biodiversity
assessments & solutions

Ecological Assessment

Extension of coastal protection works – Belongil Beach, Byron Bay.

Client:	Elements of Byron
Prepared by:	Biodiversity Assessments & Solutions Pty Ltd
Date:	20th June 2023

Project Control

Project name: Ecological Assessment

Extension of coastal protection works - Belongil Beach, Byron Bay.

Job number: 230206

Client: Elements of Byron

Prepared by: Biodiversity Assessments & Solutions Pty Ltd

Lennox Head, NSW, 2478

adam@biodiversityassessments.com.au

Date:	Revision:	Prepared by:	Distributed to:
03.04.2023	A	Adam Gosling	KS; JH
20.06.2023	B	Adam Gosling	KS; JH

Contents

List of Figures

List of Tables

1. Introduction and Background

Biodiversity Assessments & Solutions Pty Ltd has completed an ecological assessment including a threatened species Test of Significance (ToS) with respect to part Lot 1 DP 1215893, Belongil Beach, Byron Bay, NSW (Figure 1). Lot 1 DP 1215893 contain the Elements of Byron tourism Resort.

The assessment has taken into consideration any potential impacts of the identified proposal on threatened species or ecological communities in accordance with the *Biodiversity Conservation* (BC) *Act 2016* and identifies any provisions within the *Biodiversity Conservation Regulation 2017* that may apply to the proposal. The assessment also considers the requirements of the *Coastal Management Act 2016* and how it pertains to the proposal.

This assessment has been undertaken to accompany the lodgement of a Part 4 Development Application (DA) for the extension of coastal protection works within the lot boundaries of the subject land.

1.1 Subject land

The subject land is for the purposes of this assessment described as:

- comprised of one (n = 1) coastal foreshore lot (Lot 1 DP 1215893), covering a total area of approx. 32.75 ha. The development footprint is limited to the far north-western portion of the lot, and covers an area of approx. 750 m^2 (Figure 1);
- a foreshore lot owned and operated as a tourism facility and consisting of beach, dunes, foreshore, resort guest assets, and open space. The lot contains small areas of fragmented littoral vegetation and isolated native trees scattered throughout the subject land;
- generally flat and low-lying, with two relatively distinct tiers applicable to the proposal (i.e., beach and elevated foreshore), with elevation below the 10 m Australian Height Datum (AHD) contour; and
- contains multiple land zonings, but with the entirety of the proposal footprint being zoned DM Deferred Matter under the Byron Local Environmental Plan 2014 and zoned 7(f1) Coastal Lands under the Byron Local Environmental Plan 1988.

1.2 The proposal

The proposal identified for which approval is sought (Figure 2) is described as:

- Extension of coastal protection works (sandbags and sand nourishment) for a period of (nominally) 5 years, dune fencing and revegetation while the Coastal Management Program (CMP) for the Byron Shire Northern Coastline (Cape Byron to South Golden Beach) is completed.

The proposal is to be undertaken on land zoned DM Deferred Matter under the Byron Local Environmental Plan 2014 and zoned 7(f1) Coastal Land Zone under the Byron Local Environmental Plan 1988.

The full design details are included in Appendix C. The *Coastal Engineering Assessment* (2003) by Royal HaskoningDHV for the proposal is included with the DA submission as a separate report.

Plate 1: View looking west showing existing sandbag coastal protection works with regenerating dune (left) and rapidly eroding dune where no protection exists (right).

Plate 2: Drone view illustrating the erosion occurring (left) where no coastal protection works have occurred, and stable vegetated dunes (right) where coastal protection works have been undertaken.

biodiversity
assessments & solutions

Figure 1: Subject land and location - North Beach

Legend

- Subject Land - Lot 1 DP 1215893
- Proposed Sandbag Wall Extension
- Lot
- Road Corridor
- NPWS Reserve
- Cape Byron Marine Park
- railway
- Hydroline
- Water Feature
- Contour

0 100 200 300 400 m

ATTRIBUTION PARTIES
Aerials: © NearMap Pty Ltd [2023]
Topographic: © Land and Property Information [2022]
Cadastral: © Land and Property Information [2022]

biodiversity
assessments & solutions

Figure 2: Proposal elements and local statutory mapping.

Legend

- Subject Land - Lot 1 DP 1215893
- Contours - 1m
- Biodiversity Values Map_V15
- Coastal Wetland
- Coastal Wetland Proximity Area
- Littoral Rainforest
- Littoral Rainforest Proximity Area
- Cape Byron Marine Park
- Hydroline
- Lot
- NPWS Reserve
- Railway
- Road Corridor
- Water Feature
- Existing Sandbag Wall

Proposed Sandbag Wall Extension

- Excavation (500 m2)
- Sandbag Wall (240 m2)

0 50 100 150 m

2. Methods and results

2.1 Desktop assessment

A GIS mapping project was established to combine all relevant and available spatial information for the subject land, Byron Shire and NSW data to enable a thorough desktop assessment. Spatial data used or consulted in the assessment include:

- Cadastre (NSW Department of Finance, Services and Innovation 2022);
- Topography (NSW Department of Finance, Services and Innovation 2022);
- Byron LGA Vegetation 2017 (BSC 2017);
- Biodiversity Values Mapping (DPE 2021);
- Coastal Management Act 2016 (Repealed - SEPP Coastal Management (DPE 2018));
- Fauna Corridors for North East NSW (OEH 2018);
- Acid Sulfate Soils Risk map (OEH 1998);
- NSW Hydrography (Department of Finance, Services and Innovation 2018); and
- Nearmap aerial imagery (2012 to 2022).

2.2 BioNet Atlas records

A search of the BioNet Atlas of NSW Wildlife was conducted, based on an area within 1.5 km of the development footprint. This search returned a record of forty-four (n = 44) threatened species listed under Schedule 1 of the BC Act 2016 (Table 1 and Figure 3). This includes forty-two (n = 42) fauna species and two (n = 2) flora species.

A search of the BioNet Atlas of NSW Wildlife returned thirteen (n = 13) Threatened Ecological Communities (TEC) listed under Schedule 2 of the BC Act 2016 that are known to occur within the Byron Local Government Area (LGA) (Table 2).

Table 1: BioNet Atlas of NSW Wildlife records of threatened species within 1.5 km of the development footprint.

Class	Family	Scientific name	Common name	NSW Status	Cth Status
Amphibia	Hylidae	*Litoria olongburensis*	Olongburra Frog	V,P	V
Amphibia	Myobatrachidae	*Crinia tinnula*	Wallum Froglet	V,P	
Aves	Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P	
Aves	Accipitridae	*Hieraaetus morphnoides*	Little Eagle	V,P	
Aves	Accipitridae	*Lophoictinia isura*	Square-tailed Kite	V,P,3	
Aves	Accipitridae	*Pandion cristatus*	Eastern Osprey	V,P,3	
Aves	Anatidae	*Stictonetta naevosa*	Freckled Duck	V,P	
Aves	Anseranatidae	*Anseranas semipalmata*	Magpie Goose	V,P	

Class	Family	Scientific name	Common name	NSW Status	Cth Status
Aves	Ardeidae	*Botaurus poiciloptilus*	Australasian Bittern	E1,P	E
Aves	Ardeidae	*Ixobrychus flavicollis*	Black Bittern	V,P	
Aves	Burhinidae	*Burhinus grallarius*	Bush Stone-curlew	E1,P	
Aves	Burhinidae	*Esacus magnirostris*	Beach Stone-curlew	E4A,P	
Aves	Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2	V
Aves	Charadriidae	*Charadrius leschenaultii*	Greater Sand-plover	V,P	V,C,J,K
Aves	Charadriidae	*Charadrius mongolus*	Lesser Sand-plover	V,P	E,C,J,K
Aves	Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P	
Aves	Columbidae	*Ptilinopus magnificus*	Wompoo Fruit-Dove	V,P	
Aves	Columbidae	*Ptilinopus regina*	Rose-crowned Fruit-Dove	V,P	
Aves	Columbidae	*Ptilinopus superbus*	Superb Fruit-Dove	V,P	
Aves	Gruidae	*Grus rubicunda*	Brolga	V,P	
Aves	Haematopodidae	*Haematopus fuliginosus*	Sooty Oystercatcher	V,P	
Aves	Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher	E1,P	
Aves	Jacanidae	*Irediparra gallinacea*	Comb-crested Jacana	V,P	
Aves	Laridae	*Sternula albifrons*	Little Tern	E1,P	C,J,K
Aves	Procellariidae	*Pterodroma neglecta neglecta*	Kermadec Petrel (west Pacific subspecies)	V,P	V
Aves	Procellariidae	*Pterodroma nigripennis*	Black-winged Petrel	V,P	
Aves	Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V,P	
Aves	Rallidae	*Amaurornis moluccana*	Pale-vented Bush-hen	V,P	
Aves	Rostratulidae	*Rostratula australis*	Australian Painted Snipe	E1,P	E
Aves	Scolopacidae	*Calidris alba*	Sanderling	V,P	C,J,K
Aves	Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	E1,P	CE,C,J,K
Aves	Scolopacidae	*Calidris tenuirostris*	Great Knot	V,P	CE,C,J,K
Aves	Scolopacidae	*Limosa limosa*	Black-tailed Godwit	V,P	C,J,K
Aves	Tytonidae	*Tyto longimembris*	Eastern Grass Owl	V,P,3	
Gastropoda	Camaenidae	*Thersites mitchellae*	Mitchell's Rainforest Snail	E1	CE
Mammalia	Dasyuridae	*Planigale maculata*	Common Planigale	V,P	
Mammalia	Miniopteridae	*Miniopterus australis*	Little Bent-winged Bat	V,P	
Mammalia	Phascolarctidae	*Phascolarctos cinereus*	Koala	E1,P	E
Mammalia	Potoroidae	*Potorous tridactylus*	Long-nosed Potoroo	V,P	V
Mammalia	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V

Class	Family	Scientific name	Common name	NSW Status	Cth Status
Mammalia	Vespertilionidae	*Myotis macropus*	Southern Myotis	V,P	
Reptilia	Cheloniidae	*Caretta caretta*	Loggerhead Turtle	E1,P	E
Flora	Lauraceae	*Cryptocarya foetida*	Stinking Cryptocarya	V	V
Flora	Meliaceae	*Owenia cepiodora*	Onion Cedar	V	V

Notes

NSW Status: V = Vulnerable; E1 = Endangered; P = Protected; 3 = Category 3 sensitive species.

Commonwealth (Cth) Status: V = Vulnerable; C = China-Australia Migratory Bird Agreement (CAMBA).

Table 2: Threatened Ecological Communities known to occur in the Byron Local Government Area.

Threatened ecological community	NSW status	Cth status
Byron Bay Dwarf Graminoid Clay Heath Community	E3	
Coastal Cypress Pine Forest in the NSW North Coast Bioregion	E3	
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	V
Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	
Grey Box—Grey Gum Wet Sclerophyll Forest in the NSW North Coast Bioregion	E3	
Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	CE
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E3	CE
Lowland Rainforest on Floodplain in the NSW North Coast Bioregion	E3	CE
Subtropical Coastal Floodplain Forest of the NSW North Coast Bioregion	E3	
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	
Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3	
White Gum Moist Forest in the NSW North Coast Bioregion	E3	

Notes

NSW Status: V = Vulnerable; E1 = Endangered; P = Protected; 3 = Category 3 sensitive species.

Commonwealth (Cth) Status: V = Vulnerable; CE = Critically endangered.

2.3 Supporting studies

The proposal for coastal protection works has undergone a coastal engineering assessment by Royal HaskoningDHV (2023) in response to recent erosion which has adversely impacted Elements of Byron assets, increased public risk, reduced public access, and reduced beach amenity. The costal engineering assessment assesses construction vs operational impacts and outlines the methodology to be used.

2.4 Subject land assessment

The on-ground assessment involved a meandering habitat field survey concentrated on the development footprint and the immediate surrounding buffer, with regard for the suitability of the habitat for threatened species, particularly those recorded within 1.5 km of the development footprint (see section 2.2), and others that have the potential to occur.

2.5 Discussion

As a result of significant historical land use impacts (e.g., sand mining followed by tourism expansion), the dynamic nature of the foreshore, and the high public use of the subject land in general, the immediate proposal site represents limited potential habitat for native fauna, particularly for threatened species with the potential to occur in the locality. The development footprint however does include an area of Belongil Beach and associated dune system, which is in the vicinity of potential habitat for a small suite of threatened species, particularly marine species such as marine turtles and shorebirds. The development footprint also contains a small area of vegetation containing some vegetation species analogous with littoral rainforest, which is currently being progressively lost as a result of coastal erosion.

The development footprint for works prescribed for the proposal is currently the upper tidal extent and north facing dune of Belongil Beach, an area significantly eroded by storms in recent years. Excavation would occur over an area including dune, managed lawn, and a small area (< 75 m^2) of native dune vegetation. The mouth of Belongil Creek occurs in proximity to the proposal footprint, with the location of the mouth varying considerably. The area is a highly trafficked and dynamic stretch of beach. It offers habitat potential for predominantly marine and coastal species, however, the specific value provided is variable in that precise location, depending on the position of the foreshore, dune system and estuary mouth in relation to the development footprint at any given time.

Plate 3: View towards the dune system with existing sandbags (left) and proposal location (right).

The value of habitat within the development footprint, with respect to threatened species with the potential to occur, is of most relevance to shorebirds and marine turtles. The beach and dune system provides potential nesting habitat for marine turtles, and the beach, dune and estuary provide potential foraging and temporary resting habitat for a variety of shorebirds. Minimal works are required for the extension of the sandbag wall to provide coastal protection, with the objective to then leave those sandbags in their proposed location for an additional nominal 5 years, until the Coastal Management Program (CMP) for the Byron Shire Northern Coastline (Cape Byron to South Golden Beach) is completed.

The development footprint for the proposed coastal protection works may also impact a small area (< 75 m^2) of disturbed young age class dune vegetation containing species analogous with littoral rainforest. Tree and shrub species present in the area include Tuckeroo (*Cupaniopsis anacardioides*), Three-veined Cryptocarya (*Cryptocarya triplinervis*), Beach Alectryon (*Alectryon coriaceus*), Screw Pine (*Pandanus tectorius*) and Coast Banksia (*Banksia integrifolia*). Exotic species* within the development footprint are generally limited to exotic grasses (e.g., *Durban Grass (*Dactyloctenium australe*)) herbs (e.g., *Blackberry Nightshade (*Solanum nigrum*)) and vines (e.g., *Coastal Morning Glory (*Ipomoea indica*) and Ground Asparagus (*Asparagus aethiopicus*)). No threatened species were recorded from within the proposal footprint or areas immediately adjacent.

Plate 4: Erosion currently threatens Elements of Byron assets, creating public risk and reducing amenity.

As identified, vegetation on the terrestrial component of the subject land in the proximity of the proposal is analogous with the vegetation community listed in Schedule 2 of the BC Act as threatened ecological communities (TEC), namely the endangered ecological community (EEC) *Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*. Potential direct and indirect impacts have been further assessed for this vegetation by way of the ToS in Appendix A.

* Denotes exotic species

Extensive high-quality habitat for native fauna occurs in the wider locality, particularly to the southeast and north / northwest of the subject land, including within protected areas such as the Tyagarah Nature Reserve. Cape Byron Marine Park also provides protected marine habitat within the 1.5 km assessment circle and beyond, with Belongil Creek falling within the boundaries of the Marine Park and identified as a 'Special Purpose Zone'. The abundance of high-quality habitat in the wider locality is likely to further mitigate any potential indirect impacts that may occur from this development proposal by providing significant alternative resources for threatened species with a likelihood of occurring on the subject land.

The suitability of the subject land for threatened flora and fauna species previously recorded within a 1.5 km assessment circle of the development footprint (and others considered likely to occur), and their likelihood of occurrence, is included in Table 3. This suitability assessment has been undertaken following a desktop GIS spatial analysis, subject land habitat assessment and review of the Office of Environment and Heritage (OEH) Threatened Species Profiles.

A *Test of Significance* (ToS) was undertaken for those threatened fauna species with the potential to occur within the development footprint and/or considered to have some potential to be impacted by the proposal (Appendix A). The following eleven (n = 11) fauna species were identified for further assessment:

- Beach Stone-curlew (*Esacus magnirostris*)
- Greater Sand-plover (*Charadrius leschenaultia*)
- Lesser Sand-plover (*Charadrius mongolus*)
- Sooty Oystercatcher (*Haematopus fuliginosus*)
- Pied Oystercatcher (*Haematopus longirostris*)
- Little Tern (*Sternula albifrons*)
- Sanderling (*Calidris alba*)
- Curlew Sandpiper (*Calidris ferruginea*)
- Common Blossom-bat (*Syconycteris australis*)
- Loggerhead Turtle (*Caretta caretta*)
- Green Turtle (*Chelonia mydas*)

The ToS concluded that the proposal would not have a significant impact (Appendix A).

biodiversity
assessments & solutions

Figure 3: Threatened flora species within 1.5 km, vegetation mapping, and protected areas.

Legend

- Subject Land - Lot 1 DP 1215893
- Proposed Sandbag Wall Extension
- 1500m Assessment Buffer
- Lot
- FLORA_BioNet Threatened Species_1500m
- Contour
- Hydroline
- NPWS Reserve
- Railway
- Road Corridor
- Water Feature

ByronVeg2017_clipped 1500m

- DRY SCLEROPHYLL FORESTS
- EXOTIC
- FORESTED WETLANDS
- FRESHWATER WETLANDS
- GRASSLANDS
- HEATHLANDS
- RAINFORESTS
- SALINE WETLANDS

Stinking Cryptocarya

Stinking Cryptocarya

Onion Cedar

0 100 200 300 400 500 m

biodiversity
assessments & solutions

Figure 4: Threatened fauna species within 1.5km, protected areas and habitat corridors.

Legend

- Subject Land - Lot 1 DP 1215893
- Proposed Sandbag Wall Extension
- Lot
- 1500m Assessment Buffer
- Contour
- Hydroline
- NPWS Reserve
- Cape Byron Marine Park
- Railway
- Road Corridor
- Water Feature

FAUNA_BioNet Threatened Species_1500m

- Amphibia
- Aves
- Gastropoda
- Mammalia
- Reptilia

FaunaCorridors_NE_NSW

- regional
- subregional

0 250 500 m

Table 3: Threatened species recorded within 1.5 km of the development footprint (and those with the potential to occur), and suitability assessment of the subject land.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Amphibia				
Olongburra Frog (*Litoria olongburensis*)	Found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands & wet heathlands but can also be found along drainage lines within other vegetation communities & disturbed areas, & occasionally in swamp sclerophyll forests. The species breeds in swamps with permanent water as well as shallow ephemeral pools & drainage ditches. Breeding is thought to peak in the colder months but can occur throughout the year following rain. Eggs of 1.1-1.2mm are deposited in water with a pH of <6 & tadpoles take 2-6 months to develop into frogs. Shelters under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are wet or very damp & often located near the water's edge. Males may call throughout the year & at any time of day, peaking following rain.	Very Unlikely	No	The development footprint does not contain freshwater wetland habitat potentially able to support the Olongburra Frog, and the site does not contain typically preferred specific habitat requirements of 'acid' frogs. Eight (n = 8) records have been identified within the 1.5 km assessment circle; however, these have all been recorded >800m southwest of the proposal location. These records are located within an area of relatively undisturbed & preferred wet heath habitat suitable for the Olongburra Frog. The small scale of the proposal, the minimal disturbance, the lack of identified preferred habitat for this species, and the lack of records within proximity to the site, provides a level of confidence that the proposal would not significantly impact on potential food or habitat resources for the Olongburra Frog.
Wallum Froglet (*Crinia tinnula*)	Wallum Froglets are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands. They can also be found along drainage lines	Very Unlikely	No	The development footprint does not contain freshwater wetland habitat potentially able to support the Wallum Froglet, and the site does

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests. The species breeds in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. Breeding is thought to peak in the colder months but can occur throughout the year following rain. Eggs of 1.1-1.2mm are deposited in water with a pH of <6 and tadpoles take 2-6 months to develop into frogs. Wallum Froglets shelter under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are wet or very damp and often located near the water's edge. Males may call throughout the year and at any time of day, peaking following rain.			not contain typically preferred specific habitat requirements of 'acid' frogs. Twenty (n = 20) records have been identified within the 1.5 km assessment circle; however, these have all been recorded >600m northeast and southwest of the proposal location. These records are located within areas of relatively undisturbed & preferred habitat suitable for the Wallum Froglet. The small scale of the proposal, the minimal disturbance, the lack of identified preferred habitat for this species, and the lack of records within proximity to the site, provides a level of confidence that the proposal would not significantly impact on potential food or habitat resources for the Wallum Froglet.
Aves				
White-bellied Sea Eagle (*Haliaeetus leucogaster*)	The habitats of this species are characterised by the presence of large areas of open water including rivers, swamps, lakes, and the sea. White-bellied Sea Eagles occur at sites near the sea or seashore, such as around bays and inlets, beaches, reefs, lagoons, estuaries, and mangroves, and at, or in the vicinity of, freshwater swamps, lakes, reservoirs, billabongs and saltmarsh.	Potential	No	Potential to occur overhead of the development footprint in association with general foraging flight patterns in the area and may seek prey items or carrion from surrounding beaches or open areas, including waters of Belongil Creek. No suitable roosting habitat features occur within the development footprint or in the immediate vicinity.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as guard roosts. Nests are large structures built from sticks and lined with leaves or grass. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals, and carrion.			The proposal would not result in any impacts on potential habitat or food resources for this species. Given the distance separating the proposal footprint and potential foraging habitat currently, the activity associated with the proposal is unlikely to represent a significant disturbance impact to this species.
Little Eagle (*Hieraaetus morphnoides*)	Occupies open eucalypt forest, woodland, or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Preys on birds, reptiles, and mammals, occasionally adding large insects and carrion.	Very Unlikely	No	Potential to occur overhead of the development footprint in association with general foraging flight patterns in the area and may seek prey items or carrion from surrounding areas in the locality. No suitable roosting habitat features occur within the development footprint or in the immediate vicinity. The proposal would not result in any impacts on potential habitat or food resources for this species.
Square-tailed Kite (*Lophoictinia isura*)	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.	Very Unlikely	No	Potential to occur overhead of the development footprint in association with general foraging flight patterns in the area and

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting ranges of more than 100 square km. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.			may seek prey items or carrion from surrounding areas in the locality. No suitable roosting habitat features occur within the development footprint or in the immediate vicinity. The proposal would not result in any impacts on potential habitat or food resources for this species.
Eastern Osprey (*Pandion cristatus*)	Favour coastal areas, especially the mouths of large rivers, lagoons, and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. Incubation of 2-3 eggs, usually by the female, is about 40 days. Female remains with young almost until they fly, usually after about nine weeks in the nest.	Potential	No	Potential to occur overhead of the development footprint in association with general foraging flight patterns in the area and may seek prey items or carrion from surrounding beaches or open areas, including waters of Belongil Creek. No suitable roosting habitat features occur within the development footprint or in the immediate vicinity. The proposal would not result in any impacts on potential habitat or food resources for this species. Given the distance separating the proposal footprint and potential foraging habitat currently, the activity associated with

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				the proposal is unlikely to represent a significant disturbance impact to this species.
Freckled Duck (*Stictonetta naevosa*)	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Generally, rest in dense cover during the day, usually in deep water. Feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates. Nesting usually occurs between October and December but can take place at other times when conditions are favourable. Nests are usually located in dense vegetation at or near water level.	Very Unlikely	No	The development footprint is a marine/estuarine environment which does not reflect preferred habitat for the Freckled Duck. Areas of suitable habitat in the form of manmade dams located >100m from the development footprint do occur on the subject land and adjacent land held under the same ownership. These areas provide potential habitat for this species; however, they would not be impacted either directly or indirectly as a result of the proposal. The proposal would not result in any impacts on potential habitat or food resources for this species.
Magpie Goose (*Anseranas semipalmata*)	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs, and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level; most breeding now occurs in monsoonal	Very Unlikely	No	The development footprint is a marine/estuarine environment which does not reflect preferred habitat for the Magpie Goose. Areas of suitable habitat in the form of manmade dams located >100m from the development footprint do occur on the subject land and adjacent land held under the same ownership. These areas provide potential habitat for this species; however, they would

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands, and floodplains; roosts in tall vegetation.			not be impacted either directly or indirectly as a result of the proposal. The proposal would not result in any impacts on potential habitat or food resources for this species.
Australasian Bittern (*Botaurus poiciloptilus*)	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha spp.*) and spikerushes (*Eleocharis spp.*). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects, and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch.	Very Unlikely	No	The development footprint is a marine/estuarine environment which does not reflect preferred habitat for the Australian Bittern. Areas of suitable habitat in the form of riparian vegetation surrounding manmade dams located >100m from the development footprint do occur on the subject land and adjacent land held under the same ownership. These areas provide potential habitat for this species; however, they would not be impacted either directly or indirectly as a result of the proposal. The proposal would not result in any impacts on potential habitat or food resources for this species.
Black Bittern (*Ixobrychus flavicollis*)	The Black Bittern inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest, and mangroves.	Very Unlikely	No	The development footprint does not contain areas of shallow wetland and when Belongil Creek is located closer to the development footprint, no suitable dense vegetation exists in the location. This shy and cryptic species is also

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	Black Bitterns feed on frogs, reptiles, fish and invertebrates, including snails, dragonflies, shrimps and crayfish, with most feeding done at dusk and at night. During the day, roosts in trees or on the ground amongst dense reeds. When disturbed, freezes in a characteristic bittern posture (stretched tall, bill pointing up, so that shape and streaked pattern blend with upright stems of reeds), or will fly up to a branch or flush for cover where it will freeze again. Like other bitterns, but unlike most herons, nesting is solitary. Nests, built in spring are located on a branch overhanging water and consist of a bed of sticks and reeds on a base of larger sticks.			unlikely to occupy habitat in the vicinity of the proposal due to the 'busyness' of the location. Three (n = 3) records occur within the 1.5 km assessment circle; however, these all occur >1km from the subject land in an area of dense consolidated vegetation. As such, suitable habitat occurs beyond the development footprint within the assessment circle and beyond; however, these areas would not be impacted. The proposal would not result in any impacts on potential habitat or food resources for this species.
Bush Stone-curlew (*Burhinus grallarius*)	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards, and snakes. Nest on the ground in a scrape or small bare patch. Two eggs are laid in spring and early summer.	Unlikely	No	Although the development footprint does not contain habitat considered to be preferred habitat, this species is known to venture into suburban areas from time to time, and even nest in urban areas. It is also noted that the three (n – 3) records do occur in proximity to the subject land, although these are at least 10 years old. With consideration of the general lack of subsequent records from the 1.5 km assessment circle of this distinctive species, and the presence of more recent records from preferred protected habitat in the wider locality, it is considered unlikely that the

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				species would occur within or adjacent to the development footprint. Furthermore, the proposal would not result in any impacts on potential habitat or food resources for this species.
Beach Stone-curlew (*Esacus magnirostris*)	Beach Stone-curlews are found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. They forage in the intertidal zone of beaches and estuaries, on islands, flats, banks and spits of sand, mud, gravel or rock, and among mangroves. Beach Stone-curlews breed above the littoral zone, at the backs of beaches, or on sandbanks and islands, among low vegetation of grass, scattered shrubs or low trees; also, among open mangroves. Beach Stone-curlews are usually seen alone or in pairs, but sometimes occur in small groups. Birds forage by stalking slowly like a heron or with quicker dashes after prey. The diet consists of crabs and other marine invertebrates. They are mainly active at dawn, dusk and at night, but birds are often seen when they shift or move about sedately during the day. Less strictly nocturnal than the related Bush Stone-curlew (*Burhinus grallarius*). In NSW, clutches have been recorded from early October to late March, but elsewhere in temperate Australia,	Potential	Yes	Multiple records for the Beach Stone-curlew occur within the 1.5km assessment circle, and further to that, multiple records occur in association with the mouth of Belongil Creek, which is known habitat for this species. The development footprint constitutes the beach at the base of the existing dune on the western side of Belongil Ck, with most records located to the eastern side where this species fenced habitat occurs. The proposal would not result in any impacts on potential habitat or food resources for this species, however, activity associated with the proposal represents a potential disturbance impact to this species. In the interests of the precautionary principal, this species has been selected for further assessment by way of a Test of Significance.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	breeding has been recorded from September. Their nests are just a shallow scrape in sand or gravel, above the tidal zone at the backs of beaches, or on sandbanks and islands or among open mangroves. Only one egg is laid, but birds will re-lay after the failure of a breeding attempt. Both parents defend the nest and care for the young. The young are precocial but appear not to be independent until they are 7-12 months old.			
Glossy Black-Cockatoo (*Calyptorhynchus lathami*)	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuarina diminuta*, and *A. gymnathera*. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.	Unlikely	No	The development footprint does not contain food resources associated with the Glossy Black-Cockatoo. The dune system along Belongil Beach and vegetation within the 1.5km assessment circle does contain suitable resources. Six (n = 6) records occur within the assessment circle, although sighting and location notes are withheld. The proposal would not result in any impacts on potential habitat or food resources for this species, however, activity associated with the proposal represents a potential disturbance impact to this species. In the interests of the precautionary principal, this species has been selected for further assessment by way of a Test of Significance.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Greater Sand-plover (*Charadrius leschenaultia*)	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly, or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders. Diet includes insects, crustaceans, polychaete worms and molluscs. Prey is detected visually by running a short distance, stopping to look, then running to collect the prey.	Potential	Yes	Only one (n = 1) record for the Greater Sand-plover occurs within the 1.5km assessment circle, recorded in 2009 in association with the mouth of Belongil Creek, which is known habitat for migratory shorebird species. The development footprint constitutes the beach at the base of the existing dune on the western side of Belongil Ck, which currently represents marginal foraging habitat. However, it is noted that the dynamic nature of the environment in that location means that the significance of that precise location for each species varies. It is considered that the proposal would not result in any significant impacts on potential habitat or food resources for this species, however, activity associated with the proposal represents a potential disturbance impact to this species. However, in the interests of the precautionary principal, this species has been selected for further assessment by way of a Test of Significance.
Lesser Sand-plover (*Charadrius mongolus*)	Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large	Potential	Yes	Twenty (n = 20) records for the Lesser Sand-plover occur within the 1.5km assessment circle, generally in association with the mouth

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs, and rock platforms. Highly gregarious, frequently seen in flocks exceeding 100 individuals; also, often seen foraging and roosting with other wader species. Roosts during high tide on sandy beaches, spits, and rocky shores; forage individually or in scattered flocks on wet ground at low tide, usually away from the water's edge. Diet includes insects, crustaceans, molluscs, and marine worms. Prey is usually detected visually with the birds making short, quick runs, with abrupt stops to lunge at the ground or look for prey.			of Belongil Creek, which is known habitat for migratory shorebird species. The development footprint constitutes the beach at the base of the existing dune on the western side of Belongil Ck, which currently represents marginal foraging habitat. However, it is noted that the dynamic nature of the environment in that location means that the significance of that precise location for each species varies. It is considered that the proposal would not result in any significant impacts on potential habitat or food resources for this species, however, activity associated with the proposal represents a potential disturbance impact to this species. However, in the interests of the precautionary principal, this species has been selected for further assessment by way of a Test of Significance.
Black-necked Stork (*Ephippiorhynchus asiaticus*)	Floodplain wetlands (swamps, billabongs, watercourses, and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Storks usually forage in water 5-30cm deep for vertebrate and invertebrate prey. Eels regularly	Very Unlikely	No	Numerous (n = 58) records occur over the past 30 years, with records either associated with the area in the vicinity of the West Byron STP located > 1km to the south-west, or within Belongil Creek, generally in areas able to provide shelter for this species.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	contribute the greatest biomass to their diet, but they feed on a wide variety of animals, including other fish, frogs and invertebrates (such as beetles, grasshoppers, crickets and crayfish). Black-necked Storks build large nests high in tall trees close to water. Trees usually provide clear observation of the surroundings and are at low elevation (reflecting the floodplain habitat). In NSW, breeding activity occurs May - January; incubation May - October; nestlings July - January; fledging from September. Parents share nest duties and in one study about 1.3-1.7 birds were fledged per nest. The NSW breeding population has been estimated at about 75 pairs. Territories are large and variable in size. They have been estimated to average about 9,000ha, ranging from 3,000-6,000ha in high quality habitat and 10,000-15,000ha in areas where habitat is poor or dispersed.			The development footprint constitutes the beach at the base of the existing dune on the western side of Belongil Ck, which currently does not represent suitable habitat. Preferable suitable habitat occurs beyond the development footprint within the assessment circle and beyond; however, these areas would not be impacted. The proposal would not result in any impacts on potential habitat or food resources for this species.
Wompoo Fruit-Dove (*Ptilinopus magnificus*)	Occurs in, or near rainforest, low elevation moist eucalypt forest & brush box forests. Feeds on a diverse range of tree & vine fruits & is locally nomadic - following ripening fruit. Thought to be an effective medium to long-distance vector for seed dispersal. The nest is a typical pigeon nest - a flimsy platform of sticks on a thin branch or a palm frond, often over water,	Unlikely	No	One (n = 1) solitary record occurs within the 1.5 km assessment circle, on the subject land, attributed to a location approx. 250m southwest of the development footprint. Most of the development does not contain any suitable habitat, with the footprint being substantially located on a tidal beach and exposed dune. However, the north-western end of the proposed extension may result in

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	usually 3 - 10 m above the ground. Breeds in spring & early summer; a single white egg is laid. Most often seen in mature forests, but also found in remnant & regenerating rainforest.			some impact on vegetation containing rainforest species, located at the top of the eroding dune. This area provides marginal potential foraging habitat. The subject land in general is unlikely to provide suitable nesting habitat, due to the young age class of vegetation generally, and the 'busyness' of the site likely to discourage significant usage of the area for this very shy & cryptic species. The proposal is unlikely to result in any impacts on resources at the site or in the locality, & likely suitable habitat for this species would not be impacted. Therefore, the proposal is unlikely to impact on this mobile species.
Rose-crowned Fruit-dove (*Ptilinopus regina*)	Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. They are shy pigeons, not easy to see amongst the foliage, and are more often heard than seen. They feed entirely on fruit from vines, shrubs, large trees, and palms, and are thought to be locally nomadic as they follow the ripening of fruits. Some populations are migratory in response to food availability - numbers in north-east NSW increase during spring and summer then decline in April or May.	Unlikely	No	Two (n = 2) records occur within the 1.5 km assessment circle, attributed to a location >1km southwest of the development footprint. Most of the development does not contain any suitable habitat, with the footprint being substantially located on a tidal beach and exposed dune. However, the north-western end of the proposed extension may result in some impact on vegetation containing rainforest species, located at the top of the eroding dune. This area provides marginal potential foraging habitat. The subject land in general is unlikely to provide suitable nesting

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				habitat, due to the young age class of vegetation generally, and the 'busyness' of the site likely to discourage significant usage of the area for this very shy & cryptic species. The proposal is unlikely to result in any impacts on resources at the site or in the locality, & likely suitable habitat for this species would not be impacted. Therefore, the proposal is unlikely to impact on this mobile species.
Superb Fruit-Dove (*Ptilinopus superbus*)	Inhabits rainforest & similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs & palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Part of the population is migratory or nomadic. There are records of single birds flying into lighted windows & lighthouses, indicating that birds travel at night. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn. Breeding takes place from September to January. The nest is a structure of fine interlocked forked twigs, giving a stronger structure than its flimsy appearance would suggest, & is usually 5-30 metres up in rainforest & rainforest edge tree & shrub species.	Very Unlikely	No	One (n = 1) solitary record occurs within the 1.5 km assessment circle, on the subject land, attributed to a location >1km south of the development footprint. This record is from 1990. Most of the development does not contain any suitable habitat, with the footprint being substantially located on a tidal beach and exposed dune. However, the north-western end of the proposed extension may result in some impact on vegetation containing rainforest species, located at the top of the eroding dune. This area provides marginal potential foraging habitat. The subject land in general is unlikely to provide suitable nesting habitat, due to the young age class of vegetation generally, and the 'busyness' of the

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				site likely to discourage significant usage of the area for this very shy & cryptic species. The proposal is unlikely to result in any impacts on resources at the site or in the locality, & likely suitable habitat for this species would not be impacted. Therefore, the proposal is unlikely to impact on this mobile species.
Brolga (*Grus rubicunda*)	Though Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged. They feed using their heavy straight bill as a 'crowbar' to probe the ground or turn it over, primarily on sedge roots and tubers. They will also take large insects, crustaceans, molluscs, and frogs. The famous Brolga 'dance' is apparently at least in part a courtship or bonding display where a pair or many pairs face each other, crouch down and stretch upwards, trumpet, leap and toss grass and sticks into the air. The nest comprises a platform of grasses and sticks, augmented with mud, on an island or in the water. Two eggs are laid from winter to autumn.	Very Unlikely	No	Four (n = 4) records occur between 1994 and 2009, with records either associated with the area in the vicinity of the West Byron STP located > 1km to the south-west, or within Belongil Creek, generally in areas able to provide shelter for this shy species. The development footprint constitutes the beach at the base of the existing dune on the western side of Belongil Ck, which currently does not represent suitable habitat. Preferable suitable habitat occurs beyond the development footprint within the assessment circle and beyond; however, these areas would not be impacted. The proposal would not result in any impacts on potential habitat or food resources for this species.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Sooty Oystercatcher (*Haematopus fuliginosus*)	Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches, and muddy estuaries. Forages on exposed rock or coral at low tide for foods such as limpets and mussels. Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells, or seaweed when nesting among rocks.	Potential	Yes	Six (n = 6) records occur from within the 1.5 km assessment circle, all of which are associated with the Belongil estuary. The development footprint is located on Belongil Beach, at the base of the current dunes, and represents potential marginal foraging habitat for this species. Works for the proposal are limited to the approx. 50m extension of the existing configuration of sandbags and sand nourishment. This represents both a potential impact in the vicinity of foraging habitat, and a potential disturbance impact when installation of sandbags is undertaken. Although it is considered that the proposal would not result in any significant impacts on potential habitat or food resources for this species, in the interests of the precautionary principal, this species has been selected for further assessment by way of a Test of Significance.
Pied Oystercatcher (*Haematopus longirostris*)	The Pied Oystercatcher favours intertidal flats of inlets and bays, open beaches, and sandbanks. Foraging occurs on exposed sand, mud, and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-	Potential	Yes	Numerous records (n = 170) occur from within the 1.5 km assessment circle, almost all of which are associated with the Belongil estuary. The development footprint is located on Belongil Beach, at the base of the current dunes, and represents potential marginal

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	like bill is used to pry open or break into shells of oysters and other shellfish. This species nests mostly on coastal or estuarine beaches, although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells, and small stones. Two to three eggs are laid between August and January. The female is the primary incubator, and the young leave the nest within several days.			foraging habitat for this species. Works for the proposal are limited to the approx. 50m extension of the existing configuration of sandbags and sand nourishment. This represents both a potential impact in the vicinity of foraging habitat, and a potential disturbance impact when installation of sandbags is undertaken. Although it is considered that the proposal would not result in any significant impacts on potential habitat or food resources for this species, in the interests of the precautionary principal, this species has been selected for further assessment by way of a Test of Significance.
Comb-crested Jacana (*Irediparra gallinacea*)	Inhabit permanent freshwater wetlands, either still or slow flowing, with a good surface cover of floating vegetation, especially waterlilies, or fringing and aquatic vegetation. Forage on floating vegetation, walking with a characteristic bob and flick. They feed primarily on insects and other invertebrates, as well as some seeds and other vegetation. Breed mainly in spring and summer in NSW, with clutches recorded from September to April. The nest is a platform or shallow cup of vegetable material, though eggs sometimes laid directly onto a large leaf with no nest	Very Unlikely	No	The development footprint is a marine/estuarine environment which does not reflect preferred habitat for the Comb-crested Jacana. Areas of suitable habitat in the form of manmade dams located >100m from the development footprint do occur on the subject land and adjacent land held under the same ownership. These areas provide potential habitat for this species; however, they would not be impacted either directly or indirectly as a result of the proposal.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	built. The male builds the nest, incubates the eggs, and broods the young. Eggs that roll into the water from a nest are usually retrieved. The young are precocial, but the adult male can carry one or two under each wing if they are threatened and drop them in separate places. Young birds will dive and stay submerged with just their nostrils exposed for a very long time. Adults will also dive for safety on occasion. Comb-crested Jacanas are dispersive, moving about in response to the condition of wetlands, and occasionally turn up well beyond normal range.			The proposal would not result in any impacts on potential habitat or food resources for this species.
Little Tern (*Sternula albifrons*)	Almost exclusively coastal, preferring sheltered environments; however, may occur several km from the sea in harbours, inlets & rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes & islands. The nest is a scrape in the sand, which may be lined with shell grit, seaweed, or small pebbles. Often seen feeding in flocks, foraging for small fish, crustaceans, insects, worms & molluscs by plunging in the shallow water of channels & estuaries, & in the surf on beaches, or skipping over the water surface with a swallow-like flight.	Potential	Yes	Multiple records (n = 69) records occur from within the 1.5 km assessment circle, with records almost exclusively associated with the entrance to Belongil Creek and Belongil Beach. The development footprint located at the base of the current dunes on Belongil Beach is in the vicinity of potential foraging and resting habitat for this species, and the proposal represents a potential disturbance impact when installation of sandbags is undertaken. Although it is considered that the proposal would not result in any significant impacts on potential habitat or food resources for this species, in the interests of the precautionary

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				principal, this species has been selected for further assessment by way of a Test of Significance.
Kermadec Petrel (west Pacific subspecies) (*Pterodroma neglecta neglecta*)	Marine. Breeds on islands across the South Pacific. In Australia it breeds on Ball's Pyramid and Phillip Island (near Norfolk Island). Nests in a crevice amongst rocks. Diet is squid and crustaceans. Vagrant birds occur in coastal NSW waters, particularly after storm events.	Unlikely	No	This marine species is unlikely to occur in the vicinity of the proposal, and if encountered, is likely to be as a vagrant species following storm events. The proposal does not contain preferred habitat for this species. The proposal would not result in any impacts on potential habitat or food resources for this species.
Black-winged Petrel (*Pterodroma nigripennis*)	Marine. Nests at numerous sites on Lord Howe Island: North Head, New Gulch, Dawson's Ridge, Malabar, Ned's Beach, Jim's Point, Transit Hill, adjacent to Muttonbird Point, Red Point and Ball's Pyramid. Nest in a burrow, up to a metre long in sandy soil but shorter in stony volcanic soil. The burrow is located on higher ground, and the entrance is usually hidden amongst bushes.	Unlikely	No	This marine species is unlikely to occur in the vicinity of the proposal, and if encountered, is likely to be as a vagrant species following storm events. The proposal does not contain preferred habitat for this species. The proposal would not result in any impacts on potential habitat or food resources for this species.
Little Lorikeet (*Glossopsitta pusilla*)	Forages primarily in the canopy of open Eucalyptus forest & woodland, yet also finds food in Angophora, Melaleuca & other tree species. Riparian habitats are particularly used, due to higher soil fertility & hence greater productivity.	Unlikely	No	One solitary (n = 1) record occurs within the 1.5 km assessment circle. This is a record more than 20 years ago from the West Byron STP. Most records for this species occur before the year 2000. The development footprint for the proposal does not contain any suitable foraging habitat,

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	Isolated flowering trees in open country, e.g., paddocks, roadside remnants & urban trees also help sustain viable populations of the species. Feeds mostly on nectar & pollen, occasionally on native fruits such as mistletoe, & only rarely in orchards. Gregarious, travelling & feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed & may have been the norm in past centuries. Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas, if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) & generally high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like *Allocasuarina*. Nesting season extends from May to September. In years when flowering is prolific, Little Lorikeet pairs can breed twice, producing 3-4 young per attempt. However, the survival rate of fledglings is unknown.			with the entirety of the development footprint being located on a tidal beach and exposed dune. No suitable hollows occur in the vicinity of the proposal location, & as such the site is unlikely to offer suitable roosting habitat for Little Lorikeet. The proposal would not result in any impacts on potential habitat or food resources, & therefore the proposal is unlikely to impact on this mobile species.
Pale-vented Bush-hen (*Amaurornis moluccana*)	The Pale-vented Bush-hen inhabits tall dense understorey or ground-layer vegetation on the margins of freshwater streams and natural or artificial wetlands, usually within or bordering rainforest, rainforest remnants or forests.	Unlikely	No	The development footprint does not contain preferred wetland habitat for this species, and the "busyness" of the location is likely to generally deter this species from utilising any vegetation at or adjacent to the site, even on a

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	Also occur in secondary forest growth, rank grass or reeds, thickets of weeds, such as Lantana (Lantana camara), and pastures, crops, or other farmland, such as crops of sugar cane, and grassy or weedy fields, or urban gardens where they border forest and streams or wetlands, such as farm dams. Can also occur in and around mangroves, though rarely do so, if at all, in NSW. Key elements of their habitat are dense undergrowth 2 to 4 metres tall and within 300 metres of water. The diet consists of seeds, plant matter, earthworms, insects, and some frogs, taken from ground cover or by wading at edges of streams or wetlands. The breeding season is from spring to early autumn, October to April. The nest is a shallow bowl or cup of grass stems, often partly hooded, built close to water in thick ground vegetation such as dense Blady Grass (*Imperata cylindrica*), mat rush (*Lomandra*) or reeds, often under or growing through shrubs or vine or beneath a tree. Birds lay 4 to 7 eggs in a clutch and will re-lay after a successful breeding attempt and make multiple attempts after nesting failures. The incubation period is about 3 weeks. The hatchlings are precocial and can run soon after hatching; they are probably dependent on their parents for 4 to 5 weeks after hatching.			temporary foraging basis. Two (*n* = 2) records occur within the 1.5km assessment circle in association with the West Byron STP, >1km from the proposal footprint. Preferred habitat of this species occurs in the locality and beyond, which would not be impacted either directly or indirectly by the proposal. The proposal would not result in any impacts on potential habitat or food resources for this species.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Australian Painted Snipe (*Rostratula australis*)	Prefers fringes of swamps, dams, and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks, or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally, occurs from September to December. Incubation and care of young is all undertaken by the male only. Forages nocturnally on mudflats and in shallow water. Feeds on worms, molluscs, insects, and some plant-matter.	Unlikely	No	The development footprint does not contain preferred wetland habitat for this species, and the "busyness" of the location is likely to generally deter this species from utilising any vegetation at or adjacent to the site, even on a temporary foraging basis. Only one (n = 1) solitary record occur within the 1.5km assessment circle in association with the West Byron STP, >1km from the proposal footprint. Preferred habitat of this species occurs in the locality and beyond, which would not be impacted either directly or indirectly by the proposal. The proposal would not result in any impacts on potential habitat or food resources for this species.
Sanderling (*Calidris alba*)	Often found in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats, and bare open coastal lagoons; individuals are rarely recorded in near-coastal wetlands. Generally, occurs in small flocks, however, may associate freely with other waders. Individuals run behind receding waves, darting after insects, larvae, and other small invertebrates in the sand, then dart back up the beach as each wave breaks.	Potential	Yes	Fourteen (n = 14) records occur from within the 1.5 km assessment circle, with records exclusively associated with the Belongil estuary. The development footprint located at the base of the current dunes on Belongil Beach is in the vicinity of potential foraging and resting habitat for this species, and the proposal represents a potential disturbance impact when installation of sandbags is undertaken.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	Also feeds on plants, seeds, worms, crustaceans, spiders, jellyfish, and fish, foraging around rotting heaps of kelp, at the edges of shallow pools on sandspits and on nearby mudflats. Roosts on bare sand, behind clumps of beach-cast kelp or in coastal dunes. Breeding occurs in the Northern Hemisphere.			Although it is considered that the proposal would not result in any significant impacts on potential habitat or food resources for this species, in the interests of the precautionary principal, this species has been selected for further assessment by way of a Test of Significance.
Curlew Sandpiper (*Calidris ferruginea*)	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes, and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell, or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects, and some seeds. Birds breed at 2 years of age and the oldest recorded bird is 19 years old. Most birds caught in Australia are between 3 and 5 years old.	Potential	Yes	Twelve (n = 12) records occur from within the 1.5 km assessment circle, with records associated with the Belongil estuary or the West Byron STP. The development footprint located at the base of the current dunes on Belongil Beach is in the vicinity of potential foraging and resting habitat for this species, and the proposal represents a potential disturbance impact when installation of sandbags is undertaken. Although it is considered that the proposal would not result in any significant impacts on potential habitat or food resources for this species, in the interests of the precautionary principal, this species has been selected for further assessment by way of a Test of Significance.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Great Knot (*Calidris tenuirostris*)	Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries, and lagoons. Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms. Migrates to Australia from late August to early September, although juveniles may not arrive until October-November. Most birds return north in March and April; however, some individuals may stay over winter in Australia. Forages for food by methodically thrusting its bill deep into the mud to search for invertebrates, such as bivalve molluscs, gastropods, polychaete worms and crustaceans.	Unlikely	No	Only two (n = 2) records occur from within the 1.5 km assessment circle, with records associated with the Belongil estuary from 1994. Additionally, it is noted that the last record for this species within the Byron Shire is from 2011, indicating that the Great Knot is likely an infrequent visitor to the shire. The development footprint located at the base of the current dunes on Belongil Beach is in the vicinity of potential foraging and resting habitat for this species, and the proposal represents a potential disturbance impact when installation of sandbags is undertaken. Although it is considered that the proposal would not result in any significant impacts on potential habitat or food resources for this species, in the interests of the precautionary principal, this species has been selected for further assessment by way of a Test of Significance.
Black-tailed Godwit (*Limosa limosa*)	Primarily a coastal species. Usually found in sheltered bays, estuaries, and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps.	Unlikely	No	Five (n = 5) records occur from within the 1.5 km assessment circle, with all records associated with the Belongil estuary. The most recent record being from 2009, indicating the Black-tailed Godwit is an infrequent visitor to the Byron Shire.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	Individuals have been recorded in wet fields and sewerage treatment works. Forages for insects, crustaceans, molluscs, worms, larvae, spiders, fish eggs, frog eggs and tadpoles in soft mud or shallow water. Roosts and loafs on low banks of mud, sand, and shell bars. Frequently recorded in mixed flocks with Bar-tailed Godwits.			The development footprint located at the base of the current dunes on Belongil Beach is in the vicinity of potential foraging and resting habitat for this species, and the proposal represents a potential disturbance impact when installation of sandbags is undertaken. Although it is considered that the proposal would not result in any significant impacts on potential habitat or food resources for this species, in the interests of the precautionary principal, this species has been selected for further assessment by way of a Test of Significance.
Gastropoda				
Mitchell's Rainforest Snail (*Thersites mitchellae*)	The Mitchell's Rainforest Snail occurs in remnant areas of lowland subtropical rainforest and swamp forest on alluvial soils. Slightly higher ground around the edges of wetlands with palms and fig trees are particularly favoured habitat. This snail is typically found amongst leaf litter on the forest floor, and occasionally under bark in trees. Active at night and feeds on leaf litter, fungi, and lichen.	Very Unlikely	No	Twenty-five (n = 25) records occur from within the 1.5 km assessment circle; however, all records are attributed to a location proximate to the West Byron STP, approx. 1.45km from the development site. The development footprint does not represent preferred habitat for this species, with the development footprint comprised of a dune and estuarine setting. Areas of forest, such as subtropical rainforest and swamp sclerophyll forest are generally preferred. The species preference for wetter sites, generally in association with freshwater coastal wetlands also likely reduces the

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				likelihood of occurrence of this species within the development footprint. Significant preferred habitat occurs in the wider locality and beyond, which would not be impacted either directly or indirectly by the proposal. The proposal would not result in any impacts on potential habitat or food resources for this species.
Mammalia				
Common Planigale (*Planigale maculata*)	Common Planigales inhabit rainforest, eucalypt forest, heathland, marshland, grassland, and rocky areas where there is surface cover, and usually close to water. They are active at night and during the day shelter in saucer-shaped nests built in crevices, hollow logs, beneath bark or under rocks. They are fierce carnivorous hunters and agile climbers, preying on insects and small vertebrates, some nearly their own size. They breed from October to January. The female builds a nest lined with grass, eucalypt leaves or shredded bark.	Unlikely	No	Two (n = 2) records from the West Byron STP from 2004 occur within the 1.5 km assessment circle. The development footprint is almost exclusively located on a tidal beach and exposed dune system and does not represent preferred or suitable habitat for the Common Planigale. Marginal habitat located on the dune system containing littoral rainforest species is likely to small, disturbed and exposed to provide any potential habitat. As this species is highly sensitive to crossing open spaces, for fear of exposure to predators, it is unlikely that individuals would venture from another habitat area in the locality.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				Significant preferred habitat occurs in the locality and beyond, which would not be impacted either directly or indirectly by the proposal. The proposal would not result in any impacts on potential habitat or food resources for this species.
Little Bentwing-bat (*Miniopterus australis*)	These bats inhabit moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests, and banksia scrub. Generally found in well-timbered areas. Roost locations include caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day. At night they forage for small insects beneath the canopy of densely vegetated habitats. In NSW the largest maternity colony is in close association with a large maternity colony of Eastern Bentwing-bats (*Miniopterus schreibersii*) and appears to depend on the large colony to provide the high temperatures needed to rear its young. Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer. Only five nursery sites / maternity colonies are known in Australia.	Potential	No	The development footprint does not contain any suitable roosting habitat and does not necessarily represent typical habitat for this species. However, this species forages widely where present and therefore the subject land offers potential foraging habitat, which it would continue to provide. Significant areas of potential roosting and foraging habitat occur in association with mature forested wetlands and other vegetation types in the local area. However, it is also noted that records for this species are infrequent, with only four (n = 4) records occurring within the 1.5km assessment circle, with only one record occurring in the past 20 years. The proposal would not result in any significant impacts on potential habitat or food resources, and therefore the proposal is unlikely to impact on this mobile species.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Koala (*Phascolarctos cinereus*)	Koalas inhabit eucalypt woodlands and forests. Koalas feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, Koalas feed and move mostly at night. They spend most of their time in trees but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred ha in size. Generally solitary but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year.	Unlikely	No	The development footprint or adjacent areas do not contain any Koala feed tree species listed in Schedule 2 of SEPP (Biodiversity & Conservation) 2021. Records for the Koala occur scattered throughout the 1.5 km assessment circle, and the species can wander widely. However, most records occur south of the railway corridor where forested wetland habitat containing species such as Swamp Mahogany (*Eucalyptus robusta*) occur. The small scale of the proposal in general, the lack of suitable habitat, and the busy nature of the development footprint area would be likely to reduce the potential occurrence of this species within or adjacent to the development footprint. The general busyness of the area and highly visible nature of the proposal area, also means that any occurrence of this species in the area would be readily noted, and able to be mitigated for. The proposal would not result in any impacts on potential habitat or food resources for this species.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
Long-nosed Potoroo (*Potorous tridactylus*)	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grasstrees, sedges, ferns, or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. The fruit-bodies of hypogeous (underground-fruiting) fungi are a large component of the diet of the Long-nosed Potoroo. They also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil. Often digs small holes in the ground in a similar way to bandicoots. Mainly nocturnal, hiding by day in dense vegetation - however, during the winter months animals may forage during daylight hours. Individuals are mainly solitary, non-territorial and have home range sizes ranging between 2-5 ha. Breeding peaks typically occur in late winter to early summer and single young are born per litter. Adults are capable of two reproductive bouts per annum.	Unlikely	No	The development footprint or adjacent areas do not contain any suitable habitat for this rarely seen species. Only two (n = 2) records for the Long-nosed Potoroo occur in the 1.5 km assessment circle, with both records from 1992 within the Tyagarah Nature Reserve. The small scale of the proposal in general, the lack of suitable habitat, and the busy nature of the development footprint area would be likely to reduce the potential occurrence of this species within or adjacent to the development footprint. The proposal would not result in any impacts on potential habitat or food resources for this species.
Grey-headed Flying-fox (*Pteropus poliocephalus*)	Grey-headed Flying-foxes occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, and swamps as well as urban gardens and cultivated fruit crops.	Potential	No	The development footprint does not contain preferred habitat for either roosting or foraging. The subject land contains some marginal opportunistic foraging resources; however, resources are generally limited due to the

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
	Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, giving birth, and rearing young. Can travel up to 50 km from the camp to forage though commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular *Eucalyptus*, *Melaleuca* and *Banksia* spp., and fruits of rainforest trees and vines. Also forage in cultivated gardens and on fruit crops.			types of vegetation present, with limited availability of resources in general. Preferred habitat occurs within the locality, with significant potential habitat available to the southeast, southwest, and west of the subject land. The proposal would not result in any significant impacts on potential habitat or food resources, and therefore the proposal is unlikely to impact on this mobile species.
Southern Myotis (*Myotis macropus*)	Generally, roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface. In NSW females have one young each year usually in November or December.	Potential	No	Five (*n* = 5) records for the Southern Myotis occur within the 1.5km assessment circle, however, it is likely that this is an under-representation of the presence of this species. Considerable suitable habitat occurs in the locality, including the waters of Belongil Creek and waterbodies on the subject land. The dynamic nature of the estuary mouth means that the proximity of suitable foraging habitat for this species in relation to the proposal varies significantly. At the time of the site visit and assessment, suitable potential habitat was > 100m from the proposal footprint and unlikely to represent a direct or indirect impact on this species.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				The proposal would not result in any significant impacts on potential habitat or food resources, and therefore the proposal is unlikely to impact on this mobile species.
Common Blossom-bat* (*Syconycteris australis*)	Common Blossom-bats often roost in littoral rainforest and feed on nectar and pollen from flowers in adjacent heathland and paperbark swamps. They have also been recorded in a range of other vegetation communities, such as subtropical rainforest, wet sclerophyll forest and other coastal forests. They generally roost individually in dense foliage and vine thickets of the sub-canopy, staying in the same general area for a season. They change roost sites daily, but each roost site is generally only 50m or so away from other recent roosts. Favoured feeding sites are repeatedly visited on consecutive nights within a flowering season and revisited over several years. They require a year-round supply of nectar and pollen that is gathered from a mosaic of complex coastal vegetation types. When these vegetation types are in short supply of nectar and pollen (Nov/Dec in northern NSW), Common Blossom-bats have been known to utilise riverine areas containing Black Bean, Silky Oak, and Weeping Bottlebrush.	Potential	Yes	The development footprint does not contain any suitable roosting habitat, but a small area in the vicinity of the development footprint contains potential foraging habitat, with the presence of both littoral rainforest and banksia species present. While the subject land offers potential foraging habitat, the high level of regular and sustained disturbance surrounding the subject land is likely to significantly reduce the potential occurrence of this shy species. Significant areas of potential roosting and foraging habitat occur in association with mature forested wetlands and other vegetation types in the local area. The proposal would not result in any significant impacts on potential habitat or food resources; however, some potential foraging habitat would temporarily be impacted, and disturbance would occur within potential foraging habitat. However, in the interest of a precautionary approach, this species has been selected for

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				additional assessment by way of a Test of Significance.
Reptilia				
Loggerhead Turtle (*Caretta caretta*)	Loggerhead Turtles are ocean-dwellers, foraging in deeper water for fish, jellyfish & bottom-dwelling animals. The female comes ashore to lay her eggs in a hole dug on the beach in tropical regions during the warmer months.	Potential	Yes	Two (*n* =2) records occur for this species within the 1.5 km assessment circle, both occurring > 1km from the proposal location. Most records from the Byron Shire occur along Tallow Beach to the east of the subject land, which likely offers preferred nesting habitat. The extension of the existing sandbag wall to prevent coastal erosion represents a potential barrier to nesting attempts should this species come ashore along this stretch of beach. This is likely only relevant if sandbags are exposed. If the sandbags are covered by sand, this barrier no longer exists. This species has been selected for additional assessment by way of a Test of Significance.
Green Turtle* (*Chelonia mydas*)	Ocean-dwelling species spending most of its life at sea. Carnivorous when young but as adults they feed only on marine plant material. Eggs laid in holes dug in beaches throughout their range. Scattered nesting records along the NSW coast.	Potential	Yes	No records for the Green Turtle occur for this species within the 1.5 km assessment circle. Records for this species generally occur along or adjacent to Clarkes Beach, Main Beach, and The Pass, with additional records for Tallow Beach. These areas likely represent preferred nesting habitat.

Common name (Scientific name)	Habitat requirements of the species	Likelihood of occurrence in the development footprint	Test of Significance conducted	Rationale explaining whether a Test of Significance was required for the species
				The extension of the existing sandbag wall to prevent coastal erosion represents a potential barrier to nesting attempts should this species come ashore along this stretch of beach. This is likely only relevant if sandbags are exposed. If the sandbags are covered by sand, this barrier no longer exists. This species has been selected for additional assessment by way of a Test of Significance.
Flora				
Stinking Cryptocarya (*Cryptocarya foetida*)	Found in littoral, warm temperate and subtropical rainforest, wet sclerophyll forest and Camphor Laurel forest usually on sandy soils, but mature trees are also known on basalt soils. The seeds are readily dispersed by fruit-eating birds, and seedlings and saplings have been recorded from other habitats where they are unlikely to develop to maturity. Though seedlings can be fairly numerous, few mature trees are known.	Does not occur	No	The habitat requirements identified in the species profile do not match those that occur in the proposal area. This species was not recorded during the site survey.
Onion Cedar (*Owenia cepiodora*)	Subtropical and dry rainforest on or near soils derived from basalt.	Does not occur	No	The habitat requirements identified in the species profile do not match those that occur in the proposal area. This species was not recorded during the site survey.
*not recorded within 1.5km but assessed as a matter of precaution				

3. Impact assessment

The proposal is comprised of several different elements, which make up the development footprint. The principle of avoid and minimise has been incorporated into the proposal where possible, however, limitations exist for alternative designs to be considered. It is recognised that the proposal is necessary works required to enable temporary foreshore and infrastructure protection, and to ameliorate impacts (e.g., erosion) to littoral rainforest. The proposal would also help to minimise safety risks to the public from dangerous falling vegetation caused by dune erosion. Significant valuable habitat exists in the locality and beyond, with areas of significant habitat value remaining unimpacted.

Potential development impacts associated with the proposal are summarised below. A comprehensive suite of management strategies and mitigation measures are provided in Section 5, which would further reduce any potential impacts of the development to flora, fauna, and ecological communities.

3.1 Habitat Loss

Habitat loss within the development footprint is considered below for the identified proposal.

Habitat loss from the extension of the sandbag coastal protection wall is minimal. The placement of sandbags on the beach near to the base of the existing eroding dunes represents a minimal impact or loss of habitat in the local context. Following the extension of the coastal protection wall and following the ensuing beach replenishment behind the sandbag wall forming an appropriately shaped and protected dune, beach and dune infauna is likely to begin recolonizing the upper sand column. The total area of the sandbag wall is estimated to be approx. 500 m^2, with excavation over another 250 m^2, which is unlikely to represent a significant loss of habitat in the local context.

Habitat loss has also been considered in the context of the sandbag wall acting as a barrier to fauna movement, of most relevance when considering the importance of the beach habitat for nesting marine turtles. Again, this is likely to result in more pronounced impacts whilst the sandbag wall is exposed, with minimal impact likely with ensuing beach replenishment. The existing sandbag wall currently covers a length of approx. 200 m. The proposal subject to this assessment would extend the existing coastal protection works by an additional approx. 50m. Even in the instance of sufficient exposure of the sandbag wall to a level which would constitute a barrier to movement, the small scale of the temporary structure is unlikely to represent significant loss of habitat in the local context.

Habitat loss because of potential additional sand nourishment required to maintain the dune between the sandbag wall and existing upper tier land, is also highly unlikely to represent a significant loss of habitat, with little significant habitat currently present at the time of the assessment. This is unlikely to represent a significant loss in the local context.

Habitat loss attributable to the far north-west end of the proposed extension, into an area of young age fragmented littoral rainforest and dune vegetation, has also been considered. The total development footprint for the entire proposal is approx. 750 m^2. The area of littoral vegetation potentially impacted is calculated as being < 75 m^2. Habitat within this area is generally sparse, disturbed, and invaded with exotics, with little native ground layer vegetation or mid layer vegetation present within the development footprint (Plate 6). It is likely that this vegetation would be lost due to erosion if not removed as a component of the proposal.

Plate 5: Erosion currently threatens Elements of Byron assets, creating public risk and reducing amenity.

The sum of habitat loss, which would be limited to impacts to an area of open beach, and degraded top of dune vegetation, would occur over a maximum area of approx. 750 m^2. Vegetation is not present within much of this area, so disturbance to habitat would be significantly lower than the total footprint area, and the loss of habitat would be negligible.

There are no threatened flora species located in the impacted areas and no significant habitat vegetation (e.g., those with hollows) would require removal or be impacted by the development. The loss of a small area of young age class top of dune vegetation is unlikely to represent a significant loss in the local context.

3.2 Disturbance

The level of potential disturbance attributed to the proposal because of activities within the identified development footprint are considered relatively minor. This is attributed to the small footprint, minimal vegetation impacts, or disturbance required, and in the context of existing land use, current impacted condition (i.e., from coastal erosion) and public activity at the site (i.e., human traffic).

With regard to threatened species with the potential to occur within the development footprint, the threat of disturbance is considered most applicable to marine or coastal species, and most applicable to shorebirds and marine turtles with the potential to occur.

The potential disturbance from the sandbag wall currently in place is considered as a potential risk for marine turtles for the reason that the sandbag wall, when exposed, poses a potential barrier for marine turtles coming ashore to nest in the dunes on this section of Belongil Beach. The level of disturbance attributed to the sandbag wall barrier is likely to vary substantially with the level of exposure at the time. I.e., the sandbag wall is likely to represent a potential barrier when the sandbag wall is exposed, and there is potential that nesting marine turtles may abort attempts to come ashore at that location if unable to traverse the location of the sandbag wall. The level of threat is significantly reduced, and

potentially removed, if sand has been redeposited on the beach and covered the sandbag wall. At the time of the assessment the existing sandbag wall was only partially visible, with the majority situated below the current beach surface or covered by replenished dune.

Disturbance to shorebirds is likely more attributable to activities undertaken within the development footprint to accommodate the proposal, which is likely to represent minor short term impacts, and in the context of the regular disturbances at the site due to the 'busyness' of the area, it is unlikely that these disturbance events would be significant, as shorebirds generally favour the eastern side of Belongil Creek, currently situated > 100 m from the proposal footprint.

Plate 6: A small area of littoral dune vegetation may be impacted to accommodate the proposal.

With respect to potential disturbance of littoral dune vegetation, the small scale and area of the potential impact (< 75 m^2), in a busy tourism location, it is considered that the level of disturbance to threatened species with the potential to occur is likely to be negligible. Common native species generally occurring in the area (e.g., Brush Turkey), are acclimatized to regular disturbance, and the likelihood of threatened fauna species occurring in this location is limited. No areas of habitat significance would be impacted, and the significant areas of vegetation in adjacent areas, which provide the most valuable habitat in association with the subject land, would not be disturbed nor indirectly impacted.

biodiversity
assessments & solutions

Figure 5: Development footprint impact area required to accommodate the proposal and statutory mapping.

Legend

- Subject Land - Lot 1 DP 1215893
- Lot
- Contour
- Hydroline
- Cape Byron Marine Park
- Railway
- Road Corridor
- Water Feature
- Biodiversity Values Map v15
- Littoral Rainforest
- Littoral Rainforest Proximity Area
- Existing Sandbag Wall

Proposed Sandbag Wall Extension

- Excavation
- Sandbag Wall

0 25 50 m

4. Statutory assessment of the proposal

The proposal has been (i) examined in the context of the most relevant environmental legislation and planning instruments; and (ii) assessed based on the subject land attributes, threatened species records, vegetation condition and habitat potential.

Key legislation and planning instruments assessed and of most relevance include the:

- Biodiversity Conservation (BC) Act 2016;
- Biodiversity Conservation (BC) Regulation 2017;
- Environmental Planning and Assessment Act 1979;
- State Environmental Planning Policy (SEPP) (Biodiversity and Conservation) 2021;
- Coastal Management Act 2016; and
- Environment Protection and Biodiversity Conservation (EPBC) Act 1999.

Other applicable legislation relating to the proposals are assessed within the relevant submission documents accompanying the proposal.

4.1 Biodiversity Conservation Act 2016

Section 7.2 of the BC Act 2016 provides that development under the EP&A Act 1979 is likely to significantly affect threatened species if:

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

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

(c) It is carried out in a declared Area of Outstanding Biodiversity Value (AOBV).

No threatened flora species listed under Schedule 1 of the BC Act 2016 were recorded at the subject land or in the immediate vicinity. Therefore, it is considered that no threatened flora species would be likely to be impacted by the proposal.

Vegetation on the subject land and extending into the north-west of the development footprint contains tree species commonly found within the vegetation community listed in Schedule 2 of the BC Act 2016 as a threatened ecological community (TEC), namely the endangered ecological community (EEC) *Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*. It is considered that despite a sparse understorey or midstorey, vegetation in this location, vegetation is analogous with the EEC as described in the final Scientific Committee determination.

No threatened fauna species were recorded, although targeted surveys for fauna classes was not undertaken. Considerable monitoring of shorebirds occurs at the mouth of Belongil Creek, with these results uploaded to BioNet, and these have been utilised for this ecological assessment. The subject land, particularly in the vicinity of the development footprint, contains little valuable habitat for threatened fauna species listed under the BC Act 2016. However, valuable habitat does occur proximal to the site in the vicinity, which would not be impacted by the proposal.

A subject land suitability assessment was undertaken for those species recorded within 1.5 km of the development footprint (Table 3). This identified the following seventeen (*n* = 17) species as having some potential to occur at the subject land and to be impacted by the proposal which were further assessed by way of a *Test of Significance* (ToS)*:*

- White-bellied Sea Eagle (*Haliaeetus leucogaster*)
- Eastern Osprey (*Pandion cristatus*)
- Beach Stone-curlew (*Esacus magnirostris*)
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*)
- Greater Sand-plover (*Charadrius leschenaultia*)
- Lesser Sand-plover (*Charadrius mongolus*)
- Sooty Oystercatcher (*Haematopus fuliginosus*)
- Pied Oystercatcher (*Haematopus longirostris*)
- Little Tern (*Sternula albifrons*)
- Sanderling (*Calidris alba*)
- Curlew Sandpiper (*Calidris ferruginea*)
- Great Knot (*Calidris tenuirostris*)
- Black-tailed Godwit (*Limosa limosa*)
- Southern Myotis (*Myotis macropus*)
- Common Blossom-bat (*Syconycteris australis*)
- Loggerhead Turtle (*Caretta caretta*)
- Green Turtle (*Chelonia mydas*)

The ToS set out in Section 7.3 of the BC Act 2016 is based on the footprint and design of the development. Measures that offset or otherwise compensate for the development have not been considered in determining the degree of the developments effect on threatened species or ecological communities.

In determining the nature and magnitude of an impact, the following factors have been considered:

- pre-construction, construction and occupation/maintenance phases;
- all on-site and off-site impacts, including location, installation, operation and maintenance of auxiliary infrastructure and fire management zones;
- all direct and indirect impacts;
- the frequency and duration of each known or likely impact/action;
- the total impact which can be attributed to that action over the entire geographic area affected, and over time;

- the sensitivity of the receiving environment; and,
- the degree of confidence with which the impacts of the action are known and understood.

A ToS under Section 7.3 of the BC Act was undertaken for those species considered likely to occur and with some potential to be directly or indirectly impacted by the proposal (Appendix A). The ToS concluded that the proposal for (i) extension of coastal protection works is not likely to result in any direct or indirect impacts to threatened species, populations, ecological communities, or their habitats either on the subject land or beyond.

4.1.1 Biodiversity Conservation Regulation 2017

Part 7 of the BC Regulation 2017 prescribes the biodiversity assessment and approvals under the EP&A Act 1979*,* and details when an activity exceeds a threshold and therefore requires assessment under the Biodiversity Offsets Scheme (BOS). The following three main threshold triggers apply: (i) Area clearing threshold; (ii) Biodiversity Values Map threshold; and (iii) a threatened species ToS.

(i) Area clearing thresholds (Clause 7.2) depend on the minimum lot size under the relevant LEP, as defined in Table 4. The proposal is to occur on land zoned DM Deferred Matter under the Byron Local Environmental Plan 2014 and zoned 7(f1) Coastal Land Zone under the Byron Local Environmental Plan 1988. The 'Minimum Lot Size Method' identified in the Biodiversity Values Map and Threshold Report (Appendix B) is the actual lot size of the smallest lot included within the subject land. The corresponding area threshold of entry into the scheme is therefore considered to be 0.5 ha (Table 4). Given the entire development proposal footprint covers an area approx. 750 m^2, and vegetation impacts have been calculated as being < 75 m^2 as a result of the proposal, the area clearing threshold is not exceeded and does not apply.

(ii) The Biodiversity Values Map threshold (Clause 7.3) is triggered when clearing of native vegetation or additional biodiversity impacts (Clause 6.1) within the Biodiversity Values Map exceeds a threshold. The current sandbag location marginally intersects an area mapped on the Biodiversity Values Map (Figure 6). This area is currently an intertidal beach, having experienced severe erosion since 2015. As a result, vegetation which had been mapped as Littoral Rainforest in circa 2017, no longer exists in this area. The proposal subject to this ecological assessment does not occur within an area mapped on the Biodiversity Values Map, nor would any impacts to native vegetation occur within the nearby mapped polygon. Therefore, no clearing of native vegetation or additional biodiversity impacts would occur within the area mapped on the Biodiversity Values Map. It follows that this threshold does not apply.

(iii) A threatened species ToS is triggered for all local developments that do not exceed the BOS threshold. If the ToS assessment indicates that there will be a significant impact, this exceeds the threshold, and the proponent must carry-out a BAM assessment. No threatened flora species were identified from the development footprint, and following a detailed desktop assessment, site habitat assessment and threatened species review, a ToS was undertaken for eleven (*n* = 11) species recorded within 1.5 km of the development footprint with the potential to occur and potential to be impacted by the proposal (Appendix A). The ToS concluded that the proposal is not likely to result in any direct or indirect impacts to threatened species, populations, ecological communities or their habitats. Therefore, the BOS threshold has not been exceeded and the BOS will not apply.

Table 4: Area clearing thresholds as stipulated under Part 7.2 of the Biodiversity Conservation Regulation, 2017.

Minimum lot size of land (ha)	Area of clearing (ha)
Less than 1	0.25 or more
Less than 40 but not less than 1	0.5 or more
Less than 1,000 but not less than 40	1 or more
1,000 or more	2 or more

4.2 Environmental Planning and Assessment Act 1979

The proposal is an activity regulated under Part 4 of the EP&A Act. For the purposes of the Act, the proposal is not a development that is likely to significantly affect threatened species, populations, ecological communities, or their habitats.

In consideration of the likely impacts of the development pursuant to the EP&A Act Section 4.15 evaluation:

S.4.15 1(b) - the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; and

The proposed development would not significantly impact the natural environment of the locality. No significant areas of native vegetation or significant fauna habitat would be impacted. The proposal would occur on predominantly low constraint land, the scale of the proposal is small, and the proposal is suitable for the zoning of the site. The most significant habitat associated with the subject land, which occurs in the south-east, would be retained, and protected. The direct and indirect environmental impacts of the proposal would be minimal.

S.4.15 1(c) - the suitability of the site for the development.

The development can be accommodated in lower constraint cleared land or areas of lesser condition or habitat value. The most significant forest habitat associated with the subject land occurs in the south-east of the subject land, which would be retained and protected. It is therefore considered that the site is suitable for the proposal with the incorporation of suitable mitigation measures.

4.3 State Environmental Planning Policy (Biodiversity and Conservation) 2021

Chapter 4 of (SEPP Biodiversity and Conservation) 2021 defines Core Koala Habitat as:

(a) an area of land with a resident population of koalas, evidenced by attributes such as breeding females, being females with young, and recent sightings of and historical records of a population.

(b) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years.

The subject land contains Schedule 3 trees scattered throughout the resort, including an area of consolidated Coastal Swamp Forest located in the south-east of the subject land. However, the development footprint does not contain any Koala feed trees, nor does it contain any areas of native vegetation considered able to support a resident population of Koalas.

Several records for the Koala occur on the subject land; however, as identified above, these records are in areas where suitable habitat or food trees occur. The proposal does not require the removal of any Koala feed trees nor would it impact any areas in proximity to suitable habitat. All "habitat" in the locality will continue to serve its present function to Koalas, with no direct or indirect impact from the proposed development.

The Byron Coast Comprehensive Koala Plan of Management (CKPoM) was approved under the SEPP (Koala Habitat Protection) 2021 in March 2021; therefore Part 4.2 (Cl. 4.8) of Chapter 4 of SEPP (Biodiversity and Conservation) 2021 applies. Clause 4.8 (2) states that "*The council's determination of the development application must be consistent with the approved koala plan of management that applies to the land*".

The flow chart in the Byron Coast CKPoM (i.e., Figure 10, pg. 64), indicates that the CKPoM does apply to the land as the subject land is >1 hectare in size. However, as identified, no Koala feed tree species in the Byron Coast CKPoM, or in Schedule 3 of the SEPP (Biodiversity and Conservation) 2021 would be removed or impacted.

It is therefore concluded that: (i) the subject land does not meet the definitions of 'core' Koala habitat; and (ii) no Koala habitat or Schedule 3 trees would be impacted by the development. Hence, the SEPP (Biodiversity and Conservation) 2021 and Byron Coast CKPoM do not prevent granting consent to the development application.

4.4 Coastal Management Act 2016

The Coastal Management Act 2016 specifies how development proposals are to be assessed if they fall within the coastal zone. The development footprint does not occur within any areas identified as either coastal wetland or littoral rainforest area, nor does it occur in the proximity areas associated with either of those mapped areas.

Provisions relating to Part 5 S27 'Granting of development consent relating to coastal protection works' are addressed in the Coastal Engineering Assessment by Royal HaskoningDHV (2023).

4.5 Environment Protection & Biodiversity Conservation Act 1999 (Cth)

No flora or fauna species listed under the EPBC Act (1999) were recorded at the subject land during site surveys, however, several are likely to occur in the general vicinity of the mouth of Belongil Creek. A habitat suitability assessment includes those EPBC listed species and concluded that no fauna species listed under the EPBC Act would likely be impacted by the proposal.

Therefore, the proposal would not impact on any Matters of National Environmental Significance (MNES) and assessment under the EPBC Act would not be required.

2012

2019

2023

biodiversity
assessments & solutions

Figure 6: Development footprint, NSW Govt. statutory mapping and shoreline recession since 2012.

Legend

- Subject Land - Lot 1 DP 1215893
- Lot
- Contours - 1m
- Littoral Rainforest
- Littoral Rainforest Proximity Area
- Biodiversity Values Map v15
- Cape Byron Marine Park
- Existing Sandbag Wall

Proposed Sandbag Wall Extension

- Excavation
- Sandbag Wall

0 10 20 30 40 50 60 70 m

5. Management strategy to minimise development impacts

The sum of deleterious ecological impacts from this proposal (i.e., coastal protection works, dune replenishment and infrastructure repair) is minor, with the works also necessary to protect coastal infrastructure and to reduce current impacts of coastal erosion. The potential direct and indirect environmental impacts of the proposal through both construction and operational phases have been taken into consideration for this assessment, with key mitigation measures detailed in section 5.1 to ensure minimisation of potential impacts.

5.1 Mitigation measures

The following environmental safeguards and mitigation measures are proposed to promote beneficial ecological and biodiversity outcomes:

- an assessment by a qualified arborist would be undertaken prior to construction to ensure adequate measures are provided for tree protection in the vicinity of the proposal footprint, most notably at the north-western end of the extension;
- tree protection zones (TPZs) would be established and maintained around trees to be retained which are immediately adjacent to the proposal where excavation and/or construction are required;
- if present, fallen logs and large woody debris in the proposal area would be relocated into adjacent areas of habitat;
- ensure all machinery/vehicles/personnel enter and exit along main entry routes so additional impacts or disturbance do not occur to native vegetation or marine habitat;
- machinery would be cleaned prior to entering the subject land to ensure that weed seeds and propagules are not imported;
- delineation of the proposal footprint as designated work sites so that no machinery/vehicles/personnel impact on vegetation or habitat outside of each works area;
- if unexpected protected or threatened fauna are encountered, then work would stop immediately, and a qualified ecologist or wildlife carer would be contacted;
- if a Koala is present within 30 metres of an area to be cleared/disturbed, then 24 hours must be provided for the animal to disperse of its own volition;
- contingencies would be required to address the risk of bushfire, including spark arrestors, and suspending works in high bushfire danger periods; and
- dune revegetation would be undertaken using species endemic to the location and local seed provenance.

The following environmental safeguards and mitigation measures are proposed to promote beneficial water quality, hydrology and drainage outcomes:

- appropriate sedimentation and erosion controls must be installed and maintained at all times during construction and operations to limit impacts on adjacent vegetation and waterways;
- all proposed works would be undertaken during periods of dry weather;

- all areas where excavation is required and/or vegetation is removed would be stabilised with the most appropriate method;
- fuels and oils would be stored more than 40m away from waterways and flood zones where practical;
- refueling and maintenance of machinery would be undertaken at least 40m away from waterways or drainage lines where practical;
- disturbed surfaces would be compacted and stabilised in anticipation of a rain event to reduce the potential for erosion; and
- erosion and sediment controls would be monitored for effectiveness and maintained until the site is remediated and the soil profile re-stabilised.

The following environmental safeguards and mitigation measures are proposed to promote beneficial Aboriginal and non-Aboriginal heritage outcomes:

- If any Aboriginal items or cultural heritage objects (including human remains) are located during the works, all work would cease near the artefact and the Tweed Byron Local Aboriginal Land Council (TBLALC) Aboriginal Sites Officer would be notified on (07) 5536 1763. The find is also required to be reported to the Heritage NSW; and
- all staff and contractors would be made aware of their responsibilities under the National Parks and Wildlife (NPW) Act 1974 and would be informed of the procedures in the event of unearthing an object.

The following environmental safeguards and mitigation measures are proposed to promote best practice dangerous goods/chemical and waste management:

- waste destined for recycling or reuse would be stored separately and in a suitable location to avoid mixing with other materials/wastes;
- all residual waste material would be disposed of at a suitably licensed landfill or waste management facility;
- all working areas would be monitored to ensure they are kept free of rubbish and cleaned at the end of each working shift;
- storage and handling of any dangerous goods must be undertaken in accordance with *The Storage and Handling of Dangerous Goods Code of Practice 2005;*
- sufficient spill kits would always be kept on site; and
- any excavated natural material would be treated in accordance with the requirements of the Protection of the Environment Operations (POEO) Act 1997.

6. Summary and Conclusion

This assessment has been undertaken to accompany the lodgement of a Part 4 Development Application (DA) for temporary coastal protection works on the subject land on land zoned 7(f1) - Coastal Lands Zone.

Following assessment of all available ecological information, threatened species records, habitat assessment of the subject land and potential impacts, as well as key relevant legislation, the following conclusions are provided:

- the proposal has environmental benefits by way of protecting littoral rainforest and other areas of coastal habitat from further loss, as well as preventing further damage to resort assets, reducing potential risk for the public, and improving public amenity;
- the proposal footprint is not considered to be of significant biodiversity value in the local context, nor is it considered to have any significant ecological value or to provide any significant wildlife habitat;
- accommodating the proposal requires the removal of some ground and lower layer vegetation, both common local native and exotic species, and the potential removal of some vegetation analogous with littoral rainforest occurring on top of the eroding dune;
- the total area of the development footprint has been calculated as having an area of approx. 750 m^2, with native vegetation occurring sparsely across an area of < 75 m^2;
- the development footprint does not contain any tree species listed in Schedule 3 of the SEPP (Biodiversity and Conservation) 2021 as a Koala feed tree, nor is the footprint representative of preferred Koala habitat. No Schedule 3 trees or other Koala habitat elsewhere on the subject land would be impacted to accommodate the proposal;
- potential impacts of the construction and occupation phases of the proposal would be negligible and be able to be mitigated sufficiently to ensure that direct and indirect impacts on biodiversity values would be avoided and minimised; and
- the proposal would not cause significant impacts to species or ecological communities listed in the NSW BC Act 2016 or the EPBC Act 1999, nor would the development proposal be likely to result in a significant impact for any threatened fauna listed under these Acts.

Based on these key summary points, it is considered that the subject land and identified proposal footprint is suitable for the proposal and subsequent activities, and that the proposal has, within all reasonable expectations, avoided and minimised impacts to the biodiversity values of the subject land.

References

Biolink (2012). Byron Coast Koala Habitat Study. A report to Byron Shire Council March 2012. Biolink Ecological Consultants.

BMT WBM (2013). Byron Shire Coastline Hazards Assessment Update, Final report for Byron Shire Council, September.

Byron Shire Council (1988). Byron Local Environmental Plan 1988. Byron Shire Council, Mullumbimby, NSW.

Byron Shire Council (2010). Byron Development Control Plan 2010. Byron Shire Council, Mullumbimby, NSW.

Byron Shire Council (2014). Byron Local Environmental Plan 2014. Byron Shire Council, Mullumbimby, NSW.

Byron Shire Council (2014). Byron Development Control Plan 2014. Byron Shire Council, Mullumbimby, NSW.

Byron Shire Council (2015). Byron Coast Comprehensive Plan of Management. Byron Shire Council, Mullumbimby, NSW. Accessed online 30/04/2021 from: https://www.byron.nsw.gov.au/Services/Environment/Native-animals-and-plants/Koalas-in-Byron-Shire/Byron-Coast-Comprehensive-Koala-Plan-of-Management

Department of the Environment (Cth) (2016). *Protected Matters Search Tool*. [Accessed 25/03/2021]. http://www.environment.gov.au/epbc/pmst/index.html

Geering, A., et. al. (2007). *Shorebirds of Australia*. CSIRO Publishing, Collingwood, Vic.

Morand, D.T. (1994). Soil Landscapes of the Lismore-Ballina: 100 000 Sheet. Department of Land and Water Conservation, Sydney, NSW.

NSW government (2021). *State Environmental Planning Policy (Koala Habitat Protection) 2021*. [Accessed online 30/04/21]. https://legacy.legislation.nsw.gov.au/EPIs/2021-115.pdf

NSW DEC (2004). *Threatened Biodiversity Survey and Assessment*: *Guidelines for Developments and Activities. Working Draft.* Department of Environment and Conservation (NSW).

NSW DECCW (2009). *Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians.* Department of Environment, Climate Change and Water.

NSW Government (2001), Coastal dune management: a manual of coastal dune management and rehabilitation techniques, by R. Kidd Published 2001.

NSW OEH (2018). *A review of Koala tree use across New South Wales.* NSW Office of Environment and Heritage, Sydney, NSW.

NSW OEH (2017). *NSW BioNet Database Search Tool*. [Accessed 25/03/2023]. http://www.bionet.nsw.gov.au/

NSW OEH (2017). *Threatened Species Profiles*. [Accessed 25/03/2023]. http://www.environment.nsw.gov.au/threatenedSpeciesApp/

NSW OEH (2017). *Threatened Species Survey and Assessment Guidelines*. [Accessed 07/06/2019]. http://www.environment.nsw.gov.au/threatenedspecies/surveyassessmentgdlns.htm

NSW OEH (2018). *Threatened Species Test of Significance Guidelines*. Office of Environment and Heritage, Sydney, NSW.

NSW OEH (2017). *Field Survey Methods for Threatened Species, Populations or Ecological Communities*. [Accessed 20/05/2018]. http://www.environment.nsw.gov.au/threatenedspecies/surveymethodsfauna.htm

Royal HaskoningDHV (2023). *Elements of Byron – Extension to Existing Geobag Coastal Protection Works*. HaskoningDHV Nederland B.V., North Sydney, NSW.

Witherington, B., Hirama, S. and Mosier, A. (2011). *Sea turtle responses to barriers on their nesting beach.* Journal of Experimental Marine Biology and Ecology, Volume 401, Issues 1-2, pgs 1-6.

Appendix A – Test of Significance

In accordance with Section 7.3 of the *Biodiversity Conservation Act 2016,* a *Test of Significance* (ToS) has been completed for the following eleven (*n* = 11) threatened fauna species identified as having the potential to occur on the subject land (i.e., Lot 1 DP 1215893), as well as one (*n* = 1) endangered ecological community (EEC):

Threatened Fauna

- Beach Stone-curlew (*Esacus magnirostris*)
- Greater Sand-plover (Charadrius leschenaultia)
- Lesser Sand-plover (*Charadrius mongolus*)
- Sooty Oystercatcher (*Haematopus fuliginosus*)
- Pied Oystercatcher (Haematopus longirostris)
- Little Tern (Sternula albifrons)
- Sanderling (*Calidris alba*)
- Curlew Sandpiper (*Calidris ferruginea*)
- Common Blossom-bat (Syconycteris australis)
- Loggerhead Turtle (*Caretta caretta*)
- Green Turtle (*Chelonia mydas*)

Endangered Ecological Community (EEC)

- Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.

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

Beach Stone-curlew (*Esacus magnirostris*)

Species information

The Beach Stone-curlew is a large, heavy-set wader (up to 56 cm in body length, and with a wingspan of up to 1.1 m), with a large-headed appearance, emphasised by its massive bill, strong legs and a short tail. Adults have largely grey-brown upperparts with a distinctive black-and-white striped face and shoulder-patch. The throat and breast are a paler grey and the belly white. The wings are broad and long, mostly pale grey with dark leading and trailing edges to the innerwing and a boldly black-and-white outerwing. The eyes are yellow and there is a yellow patch at the base of the bill. Beach Stone-curlews are usually seen alone or in pairs, but sometimes occur in small groups of up to six birds. They are mainly active at dawn, dusk and at night, but birds are often seen when they shift or move about sedately during the day. Call at night, breeding birds give a harsh, wailing weer-loo call, which is slightly higher pitched and shriller than that of the related Bush Stone-curlew (*Burhinus grallarius*).

In Australia, the Beach Stone-curlew occupies coastlines from about Point Cloates in Western Australia, across northern and north-eastern Australia south to north-eastern NSW, with occasional vagrants to south-eastern NSW and Victoria. In NSW, the species occurs regularly to about the Manning River, but recent records show a breeding pair is known from the Port Stephens area (Dowadee Island and Soldiers Point [mid-north coast]) and more recently the species has been recorded at Whale Beach in Twofold Bay near Eden. These new records extend the known limit of the normal range of the species in Australia to the far south coast of NSW. Surveys in 2000 put the NSW population at a minimum of 13 adult birds. Outside Australia, the species also occurs in south-eastern Asia, from the Malay Peninsula through Indonesia and southern New Guinea, east to the Solomon Islands, Vanuatu and New Caledonia.

Habitat and ecology of the species

Key details of the Beach Stone-curlew's habitat and ecology include that they:

- Beach Stone-curlews are found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. They forage in the intertidal zone of beaches and estuaries, on islands, flats, banks and spits of sand, mud, gravel or rock, and among mangroves. Beach Stone-curlews breed above the littoral zone, at the backs of beaches, or on sandbanks and islands, among low vegetation of grass, scattered shrubs or low trees; also, among open mangroves.
- Beach Stone-curlews are usually seen alone or in pairs, but sometimes occur in small groups. Birds forage by stalking slowly like a heron or with quicker dashes after prey.
- The diet consists of crabs and other marine invertebrates.
- They are mainly active at dawn, dusk and at night, but birds are often seen when they shift or move about sedately during the day. Less strictly nocturnal than the related Bush Stone-curlew (*Burhinus grallarius*).
- In NSW, clutches have been recorded from early October to late March, but elsewhere in temperate Australia, breeding has been recorded from September. Their nests are just a shallow scrape in sand or gravel, above the tidal zone at the backs of beaches, or on sandbanks and islands or among open mangroves.
- Only one egg is laid, but birds will re-lay after the failure of a breeding attempt. Both parents defend the nest and care for the young. The young are precocial but appear not to be independent until they are 7-12 months old.

Threats to the species

Threats to the Beach Stone-curlew are identified as being:

- Predation of eggs and chicks by foxes.
- Disturbance of nesting shorebirds and direct mortality of eggs and chicks by trampling or removal by humans. 4WDs are a threat at some sites.
- Disturbance of nesting shorebirds and direct predation of eggs and chicks by dogs.
- Inundation of nests by high tides, storms and other flooding.
- Predation of eggs and chicks by avian predators (mostly corvids and gulls).

- The total number of adult beach stone-curlew in NSW is extremely low making them vulnerable to extinction via stochastic events.

Potential impacts (if any) of the proposal on the species

The mouth of the estuary (Belongil Creek) is known as important habitat for the Beach Stone-curlew. An area of dunes representing important habitat to the east of the estuary is fenced with signage to provide a level of protection for this species by limiting public access and reducing disturbance impacts.

The extension of the sandbag wall by approx. 50m to prevent continued coastal erosion is located at the base of the eroding dunes, which was at the time of the site assessment approx. 100m from the mouth of Belongil Creek. Furthermore the proposal location is > 250m from the fenced area to the east of the estuary. This spatial distance is considered adequate to minimise any disturbance to this species as it forages in the locality, and indeed is more than sufficient to prevent disturbance to individuals or pairs located in and around the fenced habitat.

The total area of impact for the proposal is calculated at approx. 750m2, which consists of open beach at the base of the currently eroding dunes. This area represents marginal potential foraging habitat, however, the location high on the beach profile, in an area generally utilised by guests of the resort, is not considered of high value for this species. Additionally, the total area of the development footprint for the proposal is considered negligible in the local context.

Therefore, considering that there is unlikely to be significant disturbance impacts due to adequate spatial separation, and that the loss of potential foraging habitat in the local context is negligible, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Beach Stone-curlew such that a viable local population of the species is likely to be placed at risk of extinction.

Greater Sand-plover (*Charadrius leschenaultii*)

Species information

The non-breeding Greater Sand-plover (i.e., as expected in Australia) has a grey-brown crown, nape, back and breast patches. The lores, bill and upperwing are dark, with dusky ear-coverts. There is prominent white plumage on the forehead, chin, throat and underparts, including the underwing. The legs and feet are greenish-grey; this helps distinguish it from the very similar Lesser Sand-plover, which has dark grey legs. Birds have a hunched, horizontal stance when relaxed, and a more upright extended stance when alert. When breeding in the Northern Hemisphere, the plumage on the breast, crown and nape changes to a dull brick-red and the ear coverts become black. Elements of this plumage may be visible in some Australian birds just after arrival in spring or prior to departure in autumn, and in some overwintering birds.

The Greater Sand-plover breeds in central Asia from Armenia to Mongolia, moving further south for winter. In Australia the species is commonly recorded in parties of 10-20 on the west coast, with the far northwest being the stronghold of the population. The species is apparently rare on the east coast, usually found singly. In NSW, the species has been recorded between the northern rivers and the Illawarra, with most records coming from the Clarence and Richmond estuaries.

Habitat and ecology of the species

Key details of the Greater Sand-plover's habitat and ecology include that they:

- Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks.
- Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders.
- Diet includes insects, crustaceans, polychaete worms and molluscs.
- Prey is detected visually by running a short distance, stopping to look, then running to collect the prey.

Threats to the species

Threats to the Greater Sand-plover are identified as being:

- Human disturbance at roosting and foraging sites (e.g., walking, fishing, baiting, pets, boating, horses, 4WD, biking, surfing).
- Hydrological changes to estuaries and similar water bodies may modify or remove important areas of suitable habitat.
- Mangrove incursion into saltmarsh habitat.
- Habitat loss due to development.
- Weed invasion of key habitat.
- Industrial development e.g., major port expansions and other transport related developments.
- Groundwater pollution impacting foraging habitat and resources.
- Habitat loss from erosion, climate change inundation and sea-level rise.

Potential impacts (if any) of the proposal on the species

The mouth and inner waters of the estuary (Belongil Creek) is known as important habitat for a variety of shorebirds, both migratory and residential. This migratory species, the Greater Sand-plover has been recorded from deeper in the estuary, > 200m from the proposal, with this being the only record for this species with the 1.5km assessment circle. As with all migratory shorebirds, disturbance represents a potential threat to foraging activities.

The extension of the sandbag wall by approx. 50m to prevent continued coastal erosion is located at the base of the eroding dunes, which was at the time of the site assessment approx. 100m from the mouth of Belongil Creek, where a variety of coastal birds were resting. Furthermore, the proposal location is separated from the inner estuary where this species has been recorded. This spatial distance is considered adequate to minimise any disturbance to this species as it forages in the locality.

The total area of impact for the proposal is calculated at approx. 750 m^2, which consists of open beach at the base of the currently eroding dunes. This area represents marginal potential foraging habitat, however, the location high on the beach profile, in an area generally utilised by guests of the resort, is not considered of high value for this species. Additionally, the total area of the development footprint for the proposal is considered negligible in the local context.

Therefore, considering that there is unlikely to be significant disturbance impacts due to adequate spatial separation, and that the loss of potential foraging habitat in the local context is negligible, it is highly

unlikely that the proposal would have an adverse effect on the life cycle of the Greater Sand-plover such that a viable local population of the species is likely to be placed at risk of extinction.

Lesser Sand-plover (*Esacus mongolus*)

Species information

The non-breeding Lesser Sand-plover has a grey-brown crown, nape, back and breast patches. The forehead, lores, bill and upperwing are dark; ear coverts are dusky. There is prominent white plumage on the forehead, chin, throat and underparts, including the underwing. The Lesser Sand-plover is distinguished from the Greater Sand-plover by a smaller body with a more upright stance, more compact appearance and dark grey (rather than greenish) legs. When breeding in the Northern Hemisphere, the plumage on the breast, crown and nape changes to a dull brick-red and the ear coverts become black. The brick-red breast is separated from the white throat by a narrow black line. Elements of this plumage may be visible in some Australian birds just after arrival in spring or prior to departure in autumn, and in some overwintering birds.

The Lesser Sand-plover breeds in central and north-eastern Asia, migrating further south for winter. In Australia the species is found around the entire coast but is most common in the Gulf of Carpentaria, and along the east coast of Queensland and northern NSW. Individuals are rarely recorded south of the Shoalhaven estuary, and there are few inland records.

Habitat and ecology of the species

Key details of the Lesser Sand-plover's habitat and ecology include that they:

- Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms.
- Highly gregarious, frequently seen in flocks exceeding 100 individuals; also often seen foraging and roosting with other wader species.
- Roosts during high tide on sandy beaches, spits and rocky shores; forage individually or in scattered flocks on wet ground at low tide, usually away from the water's edge.
- Diet includes insects, crustaceans, molluscs and marine worms.
- Prey is usually detected visually with the birds making short, quick runs, with abrupt stops to lunge at the ground or look for prey.

Threats to the species

Threats to the Lesser Sand-plover are identified as being:

- Hydrological changes to estuaries and similar water bodies may modify or remove important areas of suitable habitat.
- Human disturbance at roosting and foraging sites (e.g., walking, fishing, baiting, pets, boating, horses, 4WD, biking, surfing).
- Mangrove incursion into saltmarsh habitat.
- Habitat loss due to development.

- Weed invasion of key habitat.
- Industrial development, e.g., major port expansions and other transport related developments.
- Groundwater pollution impacting foraging habitat and resources.
- Habitat loss from erosion, climate change inundation and sea-level rise.

Potential impacts (if any) of the proposal on the species

The mouth and inner waters of the estuary (Belongil Creek) is known as important habitat for a variety of shorebirds, both migratory and residential. This migratory species, the Lesser Sand-plover, has been recorded from deeper in the estuary, with substantially more records occurring at the West Byron STP. As with all migratory shorebirds, disturbance represents a potential threat to foraging activities.

The extension of the sandbag wall by approx. 50m to prevent continued coastal erosion is located at the base of the eroding dunes, which was at the time of the site assessment approx. 100m from the mouth of Belongil Creek, where a variety of coastal birds were resting. Furthermore, the proposal location is separated from the inner estuary where this species has been recorded. This spatial distance is considered adequate to minimise any disturbance to this species as it forages in the locality.

The total area of impact for the proposal is calculated at approx. 750 m^2, which consists of open beach at the base of the currently eroding dunes. This area represents marginal potential foraging habitat, however, the location high on the beach profile, in an area generally utilised by guests of the resort, is not considered of high value for this species. Additionally, the total area of the development footprint for the proposal is considered negligible in the local context.

Therefore, considering that there is unlikely to be significant disturbance impacts due to adequate spatial separation, and that the loss of potential foraging habitat in the local context is negligible, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Lesser Sand-plover such that a viable local population of the species is likely to be placed at risk of extinction.

Sooty Oystercatcher (*Haematopus fuliginosus*)

Species information

The Sooty Oystercatcher is an unmistakable, large wader, reaching 50 cm in length. Like the Pied Oystercatcher, the Sooty Oystercatcher has a bright orange-red bill, eye-ring and iris, and coral pink legs and feet. However, the Sooty Oystercatcher has entirely black plumage. Sexes are separable when together, with the female having a longer, slenderer bill. The call is similar to the Pied Oystercatcher's, although sharper and more piercing. Gives a loud whistling call before taking flight, and a piercing call if an intruder approaches the nest.

Sooty Oystercatchers are found around the entire Australian coast, including offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW coast. The availability of suitable nesting sites may limit populations.

Habitat and ecology of the species

Key details of the Sooty Oystercatcher's habitat and ecology include that they:

- Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries.
- Forages on exposed rock or coral at low tide for foods such as limpets and mussels.
- Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks.

Threats to the species

Threats to the Sooty Oystercatcher are identified as being:

- Disturbance to coastal feeding, nesting and roosting areas through beach-combing, fishing, dog-walking, horse-riding and 4WD vehicles.
- Predation of eggs and chicks by foxes, dogs, cats, rats and raptors.
- Habitat destruction as a result of residential, agricultural and tourism developments.
- Hydrological changes to estuaries and similar water bodies causing modification or removal of important areas of suitable habitat.

Potential impacts (if any) of the proposal on the species

The mouth and inner waters of the estuary (Belongil Creek) is known as important habitat for a variety of shorebirds, both migratory and residential. This residential species, the Sooty Oystercatcher, has been recorded from both the eastern side of the mouth of the estuary and more regularly from deeper in the estuary. As with all shorebirds, disturbance represents a potential threat to foraging activities.

The extension of the sandbag wall by approx. 50m to prevent continued coastal erosion is located at the base of the eroding dunes, which was at the time of the site assessment approx. 100m from the mouth of Belongil Creek, where a variety of coastal birds were resting at the time. Furthermore, the proposal location is separated from the inner estuary where this species has been most regularly recorded. It is also important to note that the Sooty Oystercatcher favours rocky headlands, rock shelfs and reefs, with beaches and intertidal habitats considered secondary habitat. The development footprint does not contain preferred habitat for this species, and on the occasions that the species forages in the vicinity of the estuary mouth, the spatial distance is considered adequate to minimise any disturbance to this species as it forages in the locality.

The total area of impact for the proposal is calculated at approx. 750 m^2, which consists of open beach at the base of the currently eroding dunes. This area represents marginal potential foraging habitat, however, the location high on the beach profile, in an area generally utilised by guests of the resort, is not considered of high value for this species. Additionally, the total area of the development footprint for the proposal is considered negligible in the local context.

Therefore, considering that there is unlikely to be significant disturbance impacts due to adequate spatial separation, and that the loss of potential foraging habitat in the local context is negligible, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Sooty Oystercatcher such that a viable local population of the species is likely to be placed at risk of extinction.

Pied Oystercatcher (*Haematopus longirostris*)

Species information

The Pied Oystercatcher is an unmistakable, large, black and white wader, reaching 50 cm in length. The sexes are similar yet may be separable when together with the female having a slightly longer, slenderer bill. When not in flight, the Pied Oystercatcher appears entirely black above, with white underparts. The back, head and breast are black, and the belly, rump and tail are white. The tail is tipped black. The wings are black with a narrow white bar on the upperwing and white underwing coverts. The eye-ring, iris and bill of the Pied Oystercatcher are brilliant scarlet, and its legs are stout and coral pink. The most often heard call is a loud, sharp, high-pitched 'kurvee-kurvee-kurvee', usually given in alarm, which increases in pitch and rapidity when a nest site is approached. The South Island Pied Oystercatcher (*H. finschi*) has recently been recorded as a vagrant in NSW. This New Zealand native can be distinguished by a combination of subtle differences, including a shorter bill and legs and differences in the extent of white on the back and wings.

The species is distributed around the entire Australian coastline, although it is most common in coastal Tasmania and parts of Victoria, such as Corner Inlet. In NSW the species is thinly scattered along the entire coast, with fewer than 200 breeding pairs estimated to occur in the State. 'Pied' Oystercatchers are occasionally recorded on Lord Howe island, but it is uncertain which species is involved.

Habitat and ecology of the species

Key details of the Pied Oystercatcher's habitat and ecology include that they:

- Favours intertidal flats of inlets and bays, open beaches and sandbanks.
- Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish.
- Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones.
- Two to three eggs are laid between August and January. The female is the primary incubator, and the young leave the nest within several days.

Threats to the species

Threats to the Pied Oystercatcher are identified as being:

- Predation of eggs and chicks by foxes.
- Disturbance of nesting shorebirds and direct mortality of eggs and chicks by trampling or removal by humans. 4WDs are a threat at some sites.
- Disturbance of nesting shorebirds and direct predation of eggs and chicks by domestic dogs.
- Inundation of nests by high tides, storms and other flooding.
- Predation of eggs and chicks by avian predators (mostly corvids and gulls).
- Loss or degradation of habitat (e.g., nesting areas and foraging areas) due to hydrological changes in estuaries.
- Degradation of habitat due to contamination of estuaries by urban and agricultural run-off, sediment re-suspension and oil-spills.

- Reduction of nesting area due to encroachment of vegetation.
- Entanglement in or ingestion of marine debris.
- Long-term declines of a key food source, the Pipi, as a result of over-harvesting.

Potential impacts (if any) of the proposal on the species

The mouth and inner waters of the estuary (Belongil Creek) is known as important habitat for a variety of shorebirds, both migratory and residential. This residential species, the Pied Oystercatcher, has numerous (*n* = 170) records associated with it, a majority of which have been recorded from both the eastern side of the mouth of the estuary and from deeper in the estuary. The species has also been recorded from open grassland adjacent to the subject land. As with all shorebirds, disturbance represents a potential threat to foraging activities.

The extension of the sandbag wall by approx. 50m to prevent continued coastal erosion is located at the base of the eroding dunes, which was at the time of the site assessment approx. 100m from the mouth of Belongil Creek, where a variety of coastal birds, including the Pied Oystercatcher, were resting at the time. Furthermore, the proposal location is separated from the eastern side and inner estuary where this species has been most regularly recorded. The development footprint does not contain preferred habitat for this species, and on the occasions that the species forages in the vicinity of the estuary mouth, the spatial distance is considered adequate to minimise any disturbance to this species as it forages in the locality.

The total area of impact for the proposal is calculated at approx. 750 m^2, which consists of open beach at the base of the currently eroding dunes. This area represents marginal potential foraging habitat, however, the location high on the beach profile, in an area generally utilised by guests of the resort, is not considered of high value for this species. Additionally, the total area of the development footprint for the proposal is considered negligible in the local context.

Therefore, considering that there is unlikely to be significant disturbance impacts due to adequate spatial separation, and that the loss of potential foraging habitat in the local context is negligible, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Pied Oystercatcher such that a viable local population of the species is likely to be placed at risk of extinction.

Little Tern (*Sternula albifrons*)

Species information

The Little Tern is a small, slender, migratory or partly migratory seabird. At less than 25 cm long it is two-thirds to half the size of any other south-eastern tern. Pale grey upperparts contrast with the white chest, underbelly and the moderately long, deeply forked tail (80 - 110 mm). The Little Tern has a black cap and black outer wing-edges. During breeding the bill (26 - 32 mm) and legs change from black to yellow, and a black wedge appears from the bill to the eye. During non-breeding, the Little Tern's black cap shrinks to a black nape and its bill becomes black.

Migrating from eastern Asia, the Little Tern is found on the north, east and south-east Australian coasts, from Shark Bay in Western Australia to the Gulf of St Vincent in South Australia. In NSW, it arrives from September to November, occurring mainly north of Sydney, with smaller numbers found south to Victoria. It breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months.

Habitat and ecology of the species

Key details of the Little Tern habitat and ecology include that they:

- Almost exclusively coastal, preferring sheltered environments; however, may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records).
- Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands.
- The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles.
- Both parents incubate up to three well-camouflaged eggs for up to 22 days, aggressively defending the nest against intruders until the young fledge at 17 - 19 days.
- Often seen feeding in flocks, foraging for small fish, crustaceans, insects, worms and molluscs by plunging in the shallow water of channels and estuaries, and in the surf on beaches, or skipping over the water surface with a swallow-like flight.

Threats to the species

Threats to the Little Tern habitat are identified as being:

- Predation of eggs and chicks by foxes.
- Disturbance of nesting shorebirds and direct mortality of eggs and chicks by trampling or removal by humans. 4WDs are a threat at some sites.
- Disturbance of nesting shorebirds and direct predation of eggs and chicks by domestic dogs.
- Inundation of nests by high tides, storms and other flooding.
- Predation of eggs and chicks by avian predators (mostly corvids and gulls).
- Loss or degradation of habitat (e.g., nesting areas and foraging areas) due to hydrological changes in estuaries.
- Degradation of habitat due to contamination of estuaries by urban and agricultural run-off, sediment re-suspension and oil-spills.
- Reduction of nesting area due to encroachment of vegetation.
- Entanglement in or ingestion of marine debris.
- Low survival of fledged birds outside nesting areas due to unknown causes.

Potential impacts (if any) of the proposal on the species

The mouth and inner waters of the estuary (Belongil Creek) is known as important habitat for a variety of shorebirds, both migratory and residential. The Little Tern is a known visitor to the mouth of the Belongil estuary, with numerous (n = 69) records occurring from within the 1.5km assessment circle. Unlike other shorebird species assessed as part of this assessment, the Little Tern forages in waters off the coast, rather than foraging on the beach or intertidal areas, so impacts to foraging habitat are expected to be negligible. However, as with all shorebirds, disturbance represents a potential threat.

The extension of the sandbag wall by approx. 50m to prevent continued coastal erosion is located at

the base of the eroding dunes, which was at the time of the site assessment approx. 100m from the mouth of Belongil Creek, where a variety of coastal birds were resting at the time of the site visit. Furthermore, the proposal location is separated from the inner estuary where this species may forage on occasions. This spatial distance is considered adequate to minimise any disturbance to this species as it forages in the locality.

The total area of impact for the proposal is calculated at approx. 750 m^2, which consists of open beach at the base of the currently eroding dunes. As identified, this area does not represent foraging habitat.

Therefore, considering that there is unlikely to be significant disturbance impacts due to adequate spatial separation, and that no loss of potential foraging habitat would occur, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Little Tern such that a viable local population of the species is likely to be placed at risk of extinction.

Sanderling (*Calidris alba*)

Species information

The Sanderling is an active, pale wader reaching 20 cm long. The non-breeding adult is pale grey above and white below, with a black patch at the angle of the wing. It has a short, straight, broad-based black bill, blackish-brown wings with broad, white wing-stripes, and short, black legs. In flight, it shows the widest white wing-bar of any sandpiper, on a very dark wing. The forehead and eyebrows are white; the rump and tail have a brown centre and white sides. Elements of the rufous breeding plumage may be visible in some birds just after their spring arrival or before their autumn departure, and in some overwintering birds.

A regular summer migrant from Siberia and other Arctic breeding grounds to most of the Australian coastline. It is uncommon to locally common, arriving from September and leaving by May (some may overwinter in Australia). Sanderlings occur along the NSW coast, with occasional inland sightings.

Habitat and ecology of the species

Key details of the Sanderlings' habitat and ecology include that they:

- Often found in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats and bare open coastal lagoons, individuals are rarely recorded in near-coastal wetlands.
- Generally, occurs in small flocks, however, may associate freely with other waders.
- Individuals run behind receding waves, darting after insects, larvae, and other small invertebrates in the sand, then dart back up the beach as each wave breaks.
- Also feeds on plants, seeds, worms, crustaceans, spiders, jellyfish and fish, foraging around rotting heaps of kelp, at the edges of shallow pools on sandspits and on nearby mudflats.
- Roosts on bare sand, behind clumps of beach-cast kelp or in coastal dunes.
- Breeding occurs in the Northern Hemisphere.

Threats to the species

Threats to the Sanderlings habitat are identified as being:

- Hydrological changes to estuaries and waterbodies may modify or remove important areas of suitable habitat.
- Disturbance to feeding and roosting sites.
- Pollution of estuaries and coastal areas.
- Tourism or agricultural developments reducing coastal and inland habitat areas.

Potential impacts (if any) of the proposal on the species

The mouth and inner waters of the estuary (Belongil Creek) is known as important habitat for a variety of shorebirds, both migratory and residential. This migratory species, the Sanderling, has several records attributed to it from deeper in the estuary, >200m from the current proposal. As with all migratory shorebirds, disturbance represents a potential threat to foraging activities for the Sanderling.

The extension of the sandbag wall by approx. 50m to prevent continued coastal erosion is located at the base of the eroding dunes, which was at the time of the site assessment approx. 100m from the mouth of Belongil Creek, where a variety of coastal birds were resting. Furthermore, the proposal location is separated from the inner estuary, which is less trafficked than the beach, where this species has been recorded on several occasions. This spatial distance is considered adequate to minimise any disturbance to this species as it forages in the locality.

The total area of impact for the proposal is calculated at approx. 750 m^2, which consists of open beach at the base of the currently eroding dunes. This area represents marginal potential foraging habitat for this species, however, the location high on the beach profile, in an area generally utilised by guests of the resort, is not considered of significant value for this species. Additionally, the total area of the development footprint for the proposal is considered negligible in the local context.

Therefore, considering that there is unlikely to be significant disturbance impacts due to adequate spatial separation, and that the loss of potential foraging habitat in the local context is negligible, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Sanderling such that a viable local population of the species is likely to be placed at risk of extinction.

Curlew Sandpiper (*Calidris ferruginea*)

Species information

The Curlew Sandpiper is a small (18-23 cm), highly-gregarious, migratory shorebird with a medium-length, down-curved bill and longish black legs. During most of their time in Australia, adult birds are in non-breeding plumage, which is a nondescript mottled grey above and paler below, with indistinct white eyebrows and a white rump. In flight there is a white line along the centre of the upper-wings. In breeding plumage the face and underparts are chestnut, and the upperparts are mottled chestnut and black. The down-curved bill distinguishes it from the other similar-sized sandpipers. Many other shorebirds of this size have similar colouration and are easily cofused with the Curlew Sandpiper, but they differ in bill shape, length or colour; leg colour or length; and some lack a white wing bar or white rump.

The Curlew Sandpiper is distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few

days during migration.

The Curlew Sandpiper breeds in Siberia and migrates to Australia (as well as Africa and Asia) for the non-breeding period, arriving in Australia between August and November, and departing between March and mid-April.

Habitat and ecology of the species

Key details of the Curlew Sandpipers habitat and ecology include that they:

- It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coast.
- It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland.
- It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.
- It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores.
- Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds.
- Birds breed at 2 years of age and the oldest recorded bird is 19 years old. Most birds caught in Australia are between 3 and 5 years old.

Threats to the species

Threats to the Curlew Sandpiper are identified as being:

- Development pressure and human disturbance in roosting foraging sites in coastal areas, both in Australia and especially their staging grounds during migration.
- Their tidal feeding grounds on the Yellow Sea are undergoing a rapid rate of transformation due to land reclamation, agriculture and industry with about 10% of the world's human population occupying the river catchments draining into the Yellow Sea.
- Human disturbance at roosting and foraging sites (e.g., walking, fishing, baiting, pets, boating, horses, 4WD, biking, surfing).
- Major floodplain wetlands in the Murray-Darling Basin have had up to 60% reduction in flow, and consequently 40-77% of their area has been destroyed or degraded over the past century.
- Climate Change has also been proposed as a potential threat to migratory shorebirds in their breeding grounds. Average temperatures in the arctic have risen at almost twice the rate of the rest of the world and may detrimentally affect species such as the Curlew Sandpiper that nest in open tundra.
- Mangrove incursion into saltmarsh habitat.
- Groundwater pollution impacting foraging habitat and resources.
- Weed invasion of key habitat.

- Habitat loss due to development including industrial development e.g., major port expansions and other transport related developments.
- Habitat loss from erosion, climate change inundation and sea-level rise.

Potential impacts (if any) of the proposal on the species

The mouth and inner waters of the estuary (Belongil Creek) is known as important habitat for a variety of shorebirds, both migratory and residential. This migratory species, the Curlew Sandpiper, has several records attributed to it from deeper in the estuary, >200m from the current proposal, with additional records occurring at the West Byron STP. As with all migratory shorebirds, disturbance represents a potential threat to foraging activities for the Curlew Sandpiper.

The extension of the sandbag wall by approx. 50m to prevent continued coastal erosion is located at the base of the eroding dunes, which was at the time of the site assessment approx. 100m from the mouth of Belongil Creek, where a variety of coastal birds were resting. Furthermore, the proposal location is separated from the inner estuary where this species has been recorded. This spatial distance is considered adequate to minimise any disturbance to this species as it forages in the locality.

The total area of impact for the proposal is calculated at approx. 750 m^2, which consists of open beach at the base of the currently eroding dunes. This area represents marginal potential foraging habitat, however, the location high on the beach profile, in an area generally utilised by guests of the resort, is not considered of high value for this species. Additionally, the total area of the development footprint for the proposal is considered negligible in the local context.

Therefore, considering that there is unlikely to be significant disturbance impacts due to adequate spatial separation, and that the loss of potential foraging habitat in the local context is negligible, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Curlew Sandpiper such that a viable local population of the species is likely to be placed at risk of extinction.

Common Blossom-bat (*Syconycteris australis*)

Species information

The Common Blossom-bat is a small nectar-eating bats with large eyes. They are around 6 cm long and have very soft fawn to reddish fur. They are highly specialised for a diet of nectar and pollen, having very pointed muzzles and long, thin brush-like tongues.

Coastal areas of eastern Australia from Hawks Nest in NSW to Cape York peninsula in Queensland. In areas, the distribution extends inland to coastal foothills.

Habitat and ecology of the species

Key details of the Common Blossom-bats' habitat and ecology include that they:

- Common Blossom-bats often roost in littoral rainforest and feed on nectar and pollen from flowers in adjacent heathland and paperbark swamps. They have also been recorded in a range of other vegetation communities, such as subtropical rainforest, wet sclerophyll forest and other coastal forests.

- They generally roost individually in dense foliage and vine thickets of the sub-canopy, staying in the same general area for a season. They change roost sites daily, but each roost site is generally only 50m or so away from other recent roosts.
- Favoured feeding sites are repeatedly visited on consecutive nights within a flowering season and revisited over several years.
- They require a year-round supply of nectar and pollen which is gathered from a mosaic of coastal complex vegetation types. When these vegetation types are in short supply of nectar and pollen (Nov/Dec in northern NSW) Common Blossom-bats have been known to utilise riverine areas containing Black Bean, Silky Oak and Weeping Bottlebrush.

Threats to the species

Threats to the Common Blossom-bat habitat are identified as being:

- Clearing of coastal habitat for development resulting in habitat degradation, fragmentation, and edge effects.
- Weeds, such as Bitou Bush, that suppress the regeneration of key food trees, such as Coastal Banksia.
- Predation by foxes and feral cats may occur whilst the bat is feeding on low hanging flowers and fruit.
- Inappropriate fire regimes applied in heathland habitats leading to reduced flowering of Banksia, Callistemon and Melaleuca species.
- Loss of habitat from climate change including inundation of lowland (wallum) habitat, coastal erosion, influx of saline water, as well as drying of littoral forests from temperature rise and increased drought.
- Limited viable habitat for the species reducing NSW population viability.
- Lack of knowledge of threats.
- Impacts from light associated with coastal development affecting behaviour (e.g., reduced foraging), particularly in small reserves where there are edge effects.

Potential impacts (if any) of the proposal on the species

The proposal development footprint may require the removal of a small area (< 75 m^2) of littoral vegetation situated at the top of the eroding dune. This area contains some species, including Coast Banksia, which represents a potential foraging resource for this species. The vegetation that may be impacted is likely to be lost regardless of the proposal, as vegetation is being gradually lost due to the significant erosion occurring. The area is also relatively busy, and unlikely to represent a significant resource for this species. It is considered therefore that little meaningful foraging resources would be impacted as a result of the small loss of marginal habitat.

Therefore, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Common Blossom-bat such that a viable local population of the species is likely to be placed at risk of extinction.

Loggerhead Turtle (*Caretta caretta*)

Species information

The Loggerhead Turtle is a large sea turtle to 1.5 m in length. The shell is an elongated heart-shape, dark brown above and white, cream or yellowish below. The large head is dark brown on top becoming pale at the sides, with darker blotches.

Loggerhead Turtles are found in tropical and temperate waters off the Australian coast. In NSW they are seen as far south as Jervis Bay and have been recorded nesting on the NSW north coast and feeding around Sydney.

Habitat and ecology of the species

Key details of the Loggerhead Turtle's habitat and ecology include that they:

- Loggerhead Turtles are ocean-dwellers, foraging in deeper water for fish, jellyfish and bottom-dwelling animals. The female comes ashore to lay her eggs in a hole dug on the beach in tropical regions during the warmer months.

Threats to the species

Threats to the Loggerhead Turtle are identified as being:

- Collision with boats and other marine traffic causing injury or mortality.
- Entanglement and bycatch in shark nets, traps, lines and other fishing gear causing injury or mortality.
- Entanglement in or ingestion of marine debris.
- Recreational disturbance (e.g., 4WD, people, dogs) impacting turtle nests by trampling, crushing, or vandalism.
- Lack of knowledge of important habitat areas in NSW including nesting beaches.
- Lack of successful nests.
- Lack of knowledge of the species and its threats in NSW to inform management.
- Increases in temperatures, sea level, and extreme weather events from climate change impacting the species distribution and breeding success.
- Artificial light impacting hatchling behaviour and survival.
- Predation of nests by foxes, cats, pigs, or dogs.

Potential impacts (if any) of the proposal on the species

Two (n =2) records occur for this species within the 1.5 km assessment circle, both occurring > 1km from the proposal location. Most records from the Byron Shire occur along Tallow Beach to the east of the subject land, which likely offers preferred nesting habitat.

The extension of the existing sandbag wall to prevent coastal erosion represents a potential barrier to nesting attempts should this species come ashore along this stretch of beach. This is likely only relevant if sandbags are exposed. If the sandbags are covered by sand, this barrier no longer exists.

The potential impact to nesting marine turtles increases with the height of the obstacle, in this case the sandbag wall design. A significant obstacle may cause a pregnant female to abort that nesting attempt. At the time of assessment for this proposal, the existing sandbag wall which would be extended as part of this proposal was partially buried, with sand accretion since installation reducing the height of the obstacle substantially and reducing the threat of an aborted nesting attempt.

If the sandbag wall is re-exposed, the length of the obstacle (subject to this proposal) of approx. 50 m, represents a minor temporary risk of resulting in an unsuccessful nesting event by this species whilst the sandbags are in place.

Therefore, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Loggerhead Turtle such that a viable local population of the species is likely to be placed at risk of extinction.

Green Turtle (*Chelonia mydas*)

Species information

A large sea-turtle that grows up to 1 m in length. Its heart-shaped shell is olive-green, brown and black, and the scales on the side of the face and limbs have distinctive pale edges.

Widely distributed in tropical and sub-tropical seas. Usually found in tropical waters around Australia but also occurs in coastal waters of NSW, where it is generally seen on the north or central coast, with occasional records from the south coast.

Habitat and ecology of the species

Key details of the Green Turtle's habitat and ecology include that they:

- Ocean-dwelling species spending most of its life at sea.
- Carnivorous when young but as adults they feed only on marine plant material.
- Eggs laid in holes dug in beaches throughout their range.
- Scattered nesting records along the NSW coast.

Threats to the species

Threats to the Green Turtle are identified as being:

- Collision with boats and other marine traffic causing injury or mortality.
- Entanglement and bycatch in shark nets, traps, lines and other fishing gear causing injury or mortality.
- Entanglement in or ingestion of marine debris.
- Predation of nests by foxes, cats, pigs, or dogs.
- Recreational disturbance (e.g., 4WD, people, dogs) impacting turtle nests by trampling, crushing, or vandalism.
- Lack of knowledge of important habitat areas in NSW including nesting beaches.
- Lack of successful nests.

- Lack of knowledge of species populations and threats impacting the species in NSW.
- Increased temperatures, sea level, and extreme weather events from climate change impacting the species distribution and breeding success.
- Artificial light impacting hatchling behaviour and survival.

Potential impacts (if any) of the proposal on the species

No records for the Green Turtle occur within the 1.5 km assessment circle. Records for this species generally occur along or adjacent to Clarkes Beach, Main Beach, and The Pass, with additional records for Tallow Beach. These areas likely represent preferred habitat. However, only eleven (*n* = 11) records occur for the Byron Shire, with only one of those attributed to a nesting event, in 1999. Most records from the Byron Shire are from deceased or sick specimens. It is also reported that a Green Turtle left the ocean in a nesting attempt on Clarkes Beach in front of the geotextile bags and returned to the ocean without nesting.

The proposal seeks approval to extend the existing coastal protection works by a further 50m to the west, which would be retained for a nominal 5-year period and undertake dune sand replenishment works. The extension of the sandbag wall is part of temporary coastal protection works to prevent further erosion occurring along this stretch of Belongil Beach. The sandbags would be removed following the 5-year period.

The potential impact to nesting marine turtles increases with the height of the obstacle, in this case the sandbag wall design. A significant obstacle may cause a pregnant female to abort that nesting attempt. At the time of assessment for this proposal, the existing sandbag wall was partially buried, with sand accretion since installation reducing the height of the obstacle substantially and reducing the threat of an aborted nesting attempt.

While the sandbag wall is exposed, or if they are re-exposed, the length of the obstacle (subject to this proposal) of approx. 50 m, represents a minor temporary risk of resulting in an unsuccessful nesting event by this species whilst the sandbags are in place.

Therefore, it is highly unlikely that the proposal would have an adverse effect on the life cycle of the Green Turtle such that a viable local population of the species is likely to be placed at risk of extinction.

b) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(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 development footprint contains a small area (< 75 m^2) of vegetation which contains tree species commonly found within the endangered ecological community (EEC) *Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions,* listed in Schedule 2 of the BC Act 2016. However, the area potentially impacted is narrow, currently eroding, and likely to be lost, contains a sparse ground and mid layer generally and is substantially impacted by high use. It has not been considered for inclusion under the Coastal Management Act 2016 for mapping as Littoral

Rainforest. The area of the development footprint located at the base of the current dunes do not contain any vegetation.

Beyond the subject land, vegetation communities within the locality share geographical and floristic characteristics of EEC vegetation communities; however, none of these vegetation communities would be either directly or indirectly impacted by the proposed development.

The relatively small and low impact scale of the proposal and resultant direct or indirect impacts are such that the proposal would not have an adverse effect on the extent of any ecological community such that its local occurrence is likely to be placed at risk of extinction. Nor would any proposed action substantially and adversely modify the composition of any 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, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, 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.

When applying this factor, consideration has been given to all short-term and long-term impacts (direct and indirect) the proposal may have on habitat which is likely to support threatened species and ecological communities, regardless of whether the habitat occurs on the subject land.

With respect to (i), the proposal would occur on impacted land in a high use coastal zone which is currently eroding. The area of land within the development footprint is generally of low conservation significance in the local context, with regard to the value of habitat it provides. Works within the 750 m^2 development footprint comprises activities with a low level of impact overall. While habitat of conservation value does occur beyond the development proposal on adjacent offsite land, these areas would not be impacted directly or indirectly as a result of the proposal. It is therefore considered that the extent to which habitat is likely to be removed or modified as a result of the action proposed is minimal.

With respect to (ii), vegetation to be removed to accommodate the proposal occurs as a small patch of young age class vegetation already partially separated from other areas of habitat significance. The proposal would not impact on any areas of high habitat value, would not result in areas of habitat becoming fragmented or isolated from other areas, nor impact on the functionality of the foreshore corridor.

With respect to (iii), habitat to be removed for the proposal is either generally in poor condition due to storm damage and exposure, and its biodiversity value in the local context is minimal and unlikely to represent significant habitat for any threatened species with the potential to occur. The actions of the proposal would not significantly affect the long-term survival of any species, populations or ecological communities in the locality.

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)

This applies to declared areas of outstanding biodiversity value ("AOBVs") under Part 3 of the BC Act 2016 and is aimed at assessing whether a development or activity is likely to affect such areas.

The subject land does not contain any area which has been identified and declared as an AOVB. Therefore, AOVBs would not be affected by the proposed development.

e) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

The proposal is not characteristic of any listed Key Threatening Processes (KTP) gazetted pursuant to Schedule 4 of the BC Act 2016 (Table A.1). The degree that the proposal would contribute to any threatening process is not considered likely to place the local population of any of the subject species or communities at significant risk of extinction. The minor impacts to a small area of native vegetation to accommodate the proposal is not likely to represent a KTP due to the low level of disturbance expected of vegetation at the site.

It is considered unlikely that the local population of any of the subject species/communities would be placed at significant risk of extinction because of the proposal.

Table A.1: Key Threatening Processes gazetted pursuant to Schedule 4 of the Biodiversity Conservation Act, 2016.

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*Is the development or activity proposed of a class of development or activity that is recognised as a key threatening process?*		
	Likely	*Possible*	*Unlikely*
Alteration of habitat following subsidence due to longwall mining			✓
Aggressive exclusion of birds by noisy miners			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic climate change			✓
Bush rock removal			✓
Clearing of native vegetation			✓
Competition and grazing by the feral European Rabbit			✓
Competition and habitat degradation by feral goats			✓
Competition from feral honeybees			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*Is the development or activity proposed of a class of development or activity that is recognised as a key threatening process?*		
	Likely	*Possible*	*Unlikely*
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓
Herbivory and environmental degradation caused by feral deer			✓
Importation of red imported fire ants			✓
Infection by *Psittacine circoviral* (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis			✓
Infection of native plants by *Phytophthora cinnamomi*			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae			✓
Introduction of the large earth bumblebee			✓
Invasion and establishment of exotic vines and scramblers			✓
Invasion and establishment of Scotch broom			✓
Invasion and establishment of the Cane Toad			✓
Invasion, establishment and spread of *Lantana camara*			✓
Invasion of native plant communities by African Olive			✓
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)			✓
Invasion of native plant communities by exotic perennial grasses			✓
Invasion of the yellow crazy ant into NSW			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants			✓
Loss of hollow-bearing trees			✓
Loss or degradation (or both) of sites used for hill-topping by butterflies			✓
Predation and hybridisation of feral dogs			✓
Predation by the European red fox			✓
Predation by the feral cat			✓
Predation by *Gambusia holbrooki*			✓
Predation by the Ship Rat on Lord Howe Island			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*Is the development or activity proposed of a class of development or activity that is recognised as a key threatening process?*		
	Likely	*Possible*	*Unlikely*
Predation, habitat degradation, competition and disease transmission by feral pigs			✓
Removal of dead wood and dead trees			✓

Appendix B – BOSET Report

Biodiversity Values Map

269.4 0 134.70 269.4 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	29/03/2023 11:12 AM	**BDAR Required***
Total Digitised Area	1,461.3 sqm	
Minimum Lot Size Method	Lot size	
Minimum Lot Size 10,000sqm = 1ha	20,202 sqm	
Area Clearing Threshold 10,000sqm = 1ha	5,000 sqm	
Area clearing trigger Area of native vegetation cleared	no	no
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no	no
Date of the 90 day Expiry	N/A	

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is '"likely to significantly affect threatened species' as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BMAT user guide for how to do this.

On and after the 90 day expiry date a BDAR will be required.

Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Department of Planning and Environment and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies will all aspects of the *Biodiversity Conservation Act 2016.*

The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

Acknowledgement

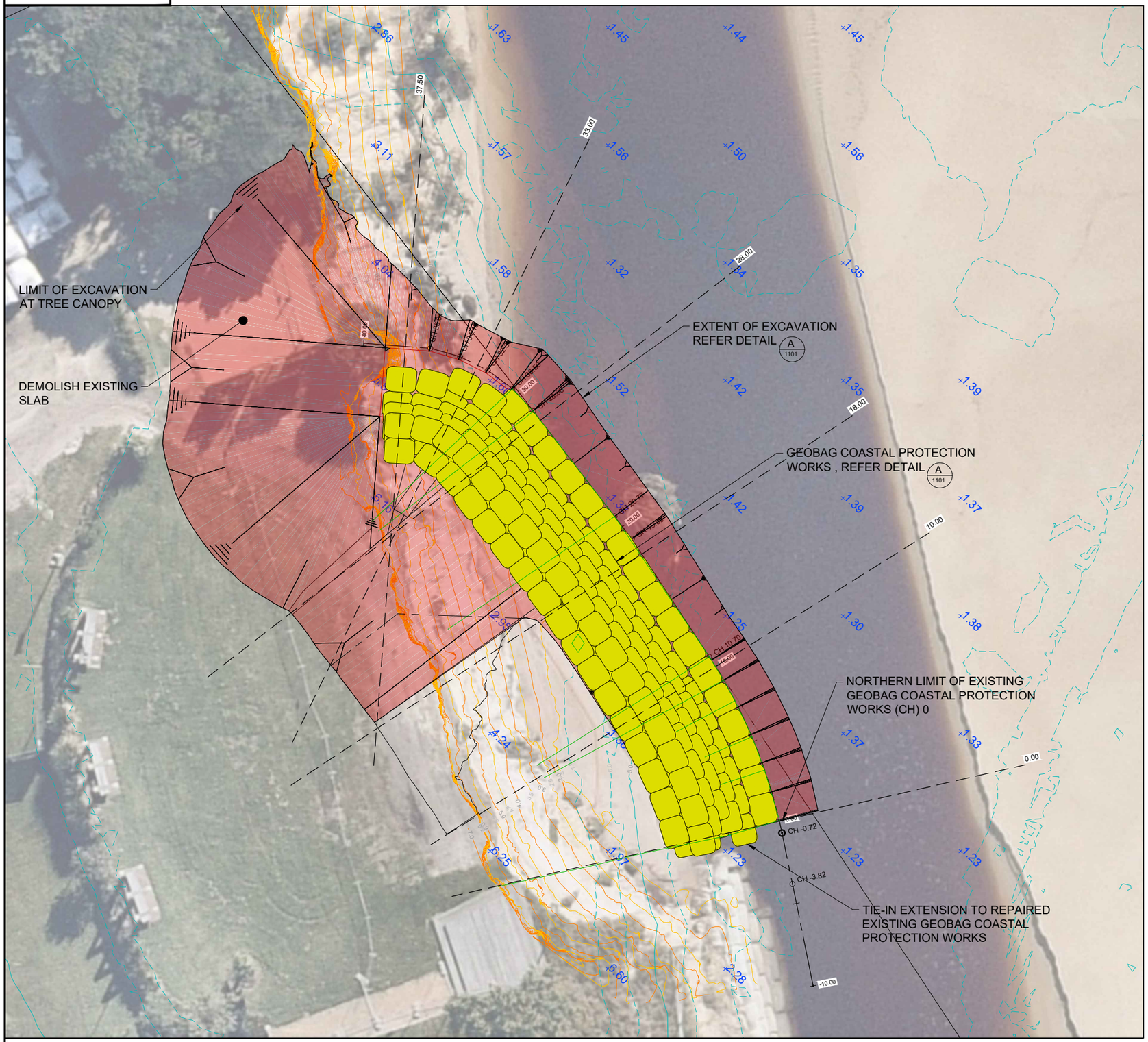
I as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature_____ Date:29/03/2023 11:12 AM

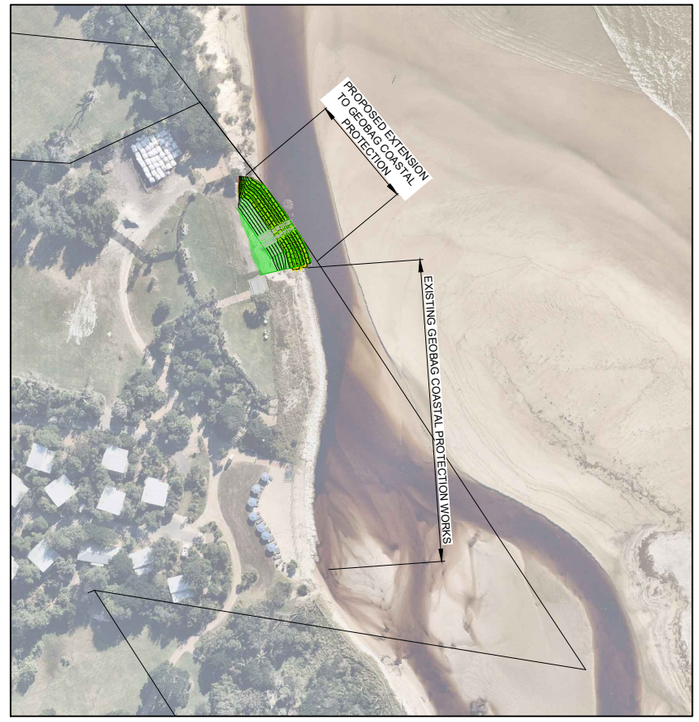
Appendix C – Proposal Engineering Design

DRAWING No.
PA3267-RHD-00-XX-DR-ME-1000

DO NOT SCALE



GENERAL ARRANGEMENT PLAN
1:125



LOCATION PLAN
1:1000

NOTES

1. CONCEPT DESIGN , SUBJECT TO DETAILED DESIGN
2. TIE IN EXTENSION WITH EXISTING GEOBAG COASTAL PROTECTION WORKS
3. REMOVE ANY DELETERIOUS MATERIAL FROM FOOTPRINT OF GEOBAGS PRIOR TO PLACEMENT
4. ALL LEVELS ARE IN METRES REDUCED TO AUSTRALIAN HEIGHT DATUM (AHD)
5. AIR PHOTO BY NEARMAP DATED 16/07/2022
6. REFER TO DRAWINGS 1104 - 1106 FOR RE-ESTABLISHMENT OF DUNE PROFILE

LEGEND

- LAND SURVEY, TERRESTIAL LASER SCANNER, 30th NOV 2022
- LAND SURVEY, MISC POINTS EXTRACTED FROM TERRESTRIAL SCANNER, 30th NOV 2022
- "ELVIS" LIDAR SURVEY, DEC 2018
- EXTENT OF EXCAVATION

2.5 0 2.5 5 7.5 10 12.5m
1:250 (A3) 1:125 (A1)

20 0 20 40 60 80 100m
1:2000 (A3) 1:1000 (A1)

NOT FOR CONSTRUCTION

AUSTRALIAN HEIGHT DATUM

REV	DATE	DESCRIPTION	BY	CHK	APP
P02	29.05.2023	ISSUED FOR DA	SGB	GWB	
P01	31.03.2023	ISSUED FOR INFORMATION	SGB		

REVISIONS

CLIENT

ELEMENTS OF BYRON

PROJECT
ELEMENTS OF BYRON
EXTENSION TO EXISTING COASTAL PROTECTION WORKS

TITLE
GENERAL ARRANGEMENT AND LOCATION PLAN

Level 15, 99 Mount Street
North Sydney NSW 2060
Australia
Tel: +61 2 88545000
Fax: +61 2 99290960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

Royal HaskoningDHV
Enhancing Society Together

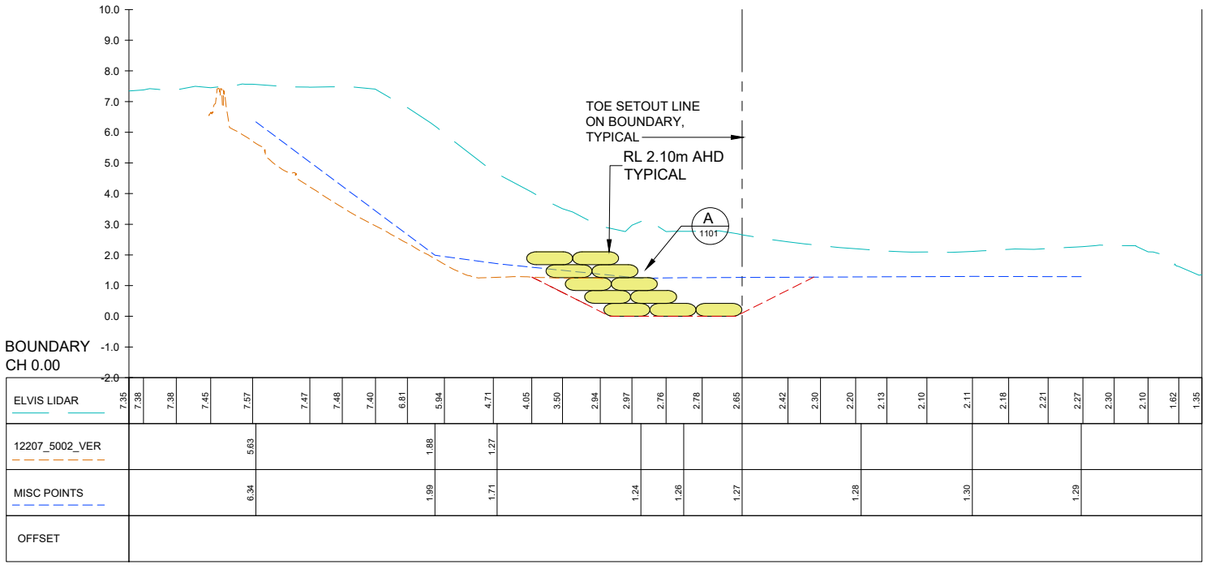
DRAWN	COORD. SYSTEM	DATUM	DATE
SGB	GDA 2020	AHD	29.05.2023
SCALE	REF		
AS SHOWN	PA3267-RHD-00-M3-ME-0001B		

DRAWING No.	SUITABILITY	REVISION
PA3267-RHD-00-XX-DR-ME-1000	S0	P02

C:\USERS\220000\ROYAL HASKONINGDHV\PROJECT-PA3267-ELEMENTS-OF-BYRON - WIP\CAD\WORKING DRAWINGS\PA3267-RHD-00-M3-ME-0001B

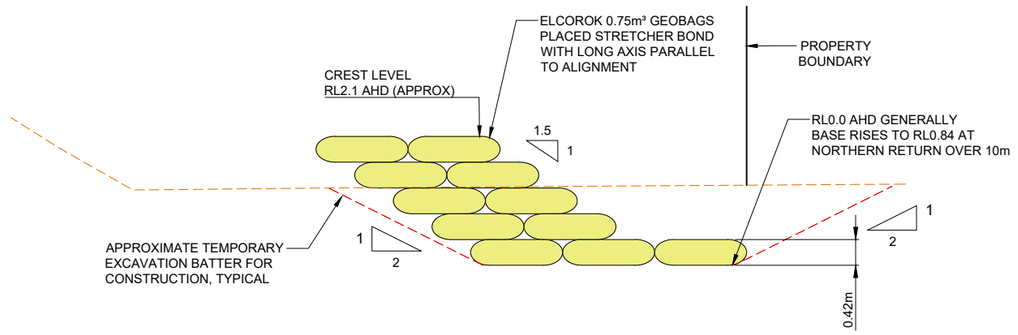
DRAWING No.
PA3267-RHD-00-XX-DR-ME-1101

DO NOT SCALE



NOTES

1. CONCEPT DESIGN , SUBJECT TO DETAILED DESIGN
2. TIE IN EXTENSION WITH EXISTING GEOBAG COASTAL PROTECTION WORKS
3. REMOVE ANY DELETERIOUS MATERIAL FROM FOOTPRINT OF GEOBAGS PRIOR TO PLACEMENT
4. ALL LEVELS ARE IN METRES REDUCED TO AUSTRALIAN HEIGHT DATUM (AHD)



DETAIL A
AS SHOWN

LEGEND

- LAND SURVEY, TERRESTIAL LASER SCANNER, 30th NOV 2022
- LAND SURVEY, MISC POINTS EXTRACTED FROM TERRESTRIAL SCANNER, 30th NOV 2022
- "ELVIS" LIDAR SURVEY, DEC 2018

AUSTRALIAN HEIGHT DATUM

NOT FOR CONSTRUCTION

2 0 2 4 6 8 10m
1:200 (A3) 1:100 (A1)

REV	DATE	DESCRIPTION	BY	CHK	APP
P02	29.05.2023	ISSUED FOR DA	SGB	GWB	
P01	31.03.2023	ISSUED FOR INFORMATION	SGB		

REVISIONS

CLIENT

ELEMENTS OF BYRON

PROJECT
ELEMENTS OF BYRON
EXTENSION TO EXISTING COASTAL PROTECTION WORKS

TITLE
CROSS SECTIONS
SHEET 1

Royal HaskoningDHV
Enhancing Society Together
Level 15, 99 Mount Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 99250960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

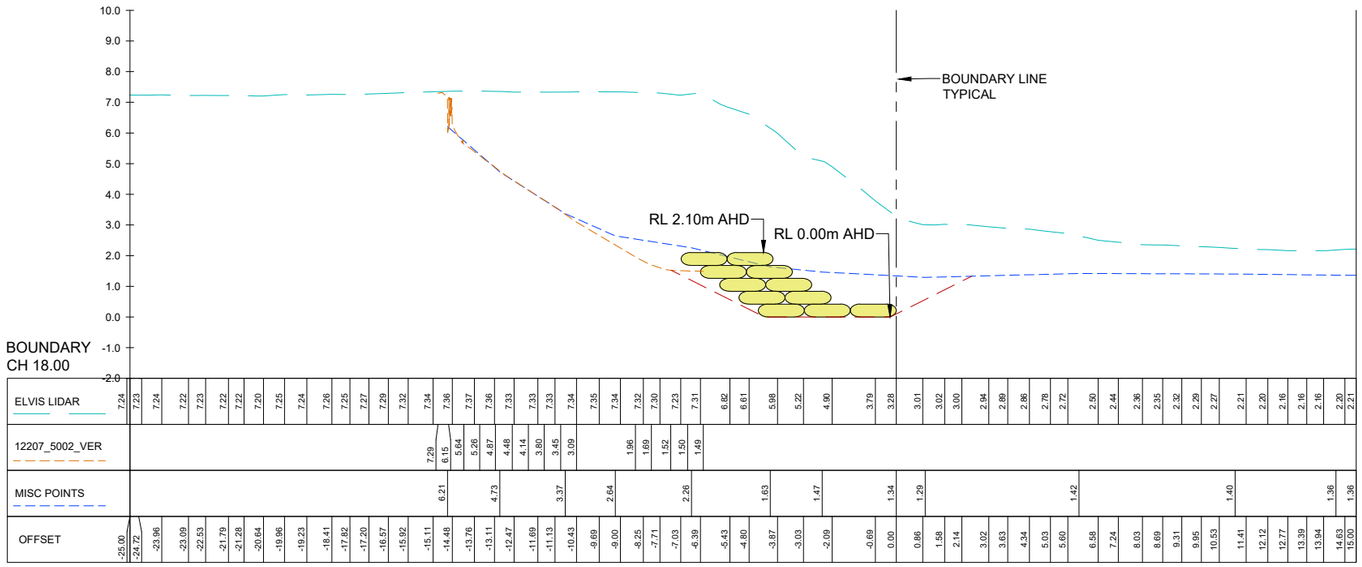
DRAWN	COORD. SYSTEM	DATUM	DATE
SGB	GDA 2020	AHD	29.05.2023
SCALE	REF.		
AS SHOWN	PA3267-RHD-00-M3-ME-0001B		

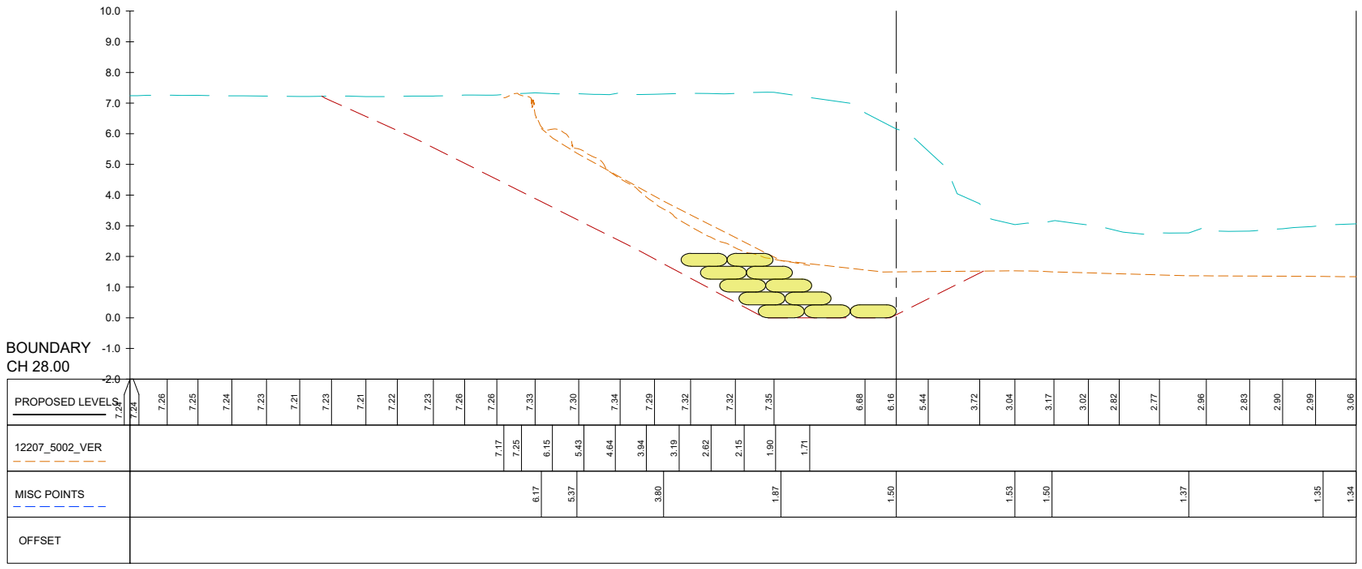
DRAWING No.	SUITABILITY	REVISION
PA3267-RHD-00-XX-DR-ME-1101	S0	P02

C:\USERS\220000\ROYAL HASKONINGDHV\PROJECT-PA3267-ELEMENTS-OF-BYRON - WIP\CAD\WORKING DRAWINGS\PA3267-RHD-00-M3-ME-0001B

DRAWING No.
PA3267-RHD-00-XX-DR-ME-1102

DO NOT SCALE





NOTES

1. CONCEPT DESIGN , SUBJECT TO DETAILED DESIGN
2. TIE IN EXTENSION WITH EXISTING GEOBAG COASTAL PROTECTION WORKS
3. REMOVE ANY DELETERIOUS MATERIAL FROM FOOTPRINT OF GEOBAGS PRIOR TO PLACEMENT
4. ALL LEVELS ARE IN METRES REDUCED TO AUSTRALIAN HEIGHT DATUM (AHD)

LEGEND

- LAND SURVEY, TERRESTIAL LASER SCANNER, 30th NOV 2022
- LAND SURVEY, MISC POINTS EXTRACTED FROM TERRESTRIAL SCANNER, 30th NOV 2022
- "ELVIS" LIDAR SURVEY, DEC 2018

AUSTRALIAN HEIGHT DATUM

NOT FOR CONSTRUCTION

2 0 2 4 6 8 10m

1:200 (A3) 1:100 (A1)

REV	DATE	DESCRIPTION	BY	CHK	APP
P02	29.05.2023	ISSUED FOR DA	SGB	GWB	
P01	31.03.2023	ISSUED FOR INFORMATION	SGB		

REVISIONS

CLIENT

ELEMENTS OF BYRON

PROJECT

ELEMENTS OF BYRON
EXTENSION TO EXISTING COASTAL PROTECTION WORKS

TITLE

CROSS SECTIONS
SHEET 2

Royal HaskoningDHV
Enhancing Society Together
Level 15, 99 Mount Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 99290960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	COORD. SYSTEM	DATUM	DATE
SGB	GDA 2020	AHD	29.05.2023
SCALE	REF.		
AS SHOWN	PA3267-RHD-00-M3-ME-0001B		

DRAWING No.	SUITABILITY	REVISION
PA3267-RHD-00-XX-DR-ME-1102	S0	P02

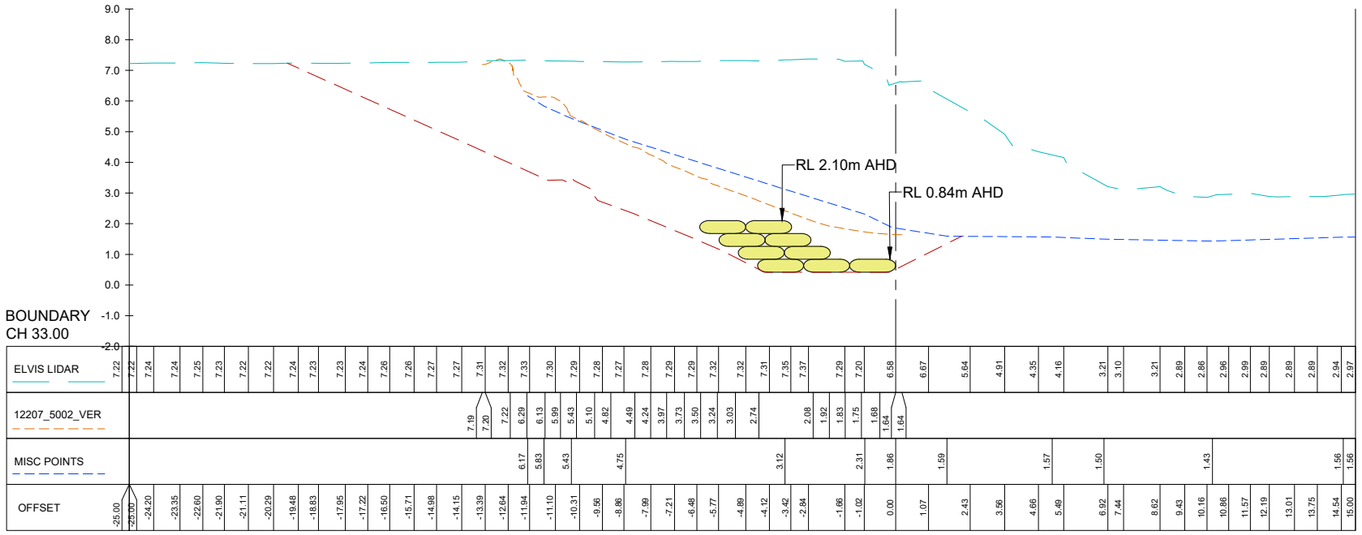
C:\USERS\220000\ROYAL HASKONINGDHV\PROJECT-PA3267-ELEMENTS-OF-BYRON - WIP\CAD\WORKING DRAWINGS\PA3267-RHD-00-M3-ME-0001B

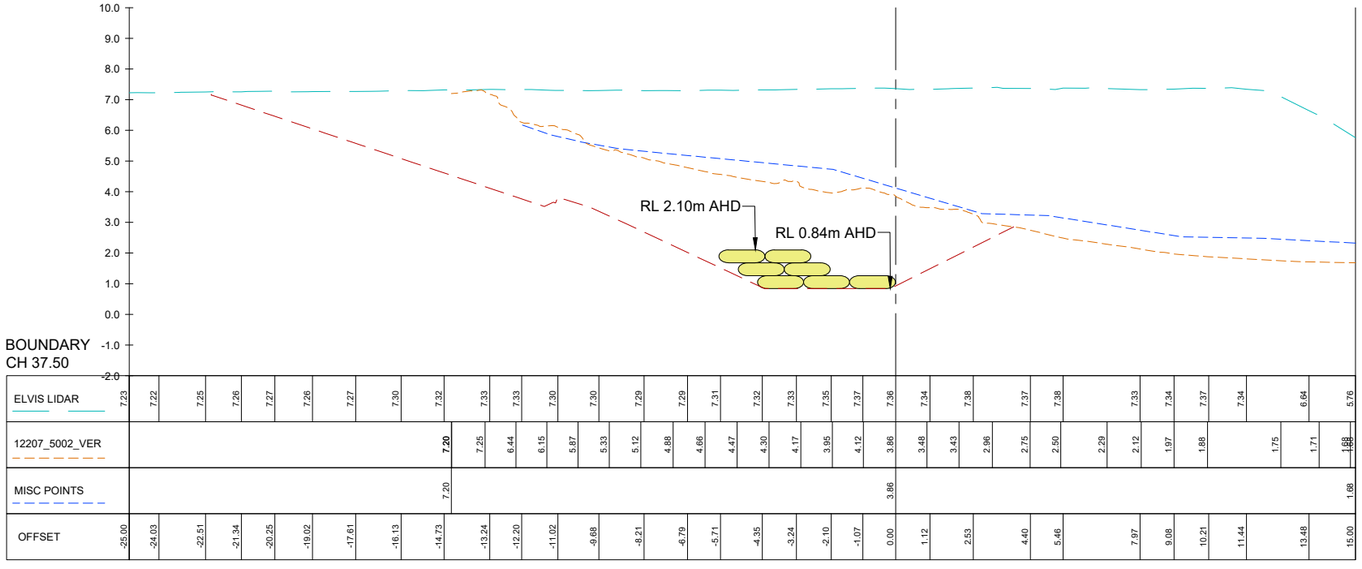
DRAWING No.
PA3267-RHD-00-XX-DR-ME-1103

DO NOT SCALE

NOTES

1. CONCEPT DESIGN , SUBJECT TO DETAILED DESIGN
2. TIE IN EXTENSION WITH EXISTING GEOBAG COASTAL PROTECTION WORKS
3. REMOVE ANY DELETERIOUS MATERIAL FROM FOOTPRINT OF GEOBAGS PRIOR TO PLACEMENT
4. ALL LEVELS ARE IN METRES REDUCED TO AUSTRALIAN HEIGHT DATUM (AHD)





LEGEND

- LAND SURVEY, TERRESTIAL LASER SCANNER, 30th NOV 2022
- LAND SURVEY, MISC POINTS EXTRACTED FROM TERRESTRIAL SCANNER, 30th NOV 2022
- "ELVIS" LIDAR SURVEY, DEC 2018

AUSTRALIAN HEIGHT DATUM

NOT FOR CONSTRUCTION

2 0 2 4 6 8 10m

1:200 (A3) 1:100 (A1)

REV	DATE	DESCRIPTION	BY	CHK	APP
P02	29.05.2023	ISSUED FOR DA	SGB	GWB	
P01	31.01.2023	-	SGB		

REVISIONS

CLIENT

ELEMENTS OF BYRON

PROJECT
ELEMENTS OF BYRON
EXTENSION TO EXISTING COASTAL PROTECTION WORKS

TITLE
CROSS SECTIONS
SHEET 3

Level 15, 99 Mount Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 99250960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

Royal HaskoningDHV
Enhancing Society Together

DRAWN	COORD. SYSTEM	DATUM	DATE
SGB	GDA 2020	AHD	29.05.2023
SCALE	REF:		
AS SHOWN	PA3267-RHD-00-M3-ME-0001B		

DRAWING No.	SUITABILITY	REVISION
PA3267-RHD-00-XX-DR-ME-1103	S0	P02

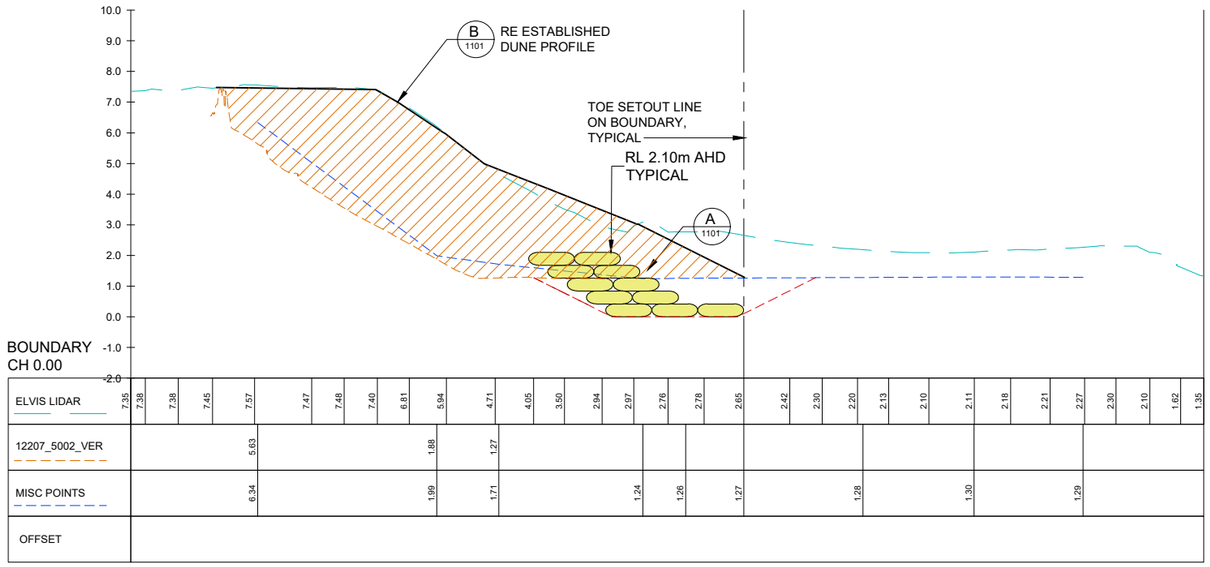
C:\USERS\220000\ROYAL HASKONINGDHV\PROJECT-PA3267-ELEMENTS-OF-BYRON - WIP\CAD\WORKING DRAWINGS\PA3267-RHD-00-M3-ME-0001B

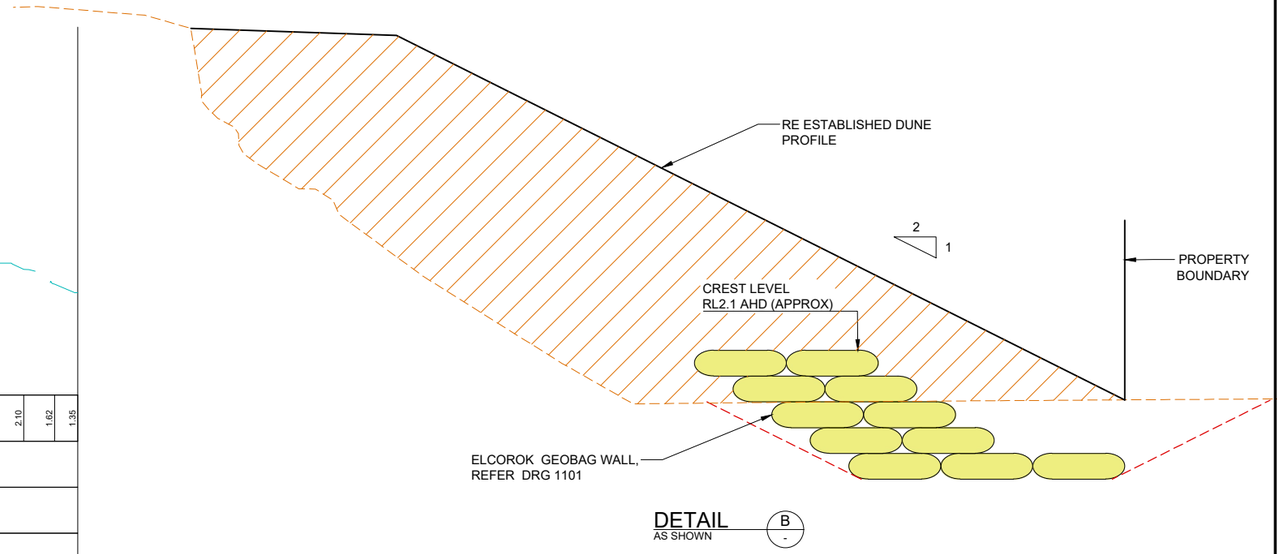
DRAWING No.
PA3267-RHD-00-XX-DR-ME-1104

DO NOT SCALE

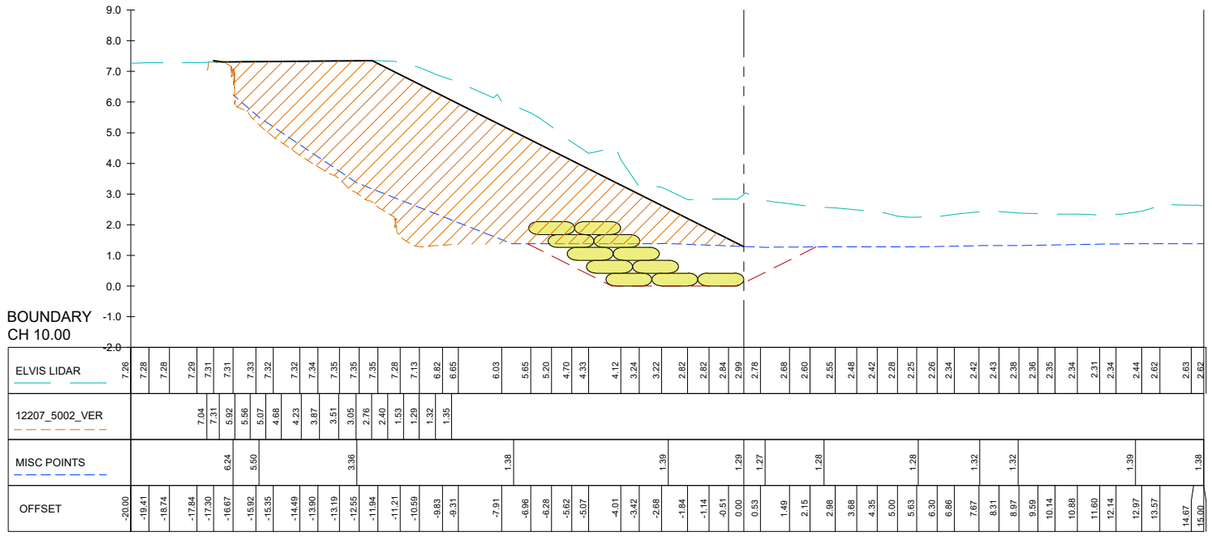
NOTES

1. CONCEPT DESIGN , SUBJECT TO DETAILED DESIGN
2. TIE IN EXTENSION WITH EXISTING GEOBAG COASTAL PROTECTION WORKS
3. REMOVE ANY DELETERIOUS MATERIAL FROM FOOTPRINT OF GEOBAGS PRIOR TO PLACEMENT
4. ALL LEVELS ARE IN METRES REDUCED TO AUSTRALIAN HEIGHT DATUM (AHD)





DETAIL B
AS SHOWN -



LEGEND

- LAND SURVEY, TERRESTIAL LASER SCANNER, 30th NOV 2022
- LAND SURVEY, MISC POINTS EXTRACTED FROM TERRESTRIAL SCANNER, 30th NOV 2022
- "ELVIS" LIDAR SURVEY, DEC 2018
- RE-ESTABLISHED DUNE PROFILE

AUSTRALIAN HEIGHT DATUM

NOT FOR CONSTRUCTION

2 0 2 4 6 8 10m
1:200 (A3) 1:100 (A1)

REV	DATE	DESCRIPTION	BY	CHK	APP
P01	29.05.2023	ISSUED FOR DA	SGB	GWB	

REVISIONS

CLIENT

ELEMENTS OF BYRON

PROJECT
ELEMENTS OF BYRON
EXTENSION TO EXISTING COASTAL PROTECTION WORKS

TITLE
RE-ESTABLISHMENT OF DUNE PROFILE SHEET 1

Level 15, 99 Mount Street,
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 99200360
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

Royal HaskoningDHV
Enhancing Society Together

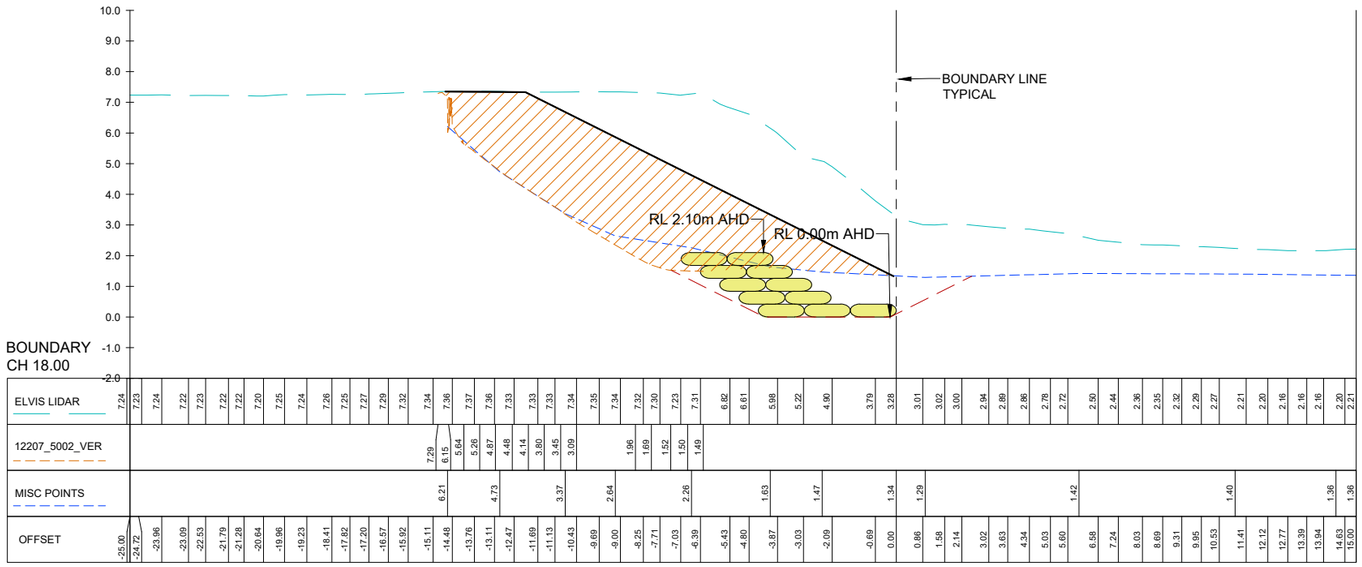
DRAWN	COORD. SYSTEM	DATUM	DATE
SGB	GDA 2020	AHD	29.05.2023
SCALE	REF		
AS SHOWN	PA3267-RHD-00-M3-ME-0001B		

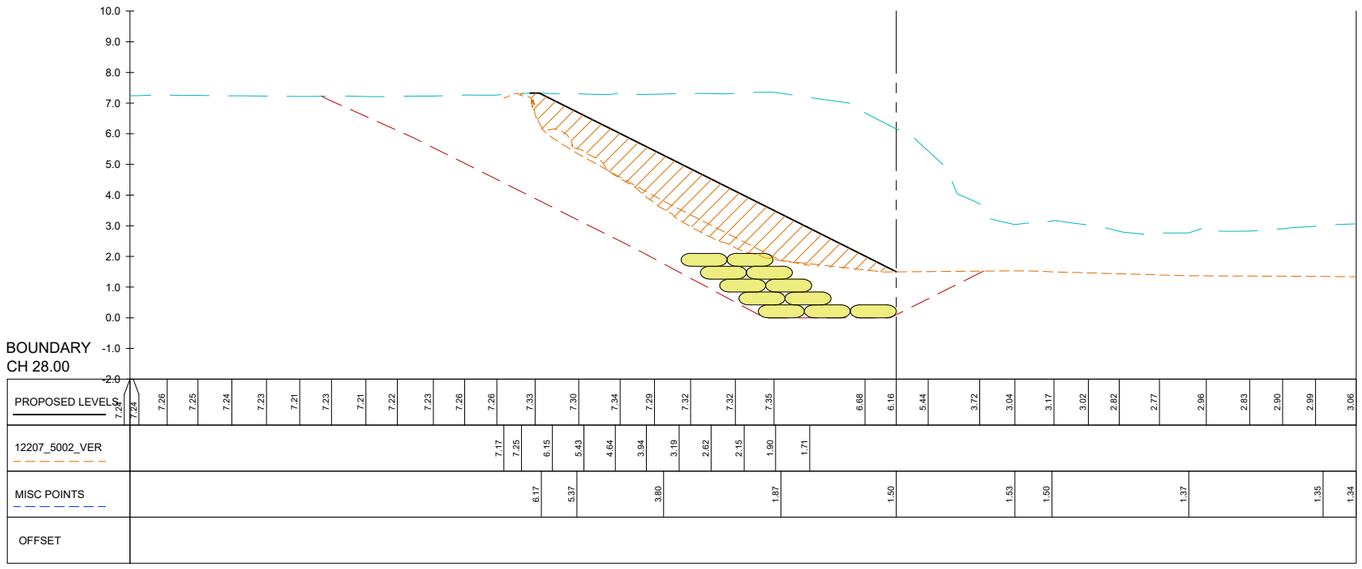
DRAWING No.	SUITABILITY	REVISION
PA3267-RHD-00-XX-DR-ME-1104	S0	P01

C:\USERS\220000\ROYAL HASKONINGDHV\PROJECT-PA3267-ELEMENTS-OF-BYRON - WIP\CAD\WORKING DRAWINGS\PA3267-RHD-00-M3-ME-0001B

DRAWING No.
PA3267-RHD-00-XX-DR-ME-1105

DO NOT SCALE





NOTES

1. CONCEPT DESIGN , SUBJECT TO DETAILED DESIGN
2. TIE IN EXTENSION WITH EXISTING GEOBAG COASTAL PROTECTION WORKS
3. REMOVE ANY DELETERIOUS MATERIAL FROM FOOTPRINT OF GEOBAGS PRIOR TO PLACEMENT
4. ALL LEVELS ARE IN METRES REDUCED TO AUSTRALIAN HEIGHT DATUM (AHD)

LEGEND

- LAND SURVEY, TERRESTIAL LASER SCANNER, 30th NOV 2022
- LAND SURVEY, MISC POINTS EXTRACTED FROM TERRESTRIAL SCANNER, 30th NOV 2022
- "ELVIS" LIDAR SURVEY, DEC 2018
- RE-ESTABLISHED DUNE PROFILE

AUSTRALIAN HEIGHT DATUM

NOT FOR CONSTRUCTION

2 0 2 4 6 8 10m

1:200 (A3) 1:100 (A1)

REV	DATE	DESCRIPTION	BY	CHK	APP
P01	29.05.2023	ISSUED FOR DA	SGB	GWB	

REVISIONS

CLIENT

ELEMENTS OF BYRON

PROJECT

ELEMENTS OF BYRON
EXTENSION TO EXISTING COASTAL PROTECTION WORKS

TITLE

RE-ESTABLISHMENT OF DUNE PROFILE SHEET 2

Level 15, 99 Mount Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 99290960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

Royal HaskoningDHV
Enhancing Society Together

DRAWN	COORD. SYSTEM	DATUM	DATE
SGB	GDA 2020	AHD	29.05.2023
SCALE	REF.		
AS SHOWN	PA3267-RHD-00-M3-ME-0001B		

DRAWING No.	SUITABILITY	REVISION
PA3267-RHD-00-XX-DR-ME-1105	S0	P01

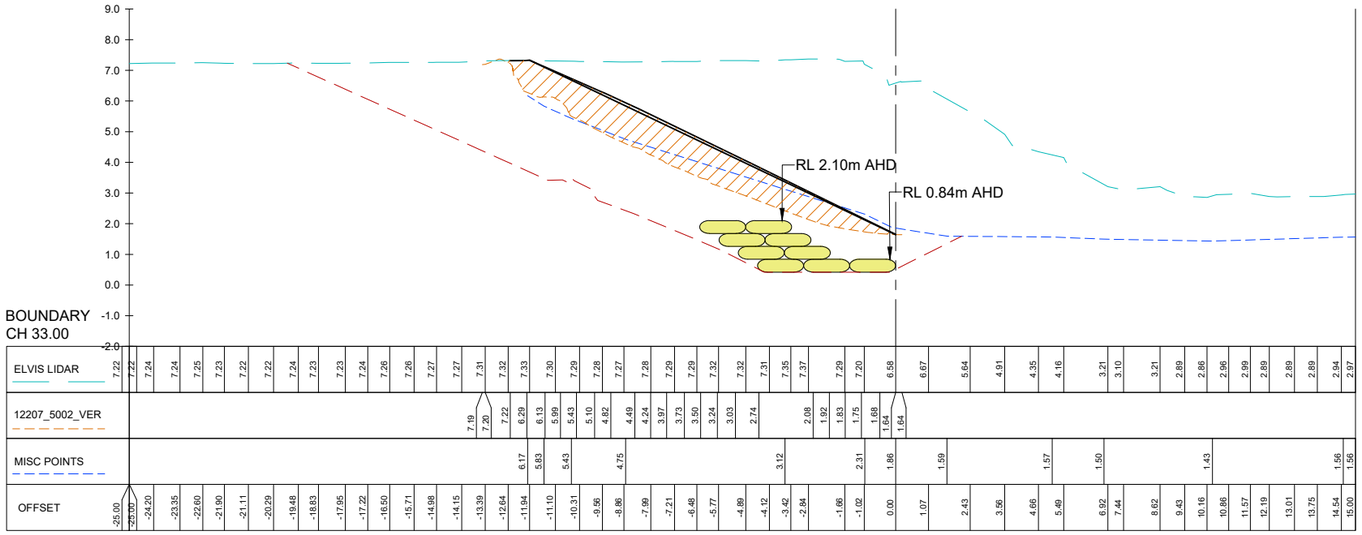
C:\USERS\220000\ROYAL HASKONINGDHV\PROJECT-PA3267-ELEMENTS-OF-BYRON - WIP\CAD\WORKING DRAWINGS\PA3267-RHD-00-M3-ME-0001B

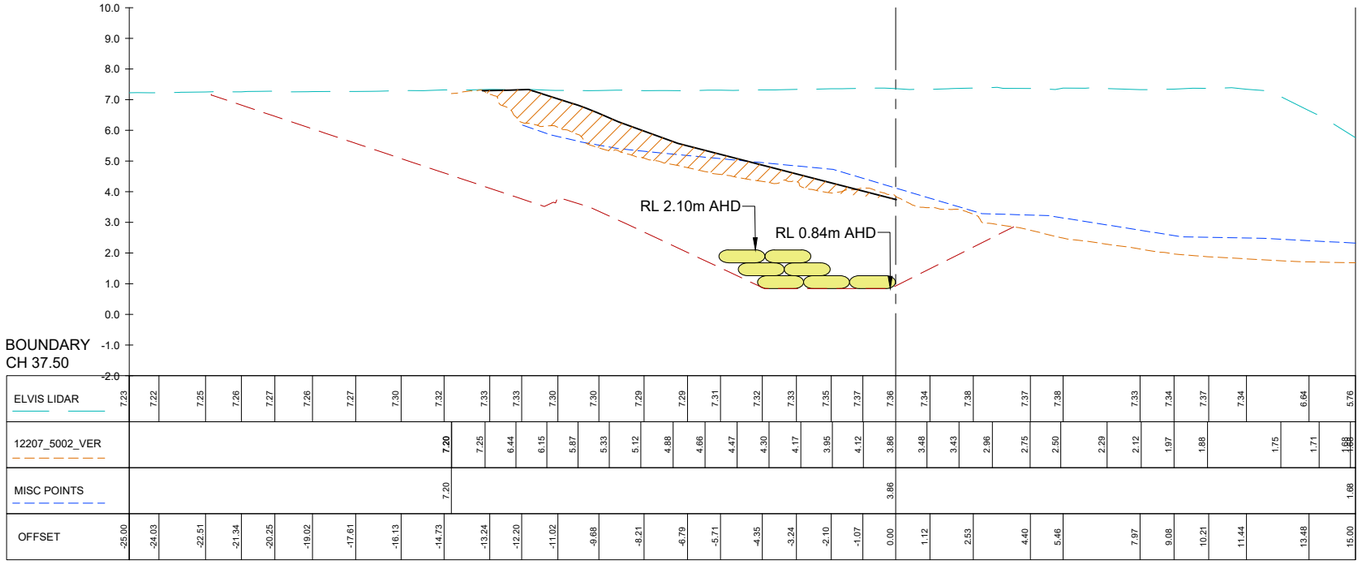
DRAWING No.
PA3267-RHD-00-XX-DR-ME-1106

DO NOT SCALE

NOTES

1. CONCEPT DESIGN , SUBJECT TO DETAILED DESIGN
2. TIE IN EXTENSION WITH EXISTING GEOBAG COASTAL PROTECTION WORKS
3. REMOVE ANY DELETERIOUS MATERIAL FROM FOOTPRINT OF GEOBAGS PRIOR TO PLACEMENT
4. ALL LEVELS ARE IN METRES REDUCED TO AUSTRALIAN HEIGHT DATUM (AHD)





LEGEND

- LAND SURVEY, TERRESTIAL LASER SCANNER, 30th NOV 2022
- LAND SURVEY, MISC POINTS EXTRACTED FROM TERRESTRIAL SCANNER, 30th NOV 2022
- "ELVIS" LIDAR SURVEY, DEC 2018
- RE-ESTABLISHED DUNE PROFILE

AUSTRALIAN HEIGHT DATUM

NOT FOR CONSTRUCTION

2 0 2 4 6 8 10m
1:200 (A3) 1:100 (A1)

REV	DATE	DESCRIPTION	BY	CHK	APP
P01	29.05.2023	ISSUED FOR DA	SGB	GWB	

REVISIONS

CLIENT

ELEMENTS OF BYRON

PROJECT
ELEMENTS OF BYRON
EXTENSION TO EXISTING COASTAL PROTECTION WORKS

TITLE
RE-ESTABLISHMENT OF DUNE PROFILE SHEET 3

Level 15, 99 Mount Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 99250960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

Royal HaskoningDHV
Enhancing Society Together

DRAWN	COORD. SYSTEM	DATUM	DATE
SGB	GDA 2020	AHD	29.05.2023
SCALE	REF:		
AS SHOWN	PA3267-RHD-00-M3-ME-0001B		

DRAWING No.	SUITABILITY	REVISION
PA3267-RHD-00-XX-DR-ME-1106	S0	P01

C:\USERS\220000\ROYAL HASKONINGDHV\PROJECT-PA3267-ELEMENTS-OF-BYRON - WIP\CAD\WORKING DRAWINGS\PA3267-RHD-00-M3-ME-0001B