COASTAL MINOR WORKS – Development without consent: Review of Environmental Factors (REF)

DOCUMENT A: Manyana Beach – Creek Diversion and Beach Scraping

EXECUTIVE SUMMARY

Project Description	
Proponent	Shoalhaven City Council
Work Type	☒ Beach scraping ☒ Beach access track maintenance ☐ Revegetation ☐ Placement of sandbags (for a period no longer than 90 days).
Location	Manyana Beach, NSW
Proposed Activity	Beach scraping, beach access track maintenance, and revegetation works at Manyana Beach.
Project Timeframe	August 2023 – November 2023
Approvals Pathway	Council is the determining authority as per Part 5 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act). The proposed activity has been deemed development without consent as per the applicable environmental planning instruments (EPI), specifically the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (TI SEPP) & *State Environmental Planning Policy (Resilience and Hazards) 2021* (RH SEPP). ***Licenses and permits:*** • A permit from NSW Crown Lands under Division 5.6 of the *Crown Land Management Act 2016* (NSW) (Crown LM Act) • A permit from NSW Department of Primary industries (DPI) – Fisheries under Part 7 of the *Fisheries Management Act 1994 (*NSW) (*FM act)*, **on any other land** (given the proposed activity necessarily takes place near to a waterbody with a footprint below mean high water).
Accompanying documentation	**Document B:** Coastal Minor Works Overview and Legislative Review **Attachment 1:** Figures **Attachment 2:** Work Plan **Attachment 3:** Unexpected Finds Protocol **Attachment 4:** Likelihood of occurrence for threatened species listed under the BC Act and EPBC Act

Project Description	
	Attachment 5: Test of Significance (BC Act) and Significant Impact Criteria (EPBC Act) **Attachment 6** – AHIMS search results **Attachment 7** – Agency Consultation **Attachment 8** – Permits and Licences
Publication	The REF as outlined in this document and the accompanying documents: Have ☒ Have not ☐ Been published on the Council website in accordance with Section 171(4) of the *Environmental Planning and Assessment Regulation 2021* (NSW) (EP&A Regulation) as the proposed activity has been deemed to be of public interest.

The REF has concluded on the basis of an assessment of the environmental factors outlined under Section 171(2) of the EP&A Regulation and the likely impacts on the environment associated with the proposed activity, that it:

Can ☒

proceed without further assessment, assuming application of the Environmental Management Plan (EMP) on the following page.

Cannot ☐

Document Author	**Reviewed and endorsed by:**
Signature: 	Signature: 
Name: Luke Moroney	Name: Nigel Smith
Title: Coast and Estuaries Officer	Title: Lead – Coastal Management
Date: 11/09/2023	Date: 12/09/2023

Authorising Manager's approval

Signature: Michael Roberts

Name: Dr Michael Roberts

Title: Manager – Environmental Services

Date: 29/09/2023

ENVIRONMENTAL MANAGEMENT PLAN

Impact	Mitigation measures	Roles/responsibilities
General		
Management of risk to project completion and execution of works. Management of reputational risk to Council and the Contractor. Management of risk from breach of statutory requirements that apply to the works and/or work site.	- Take and store pre-dilapidation photographs of the work site. - If in doubt about the implementation of any mitigation measures, or in the case of new issues arising in response to the works, cease works and contact Council's Project Manager for advice. Applicable contact details provided at final section of Environmental Management Plan. - Abide by the conditions of applicable NSW State Government agency permits and licenses. - Applicable safety hazard and risk assessments (inclusive of Safe Work Methods Statement (SWMS) for high-risk construction works as delineated under the *Work Health and Safety Act 2011* (NSW)) are to be prepared and established by the appointed contractor and are to include mapping details and controls to address work site and public exclusion zones. This is to ensure public safety is maintained throughout the entirety of the works. - Conduct induction training for all workers (inclusive of authorised visitors) to alert them to sensitive work areas, explain the requirements of the EMP, outline an individual's responsibilities and inform all workers of emergency response procedures. Documented evidence of such training is to be available before commencing work on-site. - Signage denoting a notification of works to be installed on the work site prior to work, indicating dates of proposed activities, purpose, and requirements.	Contractor/Council
Coastal landform		
Erosion of sand and other sediment.	- Undertake revegetation works to stabilise reinstated dune areas. Planting of mature stock to be in conjunction with installation of seedling stock in areas of high pedestrian traffic to enable quick colonisation and succession as part of the revegetation program. Consider recent and forecast weather (i.e., rainfall, temperatures) prior to planting to ensure the highest possible likelihood of plant survival. - Implement the erosion and sediment controls as identified in the EMP. - Identify access for machinery prior to commencement of works. Beach access tracks are required to be suitable for plant and equipment before use to minimise risk of bogging, and destabilisation and sediment runoff. - Where exercising beach scraping the excavation depth will be of a maximum 300mm and be limited to marine sands only. - Stockpiling is to be limited to the minimum necessary. Excavated fill material will be placed directly at desired 'fill' locations, shaped, and compacted as soon as reasonably practicable considering an allowance to enable the most	Contractor/Council

Impact	Mitigation measures	Roles/responsibilities
	efficient works methodology. Works methodology must exclude any requirement for overnight stockpiling and thus reduce need for further controls of excavated material. - Works to be conducted in accordance with a site-specific erosion and sediment controls as identified in the EMP and be consistent with current best practice (i.e., Managing Urban Stormwater: Soils and Construction 4th Edition, Landcom 2004, aka the Blue Book) must be implemented to ensure containment of sediment above Mean High Water Mark.	
Biodiversity		
Impacts on flora Impact on fauna	**General:** - Beach scraping is to be restricted to the section of the beach in front of the vegetated foredune. Works are to avoid any heavily vegetated areas of the incipient dune, as well as potential habitat features such as large logs, to reduce potential impacts on mammal nests and burrows. - Access for vehicles and machinery through vegetated areas will utilise existing formalised beach access tracks only (Councils formal assets). Contractor is to demonstrate knowledge and ascertain suitability of these locations prior to works commencing. Machine movement to be limited to 20 km/hr to minimise risk of injury to fauna. - Thoroughly clean all plant and equipment prior to arriving and when leaving the work site to avoid transfer of weeds or weed seeds and pathogens. - Protection zones for trees from machinery and vehicles will be maintained in accordance with *AS 4970-2009 - Protection of Trees on Development Sites*. - Only minimum vegetation pruning is to be undertaken as required for maintenance of existing formal beach access tracks. Pruned branches to be left on the work site (but off pathways) as brush matting. Pruning is to be undertaken in accordance with AS 4373—2007 – Pruning of amenity trees. No impacts on hollow bearing trees or access to site through old growth vegetation areas. - Where threatened plant species are identified, exclusion zones of >20m will be maintained where practicable. If these species are identified following the commencement of works, works should temporarily stop to establish appropriate exclusion zones prior to proceeding with the works. **Management and control of weeds:** - In accordance with guidelines outlined be NSW Department of Primary Industries WeedWise, identify areas impacted by invasive weeds and control weed spread by avoiding disturbance to vegetation and ensuring machinery is clean prior to arrival of site. Prior to commencement of works, treat weed species on site where identified to contain and reduce risk of weed spread during works.	Contractor/Council

Impact	Mitigation measures	Roles/responsibilities
	Shorebirds: - Relevant Council Officer, in consultation with a suitably qualified person, must inspect the work site for the presence of threatened and migratory shorebirds. A pre-works survey will be undertaken at least one (1) week prior to the commencement of works to determine presence/absence of threatened and migratory shorebirds. - April - September: A minimum buffer of 50 m (as adopted standard of the National Parks and Wildlife Service (NPWS)) must be maintained from individual threatened shorebirds using habitat. All plant, personnel and equipment will be excluded at least 50 m from the shorebird(s). If threatened shorebirds are detected within 50 m of the works or ancillary sites or activities, works and/or machinery movement will stop immediately and not resume until the bird(s) has/have vacated the site autonomously. - October - March: A minimum buffer of 255 m from nesting shorebirds (*Industry guidelines for avoiding, assessing, and mitigating impacts on Environment Protection and Biodiversity Conservation Act 1999 (Cth)(EPBC Act) listed migratory shorebird species* Commonwealth of Australia, 2017). If nesting threatened shorebirds are detected within 255 m of the works or ancillary sites or activities, work will immediately stop and the local NPWS office will be contacted for instruction and assistance and/or clearance. - If threatened shorebirds are detected within 50 m of the works or ancillary sites or activities, works and/or machinery movement will stop immediately and not resume until the bird(s) has/have vacated the site autonomously. - In the case whereby earth works surface disturbance is attracting bird activity an assessment is to be made onsite for the likelihood of impact on fauna. In the case of cause-and-effect conditions that may arise works may proceed if impacts on bird species are deemed low risk by relevant Council officer. - All exclusion zones are to be shown in Works Plan where required. **Aquatic biodiversity:** - Implement risk mitigation measures as determined by DPI Fisheries Permit. - A visual inspection of adjacent water bodies for dead or distressed fish (indicated by fish gasping at the water surface, fish crowding in pools or at the creek's banks) is to be undertaken daily during the works. Observations of dead or distressed fish are to be immediately reported to Department of Primary Industries (DPI) - Fisheries. In such a case all works are to cease until the issue is rectified and approval from DPI Fisheries is given to proceed. - No snags are to be removed, realigned, or relocated. Snags include large woody debris from trees and shrubs, including whole fallen trees, broken branches and exposed roots that have fallen or washed into a waterway which are wholly or partially submerged by water greater than 3m in length and 300mm in diameter.	

Impact	Mitigation measures	Roles/responsibilities
Aboriginal & non-Aboriginal cultural heritage		
Damage/impacts on cultural heritage sites.	- On-site assessment with relevant Council Officer and a Local Aboriginal Land Council (LALC) representative to confirm identification of heritage sites and establish exclusion zones at each site. Exclusion zones to be mapped on work plan and no works will be permitted within the defined area which may impact on heritage. - Avoid areas of clay or regolith materials during excavation to prevent any harm or removal of potentially buried artefacts. - The identification of flakes, blades or rock fragments of silcrete, quartz or quartzite composition during excavation works should trigger the unexpected finds protocol to determine whether these may be items of aboriginal cultural heritage. - The identification of potential middens or shell deposits should trigger the unexpected finds protocol. - Relevant Council Officer to be present at project start up to address the unexpected finds protocol which is to be implemented by the Contractor. This will consist of the following and the unexpected finds protocol attached to this document should be referred to. - Should any previously unidentified Aboriginal objects or places be identified during excavation and construction, all works must cease in the vicinity of the find and the following be notified: o Council representative. o NSW Department of Premier and Cabinet – Heritage NSW (Heritage NSW). o A qualified archaeologist. o Aboriginal stakeholders	Contractor/Council
Soil and contamination		
Uncovering contaminated soils Fuel and Hydraulic spills	- Earth works will be limited to movement of marine sands only. - An emergency marine spill kit is to be available on site at all times with procedures to contain and collect any leakage or spillage of fuels, oils and greases from plant and equipment. In the event of an accidental oil/fuel spill, Council is to be notified immediately by phone and a written incident report with corrective actions is to be supplied by the Contractor to Council within 24 hours of the incident occurring. - Storage of fuel, oils and other hazardous chemicals must be within a hardstand bunded area. - All machinery to be used shall be clean, and in good working order prior to entering the site, with daily pre-start checklists to be recorded for all heavy plant used on site. - No major equipment maintenance works shall be undertaken on-site. - Changing of hydraulic attachments on machinery is to take place off site in the compound or hardstand area.	Contractor

Impact	Mitigation measures	Roles/responsibilities
	- Relevant Council Officer to be present at project start up to address the unexpected finds protocol which is to be implemented by the Contractor. Details are provided in unexpected finds protocol attached to this EMP.	
Waterways and water quality		
Turbulence increase due to sediment release.	**Works in intertidal zone:** - Beach scraping is to be undertaken around the low tide (mid-low, low-mid) to minimise machinery working in water as much as practical and to reduce the potential for any sediment plumes in adjacent waters. - Works must be timed to occur during a spring tidal phase where tidal ranges are greater, providing lower low tides to ensure optimal conditions for obtaining sand during the periods of low water levels and where intertidal shoals will be most exposed. - Stabilising exposed dune areas through revegetation, brush matting and implementation of all other erosion sediment control measures to limit movement of sediment to waterways. **General:** - Works to be undertaken in low rain period to ensure minimal creek discharge at time of realignment and minimise sediment release due to disturbed beach surface and storm water runoff. Works to not progress if possible, rainfall exceeds 25mm on any given day of proposed work if chance of any rain exceeds 50% concurrently. Check Bureau of Meteorology forecast.	Contractor
Traffic and transport		

Detours or disruptions to traffic flow (vehicular, cycle and pedestrian) and parking during works undertaking.	- Limit works to low-use times where possible i.e., outside of all holiday periods.
	- Conduct works in standard working hours (unless for emergencies):
	  o Monday to Friday 7.00am to 6.00pm
	  o Saturday 8.00am to 2.00pm
	  o No work on Sundays or public holidays
	- Compound machinery away from parking spaces and beach access tracks, where possible.
	- Undertake letter drop to inform immediate residents of access disruptions from private property adjacent to the work site.
		Contractor

Impact	Mitigation measures	Roles/responsibilities
Socio-economic		
Impacts on community and business use of the site.	- Conduct works in standard working hours & llimit works to low-use periods where possible (see above). - Implement notification of works signage prior to commencing works to inform relevant businesses and community groups. - The community can lodge complaints about the works with the Coastal Management Team. If a representative is not on-site, contractors can direct the community member to email coastal.management@shoalhaven.nsw.gov.au. Council will provide an appropriate and timely response. - Compound machinery away from parking spaces and beach access tracks, where possible.	Contractor/Council
Noise and air quality		
Noise of vibration on surrounding properties or receptors. Air quality impacts form wind transport of sand.	- Conduct works in standard working hours (as above). - Maintain vehicles and plant to ensure they are in good working order (to be recorded in daily plant machinery pre-start checklist). - Limit works during high wind conditions. - Limit stockpiling to the minimum necessary. Stockpiling may not occur on incipient dune and not to occur overnight. - Compact sand appropriately and sufficiently enough to minimise wind erosion following placement. Sand wetting may be appropriate to facilitate sediment containment. - Vehicles leaving site carrying material loads must be covered to prevent dust generation.	Contractor
Waste		
Waste generation	- All waste generated by the works will be disposed of appropriately in accordance with the Resource Management Hierarchy (Avoidance, Recovery, Disposal). - A post-work inspection of the site should be undertaken before demobilising to ensure waste and litter is not left behind. - The unexpected finds protocol is to be implemented if works uncover unexpected waste materials (i.e., buried wastes, asbestos). - Waste may be present on site including, dumped general solid waste, remnant building material (timber fencing and wire), discarded fishing gear etc. General site clean-up and waste segregation to be conducted prior to works commencing if required. - Unexpected finds to be addressed in accordance with unexpected finds protocol attached to this document.	Contractor

Impact	Mitigation measures	Roles/responsibilities
	- Refer to Shoalhaven City Council Contaminated Land Policy for protocols in relation to the unforeseen detection of asbestos and other contaminated waste that may be detected within illegally dumped material. Works are to shut down and a proper assessment protocol developed in consultation with relevant Council Officer.	

Signatures		
Shoalhaven City Council Project Manager **Signature: XXX** **Name: XXX** **Title: XXX** **Date: XXX**	**Contractors Representative** Signature: XXX Name: XXX Title: XXX Date: XXX	**Works Lead/Foreman** Signature: XXX Name: XXX Title: XXX Date: XXX

Contents

1. INTRODUCTION

This document provides an environmental site-specific assessment for the rectification of impacts associated with coastal hazards and dependant ancillary works at Manyana Beach, in accordance with the relevant statutory and planning frameworks for coastal protection works in New South Wales (NSW). It is intended to satisfy the due diligence and legislative requirements of Shoalhaven City Council and the contractor before the proposed activity can be undertaken, or to identify further requirements before doing so.

The rectification of these coastal erosion impacts at Manyana beach constitutes an 'activity' under Part 5 of the EP&A Act. This document will provide details of the proposed activity, legislative context, and potential impacts on the community and the environment.

A contractor undertaking proposed works will adopt the identified mitigation and management measures outlined in the Environmental Management Plan (EMP). The content of this document is supported by **Document B: Coastal Minor Works Overview and Legislative Review,** which provides an overview of the legislative and policy framework and processes utilised in undertaking this environmental assessment.

1.1 Proposed activity

Manyana Beach has experienced erosion in response to coastal hazards and longshore creek migration. This has resulted in an ongoing impact on the dune system and public beach access since early 2023. The erosion has primarily occurred along the foredune at the northern end of Manyana Beach and at the Council managed beach access tracks at both the northern and southern ends of the beach. Study area and proposed work site is detailed in **Figure 1**.

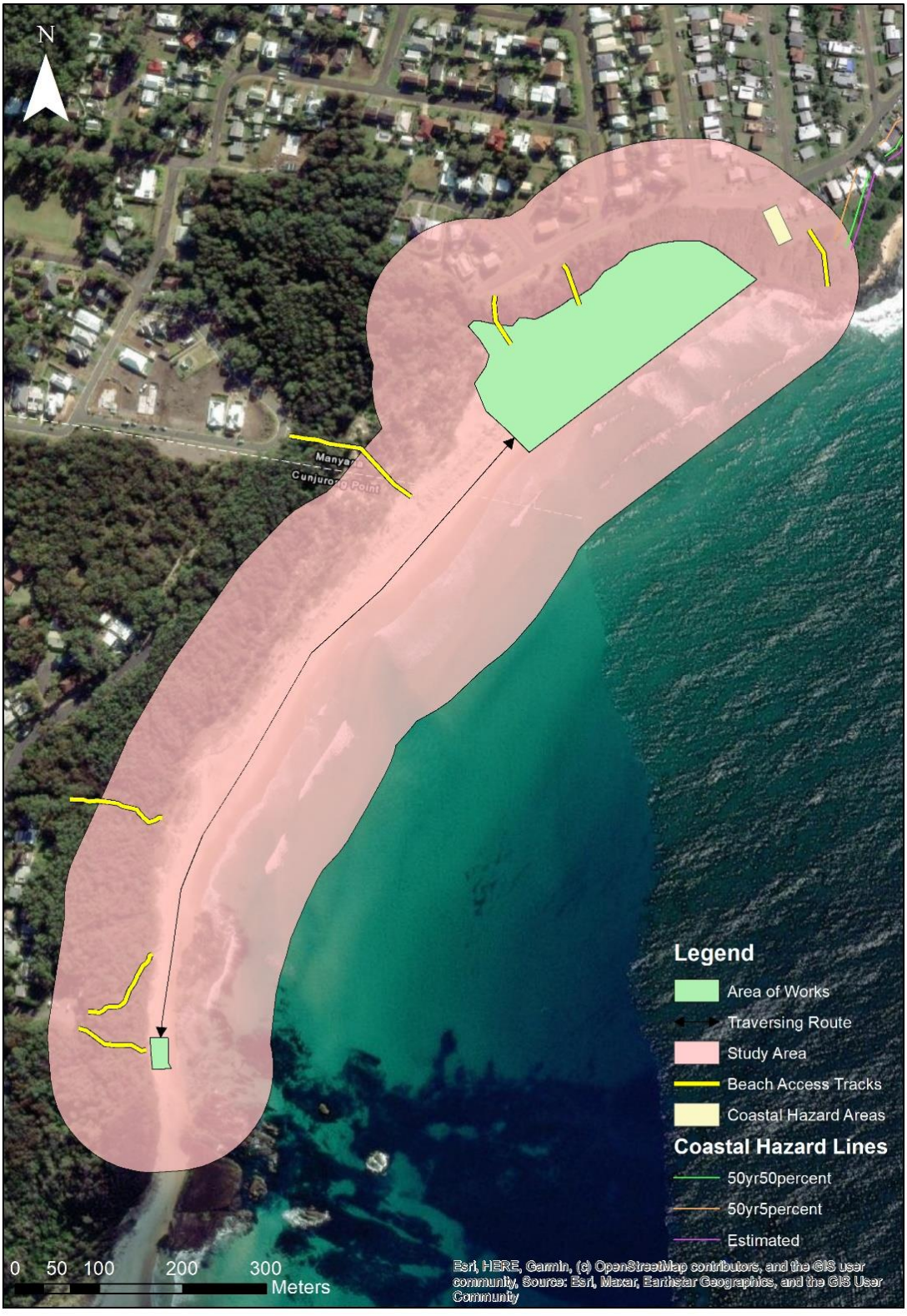


Figure 1 - Study area & areas of works (proposed work site)

Detailed scope of works

The proposed activity is in response to erosion impacting on Council managed assets and public amenity including public safety, and will generally be undertaken as described in **Document B**, **Section 3**, and specifically as described in **Attachment 2** with attention to the details provided in **Table 1**.

Table 1 - Scope of works detail

Proposed activity	Beach scraping (**Document B, Section 3.1**): - Beach scraping will be undertaken to mitigate against dune erosion caused by longshore creek migration at the northern end of Manyana Beach. This activity will involve sand replenishment to the foredune and beach area utilising in-situ marine sands. Specific processes and functions of this environmental management practice are described in detail in Document B. Implementation of the proposed beach scraping activity will enable Council to reinstate the plant machinery and pedestrian beach access that is currently inhibited by dune/creek bank erosion. Beach access track maintenance (**Document B, Section 3.2**): - Maintenance of Council managed beach access tracks through sand nourishment using in-situ marine sands as an extension of beach scraping to mitigate track incision, head cut erosion and stormwater erosion scour. Access track nourishment through beach scraping activity will also enable plant machinery access at the southernmost pedestrian access track to the beach. Improved plant machinery access at this location is required for the construction of pedestrian beach access infrastructure, which is planned to be implemented following the proposed activity*. Furthermore, such beach access track works are required since the beach access infrastructure works involve the temporary closure of an access track to facilitate these works. As such, beach access track maintenance through the implementation of the proposed activity will enable safe and traversable access tracks to be available during the construction phase of these other works. Revegetation as required to enable dune stabilisation (**Document B, Section 3.3**): - Revegetation will be undertaken using native dune species to enable stabilisation of foredune and exposed dune areas. Planting will include installation of mature stock in conjunction with

	seedling stock to enable efficient colonisation, enhanced plant succession and establishment at a rate of approximately 4/m^2 where deemed suitable following beach scraping activities.
Disturbance footprint and access	Maximum approximate disturbance footprint for the proposed activity is 30,000m^3. This encompasses a maximum area allowance for beach scraping which could potentially involve surface disturbance to the beach form the vegetated foredune to the intertidal zone along approximately 250 meters of foreshore from the northern most end of the beach, and for approximately 50 meters of foreshore at the southern end of the beach. It is considered that the realised (actual) disturbance footprint would likely be less than estimated due to the dynamic nature of the proposed work site and study area impacting on exact beach scaping extent. Location for machinery access would be via Council managed beach access track (ID 13001396) at the northern end of Manyana Beach.
Access track identification	Beach access track with Council Asset ID 13001396 & 13001397 have been impacted on by the longshore creek migration. Beach scraping will aim to improve the beach side dune condition adjacent to these assets. Beach scraping activity will also enable the subsequent infrastructure upgrades to beach access ID 13001393.

* The planned infrastructure upgrade to follow the proposed activity is Exempt Development and has been determined as such through applicable Environmental and Legislative Due Diligence Assessment (Council reference D23/51713). This Exempt Development is a standalone activity not associated with the proposed activity, hence there is no further reference to this planned infrastructure upgrade.

Machinery and equipment

The following machinery equipment will be used for the proposed activity:

- Tracked skid steers loader and/or excavator up to 15 tonnes gross weight.
- 4WD vehicles

Duration and working hours

The proposed activity is expected to be completed within 1-2 days.

All works will be undertaken within standard working hours:

- Monday to Friday 7.00am to 6.00pm
- Saturday 8.00am to 2.00pm
- No work on Sundays or public holidays

Specific working hours will be dependent on appropriate tidal phases, and coastal conditions.

Roles and Responsibilities

The roles and responsibilities for the relevant project personnel are defined in the EMP at the start of this document. Each identified person should ensure they are aware of the roles and responsibilities identified in this EMP prior to the commencement of works.

1.2 Sources of information

This document has been informed by the following desktop review and database searches:

- Council's GIS Enquiry (various data layers from June 2022 to August 2023). This contains GIS layers with data sourced under licence, including sensitive data locations and records of threatened species.
- NSW BioNet (NSW Department of Planning and Environment) (accessed 31 July 2023).
- Aboriginal Heritage Information Management System (AHIMS) (accessed 19 June 2023).
- Council records and archives.
- DPE Threatened Biodiversity Data Collection: http://www.environment.nsw.gov.au/threatenedspecies
- Birdata: https://birdata.birdlife.org.au/
- Records of threatened species in the Atlas of Living Australia (ALA): http://www.ala.org.au/
- Commonwealth Department of Climate Change, Energy, Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) (accessed 19 June 2023): http://www.environment.gov.au/epbc/protected-matters-search-tool
- Community consultation as per **Section 5** of this document.

Likelihood of occurrence was assessed for threatened flora and fauna listed under the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) that have been recorded within 10 kilometres of the subject site (referred to hereafter as the 'locality').

Based on the nature of the subject site and proposed activity, it was considered that the above listed habitat assessment, literature review and database searches were appropriate means for assessing the potential impact on environmental factors in accordance with Section 171 of the EP&A Regulation.

An inspection of the proposed work site and study area to assess the range of environmental factors was conducted by the below Council Officers:

Council Officer	Position	Date(s)
Nigel Smith	Lead – Coastal Management	10/07/2023
Luke Moroney	Coast and Estuaries Officer	10/07/2023 & 01/09/2023
Michael Roberts	Manager - Environmental Services	01/09/2023

2. PROJECT OBJECTIVES

The general objectives of the proposed activity are listed below.

Beach scraping:

a. To mitigate against erosion damage and coastal hazards on Shoalhaven coastline and estuary foreshores.

b. To preserve access and amenity of the beach to the public.

c. To achieve the above without compromising the environmental, cultural or social values of the Shoalhaven coastline and estuary foreshores.

Beach access track maintenance:

a. To maintain and improve access to the coastal and estuary foreshore for the public.

b. To discourage damage to coastal landform and biodiversity by improving condition of formal access tracks and reducing use of informal access tracks.

c. Address public safety considerations at erosion impacted assets.

Revegetation:

a. To maintain and improve the integrity of natural coastal and estuarine ecosystems.

b. To stabilise and mitigate erosion risk to exposed areas of coastal dunes.

Table 2 summarises the justification process and options analysis associated with the formulation of the scope for the proposed activity. It should be read in conjunction with the options assessment provided in the relevant subsection of **Document B, Section 3** which considers a range of potential alternative options to the above listed proposed activity.

Table **2** *Options assessment – beach scraping and possible alternatives*

Option	Advantage	Disadvantage
Preferred Option Beach scraping and access track maintenance	Allows immediate mitigation of erosion risk, therefore minimising potential environmental damage from impending, current and past extreme weather events. Cost of proactive work is far less than repair and rehabilitation following extreme weather events. Will mitigate the risks with public safety hazards associated with erosion impacts on natural areas and Council assets. Will enable upgrades to be carried out for pedestrian beach access infrastructure by facilitating access for low impact plant/machinery to the proposed work site.	Immediate timing can be inconsistent with use of beach by the public and the environmental constraints (e.g., optimal tidal conditions are required), though these potential impacts can be mitigated through other means. Immediate time/cost input. Susceptible to extreme weather events until the proposed work site has appropriately stabilised.

Option	Advantage	Disadvantage
Alternative Option 1 – Business as usual	No risk to flora and fauna or other environmental factors imposed by intervention although intervention associated with the proposed activity will aim to restore and maintain available habitats in the moderate to long-term. No immediate time/cost input. No interruption to public use of the proposed work site as a result of intervention management.	Allows erosion of the proposed work site to continue, with potential further degradation of the dune system. This may result in a reduction in the functionality of the dune system as a coastal protection buffer and hence lead to a greater risk of coastal erosion hazards impacting on the proposed work site, and any proposed enhancement of biodiversity habitats. Cost for repair and restoration to address erosion impacting on the proposed work site without sacrificial protection associated with proactive beach scraping activity can be significantly greater than proactive management. Provides limited options to address public safety hazards relating to beach access assets impacted on by coastal erosion. Formation of new beach access tracks may be required to enable safe access to the foreshore, which would involve significant impact on existing vegetation and available habitats, may result in significant risk to dune and slope stability and would be inconsistent with aim for low environmental impact.
Alternative Option 2 – Defer decision and monitor situation	Allows opportunity to monitor the proposed work site for any natural resolution to erosion and access issues through an assessment of accretion and erosion cycles. This, however, may lead to immeasurable levels of erosion and associated impacts on the dune system. May allow rescheduling actions to align with lower-use period or more seasonally favourable months.	Extreme weather events can happen successively in single seasons, with catastrophic impact on the beach structure and dune systems. Erosion processes are slow to resolve under natural conditions, risking delayed restoration of dune and ecosystem integrity, and delaying critical upgrade to pedestrian access infrastructure.
Alternative Option 3 – Hard engineering creek diversion	Longer term, end-state solution – less ongoing costs.	Significant cost. Considered higher risk of impact on natural coastal processes. Significant environmental footprint and high likelihood of offsite impacts (i.e., end effects). Lengthier design and approval period. Large visual impact. High risk of limited community support.

3. LOCATION AND SITE SETTING

The proposed work site and study area is located at Manyana Beach, approximately 56 kilometres south of Nowra in New South Wales (**Figure 2**).

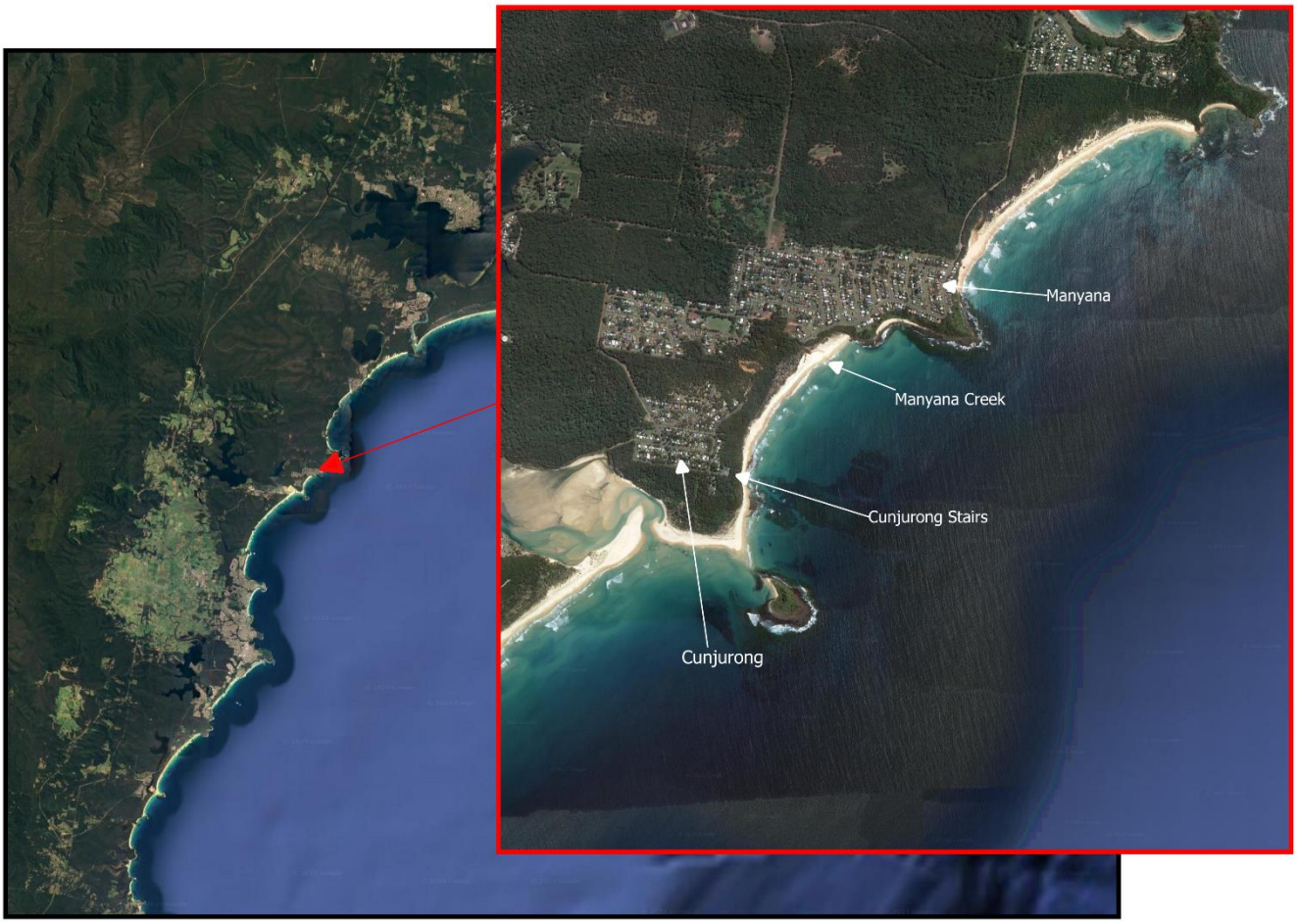


Figure 2 - Location and Site Setting, Manyana Beach

A general description of the Shoalhaven local government area (LGA) coastal zone is given in **Document B**, **Section 2**. **Table 3** provides information about the proposed work site and associated study area.

Table 3 - Location and site setting details

Proposed work site name	Manyana Beach
Lot and DP (or nearest)	Lot 822, DP 247285 Lot 7023, DP 1031073

Location	Manyana Beach off Sunset Strip, Manyana & Ottawa Street, Cunjurong Point. The Study Area includes a 100-metre buffer from the proposed work site, as shown below. 
Ownership	☒ NSW Crown lands ☒ Public (Council) ☐ Private ☐ Other: _____
Land use	☒ Public recreation ☒ Natural environment ☐ Commercial ☐ Other: _____

Description	The proposed work site and study area primarily consists of a 1.3 km open coast southeast facing beach which can be accessed from both Manyana and Cunjurong Point. The beach is encompassed by Inyadda point to the north and Green Island to the South. A steep vegetated coastal bluff is present adjacent to the foreshore at the southern end of the beach which transitions to a vegetated dune system along the foreshore to the northern end of the beach. A small coastal creek at the northern end of the beach discharges to the ocean creating variable beach and creek entrance geomorphology. Biodiversity and heritage elements of this proposed work site and study area are examined in **Section 7** of this document.

4. PERMISSIBILITY

4.1 Development Classification

The following table should be used to identify the nature of the development for the proposed activity. Development may be considered:

- Exempt development
- Development without consent
- Development with consent.

The approvals pathway and environmental assessment varies depending on the development classification of the proposed activity as is examined below in **Error! Reference source not found.**.

Table 4 - Development classification assessment

Proposed activity	**Relevant Instrument and Section**	**Satisfied (Yes/No)**
Exempt Development		
Construction and maintenance of **walking tracks, stairways, gates, handrails and vehicle barriers.** Works must: – Not involve the removal or pruning of a tree or other vegetation that requires a permit or development consent, unless undertaken in accordance with such a permit or consent. – Must involve no greater disturbance of native vegetation than necessary. – Must not result in an increase in stormwater run-off or erosion. – Must involve no more than minimal impact on the heritage significance of the item or area. Only applicable for lands that are: – National Parks – Marine Parks – Public reserves – Council managed Crown Land.	TI SEPP Ch 2, Pt 2.3, Div 12, s 2.74(1) Refer **Document B**, **Section 4.3**	Yes – Maintenance of pedestrian beach access tracks onto Manyana beach as described in **Section 1** meets the criteria as described. For the purposes of this assessment a 'beach access track' is considered a form of 'walking track'.
Emergency works as described in a certified Coastal Management Program being undertaken by a Public Authority	RH SEPP Ch 2, Pt 2.3, s2.16(3)	No - The proposed activity is not emergency works.

Proposed activity	Relevant Instrument and Section	Satisfied (Yes/No)
Development without consent		
Coastal protection works that are: – Identified in the relevant CMP; – Beach nourishment; – Placement of sandbags (no >90 days); – Routine maintenance works or repairs to any ***existing*** coastal protection works.	RH SEPP Ch 2, Pt 2.3, s2.16(2)(a) Refer **Document B, Section 4.2**	Yes – Beach scraping is considered a form of beach nourishment as described in **Section 1** of this document and **Document B, Section 3.1**
Development with consent		
Coastal protection works not identified above. *Note an assessment should be made to determine if the proposed activity is Regionally Significant Development as per *State Environmental Planning Policy (Planning Systems) 2021* (NSW). An environmental assessment must be completed in accordance with Part 4 of the EP&A Act.	RH SEPP Ch 2, Pt 2.3, s2.16(2)(b)	No – The above determined classifications encompass the proposed activity.

Based on the rationale provided, the proposed activity contains items of Exempt Development and Development without Consent. It is hence determined that the proposed activity is treated wholistically as Development without Consent (activity requiring Part 5 EP&A Act assessment) to allow the highest level of environmental due diligence and to enable dissemination of the full extent work to all stakeholders as required. As such, this document serves as the REF and has been prepared by Shoalhaven City Council (Council), in line with requirements under Part 5, Div 5.1 of the EP&A Act. This assessment relates to the impact of the proposed activity in accordance with Section 171 of the EP&A Regulation.

4.2 Legislative context

Document B, Section 4 provides a detailed legislative review relevant to coastal minor works that are undertaken by Shoalhaven City Council.

From a review of this information, the proposed activity is permissible under all relevant legislation as described in **Table 5**.

Table 5 - Legislative permissibility details

Relevant Legislation
NSW State Legislation
EP&A Act
Permissible ☑ Not permissible ☐
This document serves as the required environmental assessment under Part 5 of the EP&A Act. Refer **Document B, Section 4.1** for further details of permissibility for the proposed activity under this Act.
Crown LM Act
Permissible ☑ Not permissible ☐
Council is the appointed Crown Land Manager (CLM) of Crown Land Reserve: R81607, Lot 7023 DP 1031073. The Core Objectives for management of community land categorised as Park that are set out in the *Generic Community Land Plan of Management – Parks* https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D11/116070 are: – to encourage, promote and facilitate recreational, cultural, social, and educational pastimes and activities, and – to provide for passive recreational activities or pastimes and for the casual playing of games, and – to improve the land in such a way as to promote and facilitate its use to achieve the other core objectives for its management. The Core Objectives for management of community land categorised as Natural Area set out in the *Generic Community Land Plan of Management – Natural areas* https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D16/208141 are: – to conserve biodiversity and maintain ecosystem function in respect of the land, or the feature or habitat in respect of which the land is categorised as a natural area, and – to maintain the land, or that feature or habitat, in its natural state and setting, and – to provide for restoration and regeneration of the land, and – to provide for community use of and access to the land in such a manner as will minimise and mitigate any disturbance caused by human intrusion, and – to assist in and facilitate the implementation of any provisions restricting the use and management of the land that are set out in a recovery plan or threat abatement plan prepared under the *Biodiversity Conservation Act 2016* or the *Fisheries Management Act 1994*. Within these plans it is noted that: *'Foreshore reserves are highly valued for their social, cultural, economic, and environmental attractions. By their very nature, these reserves have a degree of environmental sensitivity as the transition zone between aquatic and terrestrial ecosystems. All foreshore reserves are public resources under public ownership and are managed by various levels of government. Within the Shoalhaven City Council area, foreshore reserves are described as Council Land (Community Land) or Crown Land (Council as Trust Manager or having a Care, Control and Management responsibility). These reserves adjoin permanent*

Relevant Legislation
water bodies or intermittent watercourses including oceans, estuaries, lakes, rivers, creeks, watercourses and wetlands.' The proposed activity is in line with these objectives. The proposed activity will not impact on the foreshore's role as a transition area between the aquatic and terrestrial environment. The PoM, as well as Council's Foreshore Reserves Policy (POL19/76), does not preclude the activity. This document will serve as an applicable attachment to the NSW Crown Land Permit.
Coastal Management Act 2016 (CM Act)
Permissible ☑ Not permissible ☐
The proposed activity is consistent with the strategies of the applicable Coastal Management Program (CMP) which is in development as a requirement of the CM Act. Refer to **Document B, Section 4.4.3** for further details of permissibility for the proposed activity under this Act.
RH SEPP
Permissible ☑ Not permissible ☐
The proposed activity is to being undertaken on land to which chapter 2 of the RH SEPP applies and hence beach scraping as a proportion of the proposed activity is determined to be development without consent as per Section 2.16(2)(a) of the RH SEPP (refer **Section 4.1**, and **Document B, Section 4.2** for further details of permissibility for the proposed activity under this Act).
TI SEPP
Permissible ☑ Not permissible ☐
The proposed activity includes maintenance of walking tracks on Council owned and managed land which meets the provisions of Exempt Development under Division 12, section 2.74 of the TI SEPP. The maintenance of the beach access tracks have been included in this REF to ensure easier communication to all stakeholders about the full extent of the works to be undertaken. Refer **Section 4.1**, and **Document B, Section 4.3** for further details of permissibility for the proposed activity under this Act.
Shoalhaven Local Environmental Plan 2014 (SLEP)
Permissible ☑ Not permissible ☐
In circumstances where development consent is not required, the SLEP does not apply. Development consent is not required as per the above permissibility. All relevant factors of consideration as outlined in Part 5 of the EP&A Act are required to be complied with. This REF fullfills this requirement.
Protection of the Environment Operations Act 1997 (POEO Act)
Permissible ☑ Not permissible ☐
The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the POEO Act. The proposed activity therefore does not require an environmental protection licence.

Relevant Legislation
National Parks and Wildlife Act 1974 (NPW Act)
Permissible ☑ Not permissible ☐
The consideration of impacts on all fauna protected under this Act has been addressed as per **Section 7.2**. The due diligence code of practice for the protection of Aboriginal objects in NSW under this legislation has been adhered to as per **Section 7.3**. Refer **Document B, Section 4.4.7** for further details of permissibility for the proposed activity under this Act.
BC Act
Permissible ☑ Not permissible ☐
The proposed activity is: Not within an area declared to be of 'outstanding biodiversity value' as defined in this Act. Unlikely to have a significant impact on threatened species and/or threatened ecological communities (TEC) listed in the schedules of this Act. Not considered to have a serious and irreversible impact on biodiversity values. For threatened species determined to have a medium or high likelihood of occurrence listed under the BC Act, a Test of Significance (ToS) pursuant to Section 7.3 of the BC Act has been conducted as per **Attachment 5**. The Test of Significance concludes that the proposed activity will not have a significant impact on threatened species or ecological communities. As such, a Species Impact Statement or entry into the Biodiversity Offset Scheme is not required.
Heritage Act 1977 (Heritage Act)
Permissible ☑ Not permissible ☐
A review of potential impacts on non-Aboriginal heritage is detailed in **Section 7.4**.
Local Land Services Act 2013
Permissible ☑ Not permissible ☐
No clearing of vegetation is proposed. No separate authorisation under this Act is required.
Water Management Act 2000
Permissible ☑ Not permissible ☐
Local councils are exempt from Section 91E(1) of this Act in relation to all controlled activites that they carry out in, on or under waterfront land (by virtue of Section 41 of the *Water Management (General) Regulation 2018).* The proposed activity would not interfere with the aquifer and therefore an interference licence is not required (Section 91F).
Aboriginal Land Rights Act 1983
Permissible ☑ Not permissible ☐
There are unresolved land claims on the subject site. However, this Act does not preclude the activity taking place on the subject site and study area. The Crown Reserve has lawfully been used as a recreational area prior to the lodgement of the land claim. The activity would not affect or complicate the assessment of the land claim as it is does not permanently impact the land as the activity is intermittent

Relevant Legislation
and would not diminish the size or nature of the land. The proposed work site would remain as 'claimable land' as defined in this Act.
Commonwealth legislation
EPBC Act
Permissible ☑ Not permissible ☐
The proposed activity would not be undertaken on Commonwealth land and no Matters of National Environmental Significance are likely to be significantly impacted on by the proposed activity. Assessment of threatened species Significant Impact Criteria (SIC) under the EPBC Act has been undertaken and provided in **Attachment 5**. The proposed activity is not considered to constitute a significant impact on threatened species and hence does not require Commonwealth referral.
Native Title Act 1993
Permissible ☑ Not permissible ☐
The proposed activity has been identified as a low-impact future act (Council reference D23/349343) hence: - There are no procedural requirements. - The proposed activity will not extinguish Native Title – the non-extinguishment principle applies. - Compensation does not arise. No further action or referral is required. The proposed activity is a valid future act under Subdivision L of this *Act.*

Document B, **Section 4** provides a detailed legislative review of coastal minor works undertaken by Council under Part 5 of the EP&A Act, including the applicable development classification as defined in the relevant Environmental Planning Instruments (RH SEPP and TI SEPP).

The proposed activity requires assessment of impacts on the community and the environment, consistent with the contents of this document and **Document B**. Consultation requirements as identified under the provisions of the TI SEPP are described in **Section 5** (and **Document B, Section 5**).

4.3 Permits and licenses

Section 5.1 of **Document B** identified the relevant agencies from whom a permit may be required. On this basis, and considering the information provided in **Section 4** of this document the following permits are required before the proposed activity can commence:

☒ A Licence from NSW Crown Lands under section 5.21 of the Crown LM Act, **where works is on Crown Land**

☐ A Marine Parks Permit, **where the works are within Jervis Bay Marine Park**

☐ A Fisheries Permit from DPI – Fisheries under section 200 of the FM Act, **on any other land** (given works necessarily take place near to a waterbody)

*Note: A NSW Crown Lands Licence will address requirement of the Fisheries Permit. Where works are to occur on Crown land, and a Fisheries Permit would otherwise be required, NSW Crown Lands will seek concurrence from DPI-Fisheries in the place of an individual Fisheries Permit. If the proposed activity is occurring on Council land adjacent to a waterway, an application for a DPI Fisheries Permit must be addressed independently.

This document, and any accompanying documentation, is intended to additionally serve as an application for the relevant permits/licenses referenced above and as detailed below for each specific geographical locality. Any permits/licenses issued to support the proposed activity have been included in **Attachment 8** of this document.

5. CONSULTATION

The following summarises the relevant consultation that occurred to support the assessment of the proposed activity. Reference should be made to **Document B, Section 5.1** for details on requirements for agency consultation items described in **Table 6**, and to **Document B, Section 5.2** for details regarding community engagement described in **Table 7**.

Consultation consists of giving written notice of the intent to carry out works to the relevant agency and taking into consideration any response received within 21 days of that notification (as per Section 2.15(1) of the TI SEPP).

Supporting documentation from the relevant consultation has been included in **Attachment 7**.

Table 6 - Agency consultation

Agency	Date of consultation	Consideration of Response
Department of Planning and Environment (DPE)	N/A	Not required
NSW Crown Lands	July 2023	As per **Attachment 7**
Department of Primary Industries (DPI) – Fisheries	March 2023 & July 2023	As per **Attachment 7**
Marine Estate Management Authority (MEMA)	N/A	Not required

Table 7 - Community Consultation

Consultation	Community consultation ☒ has / ☐ has not been undertaken for the proposed activity.
Consideration	Council consulted extensively with the community through the development stages of the Open Coast CMP. The nature of the proposed activity and outcomes reflect proposed actions directly consulted with the community. Further direct consultation with the community has been undertaken regarding concern for management of Manyana Creek and access at this location, as well as direct correspondence on the currently unsafe beach access track at Cunjurong Point. Due to the routine nature of the proposed activity, which are limited in both time and the area of the beach affected, further community consultation will be limited to property owners in the immediate proximity of the proposed activity and regular Council webpage updates.

	Refer **Section 7.8** for assessment of potential socio-economic impacts and mitigation measures for the proposed activity.

6. REVIEW OF ENVIRONMENTAL FACTORS (s171 EP&A Regulation)

Section 171(2) of the EP&A Regulation lists the factors to be taken into account when consideration is being given to the likely impact of an activity on the environment under Part 5 of the EP&A Act.

Table 8 below provides an assessment of the environmental factors listed in section 171(2) items (a) to (r) of the EP&A Regulation. The following terminology will be used to determine the potential impact of the proposed activity against each of the environmental factors for both long- and short-term time frames:

- Positive
- Neutral
- Negative

Commentary will be provided to justify the assessment. Aspects considered in the assessment of impacts on the community and the environment are listed in **Section 7** of the supporting **Document B.** Mitigation and management measures have been established in the EMP for the identified potential impacts.

Table 8 - Impacts to relevant Environmental Factors (as per s 171(2) of the EP&A Regulation) assessed for the proposed activity.

Environmental factor	Positive	Neutral	Negative	Reason
a) the environmental impact on the community		✓		The proposed activity would be implemented within the naturally dynamic coastal zone. The proposed work site and study area is utilised by the community for access to the beach. The proposed activity would not impact on the community's access to, and amenity of Manyana Beach. Conversely, the proposed activity is more likely to lead to access improvements. Furthermore, variable conditions of the proposed work site and study area are expected by the community under normal coastal erosion and recovery cycles, and the proposed activity would be consistent with this. The proposed activity would not impact on views, community services and infrastructure such as water, waste management, educational, medical or social services.
b) the transformation of the locality	✓			The proposed activity will enable improved public safety outcomes by enabling Council to rehabilitate and upgrade beach access assets while concurrently addressing impacts of erosion on the proposed work site. The proposed work site and study area will remain functional as a beach and coastal dune system. Variable conditions of the proposed work site and study area are expected under normal coastal erosion and recovery cycles, and the proposed activity would be consistent with this.

Environmental factor	Positive	Neutral	Negative	Reason
c) Any environmental impact on the ecosystems of the locality	✓			The proposed work site and study area, inclusive of the dune ecosystem, is being eroded by longshore creek migration and informal pedestrian beach access. The proposed activity will decrease the risk of current erosion hazards impacting on the dune ecosystem and will serve to promote natural stabilisation and plant regeneration, and thus ecosystem resilience.
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality		✓		No significant reduction of the aesthetic, recreational, scientific quality or value will occur as a result of the proposed activity as it is consistent with natural coastal processes.
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations		✓		No negative effect will occur for any locality, place or building that will impact on its value for present or future generations. The proposed activity does not involve changes to the built environment.
f) Any impact on the habitat of protected animals (within the meaning of *the BC Act*)	✓			The proposed activity will aim to mitigate the impacts from coastal hazards on potential habitat of protected animals. The proposed activity outcomes will aim to decrease erosion of the dunes resulting in preservation of potential habitat for threatened and migratory shore birds, as well as other native (and protected) species.

Environmental factor	Positive	Neutral	Negative	Reason
g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air		✓		The proposed activity is unlikely to endanger animal, plant or other form of life, due to the nature of the proposed activity being consistent with natural processes and in response to the proposed work site containing limited animal, plant, or other form of life habitat.
h) Any long-term effects on the environment		✓		The proposed activity is unlikely to have any long-term effects on the environment due to being consistent with natural processes. The natural variability of the creek entrance condition, shoreline and dune system under normal weather cycles will prevail the long-term condition of the proposed work site and study area and render it less susceptible to high impact erosion events and thus, long-term effects.
i) Any degradation of the quality of the environment		✓		No significant degradation to the environment will occur in response to the proposed activity as it aims to mitigate the risk of environmental degradation due to erosion.
j) Any risk to the safety of the environment		✓		The proposed activity is considered highly unlikely to present any significant risk to the safety of the environment, due to the nature of it being consistent with natural processes.
k) Any reduction in the range of beneficial uses of the environment		✓		No reduction in the range of beneficial uses of the environment will be incurred, due to the nature of the proposed activity being consistent with natural processes.

Environmental factor	Positive	Neutral	Negative	Reason
l) Any pollution of the environment		✓		The proposed activity is not expected to result in pollution of the environment. Any minor pollution that may occur as a result of the proposed activity has a planned mitigation measure.
m) Any environmental problems associated with the disposal of waste		✓		Limited waste will be generated by the proposed activity and thus, with the implementation of mitigation measures there will be no environmental problems associated with the disposal of waste.
n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply		✓		It is highly unlikely that any resources will become in short supply, due to the nature of the proposed activity being consistent with natural processes, and the short duration of works.
o) Any cumulative environmental effect with other existing or likely future activities		✓		No cumulative environmental effects will occur in response to the proposed activity. Conversely, the proposed activity is being implemented to prevent cumulative impacts associated with erosion that is currently occurring within the proposed work site.
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions		✓		The proposed activity mimics the natural erosion recovery of a beach and is therefore unlikely to have any significant effect on coastal processes and hazards.
q) Any applicable local strategic planning statement, regional strategic plan or district strategic plan made under Division 3.1 of the Act		✓		No applicable local strategic planning statement, regional strategic plan or district strategic plan was identified to be relevant to the proposed activity.
r) Any other relevant environmental factors				There are no other relevant environmental factors to be considered.

7. ASSESSMENT OF LIKELY IMPACTS ON THE ENVIRONMENT

This part of the document provides an assessment of **possible impacts** from the proposed activity on the community and the environment. Specific mitigation measures relevant to the proposed activity are identified below and are included in the EMP.

Refer to **Document B**, **Section 4** for an overview of the general coastal environment within Shoalhaven LGA and a general assessment of **possible impacts** from the proposed activity. Refer to **Section 0** for a contextualised description of the existing environment pertaining to the specific study area and proposed work site.

7.1 Coastal landform

Possible impacts
While beach scraping is generally intended to both address impacts of erosion on coastal landforms and reduce risk of further natural erosion, the placement of sand may result in an increased risk of aeolian sediment transport and or other sedimentation prior to establishment of stabilising measures (vegetation).
Proposed mitigation measures
- Revegetation to be undertaken stabilise reinstated dune areas. This would include planting of mature stock in conjunction with installation of seedling stock in areas of high pedestrian traffic to enable quick colonisation and succession as part of the revegetation program. Program to consider recent and forecast weather (i.e., rainfall, temperatures) prior to planting to ensure the highest possible likelihood of plant survival. - Implement erosion and sediment controls as identified in the EMP. - Access for machinery to be identified prior to commencement of works. Beach access tracks are required to be suitable for plant and equipment before use to avoid bogging, and destabilisation and sediment runoff. - Where exercising beach scraping, the excavation depth will be a maximum 300mm in depth and limited to marine sands only. - Stockpiling to be limited to the minimum necessary. Excavated fill material to be placed directly at desired 'fill' locations, shaped, and compacted as soon as reasonably practicable considering an allowance to enable the most efficient works methodology. Works methodology must exclude any requirement for overnight stockpiling and thus reduce need for further controls of excavated material. - Works to be conducted in accordance with a site-specific erosion and sediment controls as identified in the EMP and be consistent with current best practice (i.e. Managing Urban Stormwater: Soils and Construction 4th Edition, Landcom 2004, aka the Blue Book) must be implemented to ensure containment of sediment above Mean High Water Mark.

7.2 Biodiversity

Possible impacts
The proposed work site and study area contains the following Threatened Ecological Communities (TECs): - Bangalay Sand Forest. The likelihood of occurrence for threatened fauna and flora listed under the BC Act and/or EPBC Act recorded within the locality (10 kilometres of the proposed work site) were identified from a database search and the inspections of the proposed work site and study area. The likelihood of occurrence presented in **Attachment 4** was assessed as high, medium or low subject to the following associations.

- High – the species was or has been observed/recorded on the site, and/or the site provides important habitat known to the species.
- Medium – the species was or has been observed/recorded on the site, and/or suitable habitat is located on the site, and/or the species is known to occupy the site's habitat occasionally.
- Low – the species was or has been observed/recorded near the site. However, the site's habitat is considered unsuitable or unlikely for species to occur to the extent their life cycle would be impacted on.

Threatened species that have been identified as having a medium or high likelihood to occur are:

- *Callocephalon fimbriatum* (Gang-gang Cockatoo)
- *Calyptorhynchus lathami* (Glossy Black-Cockatoo)
- *Glossopsitta pusilla* (Little Lorikeet)
- *Haematopus fuliginosus* (Sooty Oystercatcher)
- *Haematopus longirostris* (Pied Oystercatcher)
- *Haliaeetus leucogaster* (White-bellied Sea-Eagle)
- *Hydroprogne caspia* (Caspian Tern)
- *Limosa lapponica* (Bar-tailed Godwit)
- *Pandion cristatus* (Eastern Osprey)
- *Sterna hirundo* (Common Tern)
- *Sternula albifrons* (Little Tern)
- *Thalasseus bergii* (Crested Tern)
- *Thinornis cucullatus cucullatus* (Eastern Hooded Dotterel)
- *Galium australe* (Tangled Bedstraw)

Tools and machinery used for the various aspects of the proposed activity have the potential to carry invasive weeds, pests and diseases to natural areas.

The proposed activity has the potential to impact on aquatic fauna, as the proposed work site and study area is located within and adjacent to the intertidal zone.

Proposed mitigation measures

General:

- Beach scraping is to be restricted to the section of the beach in front of the vegetated foredune. Works would be required to avoid any heavily vegetated areas of the incipient dune, as well as potential habitat features such as large logs, to reduce potential impacts on mammal nests and burrows.
- Access for vehicles and machinery through vegetated areas to utilise existing formalised beach access trakcs only (Councils formal assets). Contractor to demonstrate knowledge and ascertain suitability of these locations prior to works commencing. Machine movement to be limited to 20 km/hr to minimise risk of injury to fauna.
- Plant and equipment prior to be thoroughly cleaned prior to arriving and when leaving the proposed work site to avoid transfer of weeds or weed seeds and pathogens.
- Protection zones for trees from machinery and vehicles to be maintained in accordance with *AS 4970-2009 - Protection of Trees on Development Sites*.
- Vegetation pruning to be undertaken only for the purposed of maintenance of existing formal beach access tracks. Pruned branches to be left on the proposed work site (but off pathways) as brush matting. Pruning is to be undertaken in accordance with AS 4373—2007 – Pruning of amenity trees. No impacts on hollow bearing trees or access to site through old growth vegetation.
- Where threatened plant species are identified, exclusion zones of >20m to be maintained where practicable. If these species are identified following the commencement of works, works should temporarily stop to establish appropriate exclusion zones prior to proceeding.

Management and control of weeds:

- In accordance with guidelines outlined be NSW Department of Primary Industries WeedWise, areas impacted on by invasive weeds to be identified, control of weed spread through avoiding disturbance to vegetation and ensuring machinery is clean prior to arrival of site. Prior to commencement of works, treat weed species on site where they have been identified to contain and reduce risk of weed spread during works.

Shorebirds:

- A relevant Council Officer, in consultation with a suitably qualified person (where required), to inspect the proposed work site and study area for the presence of threatened and migratory shorebirds. A pre-works survey to be undertaken at least one (1) week prior to the commencement of works to determine presence/absence of threatened and migratory shorebirds.
- April - September: A minimum buffer of 50 m (as adopted standard of the National Parks and Wildlife Service (NPWS)) must be maintained from individual threatened shorebirds using habitat. All plant, personnel and equipment to be excluded at least 50 m from the shorebird(s). If threatened shorebirds are detected within 50 m of the works or ancillary sites or activities, works and/or machinery movement to stop immediately and not resume until the bird(s) has/have vacated the site autonomously.
- October - March: A minimum buffer of 255 m from nesting shorebirds (*Industry guidelines for avoiding, assessing, and mitigating impacts on EPBC Act listed migratory shorebird species* Commonwealth of Australia, 2017). If nesting threatened shorebirds are detected within 255 m of the works or ancillary sites or activities, work to immediately stop and the local NPWS office will be contacted for instruction and assistance and/or clearance.
- If threatened shorebirds are detected within 50 m of the works or ancillary sites or activities, works and/or machinery movement to stop immediately and not resume until the bird(s) has/have vacated the site autonomously.
- In the case whereby earth works surface disturbance attracts bird activity an assessment to be made onsite for the likelihood of impact on fauna. In the case of cause-and-effect conditions that may arise works may proceed if impacts on bird species are deemed low risk by relevant Council officer.
- All exclusion zones are to be shown in Works Plan where required.

Aquatic biodiversity:

- Implementation of any risk mitigation measures as determined by DPI Fisheries Permit.
- Visual inspection of adjacent water bodies for dead or distressed fish (indicated by fish gasping at the water surface, fish crowding in pools or at the creek's banks) to be undertaken daily during the works. Observations of dead or distressed fish are to be immediately reported to Department of Primary Industries (DPI) - Fisheries. In such a case all works would cease until the issue is rectified and approval from DPI Fisheries is given to proceed.
- No snags to be removed, realigned, or relocated. Snags include large woody debris from trees and shrubs, including whole fallen trees, broken branches and exposed roots that have fallen or washed into a waterway which are wholly or partially submerged by water greater than 3m in length and 300mm in diameter.

7.3 Aboriginal cultural heritage

Potential impacts

The sand dune systems are considered to have a high likelihood of containing sites and items of Aboriginal cultural heritage. Disturbance of the soil surface can damage or destroy archaeological heritage and can negatively impact on living Aboriginal cultural heritage.

A search of Heritage NSW's Aboriginal Heritage Information Management System (AHIMS) has been undertaken for the site, which identified two sites and one potential site within proximity to the works and on the periphery of the study area. The AHIMS extensive search results are provided in **Attachment 6.**

Site cards for the two identified sites were obtained and reviewed in addition to two historical archaeological investigations undertaken in 2005 and 2006 as part of the Conjola Regional Sewerage Scheme works (Navin Officer, 2005 and 2006). The sites identified in the AHIMS search are listed below and a brief description of each site is presented below this:

- MS5
- CS15N
- PAD1

MS5 was identified in September 2005 during works for the establishment of a subdivision in Manyana. This subdivision has been constructed since this time and consists of the streets referred to as Dune Crescent, The Palisade and The Barbette. This subdivision is located approximately 250 m landward to the south-west of the work site. The artefact identified during this investigation was located within yellow-brown sandy clays that were located within a former bike track. The surface soil in this area had experienced erosion due to human activity and use. The artefact presence at MS5 was noted to be a low density.

CS15N was identified in 2001 through the archaeological investigations undertaken as part of the Conjola Regional Sewerage Scheme Environmental Impact Statement (EIS) (Navin Officer, 2001). CS15N was investigated further in 2005 (investigated as part of the area referred to as PAD4 in Navin Officer, 2005). This area was located on the southern side of the tributary creek

line that discharges to Manyana Beach. A total of 14 pits were excavated in 2005 as part of the archaeological investigation and two items identified within two pits (Navin Officer, 2005). These pits were located closest to Manyana Beach and the mouth of the creek and were characterised by coastal banksia forest with grey-brown loamy sand grading to clayey sand and compact orange-yellow clays underlying (Navin Officer, 2005). The archaeological investigation noted that the artefact incidence was low in this area and was partly disturbed, it was concluded that no further investigation would be beneficial as it would be unlikely to identify additional artefacts.

PAD1 was also investigated as part of the Conjola Regional Sewerage Scheme (Navin Officer, 2005 and 2006). This area was located on the alluvial flats adjacent to the northern side of the tributary creek line that discharges to Manyana Beach. A total of seven pits were excavated in 2005 as part of the archaeological investigation and 32 items identified within three pits (Navin Officer, 2005). These pits were located closest to Manyana Beach and the mouth of the creek and were characterised by wet sclerophyll forest with black to dark brown sandy loams and brown/grey clays underlying (Navin Officer, 2005). The archaeological investigation noted that the artefact incidence was low in this area and was generally disturbed, it was concluded that no further investigation would be beneficial as it would be unlikely to identify additional artefacts.

The artefacts identified throughout the Conjola Regional Sewerage Scheme investigations were noted to be lithic (rock) fragments, flakes and blades created from silcrete rock materials, likely local to this environment, as well as quartz/quartzite rock materials.

It is unlikely that activities at the proposed work site will disturb the known or potential areas of aboriginal cultural heritage for the following reasons:

- The site cards and archaeological investigations (Navin Officer, 2005 and 2006) note that the artefacts were predominantly located within clay or loam materials. The proposed activity involves the scraping of shallow, unconsolidated marine sediments and sands and is not targeting the clay regolith substrate.
- The identified and potential areas of aboriginal cultural heritage are located landward of the proposed work site.
- Beach earth works take place in the dynamic zone of the beach, from the incipient dune towards the shoreline, or within watercourse outlets. Due to the constant historical disturbance of this area through natural forces, the proposed activity is considered to pose a low risk of disturbing Aboriginal cultural heritage.

Despite the low likelihood that harm may be caused, mitigation measures have been provided below to minimise the potential for harm and to manage unexpected cultural heritage finds.

Proposed mitigation measures

An on-site assessment with the relevant Council Officer and a Local Aboriginal Land Council (LALC) representative to confirm identification of heritage sites and establish exclusion zones at each site. Exclusion zones to be mapped on work plan and no works will be permitted within the defined area which may impact on heritage.

Areas of excavation to avoid areas of clay or regolith materials to prevent any harm or removal of potentially buried artefacts. The identification of flakes, blades or rock fragments of silcrete, quartz or quartzite composition during excavation works should trigger the unexpected finds protocol to determine whether these may be items of aboriginal cultural heritage.

Although midden sites have not been previously identified as part of the historical archaeological investigations, middens may still be present along the beach. All efforts will be made to verify if these are present within the proposed work site and study area with the relevant Council Officer and a Local Aboriginal Land Council (LALC) representative. The identification of potential middens or shell deposits during the enaction of the proposed activity will trigger the unexpected finds protocol.

Relevant Council Officer to be present at project start up to address the unexpected finds protocol which is to be implemented by the Contractor. This will consist of the following:

- Should any previously unidentified Aboriginal objects or places be identified during excavation and construction, all works must cease in the vicinity of the find and the following be notified:
    - Council representative.
    - NSW Department of Premier and Cabinet – Heritage NSW (Heritage NSW).
    - A qualified archaeologist.
    - Aboriginal stakeholders.

7.4 Non-Aboriginal heritage

Potential impacts
Indirect impacts on cultural heritage sites, such as impacts on viewsheds to and from heritage items
Proposed mitigation measures
No Non-Aboriginal heritage items have been identified in the proposed work site or study area. The proposed activity does not involve changes to the built environment and will not directly impact any Non-Aboriginal heritage items. Should any previously unidentified Non-Aboriginal items objects or places with potential heritage value, be identified during excavation and construction, all works to cease in the vicinity of the find and the Unexpected Finds Protocol (**Attachment 3**) is to be implemented. Notifications shall occur to the following: o Council representative. o A qualified archaeologist. o NSW Department of Premier and Cabinet – Heritage NSW.

7.5 Soils and contamination

Potential impacts
Disturbance of soils in the proposed work site is limited to marine sands, and consequently acid sulfate soils (ASS), potential acid sulfate soils (PASS) and contaminants from historical uses are unlikely to be encountered. The proposed work site and study area is located adjacent to an area mapped as low risk acid sulfate soils with no known occurrence. The soil type of the work area is Kurosols (Natric), Rudosols or otherwise unassessed. Machinery use within the proposed work site has the potential for contamination through spillage of liquids required for machinery function. Potential contamination impacts can arise from refuelling and hydraulic spills. Impacts may be exacerbated due to proximity to the waterway.
Proposed mitigation measures
The Unexpected Finds Protocol provided in **Attachment 3** should be implemented during the works. - If unexpected, contaminated material including asbestos containing material (ACM) or potential acid sulfate soils (PASS) are discovered, the proposed activity is to stop, and a proper assessment protocol be developed in consultation with the relevant Council Officer. - Acid Sulfate Soils (ASS) or Potential Acid Sulfate Soil (PASS) would be managed according to Council's Development Control Plan *Chapter G26 – Acid Sulphate Soils and Geotechnical Guidelines* (Shoalhaven Council, 2014) - Earth works to be limited to movement of marine sands only. - An emergency marine spill kit is to be always available on site with procedures to contain and collect any leakage or spillage of fuels, oils and greases from plant and equipment. In the event of an accidental oil/fuel spill, Council is to be notified immediately by phone and a written incident report with corrective actions is to be supplied by the Contractor to Council within 24 hours of the incident occurring. - Storage of fuel, oils and other hazardous chemicals must be within a hardstand bunded area. - All machinery to be used to be clean, and in good working order prior to entering the proposed work site, with daily pre-start checklists to be recorded for all heavy plant used. - No major equipment maintenance works to be undertaken within the proposed work site or study area. - Changing of hydraulic attachments on machinery to take place outside of the proposed work site and in a designated compound or hardstand area. An assessment is to be made before the compound location is chosen to ensure that no off-site impacts occur in response to such activities.

7.6 Waterways and water quality

Potential impacts
The proposed work site is adjacent to the Ocean. The creek targeted for diversion is an unnamed creek draining from a nearby natural area managed by Council. The creek has experienced a recent increase in stormwater runoff, likely due to the development of a new housing area nearby. The potential for impact on waterways and water quality is limited by the nature of the proposed activity, due to the methodology imitating natural coastal processes to a degree consistent with that experienced in the coastal foreshore and dune system. There may be some increase in turbulence due to sediment release during operation of machinery. Contamination risks which may include risks to waterways are described in **Section 7.5** above.
Proposed mitigation measures
Works in intertidal zone: - Beach scraping work to be undertaken around the low tide (mid-low, low-mid) to minimise machinery working in water as much as practical and to reduce the potential for any sediment plumes in adjacent waters. - Works must be timed to occur during a spring tidal phase where tidal ranges are greater, providing lower low tides to ensure optimal conditions for obtaining sand during the periods of low water levels and where intertidal shoals will be most exposed. - Stabilising exposed dune areas to be undertaken through revegetation, brush matting and implementation of all other erosion sediment control measures to limit movement of sediment to waterways. **General:** - Works to be undertaken in low rain period to ensure minimal creek discharge at time of realignment and minimise sediment release due to disturbed beach surface and storm water runoff. Works to not progress if possible rainfall exceeds 25mm on any given day of proposed work if chance of any rain exceeds 50% concurrently. To be informed by Bureau of Meteorology forecast to ensure that works are scheduled appropriately.

7.7 Traffic and transport

Potential impacts
Detours or disruptions to traffic flow (vehicular, cycle and pedestrian) and parking. The proposed activity relies upon the utilisation of heavy plant machinery, which can impact on access in various ways, particularly through physically taking up space in the carparks, access tracks and on the beach when in transit, operation, and when idle. This is, however, temporary in response to the short duration of the proposed activity. The closest street to the proposed work site lacks public parking allocations. The area of the street best suited for access into the proposed work site is a cul-de-sac with a small number of homes, and some public amenities such as a playground and public toilets are nearby. The proposed activity is considered unlikely to create traffic or impede transport through the selection of this access/egress and the implementation of the mitigation measures.
Proposed mitigation measures

The following mitigation measures are recommended for the proposed activity:
 	
- Low public use times are to be used, where possible i.e., outside of all holiday periods.
- Conduct works in standard working hours (unless for emergencies):
  - Monday to Friday 7.00am to 6.00pm
  - Saturday 8.00am to 1.00pm

○ No work on Sundays or public holidays - Compound machinery away from parking spaces and beach access tracks, where possible. - Designated areas are to be established to enable the exclusion of public vehicles, pedestrians, and other public activities, where possible. - A letter drop should be undertaken to inform residents living immediately adjacent to the proposed work site and/or businesses operating near the proposed work site of potential access disruptions.

7.8 Socio-economic

Potential impacts
Impacts on community and business use of the proposed work site. Nearby businesses consist of accommodation for tourists. However, as the proposed activity will be undertaken outside of school or public holidays, these businesses should not be impacted on. Community enquiries regarding the proposed activity may occur and these are to be directed to the Council's Coastal Management Unit (coastal.management@shoalhaven.nsw.gov.au) to provide a response.
Proposed mitigation measures
Refer to the mitigation measures outlined in **Section 7.7**.

7.9 Noise and air quality

Potential impacts
Beach scraping, despite using heavy machinery, will have minimal noise impacts due to their temporary nature and the fact that it is only marine sands being moved. Air quality at the coastline is generally good due to presence of coastal winds. Air quality impacts from moving of material is not considered likely due to the characteristics of the sand substrate which is not easily airborne.
Proposed mitigation measures
In addition to the mitigation measures in **Section 7.8**, the following mitigation measures are recommended: - Vehicles and plant to be maintained to ensure they are in good working order (as per **section 7.5**). - Works to be limited during high wind conditions. - Sand to be compacted appropriately and sufficiently enough to minimise wind erosion following placement. Sand wetting may be appropriate to facilitate sediment containment. - Vehicles leaving site carrying material loads to be covered to prevent dust generation.

7.10 Waste

Potential impacts
The proposed activity does not involve importation or exportation of additional sand or sediment, and thus, does not require testing/classification of the material as it is not deemed a waste in accordance with the POEO Act. Waste generated by the proposed activity is considered to be only negligible and relates to food and or general non-commercial wastes from the workers on the proposed work site, redundant materials and other minor items.

The potential impacts from fuel or hydraulic spills are discussed in **Section 7.5** above.
Proposed mitigation measures
- Waste generated by the proposed activity to be disposed of appropriately in accordance with the Resource Management Hierarchy (Avoidance, Recovery, Disposal). - A post-work survey of the proposed work site should be undertaken before demobilising to ensure waste and litter is not left behind. - The unexpected finds protocol to be implemented if the proposed activity uncovers unexpected waste materials (i.e. buried wastes, asbestos). - Waste may be present on the proposed work site including, dumped general solid waste, remnant building material (timber fencing and wire), discarded fishing gear etc. A general site clean-up and waste segregation should be conducted prior to works commencing, if required. - Refer to Shoalhaven City Council Contaminated Land Management Policy for protocols in relation to the unforeseen detection of asbestos and other contaminated waste that may be detected within illegally dumped material. Works are to shut down and a proper assessment protocol developed in consultation with relevant Council Officer.

8. CONCLUSION

This document, along with **Document B** and other attached documentation, comprise an assessment for the proposed activity at Manyana under Part 5, Div 5.1 of the EP&A Act.

Works are required to restore access and increase resilience of the dune system. An environmental assessment of these works has been undertaken and potential impacts will be managed through the implementation of risk mitigation measures details in an Environmental Management Plan (EMP). This is appended to the front of this document.

Document Review:

	Name	**Signature**	**Date**
Author:	Luke Moroney		11/09/2023
Reviewed by:	Nigel Smith		12/09/2023
Approved by:	Dr Michael Roberts		29/09/2023

9. SPECIFIC REFERENCED DOCUMENTS

The following list reflects all documents specifically referred to in undertaking this environmental assessment. Reference should be made to **Document B** for a complete list of all documents and resources relied upon in the preparation of environmental assessments for coastal minor works.

Navin Officer, 2001. *Conjola Regional Sewerage Scheme EIS Cultural Heritage Component*, July 2001, report prepared for Shoalhaven City Council and Dept of Land Water and Conservation.

Navin Officer, 2005. *Conjola Regional Sewerage Scheme Archaeological Subsurface Testing Program*, December 2005, report prepared for Shoalhaven City Council and Dept of Energy, Utilities & Sustainability.

Navin Officer, 2006. *Conjola Regional Sewerage Scheme Archaeological Salvage Program*, October 2006, report prepared for Shoalhaven City Council and Dept of Energy, Utilities & Sustainability.

Attachment 1: FIGURES

Figure 1. Council managed land around proposed work site and study area.

Figure 2. Aboriginal Cultural Heritage and Land Claims around proposed work site and study area.

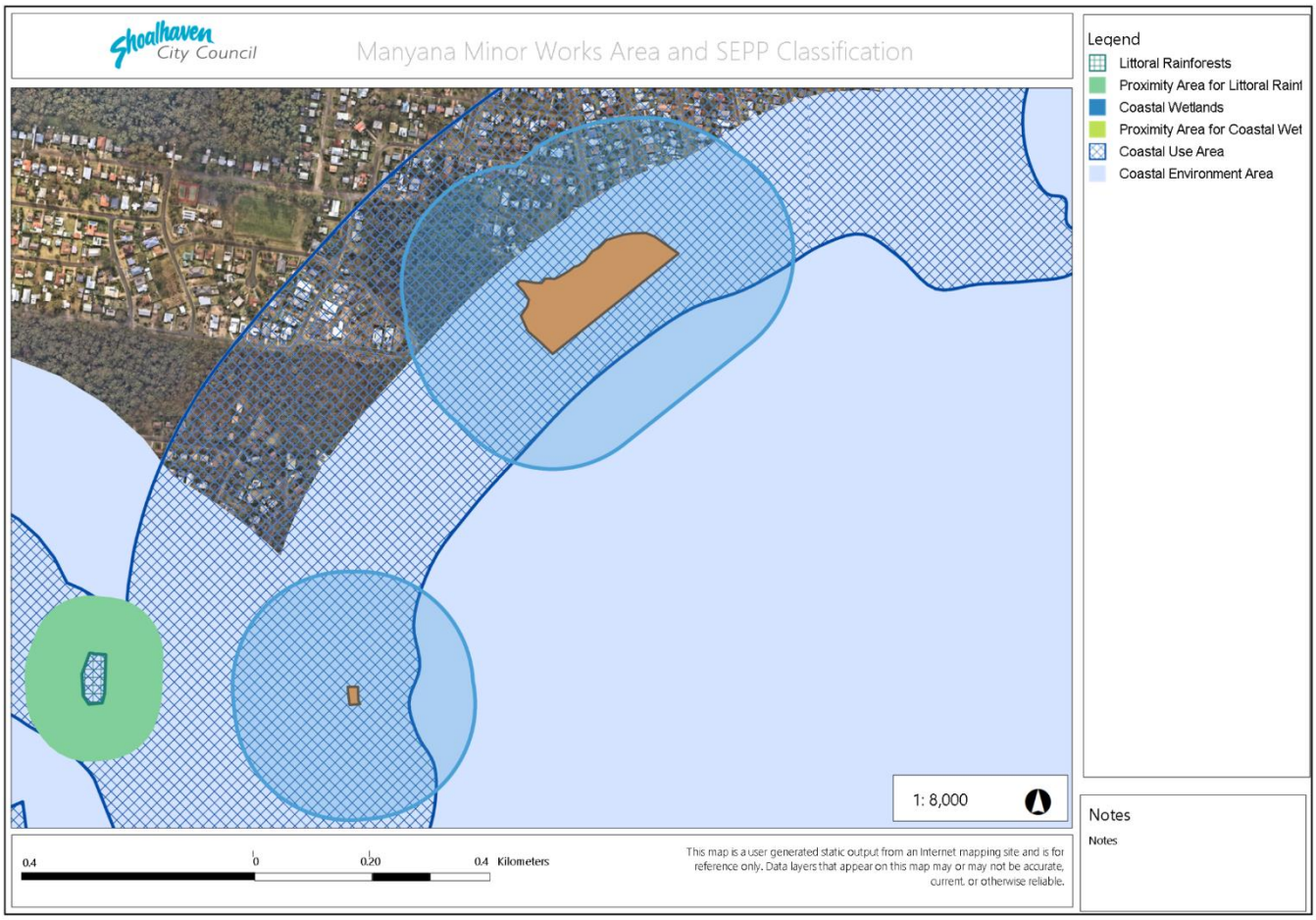


Figure 3. State Environmental Planning Policy classifications around proposed work site and study area.

Figure 4. Threatened species, habitats, ecological communities and acid sulphate soils around the proposed work site and study area.

Attachment 2: WORK PLAN

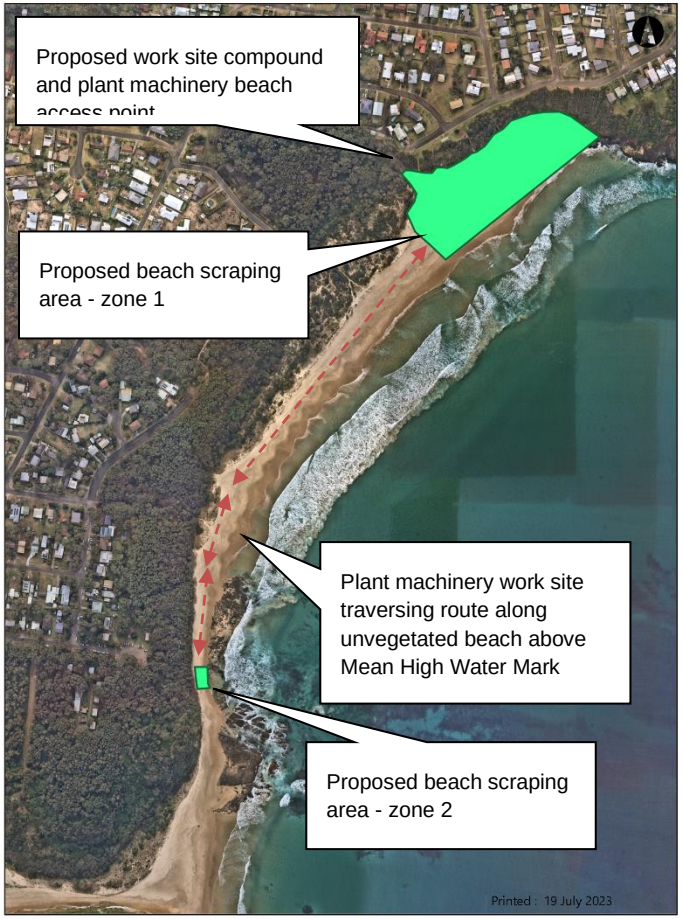


Figure 1 – Proposed work site overview

Figure 2 - Compound and beach access location

Figure 3 – Proposed work site compound detail

Figure 4 - Zone 2 beach scraping detail

Attachment 3: UNEXPECTED FINDS PROTOCOL

COASTAL MINOR WORKS

Unexpected Finds Protocol

This Unexpected Finds Protocol provides guidance and direction to site personnel if an unexpected find is encountered on-site during the course of undertaking coastal minor works as identified in **Document A**.

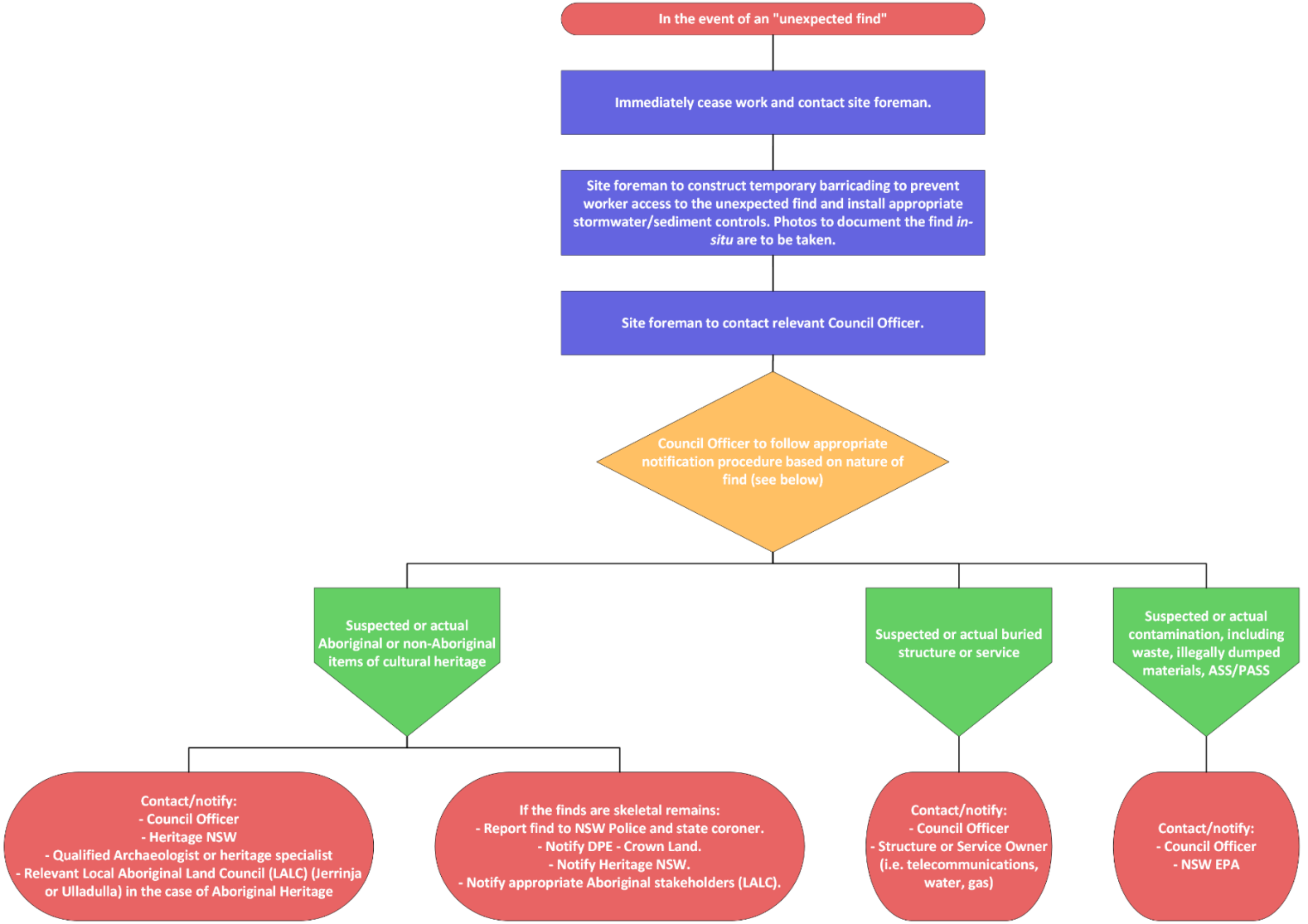
An unexpected find can be defined as, but are not limited to, any unanticipated discovery of:

- Aboriginal or non aboriginal archaeological item which have a potential to be considered heritage.
- Asbestos containing materials (ACM) (Bonded, Friable or other).
- Buried waste materials including medical waste, potentially contaminated waste, and general waste.
- Underground service infrastructure e.g. pipes, drains.
- Discoloured and odorous soils and groundwater/seepage.
- Acid Sulfate Soils (ASS) or Potential Acid Sulfate Soil (PASS)

Works may only recommence once risk has been adequately assessed and appropriate mitigation measures have been adopted with approval of Council.

Refer to Shoalhaven City Council Contaminated Land Management Policy for protocols in relation to the unforeseen detection of asbestos and other contaminated waste that may be detected within illegally dumped material. Works are to shut down and a proper assessment protocol developed in consultation with the relevant Council Officer.

Acid Sulfate Soils (ASS) or Potential Acid Sulfate Soil (PASS) to be managed according to Council's Chapter G26 – Acid Sulphate Soils and Geotechnical Guidelines (Shoalhaven Council, 2014).


In the event of an "unexpected find"
Immediately cease work and contact site foreman.
Site foreman to construct temporary barricading to prevent worker access to the unexpected find and install appropriate stormwater/sediment controls. Photos to document the find *in-situ* are to be taken.
Site foreman to contact relevant Council Officer.
Council Officer to follow appropriate notification procedure based on nature of find (see below)
Suspected or actual Aboriginal or non-Aboriginal items of cultural heritage
Suspected or actual buried structure or service
Suspected or actual contamination, including waste, illegally dumped materials, ASS/PASS
Contact/notify:
- Council Officer
- Heritage NSW
- Qualified Archaeologist or heritage specialist
- Relevant Local Aboriginal Land Council (LALC) (Jerrinja or Ulladulla) in the case of Aboriginal Heritage
If the finds are skeletal remains:
- Report find to NSW Police and state coroner.
- Notify DPE - Crown Land.
- Notify Heritage NSW.
- Notify appropriate Aboriginal stakeholders (LALC).
Contact/notify:
- Council Officer
- Structure or Service Owner (i.e. telecommunications, water, gas)
Contact/notify:
- Council Officer
- NSW EPA

Attachment 4: Likelihood of Occurrence for threatened species listed under the BC Act and EPBC Act

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
Birds						
Actitis hypoleucos	Common Sandpiper		CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area and the species is a rare visitor to the Shoalhaven area. Furthermore, important habitat characteristics required by the species are absent from the proposed work site and study area.
Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Critically Endangered	Threatened Species Profile - NSW Government	Low	No – species has not been recorded within the study area. The species inhabit dry open forest and woodland indicating presence is unlikely on open beaches and coastal dune areas. No breeding habitat for the species occurs in the Shoalhaven.
Apus pacificus	Fork-tailed Swift		CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Although habitat features utilised by this species are present within proposed work site (cliffs, beaches and coastal dune areas), other more preferred and key habitat features are present in the locality and abroad as they are known to often occur over cliffs and beaches and also over islands well out to sea.
Ardenna grisea	Sooty Shearwater		JAMBA	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the study area. Breeding season occurs in summer months within Australia. Pelagic marine bird forages in open ocean, may forage inshore occasionally.
Ardenna pacifica	Wedge-tailed Shearwater		JAMBA	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the study area. Breeding season occurs in summer months within Australia. Pelagic marine bird forages in open ocean, may forage inshore occasionally.
Ardenna tenuirostris	Short-tailed Shearwater		CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the study area. Pelagic marine bird.
Arenaria interpres	Ruddy Turnstone		CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Low	No - the species or species habitat has not been recorded or is considered likely to occur within the locality.

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the study area. Habitat features occur adjacent to the study area (eucalypt forests and woodlands), but more preferred habitat in the form of timbered paddocks and more open forests and woodlands occur in the locality. .
Botaurus poiciloptilus	Australasian Bittern	Endangered	Endangered	Threatened Species Profile - NSW Government Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the study area. Favours permanent freshwater wetlands with tall and dense vegetation. Breeding occurs in summer from October to January; nests are built in secluded places in densely vegetated wetlands on a platform of reeds. These preferred habitats are not considered highly similar to coastal dune areas that dominate within the proposed work site and study area.
Calidris alba	Sanderling	Vulnerable	CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the study area. Species presence is considered possible although previous records indicate presence is rare south of Comerong island and favoured habitat comprises broad ocean beaches with firm sand near river mouths or estuaries
Calidris canutus	Red Knot		Endangered, CAMBA, JAMBA, ROKAMBA	Threatened Species Profile - NSW Government Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the study area. Species presence considered possible between September and April with habitat features present within proposed work site and study area, however presence more likely in sheltered areas which is not considered highly applicable to open coast dune areas that predominantly feature in the proposed work site and study area.
Calidris ferruginea	Curlew Sandpiper	Endangered	Critically Endangered, CAMBA, JAMBA, ROKAMBA	Threatened Species Profile - NSW Government Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Species presence considered possible between September and April with habitat features present within proposed work site, however presence more likely in sheltered areas, shallow water and intertidal mudflats, not considered highly similar to open coast dune areas that occurs in the proposed work site.
Calidris melanotos	Pectoral Sandpiper		JAMBA,ROKAMBA	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Some habitat features present on the proposed work site, however it is considered unlikely due to habitat preference of sheltered areas. They forage in shallow water or soft mud at the edge of wetlands and this is not considered highly applicable to open coastal dune areas that feature in the proposed work site and study area.

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
Calidris ruficollis	Red-necked Stint		CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Low	No - the species or species habitat has not been recorded or is considered likely to occur within the locality. The species prefers tidal mudflats which is not commensurate to the coastal sand dunes present within the proposed work site.
Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Endangered	Threatened Species Profile - NSW Government	Medium	Yes - species has been recorded immediately outside the study area. Habitat features required by this species for breeding and foraging may occur in the adjoining bushland within the immediate environs.
Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	Vulnerable	Threatened Species Profile - NSW Government Species Profile and Threats Database - Australian Government	Medium	Yes – The species has been recorded within the subject site and study area, and suitable habitat or feed trees may be located in the adjoining bushland within the immediate environs.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the study area. Habitat features preferred by species not highly applicable to those found on open coastal dune areas.
Daphoenositta chrysoptera	Varied Sittella	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the study area. Habitat features preferred by species not highly applicable to those found on open coastal dune areas.
Diomedea gibsoni	Gibson's Albatross	Vulnerable	Vulnerable	Threatened Species Profile - NSW Government Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the study area. No known breeding habitat within the Shoalhaven, known to potentially forage in NSW Waters.
Epthianura albifrons	White-fronted Chat	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the study area. Habitat features preferred by species including wetland areas not highly applicable to those found on open coastal dune areas that comprise the proposed work site and study area.
Esacus magnirostris	Beach Stone-curlew	Critically Endangered		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Species prefers tidal mudflats and sandflats, coastal lagoons and undisturbed beaches which are not present within the proposed work site or study area.

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
				Species Profile and Threats Database - Australian Government		
Gallinago hardwickii	Latham's Snipe		JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. The dominant habitat features that are present within the proposed work site and study area (coastal dune areas) are not considered highly similar to those which the species would usually inhabit (freshwater wetlands with low, dense vegetation).
Glossopsitta pusilla	Little Lorikeet	Vulnerable		Threatened Species Profile - NSW Government	Medium	Yes - records of this species occur immediately outside of the study area. Habitat required by this species for breeding and foraging (forests, woodlands and large trees) may occur in the bushland adjoining the study area.
Haematopus fuliginosus	Sooty Oystercatcher	Vulnerable		Threatened Species Profile - NSW Government	Medium	Yes - species has been recorded to the south of the study area. Species presence possible with some habitat features utilised occur within the proposed work site and study area (exposed or ocean beaches).
Haematopus longirostris	Pied Oystercatcher	Endangered		Threatened Species Profile - NSW Government	High	Yes – Several records of this species have been recorded within the proposed work site and study area. Suitable habitat in the form of sandy beaches is present within the proposed work site and study area.
Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable		Threatened Species Profile - NSW Government Species Profile and Threats Database - Australian Government	Medium	Yes- although species has not been recorded within the proposed work site or study area, records occur in similar habitats within the locality (exposed or ocean beaches and coasts).
Hieraaetus morphnoides	Little Eagle	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the study area. Habitat features present on the proposed work site and within the study area are (coastal dune areas) not considered highly like those which the species would usually inhabit (eucalypt forest and woodland or open woodland).
Hirundapus caudacutus	White-throated Needletail		Vulnerable, CAMBA, JAMBA, ROKAMBA	Threatened Species Profile - NSW Government Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Migratory and usually observed in Australia between October and April

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
Hydroprogne caspia	Caspian Tern		JAMBA	Species Profile and Threats Database - Australian Government	Medium	Yes – records of this species occur immediately outside the study area and some suitable habitat features of the species are present within the proposed work site and study area (including coastal sand dunes and beaches).
Ixobrychus flavicollis	Black Bittern	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Habitat includes estuarine wetlands which are not considered highly like the habitat features present within the proposed work site or study area (coastal dune areas).
Lathamus discolor	Swift Parrot	Endangered	Critically Endangered	Threatened Species Profile - NSW Government Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Habitat features within proposed work site and study area are not considered highly applicable to those which the species would usually inhabit – foraging habitat only (on the mainland) where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.
Limosa lapponica	Bar-tailed Godwit		CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Medium	Yes - Possible habitat features present on the proposed work site and study area, and species or species habitat deemed likely to occur in the form of sandy ocean beaches.
Lophoictinia isura	Square-tailed Kite	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Dominant habitat features of the proposed work site (coastal dune areas) not considered highly similar to those which the species would usually inhabit (dry woodlands and open forests with a preference for timbered riparian areas).
Macronectes giganteus	Southern Giant Petrel	Endangered,	Endangered	Threatened Species Profile - NSW Government Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Species typically occurs at sea.
Ninox connivens	Barking Owl	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site and study area is not considered highly likely to contain habitat for which the species would usually inhabit (woodland and open forests).
Ninox strenua	Powerful Owl	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Habitat features adjacent to the study area considered applicable to those preferred by the species (from woodland and open sclerophyll forest to tall open wet forest and rainforest). Proposed work site does not contain such habitat features

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
Numenius madagascariensis	Eastern Curlew		Critically Endangered, CAMBA, JAMBA, ROKAMBA	Threatened Species Profile - NSW Government Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Species prefers estuaries, tidal mudflats, sandspits and mangroves which do not occur within the proposed work site or study area.
Numenius phaeopus	Whimbrel		CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Species prefers estuaries, tidal mudflats, sandspits, flooded paddocks and mangroves which do not occur within the proposed work site or study area.
Pachycephala olivacea	Olive Whistler	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site and study area do not contain habitat features for which the species would usually inhabit (wet forests).
Pandion cristatus	Eastern Osprey	Vulnerable		Threatened Species Profile - NSW Government	Medium	Yes - although the species has not been recorded within the proposed work site or study area, some habitat features present within the proposed work site applicable to those of the species (favouring coastal areas, but typically mouths of large rivers, lagoons and lakes).
Petroica boodang	Scarlet Robin	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site of study area. Proposed work site does not contain habitat features for which the species would usually inhabit (dry eucalypt forests and woodlands).
Petroica rodinogaster	Pink Robin	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain habitat features for which the species would usually inhabit (rainforest and open eucalypt forest).
Pezoporus wallicus wallicus	Eastern Ground Parrot	Vulnerable		Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain habitat features for which the species would usually inhabit (rainforest and open eucalypt forest).
Phaethon lepturus	White-tailed Tropicbird		CAMBA, JAMBA	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain habitat features for which the species would usually inhabit (dense coastal low heathlands and sedgelands)

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
Pluvialis squatarola	Grey Plover		CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Habitat features preferred by the species (mudflats, saltmarsh, tidal reefs and estuaries) are not present within the proposed work site.
Ptilinopus superbus	Superb Fruit-Dove	Vulnerable		Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain habitat features for which the species would usually inhabit (rainforests and closed woodland)
Pycnoptilus floccosus	Pilotbird		Vulnerable	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain habitat features for which the species would usually inhabit (leaf litter, ferns and sword grass within rainforests, wet eucalypt forests and drier coastal woodland that may occur in the locality).
Stercorarius parasiticus	Arctic Jaeger		CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Low	No – species records indicate presence is unlikely in the locality. Species typically occurs at sea.
Sterna hirundo	Common Tern		CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Medium	Yes - although species has not been recorded within the proposed work site or study area habitat features present within the proposed work site considered applicable to those preferred by the species (coastal dunes and beaches).
Sternula albifrons	Little Tern	Endangered	CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	High	Yes – The species has been recorded within the study area and suitable habitat in the form of coastal waters is present.
Thalassarche cauta	Shy Albatross	Vulnerable	Vulnerable	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No – species records occur immediately outside the study area and preferred habitat features are not present within the immediate environs. Typically occurs at sea and will breed within colonies on islands near the shelf break. .

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
Thalassarche melanophris	Black-browed Albatross	Vulnerable	Vulnerable	Species Profile and Threats Database - NSW Government Threatened Species Profile - NSW Government	Low	No – species records indicate presence is unlikely in the locality. Species typically occurs at sea.
Thalasseus bergii	Crested Tern		JAMBA	Species Profile and Threats Database - NSW Government	Medium	Yes - species has been recorded within the study area. Habitat features preferred by the species, including coastal waters and beaches, are present within the proposed work site .
Thinornis cucullatus cucullatus	Eastern Hooded Dotterel	Critically Endangered	Vulnerable	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Medium	Yes – records of this species occur immediately outside the study area and habitat features present within the proposed work site are considered applicable to those preferred by the species including broad sandy ocean beaches.
Tringa nebularia	Common Greenshank		CAMBA, JAMBA, ROKAMBA	Species Profile and Threats Database - Australian Government	Low	No - species has not been recorded within the proposed work site or study area. Habitat features present within the proposed work site and study area are not considered applicable to those preferred by the species (mudflats, estuaries and saltmarsh).
Tyto novaehollandiae	Masked Owl	Vulnerable,		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Habitat features adjacent to the proposed work site considered applicable to those preferred by the species (eucalypt forests and woodlands, with roosting and breeding occurring in moist eucalypt forested gullies). Proposed work site does not contain such habitat features.
Tyto tenebricosa	Sooty Owl	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain habitat features for which the species would usually inhabit (rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests).
Amphibians						
Litoria aurea	Green and Golden Bell Frog	Endangered	Vulnerable	Species Profile and Threats Database - Australian Government	Low	No – there is no suitable habitat for this species within the proposed work site (marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.).

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
				Threatened Species Profile - NSW Government		
Reptiles						
Chelonia mydas	Green Turtle	Vulnerable	Vulnerable	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No – Species occurs at sea.
Mammals						
Arctocephalus forsteri	New Zealand Fur-seal	Vulnerable		Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No – species occurs in inshore and offshore marine waters.
Arctocephalus pusillus doriferus	Australian Fur-seal	Vulnerable		Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No – species occurs in inshore and offshore marine waters.
Cercartetus nanus	Eastern Pygmy-possum	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for which the species would usually inhabit in the locality (woodlands and heath).
Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Endangered	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain habitat features for which the species exhibits preference (mature wet forest).

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
Eubalaena australis	Southern Right Whale	Endangered	Endangered	Threatened Species Profile - NSW Government	Low	No – Species occurs at sea.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species (moist habitats, with trees taller than 20 metres).
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	Endangered	Endangered	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species (heath or open forest with a heathy understorey on sandy or friable soils).
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species (dry sclerophyll forest, woodland, swamp forests and mangrove forests)
Miniopterus orianae oceanensis	Large Bent-winged Bat	Vulnerable		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain habitat features for which the species has preference.
Myotis macropus	Southern Myotis	Vulnerable,		Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species (roosting in caves and foraging in forested areas).
Petauroides volans	Southern Greater Glider	Endangered	Endangered	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Habitat features adjacent to the proposed work site considered applicable to those preferred by the species (tall eucalypt forests and woodlands containing hollow bearing trees – up to 18 in a 1 to 3 ha area). Proposed work site does not contain such habitat features.
Petaurus australis	Yellow-bellied Glider	Vulnerable,	Vulnerable	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species (tall mature eucalypt forest).

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
Petaurus norfolcensis	Squirrel Glider	Vulnerable		Threatened Species Profile - NSW Government		No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species (for coastal areas, Blackbutt-Bloodwood forest with heath understorey).
Phascolarctos cinereus	Koala	Endangered	Endangered	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	Low - species has not been recorded within the proposed work site or study area. Proposed work site and study area do not contain preferred habitat features for the species
Phoniscus papuensis	Golden-tipped Bat	Vulnerable		Threatened Species Profile - NSW Government	Low	Low - species has not been recorded within the proposed work site or study area. Proposed work site and study area do not contain preferred habitat features for the species (rainforest and adjacent wet and dry sclerophyll forest up to 1000 metres)
Physeter macrocephalus	Sperm Whale	Vulnerable		Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Governments	Low	No – Species occurs at sea.
Potorous tridactylus	Long-nosed Potoroo	Vulnerable	Vulnerable	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species (coastal heaths and dry and wet sclerophyll forests)
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Vulnerable	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No - species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species (subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps).
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable		Threatened Species Profile - NSW Government	Low	No – species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species. The species inhabits forested

Scientific name	Common name	Legislation		Habitat associations	Likelihood of occurrence	Significance assessment completed (refer Attachment 5)
		BC Act	EPBC Act			
						areas but forages for insects at night in both open and forested areas. Presence is unlikely on open beaches and coastal dune areas.
Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable,		Threatened Species Profile - NSW Government	Low	No – species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species The species inhabits woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest indicating presence is unlikely on open beaches and coastal dune areas.
Flora						
Cryptostylis hunteriana	Leafless Tongue Orchid	Vulnerable	Vulnerable	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No – species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species (larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbia gummifera*) and Black Sheoak (*Allocasuarina littoralis*).
Galium australe	Tangled Bedstraw	Endangered		Threatened Species Profile - NSW Government	Medium	Yes – although there are no records of this species within the proposed work site or study area, preferred habitat is present in the form of sand dunes, sand spits, shrubland and woodland. indicating possible presence on open beaches and coastal dune areas.
Rhodamnia rubescens	Scrub Turpentine	Critically Endangered	Critically Endangered	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No – species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species The species inhabits littoral, warm temperate and subtropical rainforest and wet sclerophyll forest indicating presence is unlikely on open beaches and coastal dune areas.
Thesium australe	Austral Toadflax	Vulnerable	Vulnerable	Species Profile and Threats Database - Australian Government Threatened Species Profile - NSW Government	Low	No – species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species. The species inhabits grassland and grassy woodland indicating presence is unlikely on open beaches and coastal dune areas.
Wilsonia backhousei	Narrow-leafed Wilsonia	Vulnerable		Threatened Species Profile - NSW Government	Low	No – species has not been recorded within the proposed work site or study area. Proposed work site does not contain preferred habitat features for the species The species inhabits coastal areas but prefers habitat along saltmarshes and lakes. Presence unlikely on open beaches.

Attachment 5: Test of Significance (BC Act) and Significant Impact Criteria (EPBC Act)

For threatened species determined to have a medium or high likelihood of occurrence listed under the BC Act, a Test of Significance (ToS) pursuant to Section 7.3 of the BC Act has been conducted.

For those listed under the EPBC Act, a Significant Impact Criteria (SIC), in accordance with the Significant Impact Guidelines 1.1 – Matters of National Environmental Significance, has been conducted.

Test of Significance (BC Act)

Following the analysis of likelihood of occurrence (Attachment 4), the BC Act Test of Significance was applied to:

Scientific Name	**Common name**
Fauna	
Callocephalon fimbriatum	Gang-gang Cockatoo
Calyptorhynchus lathami	Glossy Black-Cockatoo
Glossopsitta pusilla	Little Lorikeet
Haematopus fuliginosus	Sooty Oystercatcher
Haematopus longirostris	Pied Oystercatcher
Haliaeetus leucogaster	White-bellied Sea-Eagle
Pandion cristatus	Eastern Osprey
Sternula albifrons	Little Tern
Thinornis cucullatus cucullatus	Eastern Hooded Dotterel
Flora	
Galium australe	Tangled Bedstraw
Ecological Communities	

Bangalay Sand Forest in the Sydney Basin and South East Corner bioregions	*Bangalay Sand Forest in the Sydney Basin and South East Corner bioregions*

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

Threatened shorebirds – Sooty Oystercatcher, Pied Oystercatcher and Eastern Hooded Dotterel.

Manyana Beach contains foraging habitat for the Sooty Oystercatcher as they tend to breed exclusively on offshore islands, and occasionally on isolated promontories. They tend to favour rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. This species breeds in spring and summer. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks.

Manyana Beach contains potential foraging and breeding habitat for Pied Oystercatchers. This species favours sandy beaches and intertidal flats, and forage on exposed sand, mud and rock at low tide. Nesting of this species mostly occurs on coastal or estuarine beaches although occasionally they may utilise saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones. Two to three eggs are laid between August and January.

Manyana Beach contains marginal foraging and breeding habitat for the Eastern Hooded Dotterel or Hooded Plover as they are known to be more partial to sandy ocean beaches, mainly those that are broad and flat, with a wide wave-wash zone for feeding, widespread beachcast seaweed, and supported by vegetated sand-dunes that is used for shelter and nesting. Occasionally, Eastern Hooded Dotterel are observed on tidal bays and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs. They frequently utilise coastal freshwater lakes and lagoons, containing saltmarsh. Hooded Plovers breed from August to March in these habitats, in a narrow strip between the high-water mark and the base of the fore-dunes. They often nest within 6 metres of the foredune, mostly within 5 metres of the high-water mark, but occasionally among or behind dunes. The nest is a scrape in the sand near debris. A high degree of fidelity is demonstrated for previous nesting locations. Cudmirrah Beach (located to the north of the proposed work site) has the largest group of inhabitant Eastern Hooded Dotterels in NSW.

The proposed activity will employ buffer zones to threatened shorebirds to ensure their protection as per the recommended mitigation measures outlined in **Section 7** and detailed in the proposed Environmental Management Plan. These have been developed in consultation with NPWS and are more stringent during the nominated threatened shorebird breeding periods. This is more relevant to the Pied Oystercatcher and Eastern Dotterel, since Sooty Oystercatchers will tend to utilise islands for breeding, which is more likely to be contextualised to Green Island at Cunjurong Point. As such, the proposed activity is unlikely to have an adverse effect on the life cycle of the Sooty

Oystercatcher, Pied Oystercatcher, or the Eastern Dotterel such that a viable local population is placed at risk of extinction.

Other threatened birds - White-bellied Sea Eagle, Eastern Osprey, Gang-gang Cockatoo, Glossy Black Cockatoo, Little Lorikeet and Little Tern.

Manyana Beach dune system and surrounding vegetation provides appropriate habitat for White-bellied Sea Eagle. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby that are used as 'guard roosts'. Predation activities exhibited by this species occurs from a perch or whilst in flight (usually 10 -20 metres above the shore) and prey is typically carried to a feeding platform. Lake Conjola and Green Island (Conjurong Point) contains a high density of records of this species corroborating the complementary breeding and foraging habitat that is available to the south of the proposed work site. However, if nesting was to occur, the species would be unaffected due to the nature and location of nests being outside the proposed work site.

The coastal areas formed by Manyana Beach provide moderate habitat values for the Eastern Osprey. This species favours the mouths of large rivers, lagoons and lakes foraging on fish over clear and open water. They have been recorded to utilise offshore islands. They breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. They have also been recorded to use radio masts or floodlight columns to perch a nest on. This species is sedentary, though they will range more freely in non-breeding periods, exhibiting significantly less fidelity to their preferred breeding and nesting locations at this time. The judgment of the moderate quality habitat is corroborated by previous records as there are none of this species at the Lake Conjola entrance.

Gang-gang Cockatoo are generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests in spring and summer and move to lower altitudes to drier open Eucalyptus forests in autumn and winter. They typically favour old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 7 centimetres in diameter or larger in eucalypts and 3 metres above ground and a clutch of up to two eggs is laid in spring to summer. Hollow-bearing trees occur in Crown Lands to the west of the proposed work site and study area and will not be impacted on by the proposed activity.

Glossy Black Cockatoo inhabits open forest woodlands of the coast where sheoak occurs. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods for this species. Monogamous pairs of Glossy Black Cockatoo are dependent on hollow-bearing old growth Eucalyptus trees for nest sites whereby a single egg is laid between March and May. Hollow-bearing trees occur in Crown Lands to the west of the proposed work site and study area and will not be impacted on by the proposed activity.

Little Lorikeet forage primarily in the canopy of open *Eucalyptus* spp. dominated forest and woodland. However, birds can also find food sources in *Angophora, Melaleuca* and other tree species. Little Lorikeet favour riparian environments when foraging for food. However, birds often roost in treetops distant from feeding areas. Breeding typically occurs from May to September in locations within the proximity of feeding site. Little Lorikeet has been recorded within the locality but are unlikely to be observed at Manyana Beach because of the lower availability of the preferred habitats (more prevalent in the Crown Lands to the west of the proposed work site).

The Little Tern is a migratory or partly migratory seabird that almost exclusively coastal. Migrating from eastern Asia, it breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is observed until May, with only occasional birds seen in winter months. Nesting occurs in low dunes or on sandy beaches above the high-water mark near estuary entrances or adjacent to coastal lakes and islands. Foraging predominantly occurs for small fish, crustaceans, molluscs, worms and insects by plunging into shallow water of channels and estuaries, and in the surf of beaches. The nesting and foraging preferences of this species corroborated by the higher density of previous records within the lower section of the Lake Conjola catchment, with less records occurring on Manyana Beach and Green Island (Cunjurong Point). Notwithstanding, the same stringency will be employed as per the threatened shorebirds in terms of the buffer zones and the implementation of relevant recommended mitigative measures contained within **Section 7** and detailed in the proposed Environmental Management Plan.

It is therefore considered unlikely that the White-bellied Sea Eagle, Eastern Osprey, Gang-gang Cockatoo, Glossy Black Cockatoo, Little Lorikeet and Little Tern will be impacted on by the proposed activity, and the proposed activity is unlikely to have an adverse effect on the lifecycle of these species such that a viable local population of any of these species is likely to be placed at risk of extinction.

Threatened Flora - Tangled Bedstraw

Tangled Bedstraw has been recorded in Turpentine Forest and Coastal Acacia Shrubland and flowering occurs in late spring to early autumn. The dune system of Manyana Beach provides marginal habitat for this species, which is verified by the lack of previously mentioned vegetation communities within the study area and large sections of lands within the locality. The level of disturbance to these areas will not increase in response to the proposed activity.

As such, the proposed activity is unlikely to have an adverse effect on the life cycle of the Tangled Bedstraw such that a viable local population of the species is to be placed at risk of extinction.

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.

The hind dune of Manyana Beach and Cunjurong Beach contains vegetation that is commensurate to *Bangalay Sand Forest in the Sydney Basin and South East Corner bioregions* TEC (**Attachment 1, Figure 4**). The proposed activity does not involve disturbance to vegetation other than to maintain clearance at existing Council managed beach access tracks. No pruning or removal of mature trees will occur and no change to ground cover density will occur. The works associated with the proposed activity will not have an adverse effect on its extent of or substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

c) In relation to the habitat of a threatened species or ecological community

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

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

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

No habitat of a threatened species or ecological community is likely to be removed/modified or become fragmented or isolated from other areas of habitat as a result of this proposed activity.

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

No areas of outstanding biodiversity value have been declared in the Shoalhaven LGA.

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

The proposed activity will not contribute to any key threatening process listed under the BC Act.

Conclusion

The Test of Significance concludes that the proposed activity will not have a significant impact on threatened species or threatened ecological communities. As such, a Species Impact Statement or entry into the Biodiversity Offset Scheme is not required.

Significant Impact Criteria (EPBC Act)

Following the analysis of Likelihood of Occurrence (Attachment 4), the EPBC Act SIC were applied for the following taxa:

Scientific Name	Common name
Endangered Fauna	
Callocephalon fimbriatum	Gang-gang Cockatoo
Vulnerable Fauna	
Calyptorhynchus lathami	Glossy Black-Cockatoo
Thinornis cucullatus cucullatus	Eastern Hooded Dotterel
Migratory Birds	
Hydroprogne caspia	Caspian Tern
Limosa lapponica	Bar-tailed Godwit
Sterna hirundo	Common Tern
Sternula albifrons	Little Tern
Thalasseus bergii	Crested Tern

Endangered Fauna, Gang-gang Cockatoo

Significant Impact Criteria:

- ***Lead to a long-term decrease in the size of a population***

No populations have been recorded within the study area. The subject site does not support key source populations for breeding or dispersal, populations necessary for maintaining genetic diversity, or populations near the limit of the species' range. Accordingly, the proposed activity will not lead to a long-term decrease in the size of a Gang-gang Cockatoo population.

- ***Reduce the area of occupancy of the species***

The species is not known to occupy the proposed work site. The species may use the study area and the vegetation within the Crown Lands to the west of the proposed work site and study area for foraging or breeding purposes. However, more optimal foraging habitat is located in woodland areas within the locality. Consequently, the proposed activity will not reduce the area of occupancy of the species.

- ***Fragment an existing population into two or more populations.***

There is no known existing population that occurs within the study area. Individual species may occur periodically within the proposed work site and study area. However, the proposed activity will not result in fragmentation of the population.

- ***Adversely affect habitat critical to the survival of a species***

Gang-gang Cockatoo are generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests in spring and summer and move to lower altitudes to drier open eucalyptus forests in autumn and winter. They typically favour old growth forest and woodland attributes for nesting and roosting. No such habitat is located within the study area. Therefore, habitat critical to the survival of the species is unlikely to be affected in response to the proposed activity.

- ***Disrupt the breeding cycle of a population***

The Gang-gang Cockatoo species favour old growth forest and woodland attributes for nesting and roosting. Appropriate trees consisting of large hollows that are 7 centimetres or more in diameter, and 3 metres above the ground are not located within the study area. Therefore, the breeding cycle of the population will not be disrupted.

- ***Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline***

The proposed activity will not destroy, remove, isolate, or decrease the availability or quality of habitat for the Gang-gang Cockatoo since breeding and complementary foraging habitat is present outside the study area.

- ***Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat.***

The proposed activity will not result in the establishment of an invasive species.

- ***Introduce disease that may cause the species to decline***

The proposed activity will not result in the introduction of a disease that may cause the Gang-gang Cockatoo species to decline.

- ***Interfere with the recovery of the species***

Considering the above factors, the proposed activity will not interfere substantially with the recovery of the species.

Conclusion:

The proposed activity is not considered to constitute a significant impact on the Gang-gang Cockatoo and therefore a referral to the Commonwealth is not recommended.

Vulnerable Fauna Glossy Black Cockatoo & Eastern Hooded Dotterel

Significant Impact Criteria:

- ***Lead to a long-term decrease in the size of an important population of a species***

No important Glossy Black Cockatoo populations have been recorded within the study area. The proposed work site does not provide habitat that would support key source populations for breeding or dispersal or populations necessary for maintaining genetic diversity. As such, the proposed activity will not lead to a long-term decrease in the size of an important Glossy Black Cockatoo population.

No important Eastern Hooded Dotterel populations have been recorded within the study area. These are more likely to occur at Cudmirrah Beach given the repeated records of this species to the north of the study area. The proposed work site does not provide habitat that would support key source populations for breeding or dispersal or populations necessary for maintaining genetic diversity. As such, the proposed activity will not lead to a long-term decrease in the size of an important Eastern Hooded Dotterel population.

- ***Reduce the area of occupancy of an important population***

No important Glossy Black Cockatoo or Eastern Hooded Dotterel populations have been recorded within the study area.

Better quality habitat for the Glossy Black Cockatoo occurs within the woodlands located to the west of the study area. This contains potential nesting and foraging habitat, that does not occur within the proposed work site for this species. As such, proposed activity is not considered to reduce the area of occupancy for the Glossy Black Cockatoo or important populations of this species.

Although the Eastern Hooded Dotterel may utilise the proposed work site for foraging, complementary and more optimal nesting/sheltering habitat is available outside the study area. Accordingly, the proposed activity is not considered to reduce the area of occupancy for the Eastern Dotterel or important populations of this species.

- ***Fragment an existing important population into two or more populations***

No important Glossy Black Cockatoo or Eastern Hooded Dotterel populations have been recorded within the study area.

Glossy Black Cockatoos and Eastern Hooded Dotterals may only occur periodically within the proposed work site as transients. Therefore, the proposed activity will not result in fragmentation of a Glossy Black Cockatoo population, an Eastern Hooded Dotterel population or important populations of these species.

- ***Adversely affect habitat critical to the survival of a species***

Complementary breeding and foraging habitat for the Glossy Black Cockatoo occurs outside of the study area. Consequently, the proposed activity will not adversely affect habitat critical to the survival of the Glossy Black Cockatoo species.

Likewise, accompanying breeding, sheltering and foraging habitat for the Eastern Hooded Dotterel occurs outside of the study area. Consequently, the proposed activity will not adversely affect habitat critical to the survival of the Eastern Hooded Dotterel species.

- ***Disrupt the breeding cycle of an important population***

No important Glossy Black Cockatoo populations have been recorded within the study area. This species is dependent on large hollow-bearing eucalyptus for nest sites. The vegetation within the proposed work site and study area does not support core breeding habitat required by this species. Therefore, the proposed activity is not considered to disrupt the breeding cycle of the Glossy Black Cockatoo or of an important population of this species.

No important Eastern Hooded Dotterel populations have been recorded within the study area. This species prefers sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding, much beachcast seaweed, and backed by sparsely vegetated sand-dunes for shelter and nesting. A high degree of fidelity is shown for previous nesting locations (e.g., Cudmirrah Beach). The vegetation within the proposed work site and study area does not support core breeding habitat required by this species. Therefore, the proposed activity is not considered to disrupt the breeding cycle of the Eastern Hooded Dotterel or of an important population of this species.

- ***Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.***

The proposed activity will not destroy, remove, isolate or decrease the availability or quality of habitat for the Glossy Black Cockatoo or Eastern Hooded Dotterel.

- ***Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.***

The proposed activity will not result in the establishment of an invasive species that is harmful to the Glossy Black Cockatoo or Eastern Hooded Dotterel species.

- ***Introduce disease that may cause the species to decline***

The proposed activity will not result in the introduction of a disease that will cause the Glossy Black Cockatoo or Eastern Hooded Dotterel species to decline.

- ***Interfere substantially with the recovery of the species***

Considering the above factors, the proposed activity will not interfere substantially with the recovery of either the Glossy Black Cockatoo or the Eastern Hooded Dotterel.

Conclusion

The proposed activity is not considered to constitute a significant impact on the Glossy Black Cockatoo or Eastern Hooded Dotterel and therefore a referral to the Commonwealth is not recommended.

Migratory Birds - Caspian Tern, Bar-tailed Godwit, Common Tern, Little Tern & Greater Crested Tern

Significant Impact Criteria:

- ***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***

The Caspian Tern is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas). Roosting is described to occur on bare exposed sand or shell spits, banks or shores of coasts, lakes, estuaries, coastal lagoons and inlets. In coastal inlets they may prefer to forage in tidal channels, or over submerged mudbanks. It is considered areas adjacent to the proposed work site and study area provide preferable habitat.

Bar-tailed Godwit are described to inhabit sheltered coastal environments (tidal estuaries and harbours, estuaries, inlets and coastal lagoons) as well as exposed open beaches, the proposed activity will not disjoint or isolate these habitat features that are present within or adjacent to the study area. Roosting can occur on sandy beaches; however Bar Tailed Godwits do not breed in Australia.

Common Terns are marine, pelagic and coastal, but are more typically recorded in near-coastal waters, both on ocean beaches, platforms and headlands and in sheltered waters, such as bays, harbours and estuaries with muddy, sandy or rocky shores. This species forages in marine environments, and roost near the shore on coastal dune systems or protected areas during poor weather.

Little Terns are almost exclusively coastal, preferring sheltered environments. They nest in small, scattered colonies in low dunes or on sandy beaches just above high tide near estuary mouths. Foraging occurs in shallow water of channels and estuaries. These nesting and foraging preferences are corroborated by the higher density of previous records within the lower section of the Lake Conjola catchment, with less records occurring on Manyana Beach and Green Island (Cunjurong Point).

Greater Crested Terns roost on open shores, with breeding occurring in association with other seabirds. Colony sizes are dictated by the abundance of pelagic fish prey. The nest is a shallow scrape in the sand on open, flat or occasionally sloping ground. It is often unlined, but sometimes includes stones or cuttlefish bones. These habitat preferences are not holistically available within the proposed work area and study area.

The proposed activity will not substantially modify, destroy or isolate any area of important habitat for Caspian Tern, Bar-tailed Godwit, Common Tern, Little Tern or Crested Tern.

- ***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***

The proposed activity does not involve any direct or indirect introduction of invasive species to the proposed work site or study area. Risk mitigation measures outlined in **Section 7.2** provide applicable controls to actions which have been identified with any potential risk relating to invasive species introduction. Disturbance associated with the proposed activity is considered consistent with that of natural processes and will not impact on the likelihood of invasive species establishment areas of important habitat of these migratory species.

- ***Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.***

The proposed work site and study area do not contain a significant proportion of a population of the mentioned migratory species; hence the proposed activity will not impact on a significant proportion of a population by direct means. The proposed activity is considered consistent with natural coastal processes and hence will not indirectly disrupt breeding, feeding, migration or resting behaviour of a significant proportion of a population of these migratory bird species.

The proposed activity will not disrupt the lifecycle of an ecologically significant proportion of these migratory bird populations.

Conclusion

The proposed activity is not considered to constitute a significant impact on the EPBC Act listed Migratory Birds and therefore a referral to the Commonwealth is not recommended.

Attachment 6: AHIMS Search result

This attachment has been removed due to sensitive data.

Attachment 7: Agency Consultation

This attachment has been removed due to sensitive data.

Attachment 8: Permits and Licences