    - Trimming of mangroves for public safety is likely to be supported
    - Trimming of mangroves to allow construction activity and walkway footprint is likely to be supported but must be minimised.
    - Removal of mangrove seedlings should be avoided or minimised
- For the *extension* of the boardwalk (the new platforms)
    - Removal of mature mangrove trees is not likely to be supported
    - Minor trimming of mangroves for public safety is likely to be supported
    - Trimming of mangroves to allow construction activity and new platform footprints will need a detailed assessment and might not be approved.
    - Removal of mangrove seedlings will need a detailed assessment and might not be approved.

Martin Hing
Marine Ranger
Aboriginal Fishing & Marine & Coastal Environments | Marine Operations
Department of Regional NSW

T 02 4428 3003 **M** 0436 327 915 **E** marty.hing@dpi.nsw.gov.au

regional.nsw.gov.au

4 Woollamia Rd
Huskisson NSW 2540

Department of Primary Industries
Department of Regional NSW

NATIVE TITLE FUTURE ACT
REFERRAL NOTICE
(Standard Form of Notice, Request for Comment or Approval)

To: NTSCorp
PO Box 2105
Strawberry Hills NSW 2012

Email: information@ntscorp.com.au

On behalf of: The South Coast People

Date of Issue: 03/12/2020

For Enquiries Contact:

Name:	Trevor Cronk – Manager Property Unit
Email:	trevor.cronk@shoalhaven.nsw.gov.au
Telephone Number:	02 4429 3474
Council Reference Number:	D20/534972 57995E/1

THE ACTIVITY OR TRANSACTION

Description of the activity or transaction: replace and upgrade the Jervis Bay Maritime Museum boardwalk through the mangroves.

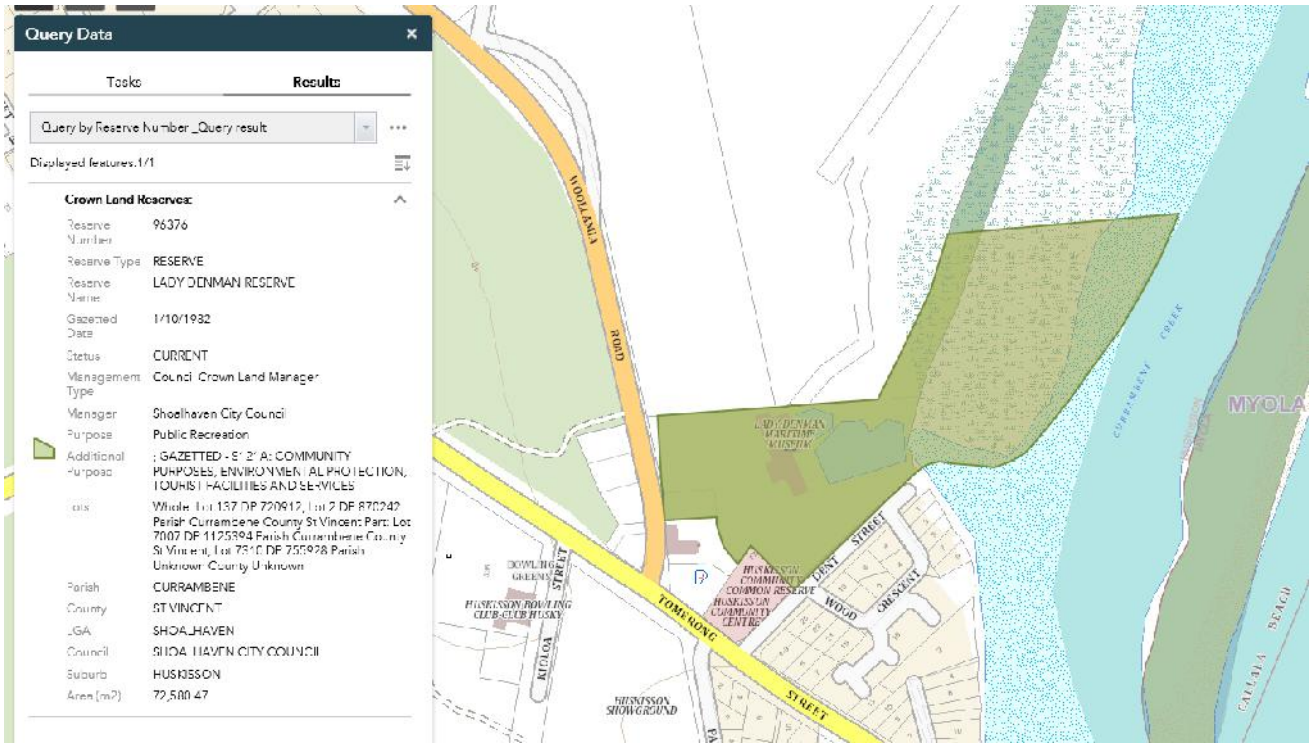
List supporting documentation attached:

Proposed works:

1. width to be increased to 1800
2. width increase will require realignments to avoid mature mangroves
3. first reliance is on existing piles however these may be deteriorated below ground, further investigation by withdrawal of samples if grant funds are received.
4. some new piles will be needed to accommodate realignments due to extra width.
5. kerbs both sides, handrail with top rail and mid rail to one side, may alternate with overlap if needed to avoid mature mangroves
6. approx. 36 square metre education / seating bays adjoined to existing board walk on new piles, two locations, one near the junction and one out near the end.
7. one approx. 36 square metre education / seating bay adjoined to existing western board walk on new piles close to land near river mangroves.
8. all education /rest areas at same height as boardwalk to discourage access to mud flats. handrails and seating to education / rest bays.
9. existing end rest and seating bay footprint remains, no closer to creek and no closer to mangroves either side.
10. intersection footprint to be increased to provide better circulation at this junction.
11. western leg to be extended at the land connection approx. 40 m to alleviate existing wear paths in grassed area.
12. deck material may be of solid nature as daylight for sea grasses is not applicable and width and orientation allows good light underneath.
13. construction methodology to adopt a no work on mud flat criteria, that is work in forward direction from replaced sections.
14. land based pathways to remain as is.
15. informative signage on boardwalk and directional signage on pathways to be enhanced

LAND AND WATERS AFFECTED BY THE PROJECT OR TRANSACTION

No.	**Address** (eg 1 Sydney Street, Sydney)	**Identification details** (Lot/DP, folio identifier, certificate of title or book and volume numbers)	**Reserve No & Purpose**
1	Currambene Creek	Part FI 7310/755928	Part R96376 – Public Recreation – GG1/10/1982



LEGISLATION

Applicable future act option under the Native Title Act 1993: Subdivision J (Reserves & Lease Land)

24JA(1)(a)	Valid earlier act that took place before the later act and on or before 23 December 1996	Yes	Reservation gazetted – 1/10/1982
24JA(1)(b)	The earlier act was valid (including because of Div. 2 or 2A)	Yes	Gazettal Notification
24JA(1)(c)	The earlier act was done by the Crown	Yes	By Minister
24JA(1)(d)	The earlier act contained, made or conferred a reservation, proclamation,	Yes	Reserved for Public Recreation

	dedication ……under which……to be used for a particular purpose		
24JA(1)(e)	The later act is done in good faith under or in accordance with the reservation	Yes	The proposed replacement of the boardwalk is in line with the public using the reserve for recreational activities
Procedural right of "comment" triggered given the act falls within the meaning of a "public work". Means: • ……any of the following that is constructed or established by or on behalf of the Crown, or a local government body…: A building, or other structure (including a memorial) that is a fixture……			

THE ACTIVITY WILL COMMENCE ONLY AFTER NOTIFICATION, CONSIDERATION OF ALL COMMENTS &/OR APPROVAL WHERE APPLICABLE

Please provide comments/approval in respect to the proposed future act/s outlined above. All comments/approvals are to be in writing and must be received by the person noted below no later than:

06/01/2021

Please send your comments &/or approval to:

The CEO
Shoalhaven City Council
Attention: Native Title Manager
council@shoalhaven.nsw.gov.au
Or PO Box 42, Nowra NSW 2541

NSW Fisheries Management Act

NSW Biodiversity Conservation Act
&
Australian Environment Protection and Biodiversity Conservation Act

Threatened Species Assessments

for

Demolition and Replacement of Existing Mangrove Boardwalk Currambene Creek Huskisson

PROPONENT: SHOALHAVEN CITY COUNCIL

PREPARED BY: PETER DALMAZZO

VERSION & DATE: 3 MAY 2023

Peter Dalmazzo Environmental Consultant
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Contents

1 INTRODUCTION

These threatened species assessments consider potential impacts of the proposed demolition and replacement of an existing boardwalk through mangroves in Currambene Creek at Huskisson, as described in the review of environmental factors to which this assessment is attached. Shoalhaven City Council is the proponent for the activity. NSW Department of Primary Industries is a determining authority for the activity. The assessments are required by the NSW Fisheries Management Act 1994, the NSW Biodiversity Conservation Act 2016 and the Australian Environment Protection and Biodiversity Conservation Act 1999.

NSW Fisheries Management Act 1994

Section 221ZV of the Fisheries Management Act 1994 requires that the matters in Section 3 below are to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species, populations or ecological communities, or their habitats, and therefore whether or not a species impact statement and concurrence/consultation with the Fisheries Agency Head/Minister for Primary Industries is required. The assessment in Section 3 has been carried out using the assessment guidelines approved by the Minister for Primary Industries under section 220ZZA of the Fisheries Management Act 1994 (NSW Department of Primary Industries, 2008). Information on habitats and life history is from the NSW Department of Primary Industries threatened species website as well as other cited sources.

NSW Biodiversity Conservation Act 2016

Section 7.3 of the Biodiversity Conservation Act 2016 requires that the matters in Section 4 below are to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. The test of significance in Section 4 has been carried out using the assessment guidelines approved by the Minister for the Environment under section 7.3(2) of the Biodiversity Conservation Act (NSW Office of Environment and Heritage, 2018).

Australian Environment Protection and Biodiversity Conservation Act 1999

Actions that are likely to have a significant impact on a matter of national environmental significance, or are being undertaken on or would have an effect on Commonwealth land, are known as protected matters and may require approval under the Australian Environment Protection and Biodiversity Conservation (EPBC) Act. The EPBC Act identifies nine matters of national environmental significance:

- world heritage properties;
- national heritage places
- Ramsar wetlands of international importance;
- listed threatened species and ecological communities;
- migratory species protected under international agreements;
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

Assessment of the likelihood of there being significant impacts and therefore whether or not the matter should be referred to the Australian Government Minister for the Environment is set out in Section 5 below. The assessment has been carried out using EPBC Act Policy Statement 1.1 Significant Impact Guidelines—Matters of National Environmental Significance (Australia Government, 2013).

2 METHODS

To inform the preparation of these assessments, relevant existing information was collated and reviewed, including previous studies, maps and air photographs. Initial assessment of habitats and vegetation communities was made by interpreting recent aerial photographs available on the Internet at nearmap.com.au and at NSW Spatial Information eXchange (SIX) Viewer. Measurements were made using the measurement tools on those web sites and by estimation on site. Ground-truthing of aerial photograph interpretation was carried out during field observations of terrestrial and aquatic habitats at the site and surrounding areas. The site was inspected by the author near local low tide on Tuesday 11 April 2023 between 6:30am and 9:00am AEST. The weather was mostly cloudy with light wind and cool to mild air temperature. Above-water observations were made from the shore and from the boardwalk, path and road. Records were made of the nature of the vegetation and habitats present at the site and of plant and animal species that were observed. A plant species list was compiled and targeted searches of suitable habitat were made for the following threatened plant species that appeared in NSW Bionet Atlas search results and/or are known to occur near estuary and foreshore areas in the Shoalhaven region:

Lepidium foliosum	Leafy Peppercress
Wilsonia backhousei	Narrow-leafed Wilsonia
Wilsonia rotundifolia	Round-leafed Wilsonia
Chamaesyce psammogeton	Sand Spurge
Distichlis distichophylla	Australian Saltgrass
Galium australe	Tangled Bedstraw
Thesium australe	Austral Toadflax
Syzygium paniculatum	Magenta Lilly Pilly

To establish whether or not vegetation types on the sites should be classed as endangered ecological communities, their characteristics (plant species, soil, landform) were compared with descriptions in relevant determinations of the threatened species scientific committee.

Where clearing would be required the following tasks were conducted as part of the site assessment:

- vegetation description
- searches for threatened flora
- habitat assessment for threatened fauna (hollow-bearing/mature trees, fallen woody debris; termite mounds; rocky outcrops, etc.)
- searches for signs of occupancy by fauna (eg, scats, scratches, tracks, nests, dreys, nocturnal roost sites, accumulations of “white wash”, owl pellets, evidence of feeding by birds or ground-dwelling mammals, such as shredded plant material or fallen flowers, or any other evidence of fauna occupying the study area).

3 NSW FISHERIES MANAGEMENT ACT ASSESSMENT OF SIGNIFICANCE FOR THREATENED SPECIES, POPULATIONS OR ECOLOGICAL COMMUNITIES, OR THEIR HABITATS

3.1 Threatened Species

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

Several saltwater species listed as threatened in the schedules to the Fisheries Management Act 1994 are known to have occurred on the south coast of NSW:

- critically endangered species - Greynurse Shark and the slug *Smeagol hilaris*
- endangered species - Cauliflower Soft Coral, Southern Bluefin Tuna, Scalloped Hammerhead Shark, Australian Grayling and White's Seahorse
- vulnerable species - Great White Shark and Black Rockcod
- presumed extinct in New South Wales - Green Sawfish

Greynurse Sharks *Carcharias taurus* (Critically Endangered) are found predominantly in inshore coastal waters. They have been recorded at various depths, but are mainly found in waters between 15 and 40 metres deep. Greynurse sharks gather at a number of key sites along the coasts of NSW and southern Queensland. These sites have gravel or sand filled gutters, rocky reefs or caves, and are called aggregation sites (NSW Department of Primary Industries, 2013). Greynurse Sharks occasionally enter estuaries. The subject site is not a known aggregation site for Greynurse Shark and the species is extremely unlikely to occur there. In the unlikely event that a Greynurse Shark was present in the vicinity at the time of construction or operation of the facility, it would be expected to swim away in response to the disturbance with little consequent disruption to its life cycle. The proposed activity is unlikely to significantly affect the life cycle of this species.

Smeagol hilaris (Critically Endangered), a pulmonate slug, had until recently only been collected from a small isolated location at Merry Beach, south of Ulladulla. A new population was recently found at Storm Bay, Kiama. Pulmonate slugs have developed lungs instead of gills and can breathe air. *Smeagol hilaris* lives in gravel and cobble filled rocky crevices and within coarse gravel under surface of cobbles and boulders. Little is known about its ecology or reproductive biology. No suitable habitat is present at the subject site. The proposed activity would have no effect on the life cycle of this species.

Cauliflower Soft Coral - *Dendronephthya australis* is usually a bright reddish pink colour and forms bushy colonies. The only estuaries where Cauliflower Soft Coral is known to grow in abundance are Port Stephens and the Brisbane Water area of Hawksbury River. They have been found sporadically in other locations including Jervis Bay. The species is predominantly found in estuarine environments in NSW at depths of 1 – 15 m, however, it occasionally occurs offshore down to depths of 30 m. It is generally found in areas of sandy seabed where there is high current flow. No suitable habitat is present at the subject site. The proposed activity would have no effect on the life cycle of this species.

Southern Bluefin Tuna *Thunnus maccoyii* (Endangered) are pelagic fish occurring in oceanic waters normally on the seaward side of the continental shelf. No suitable habitat is present at the subject site. The proposed activity would have no effect on the life cycle of this species.

Scalloped Hammerhead Shark *Sphyrna lewini* (Endangered) is a coastal pelagic species with a circumglobal 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 (NSW Department of Primary Industries, 2012a). In the extremely unlikely event that a Scalloped Hammerhead Shark was present in the vicinity at the time of construction or operation of the facility, it would be expected to swim away in response to the disturbance with little consequent disruption to its life cycle. The proposed activity is unlikely to significantly affect the life cycle of this species.

Australian Grayling *Prototroctes maraena* also known as the Cucumber Mullet or Cucumber Herring is a small to medium-sized slender fish that is endemic to south-eastern Australia. It is a migratory species that spawns in the lower freshwaters of coastal rivers and spends approximately 6 months in coastal seas as larvae/juveniles before migrating back into freshwater rivers and streams where they remain for the rest of their lives (NSW Department of Primary Industries, 2015a). Australian Grayling has historically been recorded in the nearby Shoalhaven River system but not for some time. In the extremely unlikely event that Australian Grayling were present in the vicinity at the time of construction or operation of the facility, it would be expected to swim away in response to the disturbance with little consequent disruption to its life cycle. The proposed activity would not affect migration of this species. The proposed activity is unlikely to significantly affect the life cycle of this species.

White's Seahorse *Hippocampus whitei* is considered to be endemic to the waters of southern Queensland (Hervey Bay) to Sussex Inlet NSW where it can be found occurring in coastal embayments and estuaries. It is known to occur from depths of 1 m to 18 m. Habitats that are considered important habitat for the White’s Seahorse include natural habitats such as sponge gardens, seagrass meadows and soft corals. It is also known to use artificial habitats such as protective swimming net enclosures and jetty pylons but the intertidal boardwalk piles are not expected to be suitable habitat for this species. The proposed activity is unlikely to significantly affect the life cycle of this species.

Great White Sharks *Carcharodon carcharias* (Vulnerable) 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 (NSW Department of Primary Industries, 2005a). In the extremely unlikely event that a Great White Shark was present in the vicinity at the time of construction or operation of the facility, it would be expected to swim away in response to the disturbance with little consequent disruption to its life cycle. The proposed activity is unlikely to significantly affect the life cycle of this species.

Black Rockcod *Epinephelus daemelii* (Vulnerable) live in relatively shallow rocky reefs where they are usually found in caves, ledges, gutters and beneath bommies. The Black Rockcod is territorial and lives for years in the same place (Henrisson and Smith, 1994). The site of the proposed facility is unlikely to provide suitable habitat for adult

Black Rockcod. Large juveniles are sometimes found around rocky reefs in estuaries (NSW Department of Primary Industries, 2015b & 2012b). In the unlikely event that a juvenile Black Rockcod was present in the vicinity at the time of construction or operation of the facility, it would be expected to swim away in response to the disturbance with little consequent disruption to its life cycle. The proposed activity is unlikely to significantly affect the life cycle of this species.

Green Sawfish *Pristis zijsron* (Presumed Extinct in NSW) live on muddy or sandy-mud soft bottom habitats in inshore areas mainly in the tropics. They also enter estuaries, where they have been found in very shallow water. It has been recorded on the NSW south coast including in Jervis Bay, but the last confirmed sighting of the green sawfish in NSW was in 1972 from the Clarence River at Yamba (NSW Department of Primary Industries, 2005b). In the extremely unlikely event that a Green Sawfish was present in the vicinity at the time of construction or operation of the facility, it would be expected to swim away in response to the disturbance with little consequent disruption to its life cycle. The proposed activity is unlikely to significantly affect the life cycle of this species.

Overall, the proposed activity would not be likely to have a significant adverse effect on the life cycle of any threatened fish species such that a viable local population of the species is likely to be placed at risk of extinction.

3.2 Threatened Populations

(b) in the case of an endangered population, whether the proposed development or activity is likely to have an adverse effect on the life cycle 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

No threatened populations listed in the Fisheries Management Act would be affected by the proposed activity.

3.3 Endangered Ecological Communities

(c) 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

No threatened ecological communities listed in the Fisheries Management Act would be affected by the proposed activity.

3.4 Habitat

(d) in relation to the habitat of a threatened species, population 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

(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

No habitat of a threatened species, population or ecological community listed in the Fisheries Management Act would be affected by the proposed activity.

3.5 Critical Habitat

(e) whether the proposed development or activity is likely to have an adverse effect on any critical habitat (either directly or indirectly)

No critical habitat listed in the Fisheries Management Act would be affected by the proposed activity.

3.6 Priorities Action Statement

(f) whether the proposed development or activity is consistent with a Priorities Action Statement

The Department of Primary Industries Priorities Action Statement (NSW Department of Primary Industries, 2017) provides an agreed list of strategies and actions that will assist to down-grade or de-list species, populations and ecological communities from the threatened species schedules of the Fisheries Management Act, as well as actions that will assist to abate or eliminate the impacts of key threatening processes. The Priorities Action Statement includes eleven recovery and threat abatement strategies:

- Research / monitoring
- Survey / mapping
- Collate and review existing information
- Habitat rehabilitation
- Enhance, modify or implement NRM planning processes to minimise adverse impacts on threatened species
- Habitat protection
- Advice to consent and determining authorities
- Community and stakeholder liaison, awareness and education
- Compliance / enforcement
- Stocking / translocation
- Pest eradication and control

The proposed activity is not inconsistent with these recovery and threat abatement strategies and actions.

3.7 Key Threatening Processes

(g) 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

Key threatening processes are the things that threaten, or could threaten, the survival or evolutionary development of species, populations or ecological communities. The eight key threatening processes listed under the Fisheries Management Act are presented in Table 1 along with an assessment of their relevance to the current proposal. Overall, the proposed activity is not likely to result in the operation of, or increase the impact of, a key threatening process to the extent that it could threaten

the survival or evolutionary development of any threatened species or ecological communities.

3.8 NSW Fisheries Management Act Conclusion

It is considered there is not likely to be a significant effect on threatened species, populations or ecological communities listed in the Fisheries Management Act, or their habitats, from the proposed activity and therefore a species impact statement is not required.

Table 1. Assessments of key threatening processes listed under the Fisheries Management Act

Key Threatening Process	Type of Threat	Assessment
Introduction of fish to fresh waters within a river catchment outside their natural range	Pest animal	The proposed activity would not introduce fish to fresh waters outside their natural range nor increase the impact of such fish.
Introduction of non-indigenous fish and marine vegetation to the coastal waters of New South Wales	Pest animal & Weed	The proposed activity would not introduce non-indigenous fish or marine vegetation to coastal waters nor increase the impact of such introductions.
Human-caused climate change	Habitat loss/change	A small amount of fossil fuel would be burnt to operate machinery, but the proposed activity would not significantly contribute to climate change.
Removal of large woody debris from New South Wales rivers and streams	Habitat loss/change	The proposed activity would not remove large woody debris from rivers or streams nor increase impacts from the removal of large woody debris.
Degradation of native riparian vegetation along New South Wales water courses	Habitat loss/change	There is potential for some impacts on native riparian vegetation as a result of works on the concrete path and the assembly compound. The areas are small and any damage caused shall be restored.
Installation and operation of instream structures and other mechanisms that alter natural flow of rivers and streams	Habitat loss/change	To minimise impacts on water flow, boardwalk piles would be widely spaced. The proposed activity would not alter natural flow of rivers and streams nor would it increase the impact of structures or mechanisms that alter natural flow of rivers and streams.
Current shark meshing program in New South Wales waters	Direct threat	The proposed activity is not a shark meshing program nor would it increase the impact of shark meshing programs.
Hook and line fishing in areas important for the survival of threatened fish species	Direct threat	The proposed activity is not hook and line fishing and is not likely to significantly increase the impact of hook and line fishing.

4 NSW BIODIVERSITY CONSERVATION ACT ASSESSMENT OF SIGNIFICANCE FOR THREATENED SPECIES OR ECOLOGICAL COMMUNITIES, OR THEIR HABITATS

4.1 Threatened Species

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

Using the NSW Department of Planning and Environment's BioNet website logged in as a licensed user, the Bionet Atlas was interrogated on 23 March 2023 for records of threatened species listed in schedules to the NSW Biodiversity Conservation Act and the Australian Environment Protection and Biodiversity Conservation Act that have been observed within a ten kilometre by ten kilometre area around the site. The results of the search are attached to this report. As assessed in Table 2 below, most of the animal and plant species from the Atlas search would not occur at the site or be affected by the proposal. No threatened plants or animals were observed at the site. However several species have potential to be affected and are therefore considered in more detail below the table.

Table 2. Assessments of likelihood of occurrence and potential to be affected for threatened species recorded in NSW Bionet Atlas within 10 km x 10 km area centred on the site.

NSW BC Act Status: V - Vulnerable, E1 - Endangered, E4A - Critically Endangered; P - Protected
^, ^^ species listed under the Sensitive Species Data Policy
Australian EPBC Act Status: V - Vulnerable, E - Endangered, CE - Critically Endangered

Scientific Name	Common Name	NSW status	Comm. status	Potential to be Affected
Heleioporus australiacus	Giant Burrowing Frog	V,P	V	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Deep leaf litter or loose, sandy soils as adult habitat. Breeding habitat is generally soaks or pools within first or second order streams. Low probability that adult may be affected during clearing. No breeding habitat would be affected. Unlikely to be affected.
Litoria aurea	Green and Golden Bell Frog	E1,P	V	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. There have been very few sightings near Huskisson. No suitable habitat would be affected. Unlikely to be affected.
Chelonia mydas	Green Turtle	V,P	V	Marine turtles may occasionally enter Currambene Creek estuary but are rarely likely to occur at the intertidal site. In the unlikely event that one of these animals was present in the vicinity at the time of construction or operation of the facility it would be expected to swim away in

				response to the disturbance with little consequent disruption to its life cycle. There would be no ongoing impacts on turtles. Unlikely to be affected.
Eretmochelys imbricata	Hawksbill Turtle	P	V	Marine turtles may occasionally enter Currambene Creek estuary but are rarely likely to occur at the intertidal site. In the unlikely event that one of these animals was present in the vicinity at the time of construction or operation of the facility it would be expected to swim away in response to the disturbance with little consequent disruption to its life cycle. There would be no ongoing impacts on turtles. Unlikely to be affected.
Hirundapus caudacutus	White-throated Needletail	P	V,C,J,K	Migratory and usually seen in eastern Australia from October to April. Breeds in northern hemisphere. Might occasionally forage at the site. Unlikely to be affected.
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P		Forages over in-shore waters. Might occasionally fly over or roost at the site. No large stick nest present. Unlikely to be affected.
Hieraaetus morphnoides	Little Eagle	V,P		Occupies open eucalypt forest, woodland or open woodland. Might occasionally fly over or forage at the site. No stick nest present. Unlikely to be affected.
Lophoictinia isura	Square-tailed Kite	V,P,3		Found in a variety of timbered habitats including dry woodlands and open forests with particular preference for timbered watercourses. Might occasionally fly over or forage at the site. No nest present. Unlikely to be affected.
Pandion cristatus	Eastern Osprey	V,P,3		Forages over in-shore waters. Might occasionally fly over or roost at the site. No large stick nest present. Unlikely to be affected.
Haematopus fuliginosus	Sooty Oystercatcher	V,P		Might forage or roost at the site. See further assessment below.
Haematopus longirostris	Pied Oystercatcher	E1,P		Might forage or roost at the site. See further assessment below.
Numenius madagascariensis	Eastern Curlew	P	CE,C,J,K	Might forage or roost at the site. See further assessment below.
Onychoprion fuscata	Sooty Tern	V,P		Found over tropical and sub-tropical seas and on associated islands and cays around Northern Australia. Occasionally seen along coastal NSW. Large flocks can be seen soaring, skimming and dipping but seldom plunging in off shore waters. In NSW only known to breed at Lord Howe Island. No suitable habitat at the site. Unlikely to be affected.
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3	E	In summer, generally found in tall mountain forests and woodlands. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands. Favours old growth attributes such as tree hollows for nesting and roosting. Might occasionally forage at the site. No breeding habitat would be affected. Unlikely to be affected.

^^Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2	V	Inhabits open forest and woodlands in which stands of she-oak (feed) species occur. Dependent on large hollow-bearing eucalypts for nest sites. Might occasionally forage at the site. No breeding habitat would be affected. Unlikely to be affected.
Glossopsitta pusilla	Little Lorikeet	V,P		Forages primarily in the canopy of open Eucalyptus forest and woodland. Might occasionally fly over or forage at the site. No nest present. Unlikely to be affected.
Lathamus discolor	Swift Parrot	E1, P	CE	Breeds in Tasmania. On mainland, occurs in areas where eucalypts are flowering profusely or where there are abundant lerp. Might occasionally fly over or forage near the site. Unlikely to be affected.
Neophema pulchella	Turquoise Parrot	V,P,3		Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Nests in tree hollows, logs or posts. Might occasionally forage at the site. No breeding habitat would be affected. Unlikely to be affected.
Pezoporus wallicus wallicus	Eastern Ground Parrot	V,P,3		Prefers low heathlands and sedgelands. Might occasionally forage at the site. Unlikely to be affected.
Ninox strenua	Powerful Owl	V,P,3		Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Nests in very large tree-hollows. Might occasionally forage at the site at night. No evidence of roosting. No breeding habitat would be affected. Unlikely to be affected.
Tyto novaehollandiae	Masked Owl	V,P,3		Lives in dry eucalypt forests and woodlands. A forest owl, but often hunts along the edges of forests, including roadsides. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. Might occasionally forage at the site at night. No evidence of roosting. No breeding habitat would be affected. Unlikely to be affected.
Tyto tenebricosa	Sooty Owl	V,P,3		Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night. Nests in very large tree-hollows. Might occasionally forage at the site at night. No evidence of roosting. No breeding habitat would be affected. Unlikely to be affected.
^^Dasyornis brachypterus	Eastern Bristlebird	E1,P,2	E	Habitat for central and southern populations of this species is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. Nests are elliptical domes constructed on or near the ground amongst dense vegetation.

				Might occasionally forage at the site. Unlikely to be affected.
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE	Might occasionally forage near the path. No breeding habitat would be affected. Unlikely to be affected.
Daphoenositta chrysoptera	Varied Sittella	V,P		Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Might occasionally fly over or forage at the site. No nest present. Unlikely to be affected.
Pachycephala olivacea	Olive Whistler	V,P		Mostly inhabit wet forests above about 500m. During the winter months they may move to lower altitudes. Might occasionally fly over or forage at the site. No breeding habitat would be affected. Unlikely to be affected.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. Might occasionally forage at the site. Most breeding activity occurs on the western slopes of the Great Dividing Range. Unlikely to be affected.
Petroica phoenicea	Flame Robin	V,P		Breeds in upland tall moist eucalypt forests and woodlands. In winter, birds migrate to drier more open habitats in the lowlands. Might occasionally fly over or forage at the site. Unlikely to be affected.
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	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. Might occasionally forage at the site at night. Unlikely to be affected.
Sminthopsis leucopus	White-footed Dunnart	V,P		Found in a range of different habitats across its distribution, including coastal dune vegetation, coastal forest, tussock grassland and sedgeland, heathland, woodland and forest. Might forage at the site at night. Unlikely to be affected.
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E1,P	E	Generally only found in heath or open forest with a heathy understorey on sandy or friable soils. Might forage at the site at dawn or dusk. Unlikely to be affected.
Phascolarctos cinereus	Koala	E1,P	E	Inhabits eucalypt woodlands and forests. No primary food tree species would be affected. Unlikely to be affected.
Cercartetus nanus	Eastern Pygmy-possum	V,P		Rainforest, woodlands and heath appear to be preferred. Might forage at the site at night. Unlikely to be affected.
Petaurus australis	Yellow-bellied Glider	V,P	V	Occurs in tall mature eucalypt forest including moist coastal gullies and creek flats. Dens in hollows of large trees. No feed scars were observed. No hollows would be affected. Unlikely to be affected.

Petauroides volans	Southern Greater Glider	E1,P	E	Typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. No hollows would be affected. Unlikely to be affected.
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. There was no Grey-headed Flying-fox camp at or near the subject site. Might forage at the site at night. Unlikely to be affected.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V,P		Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests. Might occasionally forage above the forest canopy or at forest edges at night. Roosts in tree hollows, under bark. No roosting habitat would be affected. Might forage at the site at night. Unlikely to be affected.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		Prefers moist habitats, with trees taller than 20m. Generally roosts in eucalypt hollows. No roosting habitat would be affected. Might forage at the site at night. Unlikely to be affected.
Myotis macropus	Southern Myotis	V,P		Roosts close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forages over streams and pools catching insects and small fish by raking their feet across the water surface. Might forage at the site at night. Unlikely to be affected.
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		Utilises woodland through to moist and dry eucalypt forest and rainforest but most commonly found in tall wet forest. Roosts in tree hollows and buildings. No roosting habitat would be affected. Might forage at the site at night. Unlikely to be affected.
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P		Occurs in rainforest, wet sclerophyll forest, dry sclerophyll forest, open woodland, Melaleuca forest and open grasslands. Hunts in forested areas, catching moths and other flying insects above the tree tops. Roosts in caves, derelict mines, stormwater tunnels and buildings. No roosting habitat would be affected. Might forage at the site at night. Unlikely to be affected.
Arctocephalus forsteri	New Zealand Fur-seal	V,P		Seals may occasionally enter the estuary but are unlikely to enter the intertidal mangrove forest. In the unlikely event that one of these animals was present in the vicinity at the time of construction or operation of the facility it would be expected to swim away in response to the disturbance with little consequent disruption to its life cycle. There would be no ongoing impacts on seals. Unlikely to be affected.
Arctocephalus pusillus doriferus	Australian Fur-seal	V,P		Seals may occasionally enter the estuary but are unlikely to enter the intertidal mangrove forest. In the unlikely event that one of these animals was present in the

				vicinity at the time of construction or operation of the facility it would be expected to swim away in response to the disturbance with little consequent disruption to its life cycle. There would be no ongoing impacts on seals. Unlikely to be affected.
Petalura gigantea	Giant Dragonfly	E1		Live in permanent swamps and bogs with some free water and open vegetation. Unlikely to be affected.
Wilsonia backhousei	Narrow-leafed Wilsonia	V		Grows on the margins of salt marshes and lakes. Not observed at the site. Unlikely to be affected.
Eucalyptus sturgissiana	Ettrema Mallee	V		The Ettrema Mallee is mostly restricted to the Northern Budawang Range in Morton National Park. Based on its location description, this record is incorrectly mapped. No records at the site. Not observed at the site. Unlikely to be affected.
Melaleuca biconvexa	Biconvex Paperbark	V	V	Grows in damp places, often near streams or low-lying areas. Not observed at the site. Unlikely to be affected.
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	Restricted mainly to remnant stands of littoral (coastal) rainforest. Not observed at the site. Unlikely to be affected.
^^Caladenia tessellata	Thick Lip Spider Orchid	E1,P,2	V	Found in grassy dry sclerophyll woodland. Not observed at the site. Unlikely to be affected.
^^Calochilus pulchellus	Pretty Beard Orchid	E1,P,2		In Vincentia grows in low Scribbly Gum dominated woodland with a low wet heath understorey. Not observed at the site. Unlikely to be affected.
^^Cryptostylis hunteriana	Leafless Tongue Orchid	V,P,2	V	Found in a range of communities, including swamp-heath and woodland. Not observed at the site. Unlikely to be affected.
^^Genoplesium baueri	Bauer's Midge Orchid	E1,P,2	E	Grows in dry sclerophyll forest and moss gardens over sandstone. Not observed at the site. Unlikely to be affected.
^^Prasophyllum affine	Jervis Bay Leek Orchid	E1,P,2	E	Grows on poorly drained grey clay soils that support low heathland and sedgeland communities. Not observed at the site. Unlikely to be affected.
^^Pterostylis ventricosa		E4A,P,2		Predominantly in more open areas of tall coastal eucalypt forest. Small moss gardens are a commonly associated micro-habitat feature in most habitats. Not observed at the site. Unlikely to be affected.
^^Rhizanthella slateri	Eastern Australian Underground Orchid	V,P,2	E	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest.. Not observed at the site. Unlikely to be affected.
^^Banksia vincentia		E4A,2	CE	Known from only one site at Vincentia. Low sedgeland and grassy heath, sometimes amongst emergent mallee *Eucalyptus gummifera* and other tall shrubs of *Banksia* and *Hakea*. Not observed at the site. Unlikely to be affected.
Macadamia integrifolia	Macadamia Nut		V	Occurs from Mt Bauple in south-east Queensland but was known to occur in north-east New South Wales. Not observed at the site. Unlikely to be affected.

The following species that have some potential of occurring at the site are considered further.

Marine Reptiles and Marine Mammals
Marine turtles may occasionally enter the Currambene Creek estuary but are rarely likely to occur at the site. In the unlikely event that one of these animals was present in the vicinity at the time of construction or operation of the facility it would be expected to swim away in response to the disturbance with little consequent disruption to its life cycle. There would be no ongoing impacts on turtles. Whales are extremely unlikely to enter the estuary. Seals may occasionally enter the estuary but are likely to keep away during construction. However an injured or unwell turtle, whale or seal might be reticent to leave the site if it has beached, hauled out or is resting there. In the unlikely event that a marine reptile or mammal was present at the site when the work was being done, the advice of the Jervis Bay Marine Park office should be sought on an appropriate course of action. The proposed development would not be likely to have an adverse effect on the life cycle of any threatened marine reptile or marine mammal species such that a viable local population of the species is likely to be placed at risk of extinction.

Water/Shore Birds
Pied and Sooty Oystercatchers, Eastern Curlew and other waders might feed in the area on this shoreline from time to time, though better quality, more extensive feeding areas occur elsewhere in the vicinity. Some birds might roost near the subject site from time to time. Impacts on foraging or roosting birds, should they be present while the work was being done, would be confined to indirect effects such as local noise disturbance for a number of hours each day that construction was underway. If any bird was present when construction commenced it is expected that their high mobility would enable them to relocate to undisturbed areas with little consequent impact on their life cycles. The site is already subject to disturbance from use of the existing boardwalk. Considering the small size of the area in relation to nearby available habitat, the proposed construction and operation would not constitute a serious disruption to the birds' life cycles. Disturbance of breeding sites is considered to be the main threat to viability of populations of some of these bird species. No species of shorebirds are likely to attempt to nest at the site. The proposed development would not be likely to have an adverse effect on the life cycle of any waterbird/shorebird species such that a viable local population of the species is likely to be placed at risk of extinction.

4.2 Threatened Ecological Communities

(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

Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Coastal Saltmarsh is a threatened ecological communities listed as endangered in Schedule 2 of the Biodiversity Conservation Act. At the nearshore end of the northern spur, the boardwalk passed through saltmarsh (Figure 1). Coastal Saltmarsh occupied the highest intertidal areas nearer to shore. Saltmarsh plants included Sea Rush *Juncus kraussii*, Bare Twigrush *Machaerina juncea*, Knobby Club-rush *Ficinia nodosa*, Saltwater Couch *Sporobolus virginicus*, Prickly Couch *Zoysia macrantha* and Warrigal Cabbage *Tetragonia tetragonioides*. There was an informal pathway through the saltmarsh by which people accessed the northern spur boardwalk.

The northern spur of the boardwalk would be extended landward by approximately 22m through this intertidal area of saltmarsh vegetation. There would likely be minor damage to some saltmarsh plants from the legs of the temporary work platforms during construction but it is expected that the plants would recover within a few months. As can be seen in Figure 1, at the time of this assessment some damage to saltmarsh was occurring from foot traffic in this location and the proposed new section of boardwalk would protect the saltmarsh from this damage in future. However, the proposed new section of boardwalk would occupy a plan area of approximately 40 square metres and consequently there would be some shading effects on saltmarsh plants. This impact would be mitigated by use of mesh decking on the boardwalk.

Based on assessment of a recent air photograph, the area of continuous local occurrence of this plant community is greater than 15,000 square metres, with larger areas nearby in the estuary. It is considered the affected area (40 square metres) forms a very small proportion of the amount of unaffected vegetation in the local occurrence. It is concluded that the proposed activity is not likely to adversely affect the extent nor substantially and adversely modify the composition of the endangered ecological community such that a local occurrence is likely to be place at risk of extinction.

Figure 1. View landward at location of proposed new section of boardwalk through saltmarsh, connecting existing northern spur to ground above intertidal area.

Bangalay Sand Forest of the NSW Sydney Basin and South East Corner Bioregions

The northern part of the concrete path (approximately 50m in length) passes through terrestrial vegetation that aligns with the description of Bangalay Sand Forest endangered ecological community. The dominant tree species was Bangalay *Eucalyptus botryoides* but there was a transition northward to forest dominated by Blackbutt *Eucalyptus pilularis*. The forest had a moderately dense, shrubby understorey. Species of plants observed in the terrestrial parts of the site are in Table 3.

To allow for construction of the widened path (from 1200 to 1800mm) some clearing of native vegetation and trimming of overhead branches would be required. Allowing for a 1000mm disturbed area on each side of the existing path, it is estimated that up to 100 square metres of vegetation would be affected, some of which would recover from damage. An additional area of approximately 100 square metres would be affected by construction of the small compound for assembly of the new boardwalk components at the head of the main boardwalk. Part of this would be on the existing path so the area of vegetation affected would be slightly less than the total footprint. As can be seen in Figures 2, 3 and 4, the vegetation to be cleared would mostly be groundcover plants, small shrubs and small trees. No large tree limbs and no limbs or trunks with hollows would need to be removed. Any pruning of vegetation shall be carried out in accordance with AS4373-2007 Australian Standard for the Pruning of Amenity Trees. No Bangalay trees would be removed. However, some parts of the concrete path are inside the structural root zone of several large trees. Construction in this zone could lead to root damage that would impact on the health and stability of

the trees leading to future issues with falling trees or branches. The trees shall be protected in accordance with AS-4970-2009 Australian Standard for Protection of Trees on Development Sites. If possible the path would be widened on the side away from the tree. If encroachment into the Tree Protection Zone cannot be avoided, root mapping and avoidance or protection of structural roots may be required.

The area of the local occurrence of this plant community was mapped in South East Local Land Service's Biometric map as occupying approximately 200,000 square metres. It is considered the affected area (200 square metres) forms a very small proportion of the amount of unaffected vegetation in the local occurrence. It is concluded that the proposed activity is not likely to adversely affect the extent nor substantially and adversely modify the composition of the endangered ecological community such that a local occurrence is likely to be place at risk of extinction.

Figure 2. Typical section of existing concrete path through coastal sand forest; to be replaced with 1800mm wide new concrete path.

Figure 3. Typical section of existing concrete path through coastal sand forest; to be replaced with 1800mm wide new concrete path.

Figure 4. Northern end of existing concrete path where it joins landward end of boardwalk (not visible on right). Hardstand for assembly of boardwalk components would be established in coastal sand forest here.

Table 3. Terrestrial plant species observed at the site, 11 April 2023.
* denotes introduced species

Family	Scientific Name	Common Name
Apocynaceae	*Parsonsia straminea*	Common Silkpod
Asparagaceae	*Asparagus asparagoides* *	Bridal Creeper
Asparagaceae	*Asparagus scandens* *	Asparagus 'Fern' *
Asparagaceae	*Lomandra longifolia*	Spiny-headed Mat-rush
Asphodelaceae	*Geitonoplesium cymosum*	Scrambling Lily
Asteraceae	*Bidens pilosa* *	Cobbler's Pegs *
Asteraceae	*Conyza sp* *	Fleabane *
Casuarinaceae	*Casuarina glauca*	Swamp Oak
Commelinaceae	*Commelina cyanea*	Scurvy Weed
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge
Dennstaedtiaceae	*Pteridium esculentum*	Bracken Fern
Dilleniaceae	*Hibbertia scandens*	Climbing Guinea Flower
Ericaceae - Epacridoideae	*Leucopogon parviflorus*	Coastal Beard-heath
Ericaceae - Epacridoideae	*Monotoca elliptica*	Tree Broom-heath
Fabaceae - Caesalpinioideae	*Senna pendula var. glabrata* *	Cassia *
Fabaceae - Faboideae	*Kennedia rubicunda*	Dusky Coral Pea
Fabaceae - Mimosoideae	*Acacia longifolia subsp. longifolia*	Sydney Golden Wattle
Fabaceae - Mimosoideae	*Acacia parvipinnula*	Silver-stemmed Wattle
Fabaceae - Mimosoideae	*Acacia ulicifolia*	Prickly Moses
Haloragaceae	*Gonocarpus teucrioides*	Raspwort
Iridaceae	*Crocosmia x crocosmiiflora* *	Montbretia *
Lamiaceae	*Plectranthus ciliatus* *	African spur flower *
Malvaceae	*Sida rhombifolia* *	Paddy's Lucerne *
Menispermaceae	*Stephania japonica*	Snake Vine
Myrtaceae	*Eucalyptus botryoides*	Bangalay
Myrtaceae	*Eucalyptus pilularis*	Blackbutt
Myrtaceae	*Eucalyptus sclerophylla*	Hard-leaved Scribbly Gum
Myrtaceae	*Leptospermum polygalifolium*	Tantoon
Myrtaceae	*Melaleuca hypericifolia*	Hillock Bush
Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum
Plantaginaceae	*Plantago lanceolata* *	Plantain *
Poaceae	*Cenchrus clandestinum* *	Kikuyu Grass *
Poaceae	*Cynodon dactylon*	Couch
Poaceae	*Echinopogon caespitosus*	Tufted Hedgehog Grass
Poaceae	*Ehrharta erecta* *	African Veldt Grass *
Poaceae	*Imperata cylindrica*	Blady Grass
Poaceae	*Paspalum dilatatum* *	Paspalum *
Poaceae	*Sporobolus africanus* *	Parramatta Grass *
Poaceae	*Stenotaphrum secundatum* *	Buffalo Grass *
Polygonaceae	*Rumex brownii*	Swamp Dock
Polygonaceae	*Rumex sagittatus* *	Turkey Rhubarb *
Proteaceae	*Banksia integrifolia*	Coastal Banksia
Rosaceae	*Rubus anglocandicans* *	Blackberry *
Rosaceae	*Rubus parvifolius*	Native Raspberry

4.3 Habitat

(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

Potential habitat of threatened species or ecological communities that could be affected would be a very small proportion of the amount of unaffected habitat in the area. Overall, the affected areas are likely to form a small and insignificant part of the total habitat present in the locality. The intertidal and shallow subtidal parts of the site support potential feeding habitat for some threatened shorebirds. The extent of potential habitat that would be affected is a few square metres which is very small compared to the very large amount of unaffected habitat nearby. Overall, the affected areas are likely to form a small and insignificant part of the total threatened species habitat present in the locality.

(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

The proposal would not form any new physical barriers in habitat of birds, mammals, reptiles or amphibians. No barriers to pollination of threatened plants or other plants in threatened ecological communities would be created. The boardwalk would be on well-spaced piles and would not form a physical barrier in estuarine and intertidal waters between aquatic habitats upstream and downstream. It is considered that the proposal would not adversely affect connections between areas to the extent that the maintenance of gene flow and the ability to sustain viable populations would be reduced. The proposal would not fragment or isolate an area of habitat of a threatened species or ecological community.

(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

The intertidal habitat to be modified is included in a protected area (Jervis Bay Marine Park) however the small areas to be affected are not likely to be important to any life cycle stages or to reproductive success, and hence long term survival, of any threatened species or ecological community. The small amount of terrestrial habitat to be modified is not likely to be important to any life cycle stages or to reproductive success, and hence long term survival, of any threatened species or ecological community.

4.4 Area of Outstanding Biodiversity Value

(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 land listed in the Register of Declared Areas of Outstanding Biodiversity Value would be affected by the proposed development
(http://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/about-threatened-species/critical-habitats)

4.5 Key Threatening Processes

(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

Key threatening processes are the things that adversely affect threatened species or ecological communities, or could cause species or ecological communities that are not threatened to become threatened. The thirty nine key threatening processes listed in Schedule 4 of the Biodiversity Conservation Act are presented in Table 4 along with an assessment of their relevance to the current proposal.

4.6 Biodiversity Conservation Act Conclusion

Provided the environmental safeguards for impact mitigation set out in the review of environmental factors are applied, there are not likely to be significant effects on threatened species or ecological communities, or their habitats from the proposed activity and therefore a biodiversity development assessment report or a species impact statement are not required.

Table 4. Assessment of key threatening processes listed under the Biodiversity Conservation Act.

Key Threatening Process	Type of Threat	Assessment
Invasion and establishment of exotic vines and scramblers	Weed	The proposed activity would not cause invasion and establishment of exotic vines and scramblers nor increase the impact of exotic vines and scramblers.
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	Weed	The proposed activity would not cause invasion by Scotch Broom nor increase the impact of Scotch Broom.
Invasion of native plant communities by bitou bush & boneseed	Weed	The proposed activity would not cause invasion of native plant communities by bitou bush & boneseed nor increase their impact.
Invasion of native plant communities by exotic perennial grasses	Weed	Environmental safeguard 17 is included in Section 8 of the review of environmental factors to prevent the proposed activity from causing invasion of native plant communities by exotic perennial grasses or increasing the impact of exotic perennial grasses.
Invasion of native plant communities by African Olive *Olea europaea* L. subsp. *cuspidata* (Wall ex G.Don Ciferri)	Weed	The proposed activity would not cause invasion by African Olive nor increase the impact of African Olive.
Invasion, establishment and spread of Lantana (*Lantana camara* L. sens. Lat)	Weed	The proposed activity would not cause invasion, establishment and spread of Lantana nor increase the impact of Lantana.
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Weed	The proposed activity would not result in invasion of escaped garden plants nor increase the impacts of invasion by escaped garden plants.
Competition and grazing by the feral European rabbit	Pest animal	The proposed activity would not introduce rabbits nor increase the impact of rabbits.
Competition and habitat degradation by Feral Goats, Capra hircus Linnaeus 1758	Pest animal	The proposed activity would not introduce goats nor increase the impact of goats.
Competition from feral honeybees	Pest animal	The proposed activity would not introduce honeybees nor increase the impact of honeybees.

Key Threatening Process	Type of Threat	Assessment
Habitat degradation and loss by Feral Horses (brumbies, wild horses), *Equus caballus* Linnaeus 1758	Pest animal	The proposed activity would not introduce horses nor increase the impact of horses.
Herbivory and environmental degradation caused by feral deer	Pest animal	The proposed activity would not introduce deer nor increase the impact of deer.
Importation of red imported fire ants into NSW	Pest animal	The proposed activity would not import fire ants nor increase the impact of fire ants.
Introduction of the large earth bumblebee (*Bombus terrestris*)	Pest animal	The proposed activity would not introduce bumblebees nor increase the impact of bumblebees.
Invasion and establishment of the Cane Toad	Pest animal	The proposed activity would not introduce cane toads nor increase the impact of cane toads.
Invasion of the yellow crazy ant (*Anoplolepis gracilipes*) into NSW	Pest animal	The proposed activity would not introduce crazy ants nor increase the impact of crazy ants.
Predation and hybridisation by feral dogs, *Canis lupus familiaris*	Pest animal	The proposed activity would neither cause nor increase the impact of predation and hybridisation by feral dogs, *Canis lupus familiaris*
Predation by feral cats	Pest animal	The proposed activity would neither cause nor increase the impact of predation by feral cats.
Predation by the European Red Fox	Pest animal	The proposed activity would neither cause nor increase the impact of predation by the European Red Fox.
Predation by the Plague Minnow (*Gambusia holbrooki*)	Pest animal	The proposed activity would not introduce plague minnows nor increase the impact of plague minnows.
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island	Pest animal	The proposed activity would not introduce rats nor increase the impact of rats.
Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*)	Pest animal	The proposed activity would not introduce pigs nor increase the impact of pigs.
Death or injury to marine species following capture in shark control programs on ocean beaches	Other threat	The proposed activity is not a shark control program nor would it increase the impact of shark control programs.
Entanglement in, or ingestion of anthropogenic debris in marine and estuarine environments	Other threat	Any debris that enters the waterway during construction will be contained by a silt curtain and shall be removed as soon as possible or as the tide permits. The proposed activity would not cause nor increase the impact of entanglement in, or ingestion of anthropogenic debris in marine and estuarine environments.
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	Other threat	The proposed activity would not cause nor increase the impact of eucalypt dieback.
Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners *Manorina melanocephala*.	Other threat	The proposed activity would not cause nor increase the impact of noisy miners.
Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.	Habitat loss/change	To minimise impacts on water flow, boardwalk piles would be widely spaced. The proposed activity would not alter the natural flow regimes of rivers, streams, floodplains & wetlands nor increase the impact of such alteration.
Bushrock Removal	Habitat loss/change	The proposed activity would not remove bushrock nor increase the impact of bushrock removal.
Clearing of native vegetation	Habitat loss/change	As far as possible the locations of structures have been sited to minimise impacts on the native

Key Threatening Process	Type of Threat	Assessment
		vegetation by utilising previously cleared areas and other open areas. The area of native vegetation that could be removed or modified is relatively small compared to the amount of nearby native vegetation. The removal or modification of this vegetation is not considered likely to result in the loss or long term modification of the structure, composition or ecological function of the stands of native vegetation that they are part of and therefore is not likely to threaten the survival or evolutionary development of species or ecological communities.
Alteration of habitat following subsidence due to longwall mining	Habitat loss/change	No longwall mining would be carried out. The proposed activity would not cause subsidence due to longwall mining nor increase the impact of subsidence due to longwall mining.
Ecological consequences of high frequency fires	Habitat loss/change	The proposed activity would not cause high frequency fires nor increase the impact of high frequency fires.
Human-caused Climate Change	Habitat loss/change	A small amount of fossil fuel would be burnt to operate machinery, but the proposed activity would not significantly contribute to climate change.
Loss and/or degradation of sites used for hill-topping by butterflies	Habitat loss/change	The proposed activity would not remove or degrade butterfly hill-topping sites nor increase impacts on butterfly hill-topping sites.
Loss of Hollow-bearing Trees	Habitat loss/change	None of the trees or limbs to be removed supported hollows. The proposed activity would not result in loss of hollow-bearing trees nor increase impacts of loss of hollow-bearing trees.
Removal of dead wood and dead trees	Habitat loss/change	No dead trees would be removed. Fallen timber and large mangrove trunks, limbs and roots are to be left in place and protected from damage during construction. The activity is not considered likely to result in the loss or long term modification of the structure, composition or ecological function of stands of native vegetation and therefore is not likely to threaten the survival or evolutionary development of species or ecological communities.
Infection by psittacine circoviral (beak and feather) disease affecting endangered psittacine species	Disease	The proposed activity would not introduce psittacine circoviral disease nor increase the impact of psittacine circoviral disease.
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	Disease	The proposed activity would not introduce chytridiomycosis nor increase the impact of chytridiomycosis.
Infection of native plants by *Phytophthora cinnamomi*	Disease	The proposed activity would not introduce *Phytophthora cinnamomi* nor increase the impact of *Phytophthora cinnamomi*.
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae.	Disease	The proposed activity would not introduce exotic rust fungi nor increase the impact of exotic rust fungi on plants of the family Myrtaceae.

5 AUSTRALIAN ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT

5.1 Protected Matters

The Australian Department of Climate Change, Energy, the Environment and Water's online Protected Matters Search Tool was interrogated on 23 March 2023 for the area around the boardwalk (Figure 5). The report is summarised below and the full report is attached.

Matters of National Environmental Significance

World Heritage Properties: None
National Heritage Places: None
Wetlands of International Importance (Ramsar): None
Great Barrier Reef Marine Park: None
Commonwealth Marine Areas: None
Listed Threatened Ecological Communities: 5
Listed Threatened Species: 81
Listed Migratory Species: 56

Other Matters Protected by the EPBC Act

Commonwealth Land: 1
Commonwealth Heritage Places: None
Listed Marine Species: 77 (relevant to Commonwealth areas only)
Whales and Other Cetaceans: 12
Critical Habitats: None
Commonwealth Reserves: None
Australian Marine Parks: None
Habitat Critical to the Survival of Marine Turtles: None

The proposal is not a nuclear action nor is it a coal seam gas development and large coal mining development. No world heritage areas, national heritage areas or Ramsar wetlands would be affected. The proposal would not be undertaken on Commonwealth land nor would it have an effect on any Commonwealth land, heritage places or reserves. Nearby Commonwealth telecommunications land would not be affected.

The attached protected matters report includes a number of listed migratory and threatened species and threatened ecological communities that have a range of distribution that includes the area of the proposed works. Assessments are included below for those species and communities recorded in the NSW Bionet Atlas as having been observed within a ten kilometre by ten kilometre area around the site.

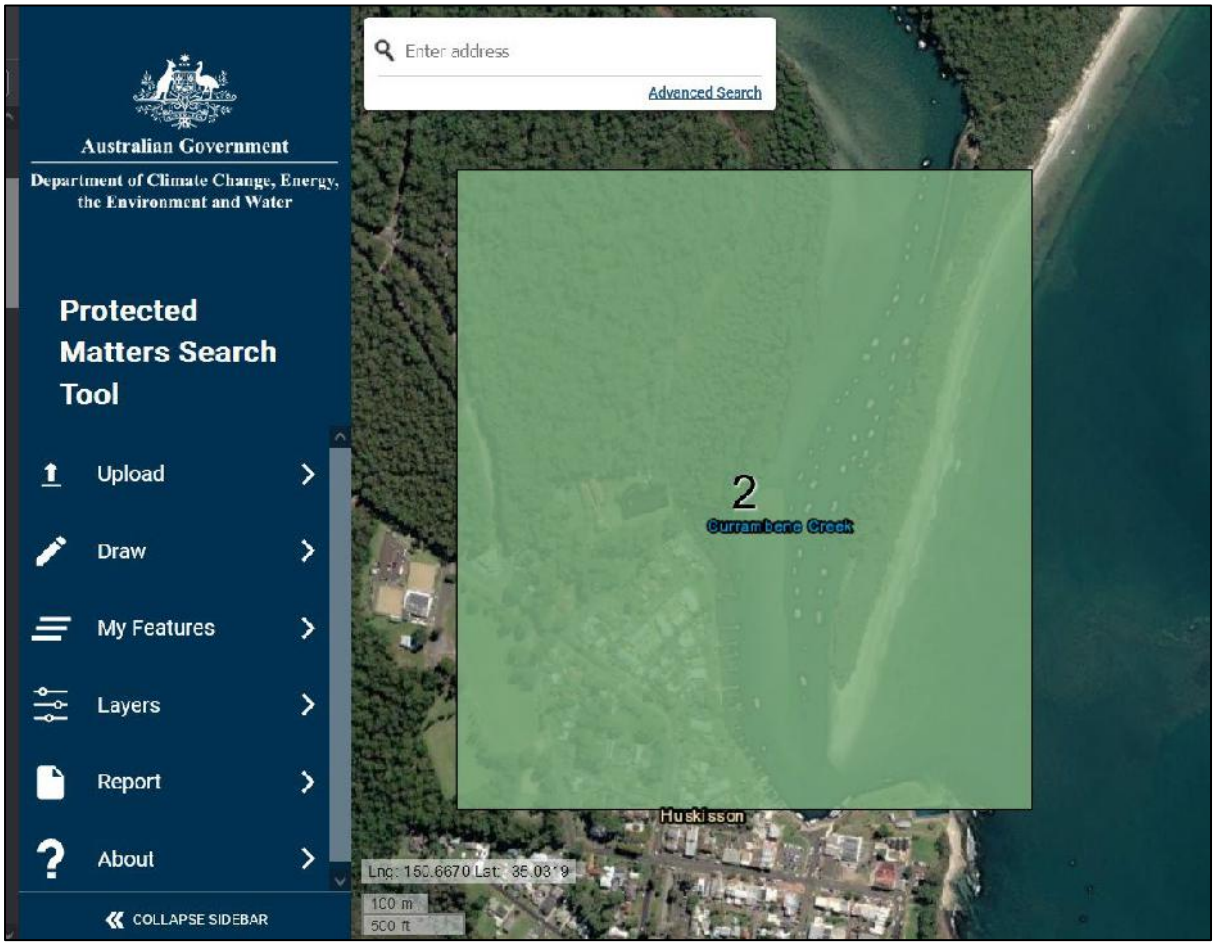

Figure 5. PMST search area 23 March 2023.

5.2 Threatened Ecological Communities

The ecological communities listed in the protected matters report are:

Name	EPBC Act Status	Occurrence near boardwalk
Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community	Endangered	Not present
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Not present
Illawarra and south coast lowland forest and woodland ecological community	Critically Endangered	Not present
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Not present
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Present

Subtropical and Temperate Coastal Saltmarsh

Coastal Saltmarsh occupied the highest intertidal areas nearer to shore. Saltmarsh plants included Sea Rush *Juncus kraussii*, Bare Twigrush *Machaerina juncea*, Knobby Club-rush *Ficinia nodosa*, Saltwater Couch *Sporobolus virginicus*, Prickly Couch *Zoysia macrantha* and Warrigal Cabbage *Tetragonia tetragonioides*. There was an informal pathway through the saltmarsh by which people accessed the northern spur boardwalk.

The northern spur of the boardwalk would be extended landward by approximately 22m through this intertidal area of saltmarsh vegetation. There would likely be minor damage to some saltmarsh plants from the legs of the temporary work platforms during construction but it is expected that the plants would recover within a few months. As can be seen in Figure 1, at the time of this assessment some damage to saltmarsh was occurring from foot traffic in this location and the proposed new section of boardwalk would protect the saltmarsh from this damage in future. However, the proposed new section of boardwalk would occupy a plan area of approximately 40 square metres and consequently there would be some shading effects on saltmarsh plants. This impact would be mitigated by use of mesh decking on the boardwalk.

Based on assessment of a recent air photograph, the area of continuous local occurrence of this plant community is greater than 15,000 square metres, with larger areas nearby in the estuary. It is considered the affected area (40 square metres) forms a very small proportion of the amount of unaffected vegetation in the local occurrence.

Listed ecological communities in the vulnerable category of ecological communities are not matters of national environmental significance. However, a conservative approach has been taken here and potential impacts on Coastal Saltmarsh are assessed below against the significant impact criteria for ecological communities in the endangered category.

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- *reduce the extent of an ecological community*

The “Extent of Occurrence” is the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of an ecological community, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of the ecological community (e.g. large areas of obviously unsuitable habitat) (Department of Environment and Energy, Commonwealth of Australia, 2017). It is stated in the conservation advice for the community (Department of Agriculture, Water and Environment, 2013) that Coastal Saltmarsh is a very broad-scale ecological community that occurs in scattered patches along the temperate and subtropical coastline of Australia. Therefore, its extent of occurrence is not geographically limited. The proposed action would not be likely to reduce the extent of occurrence of the ecological community.

- *fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines*

The proposed action would not be likely to fragment or increase fragmentation of the ecological community.

- *adversely affect habitat critical to the survival of an ecological community*

The proposed action would not be likely to adversely affect habitat critical to the survival of the ecological community.

- *modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns*

The proposed action would not be likely to modify or destroy abiotic factors necessary for the ecological community's survival.

- *cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting*

The proposed action would not be likely to cause a substantial change in the species composition of the occurrence of the ecological community.

- *cause a substantial reduction in the quality or integrity of an occurrence of an ecological community including, but not limited to:*
  - *assisting invasive species, that are harmful to the listed ecological community, to become established, or*
  - *causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or*

The proposed action would not assist invasive species or cause pollution to the extent that it would be likely to cause a substantial reduction in the quality or integrity of the occurrence of the ecological community.

- *interfere with the recovery of an ecological community.*

The proposed action would not be likely to interfere with the recovery of the ecological community.

Based on consideration of the above criteria, the proposed action is not likely to adversely affect the extent nor substantially and adversely modify the composition of a threatened ecological community such that a local occurrence is likely to be place at risk of extinction.

5.3 Threatened Species

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of a population
- reduce the area of occupancy of the species
- fragment an existing population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of a population
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
- introduce disease that may cause the species to decline, or
- interfere with the recovery of the species.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species
- reduce the area of occupancy of an important population
- fragment an existing important population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of an important population
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- introduce disease that may cause the species to decline, or
- interfere substantially with the recovery of the species.

As described in sections 4 of this report, the proposed action is unlikely to affect important habitat for threatened species known to occur in the area and is not likely to lead to a long term decrease in populations. Based on consideration of the above criteria, it is not expected that there will be significant effects on nationally listed threatened species.

5.4 Migratory Species

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

The area of the proposed action would affect very little habitat, if any, for the migratory species known to occur in the area and would not create barriers to movement. Based on consideration of the above criteria, it is not expected that there will be significant effects on nationally listed migratory species.

5.5 EPBC Act Conclusion

Provided the proposed environmental safeguards listed in the review of environmental factors are employed, the proposed action is not likely to have a significant impact on a matter of national environmental significance, nor is the action being undertaken on or having an effect on Commonwealth land. The proposed action therefore does not need to be referred to the Australian Minister for the Environment.

6 REFERENCES

Australian Government (2013). Matters of National Environmental Significance, Significant Impact Guidelines 1.1

Department of Agriculture, Water and Environment, Commonwealth of Australia (2013). Conservation Advice for Subtropical and Temperate Coastal Saltmarsh.

Department of Environment and Energy, Commonwealth of Australia (2017). Guidelines for nominating and assessing the eligibility for listing of ecological communities as threatened according to the Environment Protection and Biodiversity Conservation Act 1999 and the EPBC Regulations 2000.

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NSW Department of Primary Industries (2005a). PRIMEFACT 6, Great White Shark.

NSW Department of Primary Industries (2005b). PRIMEFACT 7, Green Sawfish.

NSW Department of Primary Industries (2008). Threatened species assessment guidelines. The assessment of significance.

NSW Department of Primary Industries (2012a). PRIMEFACT 1218, Scalloped Hammerhead Shark - *Sphyrna lewini* Fisheries Ecosystems Unit, Port Stephens Fisheries Institute

NSW Department of Primary Industries (2012b). Black Rockcod (*Epinephelus daemelii*) recovery plan. Aquaculture, Conservation and Marine Parks Unit, Port Stephens Fisheries Institute.

NSW Department of Primary Industries (2013). PRIMEFACT 582, Grey Nurse Shark.

NSW Department of Primary Industries (2015a). PRIMEFACT 162, Australian Grayling. 2nd edition.

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NSW Department of Primary Industries (2016) Fish Communities and Threatened Species Distributions of NSW.

NSW Department of Primary Industries (2017). Priorities Action Statement. https://www.dpi.nsw.gov.au/fishing/species-protection/priorities-action-statement

NSW Office of Environment and Heritage (2018). Threatened Species Test of Significance Guidelines.

NSW Office of Environment and Heritage threatened species website http://www.threatenedspecies.environment.nsw.gov.au

ATTACHMENTS

ATTACHMENT A. BIONET ATLAS SPECIES SIGHTINGS SEARCH RESULTS

ATTACHMENT B. ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT PROTECTED MATTERS REPORT

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Entities in selected area [North: -34.98 West: 150.62 East: 150.72 South: -35.08] returned a total of 1,803 records of 57 species.
Report generated on 23/03/2023 7:22 AM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Limnodynastidae	3042	*Heleioporus australiacus*		Giant Burrowing Frog	V,P	V	62	
Animalia	Amphibia	Hylidae	3166	*Litoria aurea*		Green and Golden Bell Frog	E1,P	V	4	
Animalia	Reptilia	Cheloniidae	2007	*Chelonia mydas*		Green Turtle	V,P	V	5	
Animalia	Reptilia	Cheloniidae	2008	*Eretmochelys imbricata*		Hawksbill Turtle	P	V	3	
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*		White-throated Needletail	P	V,C,J,K	8	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P		31	
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*		Little Eagle	V,P		1	
Animalia	Aves	Accipitridae	0230	*Lophoictinia isura*		Square-tailed Kite	V,P,3		23	
Animalia	Aves	Accipitridae	8739	*Pandion cristatus*		Eastern Osprey	V,P,3		6	
Animalia	Aves	Haematopodidae	0131	*Haematopus fuliginosus*		Sooty Oystercatcher	V,P		21	
Animalia	Aves	Haematopodidae	0130	*Haematopus longirostris*		Pied Oystercatcher	E1,P		9	
Animalia	Aves	Scolopacidae	0149	*Numenius madagascariensis*		Eastern Curlew	P	CE,C,J,K	7	
Animalia	Aves	Laridae	0120	*Onychoprion fuscata*		Sooty Tern	V,P		1	
Animalia	Aves	Cacatuidae	0268	*Callocephalon fimbriatum*		Gang-gang Cockatoo	V,P,3	E	20	
Animalia	Aves	Cacatuidae	0265	*^^Calyptorhynchus lathami*		Glossy Black-Cockatoo	V,P,2	V	239	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*		Little Lorikeet	V,P		21	
Animalia	Aves	Psittacidae	0309	*Lathamus discolor*		Swift Parrot	E1,P	CE	1	
Animalia	Aves	Psittacidae	0302	*Neophema pulchella*		Turquoise Parrot	V,P,3		3	
Animalia	Aves	Psittacidae	8913	*Pezoporus wallicus wallicus*		Eastern Ground Parrot	V,P,3		18	
Animalia	Aves	Strigidae	0248	*Ninox strenua*		Powerful Owl	V,P,3		36	
Animalia	Aves	Tytonidae	0250	*Tyto novaehollandiae*		Masked Owl	V,P,3		32	
Animalia	Aves	Tytonidae	9924	*Tyto tenebricosa*		Sooty Owl	V,P,3		5	
Animalia	Aves	Dasyornithidae	0519	*^^Dasyornis brachypterus*		Eastern Bristlebird	E1,P,2	E	264	
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*		Regent Honeyeater	E4A,P	CE	2	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*		Varied Sittella	V,P		11	
Animalia	Aves	Pachycephalidae	0405	*Pachycephala olivacea*		Olive Whistler	V,P		1	
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*		Dusky Woodswallow	V,P		8	
Animalia	Aves	Petroicidae	0382	*Petroica phoenicea*		Flame Robin	V,P		2	
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*		Spotted-tailed Quoll	V,P	E	3	
Animalia	Mammalia	Dasyuridae	1069	*Sminthopsis leucopus*		White-footed Dunnart	V,P		6	
Animalia	Mammalia	Peramelidae	1710	*Isoodon obesulus obesulus*		Southern Brown Bandicoot (eastern)	E1,P	E	5	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*		Koala	E1,P	E	1	
Animalia	Mammalia	Burramyidae	1150	*Cercartetus nanus*		Eastern Pygmy-possum	V,P		9	
Animalia	Mammalia	Petauridae	1136	*Petaurus australis*		Yellow-bellied Glider	V,P	V	296	
Animalia	Mammalia	Pseudocheiridae	1133	*Petauroides volans*		Southern Greater Glider	E1,P	E	3	
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*		Grey-headed Flying-fox	V,P	V	32	
Animalia	Mammalia	Molossidae	1329	*Micronomus norfolkensis*		Eastern Coastal Free-tailed Bat	V,P		8	
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*		Eastern False Pipistrelle	V,P		4	
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*		Southern Myotis	V,P		9	
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*		Greater Broad-nosed Bat	V,P		5	
Animalia	Mammalia	Miniopteridae	3330	*Miniopterus orianae oceanensis*		Large Bent-winged Bat	V,P		10	
Animalia	Mammalia	Otariidae	1543	*Arctocephalus forsteri*		New Zealand Fur-seal	V,P		6	
Animalia	Mammalia	Otariidae	1882	*Arctocephalus pusillus doriferus*		Australian Fur-seal	V,P		3	
Animalia	Insecta	Petaluridae	I007	*Petalura gigantea*		Giant Dragonfly	E1		4	
Plantae	Flora	Convolvulaceae	2234	*Wilsonia backhousei*		Narrow-leafed Wilsonia	V		1	

Plantae	Flora	Myrtaceae	4190	*Eucalyptus sturgissiana*	Ettrema Mallee	V		1	
Plantae	Flora	Myrtaceae	6809	*Melaleuca biconvexa*	Biconvex Paperbark	V	V	37	
Plantae	Flora	Myrtaceae	4293	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V	3	
Plantae	Flora	Orchidaceae	4386	*^^Caladenia tessellata*	Thick Lip Spider Orchid	E1,P,2	V	2	
Plantae	Flora	Orchidaceae	13657	*^^Calochilus pulchellus*	Pretty Beard Orchid	E1,P,2		21	
Plantae	Flora	Orchidaceae	4415	*^^Cryptostylis hunteriana*	Leafless Tongue Orchid	V,P,2	V	88	
Plantae	Flora	Orchidaceae	4464	*^^Genoplesium baueri*	Bauer's Midge Orchid	E1,P,2	E	81	
Plantae	Flora	Orchidaceae	7779	*^^Prasophyllum affine*	Jervis Bay Leek Orchid	E1,P,2	E	290	
Plantae	Flora	Orchidaceae	14259	*^^Pterostylis ventricosa*		E4A,P,2		1	
Plantae	Flora	Orchidaceae	7000	*^^Rhizanthella slateri*	Eastern Australian Underground Orchid	V,P,2	E	1	
Plantae	Flora	Proteaceae	14628	*^^Banksia vincentia*		E4A,2	CE	28	
Plantae	Flora	Proteaceae	9680	*Macadamia integrifolia*	Macadamia Nut		V	1	

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Mar-2023

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	81
Listed Migratory Species:	56

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	77
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	2
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	5
Key Ecological Features (Marine):	None
Biologically Important Areas:	6
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area
Illawarra and south coast lowland forest and woodland ecological community	Critically Endangered	Community may occur within area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus cucullatus		
Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
FISH		
Epinephelus daemelii		
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Hippocampus whitei		
White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Seriolella brama		
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area
Thunnus maccoyii		
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
FROG		

Scientific Name	Threatened Category	Presence Text
[Heleioporus australiacus](#)		
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
[Litoria aurea](#)		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
[Litoria watsoni](#)		
Watson's Tree Frog [91509]	Endangered	Species or species habitat may occur within area
MAMMAL		
[Balaenoptera musculus](#)		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
[Chalinolobus dwyeri](#)		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
[Dasyurus maculatus maculatus (SE mainland population)](#)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
[Eubalaena australis](#)		
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
[Petauroides volans](#)		
Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area
[Petaurus australis australis](#)		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area
[Pseudomys novaehollandiae](#)		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
PLANT		
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Calochilus pulchellus Pretty Beard Orchid, Pretty Beard-orchid [84677]	Endangered	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat likely to occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat likely to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat may occur within area
Prasophyllum affine Jervis Bay Leek Orchid, Culburra Leek-orchid, Kinghorn Point Leek-orchid [2210]	Endangered	Species or species habitat likely to occur within area
Prostanthera densa Villous Mintbush [12233]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat likely to occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat may occur within area
REPTILE		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
SHARK		
Carcharias taurus (east coast population)		
Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus		
Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea		
Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Calonectris leucomelas		
Streaked Shearwater [1077]		Species or species habitat may occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius leschenaultii		
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Limosa lapponica		
Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Communications, Information Technology and the Arts - Telstra Corporation Limited	
Commonwealth Land - Australian Telecommunications Commission [12038]	NSW

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area
Fish		

Scientific Name	Threatened Category	Presence Text
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Cosmocampus howensis Lord Howe Pipefish [66208]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Phyllopteryx taeniolatus](#) Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
[Solegnathus spinosissimus](#) Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
[Solenostomus cyanopterus](#) Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
[Stigmatopora argus](#) Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
[Stigmatopora nigra](#) Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
[Syngnathoides biaculeatus](#) Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
[Urocampus carinirostris](#) Hairy Pipefish [66282]		Species or species habitat may occur within area
[Vanacampus margaritifer](#) Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
[Vanacampus phillipi](#) Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Mammal		
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
[Arctocephalus pusillus](#) Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Dugong dugon		
Dugong [28]		Species or species habitat may occur within area
Reptile		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata		
Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni		
Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata		
Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area

Current Scientific Name	Status	Type of Presence
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State
Jervis Bay	National Park	NSW
Jervis Bay	Marine Park	NSW

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State
Southern RFA	New South Wales

Nationally Important Wetlands [Resource Information]

Wetland Name	State
Jervis Bay	NSW

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Golf Course Extension	2001/215	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Not controlled action (particular manner)			
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
Breeding program for Grey Nurse Sharks	2007/3245	Referral Decision	Completed

Biologically Important Areas

Scientific Name	Behaviour	Presence
Dolphins		
Tursiops aduncus		
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Known to occur
Seabirds		
Ardenna pacifica		
Wedge-tailed Shearwater [84292]	Foraging	Likely to occur
Ardenna tenuirostris		
Short-tailed Shearwater [82652]	Foraging	Likely to occur
Pelagodroma marina		
White-faced Storm-petrel [1016]	Breeding	Known to occur
Sharks		
Carcharias taurus		
Grey Nurse Shark [64469]	Foraging	Known to occur
Whales		
Megaptera novaeangliae		
Humpback Whale [38]	Foraging	Known to occur

Scientific Name	Behaviour	Presence

Bioregional Assessments

SubRegion	BioRegion	Website
Sydney	Sydney Basin	BA website

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

Item Details

Name

Lady Denman (M.V.)

SHR/LEP/S170

Lady Denman (M.V.)

Address

Dent Street HUSKISSON NSW 2540

Local Govt Area

Shoalhaven

Local Aboriginal Land Council

Jerrinja

Item Type

Movable / Collection

Group/Collection

Transport - Water

Category

Vessel - harbour & river

All Addresses

Addresses

Records Retrieved: 1

Street No	Street Name	Suburb/Town/Postcode	Local Govt. Area	LALC	Parish	County	Electorate	Address Type
	Dent Street	HUSKISSON/NSW/2540	Shoalhaven	Jerrinja	Currambene	St Vincent	SOUTH COAST	Primary Address

Boundary Description

The SHR curtilage boundary is limited to the item itself and does not include the land it is located on or the structure it is housed within.

Significance

Statement Of Significance

A rare surviving example of the characteristic type of ferryboat which served Sydney Harbour over more than a century, having a long (67 year) association with Sydney Harbour. Strongly associated in the minds of Sydneysiders and past Sydney visitors with the image of Sydney as a harbour city. One of only two surviving traditional wooden Inner Harbour Ferries. A rare surviving example of the design work of Walter Reeks, an innovative and pioneering Australian naval architect. The last remaining ferry built in Huskisson, strongly associated with Huskisson as a place of manufacture and a fine example of the timber ship-building industry at Huskisson. Significant relic of South Coast family timber ship building industry.

Criteria a)

Historical Significance

A rare surviving example of the characteristic type of ferryboat which served Sydney Harbour over more than a century. A rare surviving example of the design work of Walter Reeks, an innovative and pioneering Australian naval architect.

The last remaining ferry built in Huskisson, in service for 67 years and one of two surviving traditional wooden Inner Harbour Ferries. Significant relic of South Coast family ship building industry.

The only Sydney Harbour ferry or Australian commercial vessel to be returned to its place of construction.
(Prescott 1984; Oliver 1998)

Criteria c)

Aesthetic/Technical Significance

Traditional style of ferry, now virtually unrepresented. Current location amongst spotted gums from which it was built. "From Trees to Seas" theme. (Oliver 1998)

Criteria d)

Social/Cultural Significance

One of the longest running Sydney Harbour Ferries, which carried tens of millions of passengers over 67 years, representing era of wooden ferries. Strongly associated in the minds of Sydneysiders and past Sydney visitors with the image of Sydney as a harbour city.

Central exhibit of LDHC, which places wooden ship building in its environment, historical and social context.
(Prescott 1984; Oliver 1998)

Criteria e)

Research Potential

Rare evidence of the pioneering design innovations in double ended propulsion undertaken by naval architect Walter Reeks. Preserves construction techniques described by traditional boat builder, Alf Settree in National Trust 1997 Award winning documentary video, 'From Trees to Seas' (Prescott 1984; Oliver 1998)

Criteria f)

Rarity

(1) Last remaining ferry built in Huskisson (2) One of three surviving traditional wooden larger Sydney Harbour Ferries (3) One of the last two original Lady Class Ferries (4) only such vessel returned to its place of construction. (Oliver 1998)

Criteria g)

Representative

Represents (1) Jervis Bay wooden ship building industry (2) Lady class ferries (3) Sydney Harbour wooden ferries. (Oliver 1998)

Integrity/Intactness

Apart from the removal of the engine (on site with ferry), ferry remains as it was when decomissioned. Relatively minor changes during working life, apart from change from steam to diesel. This reflects the quality of its design and construction which gave it a working life far beyond its anticipated design life. (Prescott 1984; Oliver 1998)

Owners

Records Retrieved: 0

Organisation	Stakeholder Category	Date Ownership Updated
No Results Found		

Description

Designer	Builder/Maker
Walter Reeks	Joseph Dent

Physical Description **Updated**

Double ended wooden ferry, 33.6m long, 7.6m wide (110.4 x 25.0 x 9.0 feet), displacing 96 gross tons. 2 decks, engine room in hull. Hull built by Joseph Dent at Huskisson, NSW for the Balmain New Ferry Co. Ltd. Originally a steam ship. Current configuration with1962 Crossley diesel engine driving a single "push-pull" screw. Main deck orginally featured men's and woman's saloons. Fitted with lavatories & wooden batten seats. Wheel houses at either end. Spotted gum used extensively. Ferry is now out of the water, mounted in a display well at the Lady Denman Heritage Complex, Huskisson to which it was donated by the NSW Government in 1979. (Prescott 1984; Oliver 1998)

Physical Condition **Updated** 06/02/1998

Physical Condition is good as a result of recent conservation work, arresting a long period of deterioration. Machinery removed for separate display.

Modifications And Dates

Originally fitted with 2 cylinder 38 hp compound steam engine built by Chapman and Co. Ltd. and tall funnel.
1936 - Fitted with 228 bhp 6 cylinder diesel engine built by L. Gardner and Sons Ltd. and short funnel.
1962 - Fitted with 300 bhp 4 cylinder diesel engine built by Crossley Brothers.
Sundry modifications to seating, upper deck exits etc, dates unknown - during working life of ferry
1990s - part of engine removed to facilitate relocation. Parts held at LDHC near ferry. (Prescott 1984)

Further Comments

Current Use

Museum exhibit

Former Use

Aboriginal land, ferry

Listings

Listings

					Records Retrieved: 1
Heritage Listing	**Listing Title**	**Listing Number**	**Gazette Date**	**Gazzette Number**	**Gazzette Page**
Heritage Act - State Heritage Register		01518	11/9/2001 12:00:00 AM	173	9165

Procedures/Exemptions

Records Retrieved: 1

Section of Act	Description	Title	Comments	Action Date	Outcome
57(2)	Exemption to allow work	Standard Exemptions		11/9/2020 12:00:00 AM	

History

Historical Notes or Provenance **Updated**

The Lady Denman was built in Huskisson in 1911 for the Balmain New Ferry Co. Ltd. (subsequently taken over by Sydney Ferries Ltd.) by Joseph Dent, and named after the wife of the then Governor General. The hull was built in Huskisson from local timber, launched then floated to Sydney where machinery was installed and upperworks completed.

1912 - 1936 Lane Cove River run
War years - Cockatoo Island run
End of war to 1979 - Inner Harbour runs, including Taronga Park Zoo, Milsons Point, Cremorne, Hunter's Hill
1979 - Given by Ministry of Transport to Huskisson citizens
1981 - Transported to Jervis Bay
1983 - Moved to Lady Denman Park, Huskisson
1988 - Lady Denman Heritage Complex opened around the Ferry.

The ferry was designed by Walter Reeks, an innovative Sydney naval architect known for his pioneering designs in double-ended propulsion.
(Oliver 1998; Prescott 1984)

Historic Themes

Records Retrieved: 50

National Theme	State Theme	Local Theme
Developing cultural institutions and ways of life	Townships	Community volunteering
Developing cultural institutions and ways of life	Townships	Community organisations
Developing cultural institutions and ways of life	Environment	Ways of life 1950-2000
Developing cultural institutions and ways of life	Pastoralism	Visiting heritage places
Developing cultural institutions and ways of life	Pastoralism	Visiting heritage places
Developing cultural institutions and ways of life	Pastoralism	Going to a museum
Developing cultural institutions and ways of life	Pastoralism	Going boating and sailing
Developing cultural institutions and ways of life	Pastoralism	Developing collections of items
Developing cultural institutions and ways of life	Pastoralism	Activities associated with relaxation and recreation
Developing cultural institutions and ways of life	Defence	Developing cultural institutions and ways of life
Marking the phases of life	Social institutions	Associations with Lord Denman, fifth Australian Governor-General
Marking the phases of life	Social institutions	Associations with Joseph Dent, shipowner
Marking the phases of life	Social institutions	Associations with Lady Denman, wife of fifth Governor-General
Governing	Land tenure	Administering ports and shipping facilities
Governing	Land tenure	Developing roles for government - providing public transport

Governing	Land tenure	Developing roles for government - conserving cultural and natural heritage
Governing	Land tenure	Developing roles for government - building and operating public infrastructure
Working	Migration	Working on the waterfront
Working	Migration	Working on public infrastructure projects
Working	Migration	Working in ports and on shipping
Working	Migration	Working complex machinery and technologies
Working	Migration	Wharfside and Port Work Culture
Building settlements, towns and cities	Welfare	Unknown
Building settlements, towns and cities	Welfare	Role of Transport in Settlement
Building settlements, towns and cities	Welfare	living in the suburbs
Building settlements, towns and cities	Welfare	Developing the social life of a rural community
Building settlements, towns and cities	Welfare	Developing suburbia
Building settlements, towns and cities	Welfare	Developing ports
Building settlements, towns and cities	Welfare	community park
Building settlements, towns and cities	Welfare	Beautifying towns and villages
Building settlements, towns and cities	Welfare	20th century Suburban Developments
Building settlements, towns and cities	Mining	Townships
Building settlements, towns and cities	Mining	Changing land uses - from rural to tourist
Building settlements, towns and cities	Mining	Administering and alienating Crown lands
Building settlements, towns and cities	Agriculture	Building settlements, towns and cities
Developing local, regional and national economies	Aboriginal pre-contact	Wharf and shipping history
Developing local, regional and national economies	Aboriginal pre-contact	River Transport
Developing local, regional and national economies	Aboriginal pre-contact	Maritime navigation and regulation
Developing local, regional and national economies	Aboriginal pre-contact	Maintaining maritime transport routes
Developing local, regional and national economies	Aboriginal pre-contact	administering the public ferry system
Developing local, regional and national economies	Aboriginal pre-contact	administering the public ferry system
Developing local, regional and national economies	Aboriginal pre-contact	administering the public ferry system
Developing local, regional and national economies	Leisure	Shipping
Developing local, regional and national economies	Leisure	Boat Building and Shipwrighting
Developing local, regional and national economies	Events	Tourism

Developing local, regional and national economies	Events	Landscapes of passive recreation
Developing local, regional and national economies	Events	Developing local, regional and national economies
Tracing the evolution of a continent's special environments	Exploration	Other open space
Tracing the evolution of a continent's special environments	Exploration	Cultural - Coasts and coastal features supporting human activities
Tracing the evolution of a continent's special environments	Exploration	Changing the environment

Recommended Management

Management Summary

Continuing conservation work under cover of museum building.

Management

Records Retrieved: 6

Management Category	Management Name	Date Updated
Recommended Management	Carry out interpretation, promotion and/or education	
Recommended Management	Prepare a maintenance schedule or guidelines	
Recommended Management	Review a Conservation Management Plan (CMP)	
Recommended Management	Carry out interpretation, promotion and/or education	
Recommended Management	Prepare a maintenance schedule or guidelines	
Recommended Management	Review a Conservation Management Plan (CMP)	

Report/Study

Heritage Studies

Records Retrieved: 0

Report/Study Name	Report/Study Code	Report/Study Type	Report/Study Year	Organisation	Author
No Results Found					

Reference & Internet Links

References

Records Retrieved: 10

Type	Author	Year	Title	Link
Tourism	Jervis Bay Maritime Museum and Gallery	2007	Lady Denman (M.V.)	http://www.ladydenman.asn.au/
Written	Robyn Oliver and John Hatton	2000	Lady Denman Conservation Management Plan	
Written	Robyn Oliver	1998	NSW State Heritage Inventory Form	
Written	Graeme Andrews	1997	Untitled letter of support for Ferry Conservation project	
Written	Graeme Andrews	1994	Ferries of Sydney	
Written	Michael Staples, Conservation Shipwight National Maritime Museum	1991	Response to Questions concerning Ferry conservation	
Written	Dan Price	1991	Response to Questions concerning Ferry conservation	
Written	A.M. Prescott	1988	'Reeks, Walter 1861-1925' in Serle, Geoffrey (ed) Australian Dictionary of Biography v2 (1891-1934)	
Written	Ross Saunders	1988	No Way To Treat a Lady	
Written	Walter Reeks	1911	General arrangement drawing of a double ended ferry steamer	

Data Source

The information for this entry comes from the following source:

Data Source	Record Owner	Heritage Item ID
Heritage NSW	Heritage NSW	5001284

Every effort has been made to ensure that information contained in the State Heritage Inventory is correct. If you find any errors or omissions please send your comments to **heritagemailbox@environment.nsw.gov.au**

Item Details

Name

Lady Denman Ferry

SHR/LEP/S170

Lady Denman Ferry

Address

11 Dent Street HUSKISSON NSW 2540

Local Govt Area

Shoalhaven

Local Aboriginal Land Council

Unknown

Item Type	Group/Collection	Category
Movable / Collection	Transport - Water	Vessel - harbour & river

All Addresses

Addresses

Records Retrieved: 1

Street No	Street Name	Suburb/Town/Postcode	Local Govt. Area	LALC	Parish	County	Electorate	Address Type
11	Dent Street	HUSKISSON/NSW/2540	Shoalhaven	Unknown			Unknown	Primary Address

Boundary Description

Lot 2 & 4 DP 870242 & the vista to Currambene Creek

Significance

Statement Of Significance

A rare surviving example of the characteristic type of ferryboat which served Sydney Harbour over more than a century, having a long (67 year) association with Sydney Harbour. Strongly associated in the minds of Sydneysiders and past Sydney visitors with the image of Sydney as a harbour city. One of only two surviving tranditional wooden Inner Harbour Ferries.

A rare surviving example of the design work of Walter Reeks, an innovative & pioneering Aurstralian naval architect.

The last remaining ferry built in Huskisson, strongly associated with Huskisson as a place of manufacture and a fine example of the timber ship-building industry at Huskisson.

Significant relic of South Coast family timber ship building industry.

State significance (NSW). (included on the State Heritage Register of NSW)

The community based heritage complex established as a result of the Lady Denman Ferry has historical, social and research potential. Local significance (Shoalhaven).

Criteria a)

Historical Significance

The item is of historical significance as rare, surviving example of the characteristic type of ferryboat which served Sydney Harbour over more than a century and as a rare, surviving example of the design work of Walter Reeks(1861-1925), an innovative and pioneering Australian naval architect. The ferry was built in 1911 in Joseph Dent's shipyard for the Balmain New Ferry Co. The boat is the last remaining ferry built in Huskisson, in service for 67 years and is one of only two, surviving, traditional wooden Inner Harbour Ferries. Significant relic of South Coast family ship building industry. The only Sydney Harbour ferry or Australian commercial vessel to be returned to it's place of construction.

Criteria b)

Historical Association Significance

The item has associations with Walter Reeks (1861-1925), an innovative & pioneering Australian naval architect, with the Balmain New Ferry Co. Ltd. who commissioned the ferry and Joseph Dent's shipyard at Huskisson who built the ferry.

Criteria c)

Aesthetic/Technical Significance

The item is a traditional style of ferry, now virtually unrepresented and is rare surviving example of the design work of Walter Reeks (1861-1925), an innovative & pioneering Aurstralian naval architect.

Criteria d)

Social/Cultural Significance

The Lady Denman is one of the longest running, Sydney Harbour ferries that carried tens of millions of passengers over 67 years and representing the prime era of wooden ferries. Strongly associated in the minds of Sydneysiders and past Sydney visitors with the image of Sydney as a harbour city. The display complex is held in high esteem by local community and visitors.

Criteria e)

Research Potential

Rare evidence of the poineering design innovations in double ended propulsion undertaken by naval architect, Walter Reeks.

Criteria f)

Rarity

This item is assessed as historically rare at a State level. This item is assessed as aesthetically rare at a State level. This item is assessed as scientifically rare at a State level.

Criteria g)

Representative

This item is assessed as historically representative at a State level. This item is assessed as aesthetically representative at a State level. This item is assessed as scientifically representative at a State level. This item is assessed as socially representative at a State level.

Integrity/Intactness

Apart from the removal of the engine (on site with ferry), ferry remains as it was when decomissioned. Relatively minor changes during working life, apart from change from steam to diesel. This reflects the quality of it's design

Owners

Records Retrieved: 0

Organisation	Stakeholder Category	Date Ownership Updated
No Results Found		

Description

Designer

Walter Reeks (Lady Denman Ferry); Paul Bishop Architects (Museum Building)

Builder/Maker

Joseph Dent (Lady Denman Ferry)

Physical Description

Updated

Double ended wooden ferry, 33.6m long, 7.6 wide (110.4 x 25.0 x 9.0 feet), displacing 96 gross tons. 2 decks, engine room in hull. Hull built by Joseph Dent at Huskisson, NSW for the Balmain New Ferry Co. Ltd. Originally a steam ship. Current configuration with 1962 Crossley diesel engine driving a single "push-pull" screw. Main deck originally featured men's and woman's saloons. Fitted with lavatories & wooden batten seats. Wheel houses at either end. Spotted gum used extensively. Ferry is now out of the water, mounted in a display well at the Lady Denman Heritage Complex, Huskisson to which it was dontated by the NSW Government in 1979. (Prescott 1984; Oliver 1998)

The complex incorporates:
- Museum of Jervis Bay Science and the Sea;
- Lady Denman Museum;
- School buildings relocated from St Georges Basin;
- Woollamia Union Church relocated from Goodland Street, Woollamia;
- Estuary Walk;
- Native Bush Garden;
- Mangrove Walk;
- Fish Breeding Pond;
- Lady Denman Ferry;
- Oyster cutter; and
- Boat shed.

Physical Condition **Updated** 04/12/2002

Physical Condition of the Ferry is good as a result of recent conservation work, arresting a long period of deterioration. Machinery removed for separate display.

Modifications And Dates

The Ferry was originally fitted with 2 cylinder 38 hp compound steam engine built by Chapman and Co. Ltd. and tall funnel.

1936 - Fitted with 228 bhp 6 cylinder diesel engine built by L. Gardner and Sons Ltd. and short funnel.

1962 - Fitted with 300 bhp 4 cylinder diesel engine built by Crossley Brothers.

Sundry modifications to seating, upper deck exits etc, dates unknown - during working life of ferry.

1990's - part of engine removed to facilitate relocation. Parts held at LDHC near ferry. (Prescott 1984)

Further Comments

Current Use

Heritage centre

Former Use

Ferry/Church/School/ Vacant crown land

Listings

Listings

					Records Retrieved: 3
Heritage Listing	**Listing Title**	**Listing Number**	**Gazette Date**	**Gazzette Number**	**Gazzette Page**
Local Environmental Plan	Shoalhaven Local Environmental Plan 2014	203	4/22/2014 12:00:00 AM		
Local Environmental Plan			4/13/2007 12:00:00 AM		
Heritage study	Lady Denman Heritage Complex	JB021			

Procedures/Exemptions

Records Retrieved: 0

Section of Act	Description	Title	Comments	Action Date	Outcome
			No Results Found		

History

Historical Notes or Provenance	Updated

The Lady Denman was built in Huskisson in 1911 for the Balmain New Ferry Co. Ltd. (subsequently taken over by Sydney Ferries Ltd) by Joseph Dent, and named after the wife of the then Governor General. The hull was built in Huskisson from local timber, launched then floated to Sydney where machinery was installed and upperworks completed.

- 1912 - 1936 Lane Cove River run.
- War years - Cockatoo Island run.
- End of war to 1979 - Inner Harbour runs, including Taronga Park Zoo, Milsons Point, Cremorne, Hunter's Hill.
- 1979 - given by Ministry of Transport to Huskisson citizens.
- 1981 - Transported to Jervis Bay
- 1983 - Moved to Lady Denman Park, Huskisson
- 1988 - Land Denman Heritage Complex opened around the Ferry.

The ferry was designed by Walter Reeks, an innovative Sydney naval architect known for his pioneering designs in double-ended propulsion. (Oliver1998; Prescott 1984)

Heritage complex built on the site of George Dent's shipbuilding enterprise on Currambene Creek. Includes the Lady Denman ferry, examples of slipways and boats in addition to an extensive museum. Other buildings include the relocated Woollamia Church and a weatherboard school from St Georges Basin.

The Lady Denman Heritage Complex has evolved around the Sydney ferry 'The Lady Denman' which was built in Joseph Dent's shipyard for the Balmain New Ferry Co. in 1911. The ferry was de-commissioned from the Sydney ferry service in June 1979 and brought to Huskisson four years later. On 3rd April, 1983 the Lady was firmly anchored in her final resting place within sight of Dent's Slipway where she had been built seventy years before.

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Historic Themes

Records Retrieved: 6

National Theme	State Theme	Local Theme
4. Settlement	Towns, suburbs and villages	Unknown
3. Economy	Transport	Unknown
3. Economy	Industry	Unknown
Building settlements, towns and cities	Welfare	Unknown
Developing local, regional and national economies	Aboriginal pre-contact	Unknown
Developing local, regional and national economies	Leisure	Unknown

Recommended Management

Management Summary

Refer to Conservation Management Plan for management of Ferry

Management

Records Retrieved: 2

Management Category	Management Name	Date Updated
Recommended Management	Review a Conservation Management Plan (CMP)	
Recommended Management	Review a Conservation Management Plan (CMP)	

Report/Study

Heritage Studies

Records Retrieved: 3

Report/Study Name	Report/Study Code	Report/Study Type	Report/Study Year	Organisation	Author
Lady Denman Conservation Management Plan			1999		Lady Denman Heritage (Robyn Oliver)
Shoalhaven City Council Heritage Study 1995-1998			1998		Peter Freeman Pty Ltd
Shoalhaven City Council Heritage Study 1995-1998			1998		Peter Freeman Pty Ltd

Reference & Internet Links

References

Records Retrieved: 4

Type	Author	Year	Title	Link
Written	Lady Denman Heritage Complex (Robyn Oliver)	1999	Lady Denman Conservation Management Plan	
Written	Lady Denman Heritage Complex (Robyn Oliver)	1999	Lady Denman Conservation Management Plan	
Written	Ross Saunders		No Way to Treat a Lady, n.d.	
Written	Ross Saunders		No Way to Treat a Lady, n.d.	

Data Source

The information for this entry comes from the following source:

Data Source	Record Owner	Heritage Item ID
Local Government	Shoalhaven City Council	2390390

Every effort has been made to ensure that information contained in the State Heritage Inventory is correct. If you find any errors or omissions please send your comments to **heritagemailbox@environment.nsw.gov.au**

Item Details

Name

Lady Denman Heritage Complex inc relocated fmr St Georges Basin Sch Bldgs & fmr Woollamia Union Church

SHR/LEP/S170

Lady Denman Heritage Complex inc
relocated fmr St Georges Basin Sch Bldgs &
fmr Woollamia Union Church

Address

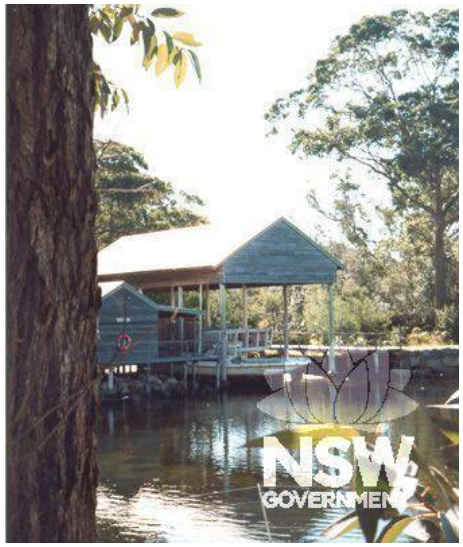
11 Dent Street HUSKISSON NSW 2540

Local Govt Area

Shoalhaven

Local Aboriginal Land Council

Unknown



Item Type

Built

Group/Collection

Community Facilities

Category

Other - Community Facilities

All Addresses

Addresses

Records Retrieved: 1

Street No	Street Name	Suburb/Town/Postcode	Local Govt. Area	LALC	Parish	County	Electorate	Address Type
11	Dent Street	HUSKISSON/NSW/2540	Shoalhaven	Unknown			Unknown	Primary Address

Significance

Statement Of Significance

Lady Denman heritage complex including relocated former St Georges Basin school buildings and relocated former Woollamia Union Church.

A rare surviving example of the characteristic type of ferryboat which served Sydney Harbour over more than a century, having a long (67 year) association with Sydney Harbour. Strongly associated in the minds of Sydneysiders and past Sydney visitors with the image of Sydney as a harbour city. One of only two surviving tranditional wooden Inner Harbour Ferries.

A rare surviving example of the design work of Walter Reeks, an innovative & pioneering Aurstralian naval architect.

The last remaining ferry built in Huskisson, strongly associated with Huskisson as a place of manufacture and a fine example of the timber ship-building industry at Huskisson.

Significant relic of South Coast family timber ship building industry.

State significance (NSW). (included on the State Heritage Register of NSW)

The community based heritage complex established as a result of the Lady Denman Ferry has historical, social and research potential. Local significance (Shoalhaven).

Criteria a)

Historical Significance

The item is of historical significance as rare, surviving example of the characteristic type of ferryboat which served Sydney Harbour over more than a century and as a rare, surviving example of the design work of Walter Reeks(1861-1925), an innovative and pioneering Australian naval architect. The ferry was built in 1911 in Joseph Dent's shipyard for the Balmain New Ferry Co. The boat is the last remaining ferry built in Huskisson, in service for 67 years and is one of only two, surviving, traditional wooden Inner Harbour Ferries. Significant relic of South Coast family ship building industry. The only Sydney Harbour ferry or Australian commercial vessel to be returned to it’s place of construction.

Criteria b)

Historical Association Significance

The item has associations with Walter Reeks (1861-1925), an innovative & pioneering Australian naval architect, with the Balmain New Ferry Co. Ltd. who commissioned the ferry and Joseph Dent's shipyard at Huskisson who built the ferry.

Criteria c)

Aesthetic/Technical Significance

The item is a traditional style of ferry, now virtually unrepresented and is rare surviving example of the design work of Walter Reeks (1861-1925), an innovative & pioneering Aurstralian naval architect.

Criteria d)

Social/Cultural Significance

The Lady Denman is one of the longest running, Sydney Harbour ferries that carried tens of millions of passengers over 67 years and representing the prime era of wooden ferries. Strongly associated in the minds of Sydneysiders and past Sydney visitors with the image of Sydney as a harbour city. The display complex is held in high esteem by local community and visitors.

Criteria e)

Research Potential

Rare evidence of the poineering design innovations in double ended propulsion undertaken by naval architect, Walter Reeks.

Criteria f)

Rarity

This item is assessed as historically rare at a State level. This item is assessed as aesthetically rare at a State level. This item is assessed as scientifically rare at a State level.

Criteria g)

Representative

This item is assessed as historically representative at a State level. This item is assessed as aesthetically representative at a State level. This item is assessed as scientifically representative at a State level. This item is assessed as socially representative at a State level.

Integrity/Intactness

Apart from the removal of the engine (on site with ferry), ferry remains as it was when decomissioned. Relatively minor changes during working life, apart from change from steam to diesel. This reflects the quality of it's design

Owners

Records Retrieved: 0

Organisation	Stakeholder Category	Date Ownership Updated
No Results Found		

Description

Designer

Walter Reeks (Lady Denman Ferry); Paul Bishop Architects (Museum Building)

Builder/Maker

Joseph Dent (Lady Denman Ferry)

Physical Description

Updated

Double ended wooden ferry, 33.6m long, 7.6 wide (110.4 x 25.0 x 9.0 feet), displacing 96 gross tons. 2 decks, engine room in hull. Hull built by Joseph Dent at Huskisson, NSW for the Balmain New Ferry Co. Ltd. Originally a steam ship. Current configuration with 1962 Crossley diesel engine driving a single "push-pull" screw. Main deck originally featured men's and woman's saloons. Fitted with lavatories & wooden batten seats. Wheel houses at either end. Spotted gum used extensively. Ferry is now out of the water, mounted in a display well at the Lady Denman Heritage Complex, Huskisson to which it was dontated by the NSW Government in 1979. (Prescott 1984; Oliver 1998)

The complex incorporates:
- Museum of Jervis Bay Science and the Sea;
- Lady Denman Museum;
- School buildings relocated from St Georges Basin;
- Woollamia Union Church relocated from Goodland Street, Woollamia;
- Estuary Walk;
- Native Bush Garden;
- Mangrove Walk;
- Fish Breeding Pond;
- Lady Denman Ferry;
- Oyster cutter; and
- Boat shed.

Physical Condition **Updated**

Physical Condition of the Ferry is good as a result of recent conservation work, arresting a long period of deterioration. Machinery removed for separate display.

Modifications And Dates

The Ferry was originally fitted with 2 cylinder 38 hp compound steam engine built by Chapman and Co. Ltd. and tall funnel.

1936 - Fitted with 228 bhp 6 cylinder diesel engine built by L. Gardner and Sons Ltd. and short funnel.

1962 - Fitted with 300 bhp 4 cylinder diesel engine built by Crossley Brothers.

Sundry modifications to seating, upper deck exits etc, dates unknown - during working life of ferry.

1990's - part of engine removed to facilitate relocation. Parts held at LDHC near ferry. (Prescott 1984)

Further Comments

Current Use

Heritage centre

Former Use

Ferry/Church/School/ Vacant crown land

Listings

Listings

			Records Retrieved: 3		
Heritage Listing	**Listing Title**	**Listing Number**	**Gazette Date**	**Gazzette Number**	**Gazzette Page**
Local Environmental Plan			4/13/2007 12:00:00 AM		
Heritage study	Lady Denman Heritage Complex	JB021			
Local Environmental Plan	Shoalhaven Local Environmental Plan 2014	202	4/22/2014 12:00:00 AM		

Procedures/Exemptions

Records Retrieved: 0

Section of Act	Description	Title	Comments	Action Date	Outcome
			No Results Found		

History

Historical Notes or Provenance	Updated

The Lady Denman was built in Huskisson in 1911 for the Balmain New Ferry Co. Ltd. (subsequently taken over by Sydney Ferries Ltd) by Joseph Dent, and named after the wife of the then Governor General. The hull was built in Huskisson from local timber, launched then floated to Sydney where machinery was installed and upperworks completed.

- 1912 - 1936 Lane Cove River run.
- War years - Cockatoo Island run.
- End of war to 1979 - Inner Harbour runs, including Taronga Park Zoo, Milsons Point, Cremorne, Hunter's Hill.
- 1979 - given by Ministry of Transport to Huskisson citizens.
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Historic Themes

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Local Government	Shoalhaven City Council	2399554

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National Native Title Tribunal

Extract from the Register of Native Title Claims

Application Information

Application Reference:	**Federal Court number:** NSD1331/2017
	NNTT number: NC2017/003
Application name:	The Applicant on behalf of the South Coast People v Attorney General of New South Wales (South Coast People)
Registration History:	Registered from 31/01/2018

Register Extract (pursuant to s. 186 of the *Native Title Act 1993*)

Application filed with:	Federal Court of Australia
Date application filed:	03/08/2017
Date claim entered on Register:	31/01/2018
Applicants:	Marilyn Pickalla Campbell, Aileen Blackburn (nee Mongta), William Campbell, Wally Stewart, John Brierley, Mark Tinelt Parsons, Dean Kelly, Cathy Thomas, Leslie Simon, Taressa Mongta, Gwenda Jarrett, Paul McLeod

Address for service: NTSCORP Limited
Unit 1a Suite 2.02
44-70 Rosehill Street
REDFERN NSW 2016
Phone: (02) 9310 3188
Fax: (02) 9310 4177

Additional Information:

Not Applicable

DESCRIPTION OF THE AREA COVERED BY THE CLAIM:

(A) Area covered by application

The area covered by the application ('the Application Area') comprises all the land and waters within the external boundaries described in Attachment B and depicted in the map at Attachment C.

The Application Area description and map have been prepared with the assistance of the Geo-Spatial Unit of the National Native Title Tribunal. The area covered by this application does not include the areas described at point B below.

(B) Areas within the external boundaries not covered by the application

1. The area covered by the application excludes any land and waters covered by past or present freehold title or by previous valid exclusive possession acts as defined by section 23B of the Native Title Act 1993 (Cth). That is, the area covered by the application excludes any land and waters which are:
a) a Scheduled interest;
b) a freehold estate;
c) a commercial lease that is neither an agricultural lease nor a pastoral lease;
d) an exclusive agricultural lease or an exclusive pastoral lease;
e) a residential lease;
f) a community purpose lease;
g) a lease dissected from a mining lease and referred to in s 23B(2)(c)(vii) of the Native Title Act (1993) (Cth); and
h) any lease (other than a mining lease) that confers a right of exclusive possession over particular land or waters.

2. Subject to paragraphs 4 and 5, the area covered by the application excludes any land or waters covered by the valid construction or establishment of any public work, where the construction or establishment of the public work commenced on or before 23 December 1996.

3. Subject to paragraphs 4 and 5, exclusive possession is not claimed over areas which are subject to valid previous non-exclusive possession acts done by the Commonwealth, State or Territory.

4. Subject to paragraph 6 below, where the act specified in paragraphs l, 2 and 3 falls within the provisions of:
a) s 23B(9) - Exclusion of acts benefiting Aboriginal Peoples or Torres Strait Islanders;
b) s 23B(9A) - Establishment of a national park or state park;
c) s 23B(9B) - Acts where legislation provides for non-extinguishment;
d) s 23B(9C) - Exclusion of Crown to Crown grants; and
e) s 23B(10) - Exclusion by regulation;
the area covered by the act is not excluded from the application.

5. Where an act specified in paragraphs 1, 2 and 3 affects or affected land or waters referred to in:
a) s 47 - Pastoral leases etc covered by claimant application;
b) s 47A - Reserves covered by claimant application;
c) s 47B - Vacant Crown land covered by claimant application; the area covered by the act is not excluded from the application.

6. The area covered by the application excludes land or waters where the native title rights and interests claimed have been otherwise extinguished.

PERSONS CLAIMING TO HOLD NATIVE TITLE:

The South Coast People are the native title claim group on whose behalf the Applicant makes this application.

The South Coast People native title claim group comprises all the descendants of the following apical ancestors:
Mary Ann, mother of Emily and Joseph Johnson
Charles ADGERY
Robert ANDY
Maria BILLYBOY (aka Coommee Nullanga)
Arthur BLOXSOME
Richard BOLLOWAY
Alick BOND
Charlotte BOND
Oswald BRIERLEY
William BROUGHTON
Jane BROWN
Thomas Golden BROWN
James BUNDLE
Jerry BUNGIL
Louisa BURROWS
William CAMPBELL
John CARPENTER
Johnny CARTER
Henry CHAPMAN
Henry COOLEY
Tom COOLEY
Bob CURRAN
Henry DAVIS
Ellen DEMESTRE
Julia DIXON

William DIXON
Jimmy Coombala FRIDAY
Biddy GILES
James GOLDING
Patrick HADDIGADDI
Jessie JENKINS
Donald JOHNSON
Annie JOHNSTON
Judy KENNY
John KERRY
Lucy LYONS
Mary Ann LYONS
Richard MARSHALL
Caroline MATHEWS
Elizabeth MATTHEWS
Annie MCGRATH
Edward MOORE
MUMBLER
Jenny NIMEBUR
George NIPPLE
Margaret Ann NIXON
Harry PICKALLA
John PITTMAN
Mary Ann ROSE
Minnie ROWLEY
John SIMS
Sally of Wandandian, spouse of Dan Parsons
Governor STEWART
Mary Ann STEWART
Peter THOMAS
George TIMBERY
Mary TURNER
Edward WALKER
William WALKER
and persons adopted and incorporated into the families of those persons in accodance with the South Coast People's traditional laws and customs (and the biological descendants of any such persons).

REGISTERED NATIVE TITLE RIGHTS AND INTERESTS:

The following Native Title Rights & Interests were entered on the Register on 31/01/2018

The South Coast People claim the following native title rights and interests in relation to the claim area, subject to the valid laws of the State of New South Wales and the Commonwealth (including the right to conduct activities necessary to give effect to them):

1. Where exclusive native title can be recognised, the South Coast People, as defined in Schedule A of this application, claim the right to possession, occupation, use and enjoyment of the lands and waters of the application area to the exclusion of all others subject to the valid laws of the Commonwealth and State of New South Wales.

2. Where exclusive native title cannot be recognised, the South Coast People as defined in Schedule A of this application, claim the following non-exclusive rights and interests including the right to conduct activities necessary to give effect to them:
i. the right to access, to remain in and to use the land and waters for any purpose;
ii. the right to access and to take resources from the land and waters for any purpose;
iii. the right to maintain and protect places and objects of significance;
iv. the right to be accompanied onto those areas by persons who, though not native title holders, are:
a) spouses, partners or parents of native title holders, together with their children, grandchildren, great-grandchildren and their descendants;
b) people required under traditional laws and customs for the performance of cultural activities, practices or ceremonies; and
c) people requested by the native title holders to assist in, observe or record cultural activities, practices or ceremonies.

The native title rights and interests are subject to and exercisable in accordance with:

a) the valid laws of the State of New South Wales and the Commonwealth;
b) the rights (past of present) conferred upon persons pursuant to the laws of the Commonwealth and the laws of the State of New South Wales; and
c) the traditional laws acknowledged and traditional customs observed by the South Coast People.

REGISTER ATTACHMENTS:

1. Attachment B Description of the area covered by the application, 6 pages - A4, 03/08/2017

2. Attachment C Map of the area covered by the application, 2 pages - A4, 03/08/2017

3. NNTT Map of the application area, 1 page - A4, 31/01/2018

Note: The Register of Native Title Claims may, in accordance with s. 188 of the Native Title Act 1993, contain confidential information that will not appear on the Extract.

149°30'E 150°0'E 150°30'E 151°0'E 151°30'E

34°0'S 34°30'S 35°0'S 35°30'S 36°0'S 36°30'S 37°0'S

Commencement Point

NSD19/2010
NSD164/2012
NSD1839/2008

NSD1272/2005

NSD1631/2004

NSD240/2010

NSD1826/2005

Buffer 3nm east of the MHWM

Montague Island

NSD1200/2009
NSD1766/2005
NSD1246/2007
NSD1199/2009

National Native Title Tribunal

Native Title Determination Application

South Coast

Legend

South Coast Claim Area

0 25 50

Kilometres

Geocentric Datum of Australia 1994

Prepared by:
Geospatial Services, National Native Title Tribunal
13/06/2017

Data Sources:
South Coast Claim boundary compiled by National Native Title Tribunal based on information or instructions provided by the applicants.

Filepath: P:\GEO_INFO\Products\NSW\NTDA\Proposed\South_Coast\Mapping\GT2017_0862_Map\20170613_Proposed_South_Coast_Topo_A3P.mxd

Geotrack Number: GT2017/0862

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : jbmm boardwalk

Client Service ID : 764933

Peter Dalmazzo

157 Cedarvale Lane
Jaspers Brush New South Wales 2535

Attention: Peter Dalmazzo

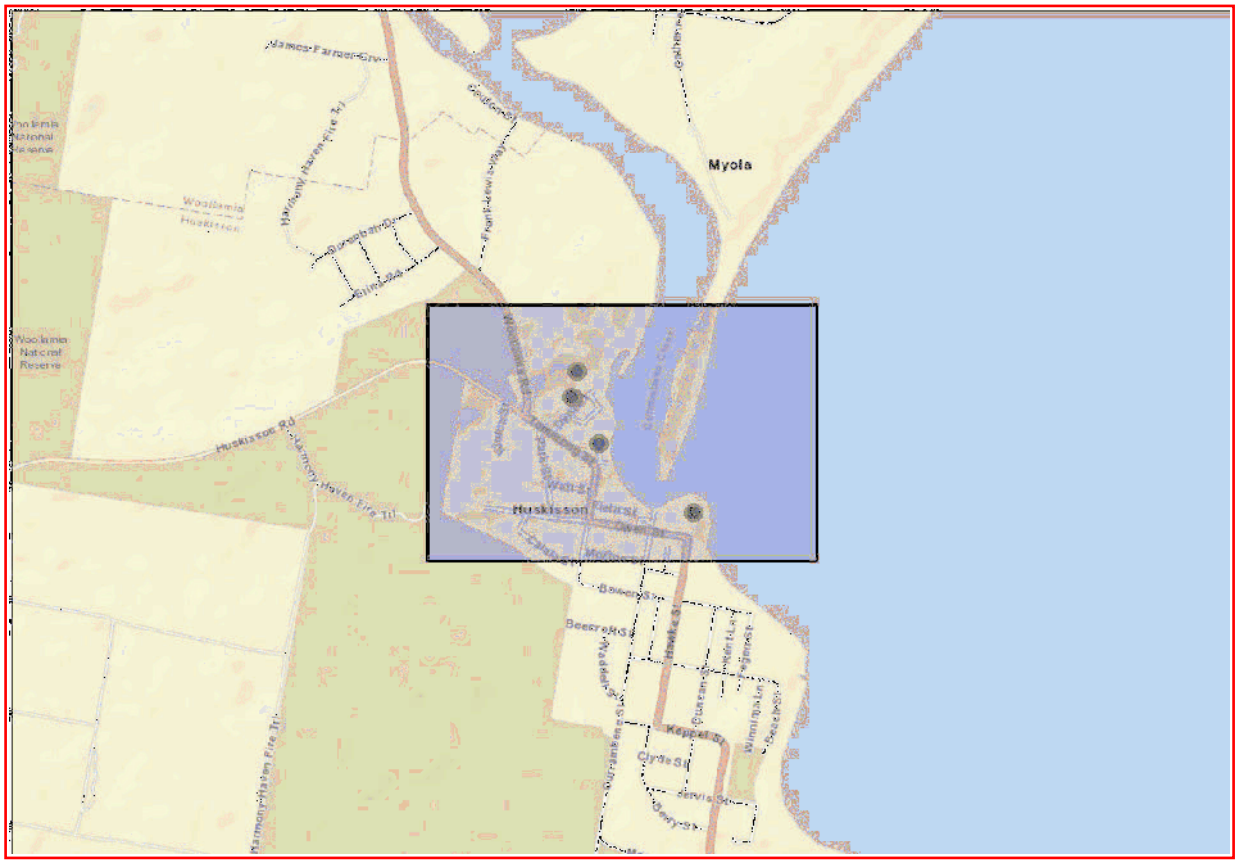
Email: peter@annaglynn.com

Date: 20 March 2023

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -35.0398, 150.6621 - Lat, Long To : -35.0313, 150.6775, conducted by Peter Dalmazzo on 20 March 2023.

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:

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

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : jbmm boardwalk

Client Service ID : 764933

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
58-2-0479	Lady Denman Midden 2	GDA	56	287271	6120754	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Onsite Cultural Heritage Management - Narooma,Mr.Gerard Niemoeller					**Permits**		
58-2-0488	Huskisson Hotel	GDA	56	287702	6120244	Open site	Valid	Shell : 100		
	Contact	**Recorders**	Apex Archaeology,Ms.Jenni Bate,Miss.Rose O'Sullivan					**Permits**	4845	
58-2-0409	Lady Denman Midden 1	GDA	56	287262	6120655	Open site	Valid	Artefact : 2, Shell : -		100686
	Contact T Russell	**Recorders**	Ms.Lodie Webster,Onsite Cultural Heritage Management - Narooma,Mr.Gerard Nie					**Permits**		
58-2-0410	Lady Denmam Midden, duplicate of 58-2-0411	AGD	56	287150	6120470	Open site	Deleted	Shell : -		
	Contact T Russell	**Recorders**	Ms.Lodie Webster					**Permits**		
58-2-0359	Tomerang Road	AGD	56	287250	6120300	Open site	Valid	Shell : -		
	Contact	**Recorders**	Dominic Steele Archaeological Consulting					**Permits**		

**** Site Status**

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 20/03/2023 for Peter Dalmazzo for the following area at Lat, Long From : -35.0398, 150.6621 - Lat, Long To : -35.0313, 150.6775. Number of Aboriginal sites and Aboriginal objects found is 5