CENTRAL COAST COUNCIL

Central Coast Open Coast

Coastal Management Program - DRAFT

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Synopsis

This report provides a draft Coastal Management Program for the Central Coast Open Coast. It has been prepared on behalf of Central Coast Council.

Disclaimer

PROJECT 311015-00572 - CS-REP-005: Central Coast Open Coast - Coastal Management Program - DRAFT

Rev	Description	Originator	Reviewer	Worley Approver	Revision Date	Customer Approver	Approval Date
Rev A	Draft for Internal Review	CA			23.05.2025		
Rev B	Draft	CA	CA, AFN	CA	25.05.2025		

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Acknowledgement of Country

"We acknowledge the Traditional Custodians of the land on which we live, work and play. We pay our respects to Darkinjung country, and Elders past and present. We recognise the continued connection to these lands and waterways and extend this acknowledgement to the homelands and stories of those who also call this place home. We recognise our future leaders and the shared responsibility to care for and protect our place and people."

Acronyms and abbreviations

Acronym/ abbreviation	Definition
ABS	Australian Bureau of Statistics
AEP	Annual Exceedance Probability, refers to the probability that a particular event will be exceeded in any given year.
AID	Action Implementation Database
ALRA	Aboriginal Land Rights Act 1983
ARI	Average Recurrence Interval, sometimes used in place of AEP. For example, a 100 year ARI storm event is equivalent to a storm event with an AEP of 1%, which has a 1% probability of being exceeded every year.
AS/NZS	Australian Standard/New Zealand Standard
CBA	Cost Benefit Analysis
CCC	Central Coast Council
CCDCP	Central Coast Development Control Plan 2022
CCLEP	Central Coast Local Environment Plan 2022
CEA	Coastal Environment Area
CLM Act	Crown Land Management Act
CM Act	NSW Coastal Management Act 2016
CM Manual	NSW Coastal Management Manual
CMA	Coastal Management Area
CMP	Coastal Management Program
COSS	Coastal Open Space System
CSP	Central Coast Community Strategic Plan
CUA	Coastal Use Area
CVA	Coastal Vulnerability Area
CWLRA	Coastal Wetland and Littoral Rainforest Area
CZEAS	Coastal Zone Emergency Action Subplan
CZMP	Coastal Zone Management Plan
DA	Development Application
DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
DCCEEW-CPHR	Conservation Programs, Heritage and Regulation Group of DCCEEW
DCP	Development Control Plan
DLALC	Darkinjung Local Aboriginal Land Council
DP	Delivery Program
DP&E	Department of Planning & Environment, now DCCEEW
DPHI	NSW Department of Planning, Housing and Infrastructure (Crown Lands)
DPI	Department of Primary Industries, now DPIRD Fisheries
DPIRD Fisheries	NSW Department of Primary Industries and Regional Development, Fisheries
DRF	Disaster Ready Fund
EDR	Engineering Design Requirements
ENSO	ENSO is the term used to describe the oscillation between the El Niño phase and the La Niña, or opposite, phase. The phases of ENSO are tracked by a metric known as the Southern Oscillation Index (SOI), which measures the difference in surface air pressure between Tahiti and Darwin

Acronym/ abbreviation	Definition
EP&A Act	Environmental Planning & Assessment Act 1979
ESD	Ecologically Sustainable Development
FAQs	Frequently Asked Questions
FM Act	Fisheries Management Act 1994
GPT	Gross Pollutant Trap
IAS	Indigenous Advancement Strategy
ICOLL	Intermittently Closed or Open Lake or Lagoon
IFC	International Finance Corporation
IP&R	Integrated Planning and Reporting Framework
ISO	International Standards Organisation
LALC	Local Aboriginal Land Council
LEP	Central Coast Local Environment Plan 2022
LG Act	Local Government Act 1993
LGA	Local Government Area
LIDAR	Light Detection and Ranging, a remote sensing technology that uses laser light to measure distances and create detailed 3D representations of objects and environments
LLS	NSW Local Land Services
m	metres
MCA	Multi Criteria Analysis
MEMA	Marine Estate Management Authority
MEMS	NSW Marine Estate Management Strategy
MER	Monitoring, Evaluation and Reporting
MHL	Manly Hydraulics Laboratory
MIDO	Maritime Infrastructure Delivery Office
MS	Microsoft
NIAA	National Indigenous Australians Agency
NPWS	National Parks and Wildlife Service
NSW	New South Wales
NSW SES	New South Wales State Emergency Service
OEH	Office of Environment and Heritage, now DCCEEW
POM	Plan of Management
RH SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
SDMPs	State Disaster Mitigation Plans
SEPP	State Environmental Planning Policy
SOI	Southern Oscillation Index
SoS	Saving our Species program
St	Street
TfNSW	Transport for NSW
TSC Act	Threatened Species Conservation Act 1995
ZSA	Zone of Slope Adjustment

Executive Summary

Overview of the CMP

Central Coast Council (Council), with the assistance of the NSW Government, is preparing their Coastal Management Program (CMP) for the Open Coast. The future management of the Central Coast Open Coast is to be guided by a CMP as described under the NSW Coastal Management Framework and the *NSW Coastal Management Act 2016* (CM Act). The CMP aims to ensure the integrated and effective management of the coastal zone, considering environmental, social, and economic factors. Specifically, the CMP is a plan of management for Council, Public Authorities and land managers responsible for management of the coastal zone to:

- address coastal hazard risks;
- preserve cultural use and habitats;
- encourage sustainable development in the coastal zone (agricultural, economic and built);
- maintain and improve recreational amenity; and,
- adapt to emerging issues.

The study area for the CMP includes the Central Coast open coast areas as illustrated in Figure E-1. In particular, the Study Area includes those areas mapped as Coastal Wetlands/Coastal Wetland Proximity Areas, Littoral Rainforest/Littoral Rainforest Proximity Areas, Coastal Environment Areas and Coastal Use Areas under the *State Environment Planning Policy (Resilience and Hazards) 2021* (the SEPP).

The CMP aims to ensure the integrated and effective management of the coastal zone, considering environmental, social, and economic factors. The CMP outlines specific actions over a 10-year management cycle and provides details on how the actions will be delivered, monitored, funded and evaluated.

As per the process described in the NSW Coastal Management Manual (NSW Office of Environment and Heritage, 2018), the CMP procedure is divided into five stages as illustrated in Figure E-2.

- **Stage 1** (Royal Haskoning DHV, 2021) included a review of relevant background information, a first pass risk assessment, data gap analysis and proposed a forward program for the CMP.
- **Stage 2** (Bluecoast Consulting Engineers, 2024-2025) included a Coastal Hazard Study, which investigated beach erosion/recession, cliff recession, coastal inundation and tidal inundation for immediate, 2040, 2050, 2070 and 2120 planning periods throughout the Central Coast LGA. The updated coastal hazard mapping (Bluecoast Consulting Engineers, 2024-2025) provides probabilistic coastal hazard extents for coastal erosion events up to the 100 year Average Recurrence Interval (ARI) (or 1% Annual

Exceedance Probability). The mapping indicates which areas are at risk from beach erosion/recession, cliff recession and coastal inundation over the various planning periods, to assist in defining which assets are subject to the highest level of risk, with these risks considered in defining coastal management options in Stage 3. Further, the Central Coast Recreational Use Study (Vision Environment, 2022) was undertaken as part of Stage 2, to identify the coastal recreational activities occurring in the area and determine the adequacy of public amenities and infrastructure to accommodate for those activities now and into the future.

- **Stage 3** (Worley Consulting, 2024) involved the identification and evaluation of management actions based on the information gleaned in the previous two stages.

The CMP has been developed in accordance with the Mandatory Requirements set out in the CM Act and the NSW Coastal Management Manual (CM Manual, OEH 2018). The CMP has been developed on behalf of Central Coast Council, with part funding and support by the Department of Climate Change, Energy, the Environment and Water (DCCEEW), and in consultation with state agencies and various other stakeholders.

Study Area

The study area for the CMP includes the open coast of the Central Coast LGA (between Killcare and Budgewoi Beach) and the land bounded by the Coastal Management Areas within the coastal zone as defined in the RH SEPP and the CM Act. The study area does not include the national parks and the coastline within Broken Bay (i.e. Umina Beach, Pearl Beach or Patonga Beach), these are included within the study area of the Hawkesbury Nepean CMP. It also does not include the estuaries of Tuggerah Lakes, Wamberal Lagoon, Terrigal Lagoon, Avoca Lagoon or Cockrone Lagoon – these have been included in separate CMPs.

The study area covering the CMP for the Central Coast Open Coast is shown below.

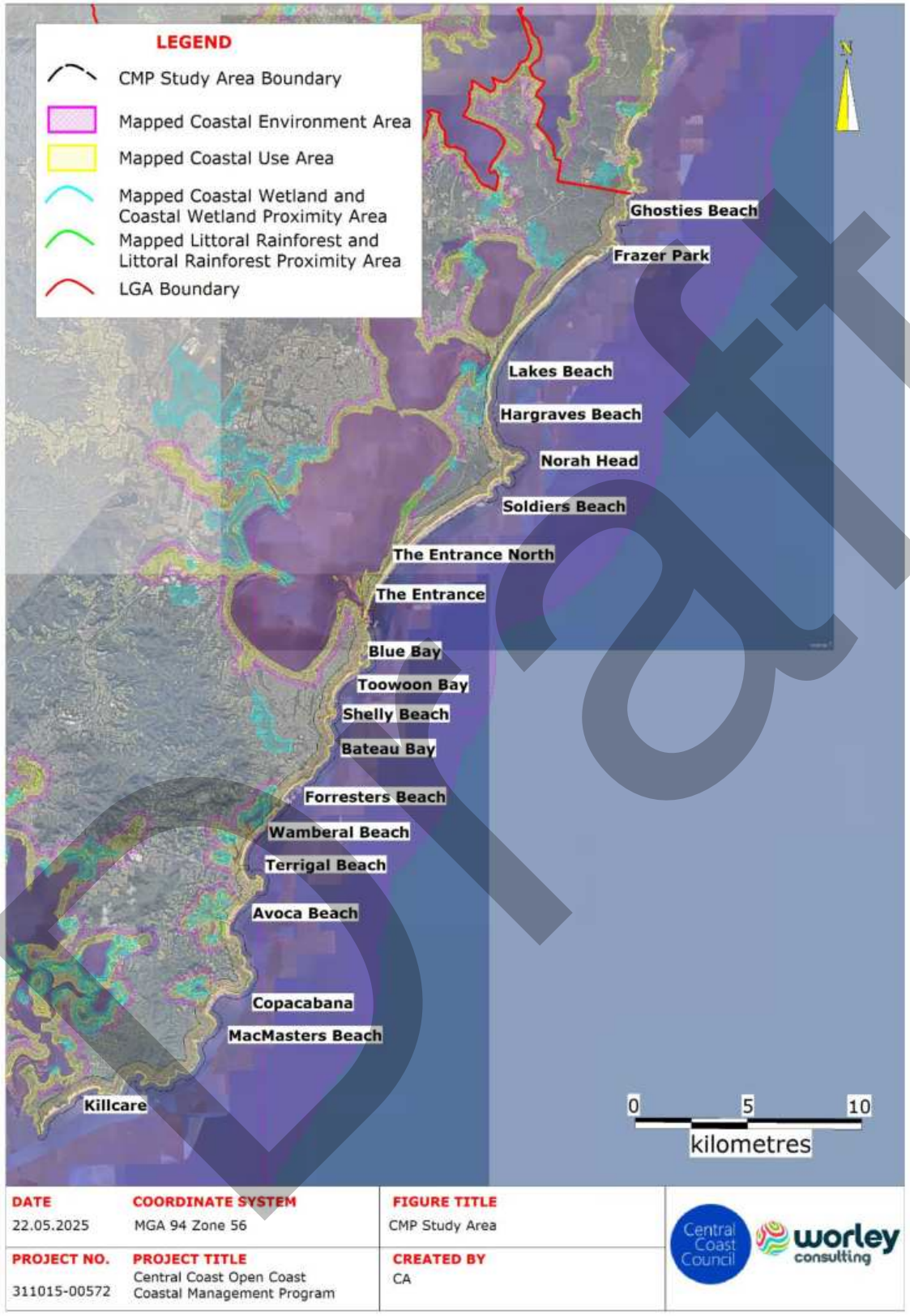


Figure E-1: Study Area for the Central Coast Open Coast CMP

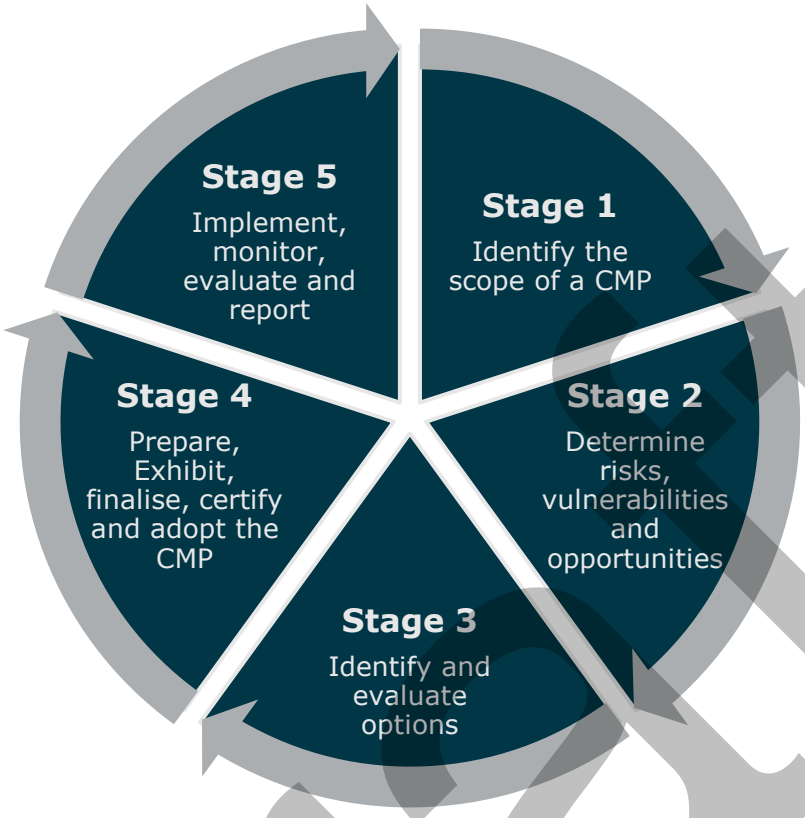


Figure E-2: Stages in preparing and implementing a CMP

Vision, Purpose and Objectives

New coastal legislation was introduced in 2016, requiring all coastal councils in NSW to develop new CMPs in line with updated coastal reforms.

CMPs set the long-term strategy for the coordinated management of the coast, with a focus on achieving the objects and objectives of the CM Act. CMPs identify coastal management issues and the actions required to address these issues in a strategic and integrated way. CMPs detail how and when those actions are to be implemented, their costs and proposed cost-sharing arrangements and other viable funding mechanisms.

The CM Act (and other relevant legislation) establishes specific roles and responsibilities for relevant Ministers, the NSW Coastal Council, public authorities and local councils, as well as providing opportunities for communities to participate when preparing and implementing a CMP.

In keeping with the **"One – Central Coast"** developed during the Community Strategic Plan 2018 – 2028, a Vision for the CMP was proposed to be further developed and refined in consultation with the local community and stakeholders during CMP development.

We are ONE Central Coast – A smart, green and liveable region with a shared sense of belonging and responsibility.

The CMP is driven by a series of Strategic and Specific Objectives, which are based on the objects of the CM Act and provide guidance and direction for the CMP.

Snapshot of Issues

The key management issues identified through the CMP process relate to the following six themes, shown below.

Figure E-3: Themes used in defining issues in the CMP

In Stage 1, a First Pass Risk Assessment was undertaken which identified key risks and issues impacting the coastal zone across the Central Coast.

Supporting studies undertaken during Stage 2 included a Coastal Hazard Study, which investigated beach erosion/recession, cliff recession, coastal inundation and tidal inundation for immediate, 2040, 2050, 2070 and 2120 planning periods throughout the Central Coast LGA (Bluecoast Consulting Engineers, 2024-2025), and the Central Coast Recreational Use Study (Vision Environment, 2022), which have provided insight into the key coastal hazards, risks and issues in relation to the above six categories. In addition to these studies, a series of community engagement sessions and a Detailed Risk Assessment (Worley Consulting, 2024a) has been undertaken as part of Stage 3 to identify the key issues, risks, existing management approaches and potential management actions.

In addition, Council has undertaken an audit of all relevant previous studies, community engagement, technical expertise and actions (Wyong/Gosford CZMP actions). Actions were reviewed to determine their status, appropriateness and whether they could be carried over to this CMP.

The coastal hazards of beach erosion/recession, cliff recession, coastal inundation and tidal inundation that impact the study area are expected to become more severe in the future with sea level rise. In the context of this CMP, the area impacted by these hazards, has been mapped in the Coastal Hazard Study (Bluecoast Consulting Engineers, 2024-2025). These maps will be used to develop the future Coastal Vulnerability Area to be included in the RH SEPP. The coastal hazards maps are provided in Appendix A.

The issues identified during Stage 2 and Stage 3 are summarised below, with existing controls in place to reduce the impact of these issues identified as part of the Risk Assessment.

Category	Key Issues
Access & Safety	• Increased erosion/scour associated with stormwater assets. • Stormwater assets impacted by coastal inundation • Risk to public safety due to wave run up, wave overtopping, cliff instability, rockfalls and coastal erosion • Informal private access and use damaging vegetation and impacting on recreational amenity for the public • Inaccessible beach accessways impacted by coastal erosion • Damage to dunes and safety concerns due to generation of informal/unauthorised beach accessways • Safety concerns regarding exposure and mobilisation of buried remnants of historic foreshore protection works • Injury to beach users caused by structures mobilising during storm events • Dune instability/steep dune scarp impacted by coastal erosion • Damage to coastal recreational assets from storm events • Limited or out-dated information available on key indicators of coastal hazards and coastal dynamics • Coastal hazards impacting viability of existing and future infrastructure long term, need for long-term coastal adaptation planning • Coastal erosion threatening coastlines and infrastructure • Inconsistent standards of SLSC's patrol towers along the coast. Unable to provide sufficient public services. • Safety hazard due to unfenced cliff lines
Amenities	• Aging or incompatible coastal recreation amenity infrastructure not compliant with engineering standards or industry best practice • Lack of guidance for implementing and assessing coastal protection works • Insufficient waste facilities and collection at coastal locations impacting amenity
Coastal Hazards	• Need for stronger planning controls to manage development in the coastal zone in relation to coastal hazards • Legacy coastal emergency works on beaches which no longer serve purpose, causing detrimental impacts or timeframe expired. • Structural integrity/slope stability • Unknown impacts associated with legacy landfill sites or other contamination that be become exposed following erosion. • Structural integrity of coastal protection works • Coastal erosion threatening private properties and public infrastructure • Flat beach profile, no protection from wave overtopping at Avoca Beach

Category	Key Issues
	• Depletion of sand along southern side of The Entrance channel and undermining of seawall • Structural Integrity of seawall at The Haven
Community & Social	• Need for community and agency representation to support decision making • Lack of detailed cultural and heritage assessments across the LGA. • Need for Aboriginal Heritage Impact Permits in areas affected by coastal erosion. • Unapproved memorial sites • Community awareness of coastal hazards and issues • Community awareness of cultural issues and practices, lack of understanding of traditional knowledge for managing the coast
Development	• Need for geotechnical information/investigations to inform planning decisions • Infrastructure at risk • Rock/ocean pools maintenance and accessibility • Lack of awareness of property owners for properties affected by coastal hazards
Ecological Environment	• Reduced water quality from urban catchments, leading to reduced water quality in open coast receiving waters • Invasive weeds and pests reducing the diversity and abundance of native species. • Lack of guidance for appropriate planting in the coastal zone. • Lack of guidance for appropriate fencing/dune stabilisation controls in the coastal zone. • Illegal vegetation clearing. • Enhancement and conservation of marine biodiversity • Dune blowout at southern carpark at Soldiers Beach

Community and Stakeholder Engagement

The management actions have been informed by a series of community consultation activities throughout Stages 1, 2 and 3 of the CMP process.

During Stage 3, the engagement process aimed to inform, engage and obtain input from stakeholders and the wider community on costal management actions and their viability and acceptability, including timing.

From December 2023 to March 2024, Council undertook the Stage 3 community consultation and engagement. This phase included:

- Project dedicated website Your Voice Our Coast – Open Coast Coastal Management Program with project background, FAQ's, links to studies and coastal staff contact email.
- Interactive Social Pinpoint page
- Six community pop up events
- Two targeted community stakeholder sessions

The feedback received during the Stage 3 consultation activities has been invaluable in refining and updating the list of potential management actions.

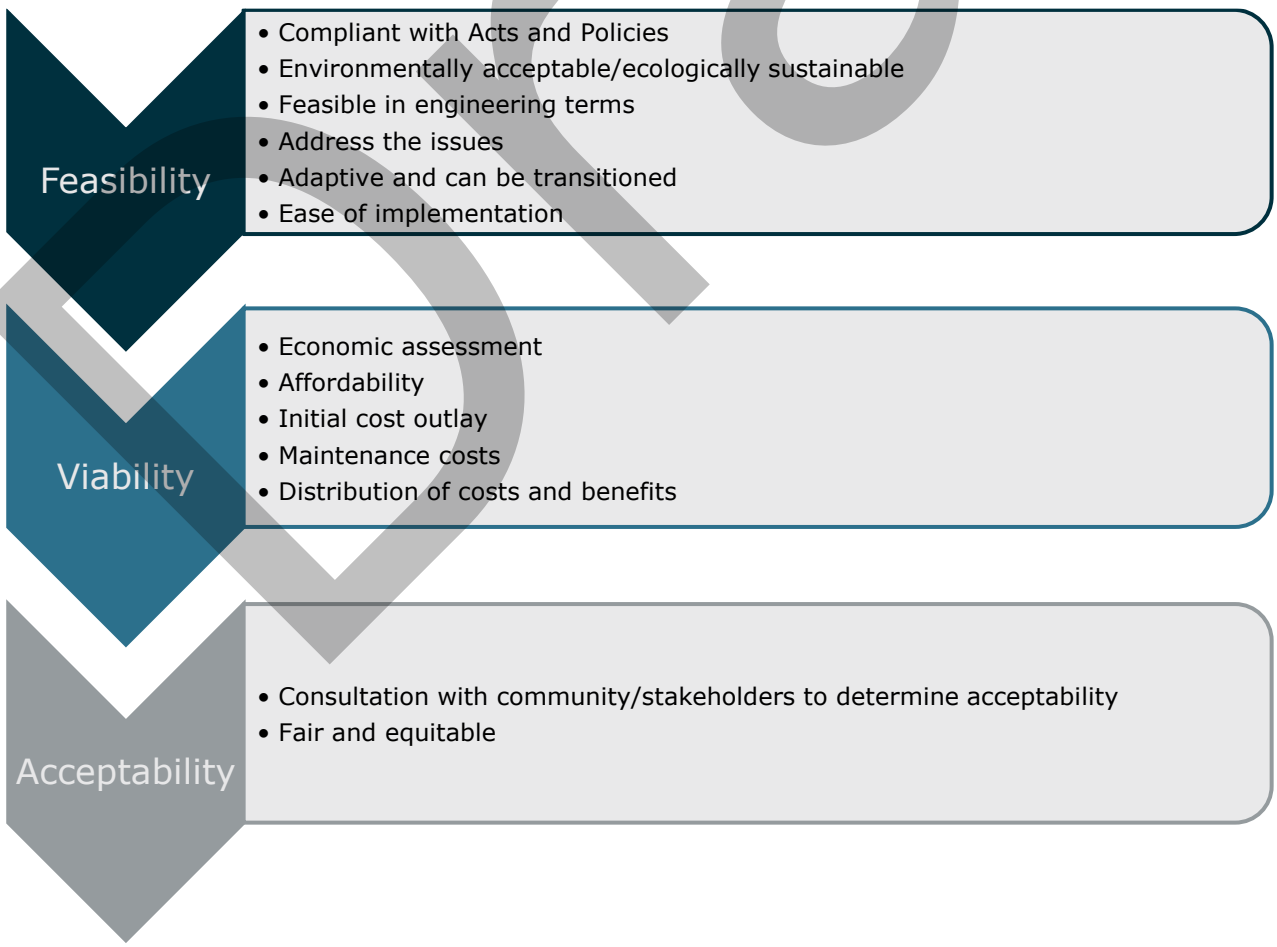
Stage 4 has involved the public exhibition of the draft CMP, together with public information sessions, to gain community and stakeholder feedback on the draft management actions, prior to the CMP being finalised and submitted to the Minister for certification.

Actions to be implemented by the Council or by public authorities

Stage 3 involved identifying and evaluating management options to select preferred coastal management actions with a focus on achieving the objectives of the CM Act.

The supporting studies that have been undertaken as part of the CMP during Stage 2, have enabled an understanding in detail of what the key issues are. The outcome of these studies, as well as the community and Agency engagement that has been carried out throughout the project, has enabled the key issues to be identified and draft management options to be developed in Stage 3. These actions have been further refined and included in this Stage 4 CMP.

Following on from the identification of management options, the options were assessed and prioritised to ensure the final Stage 4 program of management options are appropriate, achievable, and meet the objectives of the CM Act. A Multi Criteria Analysis (MCA) was implemented based on evaluating the feasibility, viability and acceptability of each potential action as depicted below.



Overview of Management Actions

The CMP structure includes:

- Management actions based on the six categories of management issues
- Management actions that apply across the entire study area
- Location-specific management actions to manage localised risks and opportunities.

There are a total of 38 actions applying across the coast and at specific locations, aimed at addressing the issues identified during Stages 1, 2 and 3. Management actions to be implemented by Council are listed in Table 4-6.

A Business Plan

A Business Plan has been developed for the CMP which outlines the key components of the funding strategy for the CMP, including the cost of proposed actions, proposed cost-sharing arrangements and other potential funding mechanisms. Delivery of the CMP for the Central Coast Open Coast is estimated to cost $22.4 Million (2025 dollars) over 10 years. The Business Plan for implementing the CMP is provided in Section 6.

Sustainable funding and financing arrangements for management actions will be established in consultation with key stakeholders. Funding for management actions may be gained from various sources, including Council's internal funds, competitive State Government grant programs, and local third parties.

All actions in this CMP to be undertaken by public authorities, will be 100% for public benefit. Public money is not proposed in this CMP to address existing or future coastal risks on private lands.

Coastal Zone Emergency Action Subplan

The Study Area is subject to a high level of risk from coastal inundation and erosion events.

A Coastal Zone Emergency Action Subplan (CZEAS) has been developed for the Central Coast Open Coast areas, for those areas subject to immediate hazards from coastal inundation and erosion. The objectives of the CZEAS are to:

- outline measures to reduce the risk to public safety, the coastal environment and public assets arising from coastal inundation.
- identify key actions to be carried out by Council before, during and following a coastal emergency to reduce the risk to public safety, the coastal environment and public assets.
- identify the responsibilities of other public authorities during a coastal emergency, and defining a protocol for communication and engagement before, during and after an emergency event.
- identify key areas and assets subject to immediate hazards from coastal erosion and inundation and prioritise actions to reduce the risks to those areas and assets.

The CZEAS is provided in Appendix B.

Monitoring, Evaluation and Reporting

The CMP is a living document subject to review every ten years to ensure that actions to manage the coastal zone within the CMP Study Area remain current and relevant in light of new information, legislative and policy changes, and improved understanding of the local coastal processes.

A framework has been developed to monitor, evaluate and report on the status of the actions in the CMP. This comprises three components:

- Component 1: The implementation status of the CMP actions
- Component 2: Monitoring of relevant environmental indicators
- Component 3: A formal review of the implemented management strategies to assess the status of CMP actions, the CMP's successes, highlights and limitations, consideration of any new or updated scientific knowledge, and the progress of any actions and commitments which continue beyond the original 10-year timeframe.

Council must maintain sufficient information and records about its management of the relevant parts of the coastal zone to demonstrate how the Central Coast Open Coast CMP has been implemented, and what has been achieved in connection with the CMP, including whether coastal management actions have been carried out within the timeframes identified in the CMP.

1. Introduction

Central Coast Council (Council), with the assistance of the NSW Government, is preparing their Coastal Management Program (CMP) for the Open Coast. The future management of the Central Coast Open Coast is to be guided by a CMP as described under the NSW Coastal Management Framework and the *NSW Coastal Management Act 2016* (CM Act). The CMP aims to ensure the integrated and effective management of the coastal zone, considering environmental, social, and economic factors. Specifically, the CMP is a plan of management for Council, Public Authorities and land managers responsible for management of the coastal zone to:

- address coastal hazard risks;
- preserve cultural use and habitats;
- encourage sustainable development in the coastal zone (agricultural, economic and built);
- maintain and improve recreational amenity; and,
- adapt to emerging issues.

1.1 Need for Coastal Management Program

The CMP aims to address specific risks and opportunities for the Central Coast open coast for the present day, 20 year, 50 year and 100 year planning periods. The risks and opportunities have been identified through the earlier stages of the CMP process, including the First Pass Risk Assessment (Royal Haskoning DHV, 2021), the Stage 2 Coastal Hazard Assessment (Bluecoast Consulting Engineers, 2024-2025), the Central Coast Recreational Use Study (Vision Environment, 2022) and the Stage 3 Detailed Risk Assessment (Worley Consulting, 2024a). Council have undertaken extensive community and stakeholder engagement throughout Stage 1, 2 and 3 of the CMP process which has informed the management actions presented in the CMP.

The CMP outlines specific actions over a 10-year management cycle and provides details on how the actions will be delivered, monitored, funded and evaluated.

The CMP has been developed in accordance with the Mandatory Requirements set out in the CM Act and the NSW Coastal Management Manual (CM Manual, OEH 2018). The CMP has been developed on behalf of Central Coast Council, with partly funding and support by the Department of Climate Change, Energy, the Environment and Water (DCCEEW), and in consultation with state agencies and various other stakeholders.

This CMP supersedes the previous Coastal Zone Management Plans (CZMP) for the former Gosford Open Coast beaches, and the former CZMP for the Wyong Coastlines. These CZMPs were prepared by the former Gosford City and Wyong Shire Councils, under the previous NSW coastal management framework and *NSW Coastal Protection Act 1979*, which no longer applies.

1.2 Structure of the Coastal Management Program

As per the process described in the CM Manual, the CMP procedure is divided into five stages (Figure 1-1). Stage 1 of the CMP (Royal Haskoning DHV, 2021) was adopted by Council in August 2021. It included a review of relevant background information, a first pass risk assessment, data gap analysis and proposed a forward program for the CMP. Stage 2 (Bluecoast Consulting Engineers, 2024-2025) assessed the coastal erosion, recession, inundation hazards, estuary hazards and coastal cliffs and geotechnical hazards. As part of Stage 2, a Recreational Use Study (Vision Environment, 2022) was undertaken to identify the coastal recreational activities occurring in the area and determine the adequacy of public amenities and infrastructure to accommodate for those activities now and into the future. Stage 3 of the process involves the identification and evaluation of management options based on the information gleaned in the previous two stages.

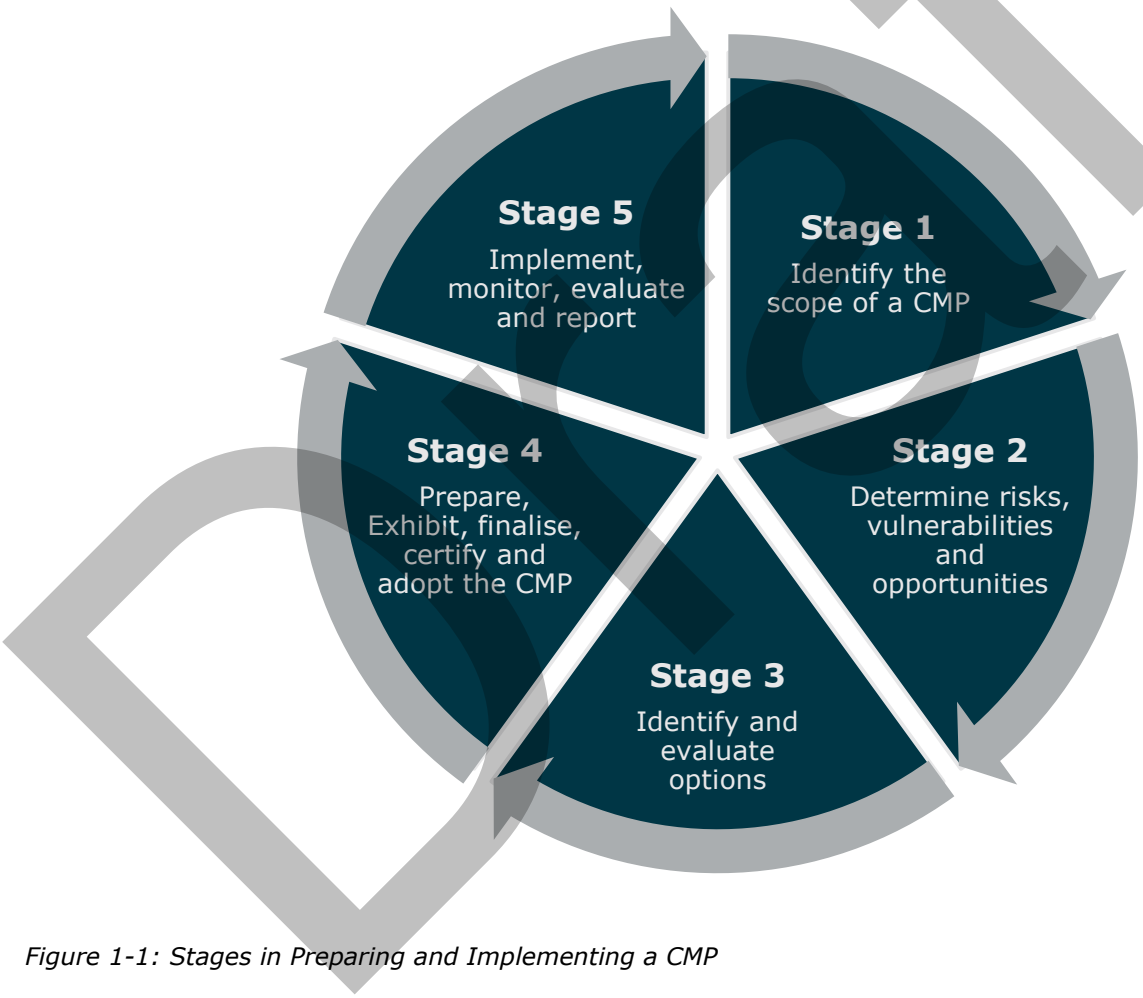


Figure 1-1: Stages in Preparing and Implementing a CMP

1.2.1 Stage 1

The Scoping Study (Royal Haskoning DHV, 2021) was the first step in drawing together the Gosford Beaches Coastal Zone Management Plan (2017), the Wyong Coastal Zone Management Plan (2011), the Draft Wyong Coastal Zone Management Plan (2018), and the Gosford Lagoons Coastal Zone Management Plan (2015). The Scoping Study noted that the CZMPs do not carry equal status as only the Gosford Beaches Coastal Zone Management Plan (2017) had been certified under the *Coastal Protection Act 1979*. As part of the Scoping

Study, an audit was undertaken by Council of the 320 recommended actions and strategies put forth in the adopted CZMPs listed above.

The Scoping Study documented a First Pass Risk Assessment to assist with identifying key management issues and threats requiring further assessment during Stage 2 of the development of the CMP for the Central Coast Open Coast. The Scoping Study documented the risk assessment and provided commentary on the existing levels of risk, identifying the issues of highest risk for the coastal zone. It also documented the environmental and physical context of the Central Coast coastal zone. For the Open Coast of the study area, the key risks and challenges identified from the first pass risk assessment were split into four impact areas with specific threats and control measures detailed in within the Scoping Study document. These included:

- Public Safety
- Infrastructure Damage
- Environmental Risk and
- Public Amenity.

The key threats identified throughout the study area in Stage 1 related to:

- Coastal Erosion and beach recession
- Coastal and tidal inundation/flooding
- Wave runup and overtopping
- Stormwater erosion and discharge
- Coastal Lagoon entrance dynamics
- Slope and cliff instability
- Water quality

1.2.2 Stage 2

As part of Stage 2 of the CMP, Council has undertaken a Coastal Hazard Study, which investigated beach erosion/recession, cliff recession, coastal inundation and tidal inundation for immediate, 2040, 2050, 2070 and 2120 planning periods throughout the Central Coast LGA (Bluecoast Consulting Engineers, 2024-2025).

The updated coastal hazard mapping (Bluecoast Consulting Engineers, 2024-2025) provides probabilistic coastal hazard extents for coastal erosion events up to the 100 year Average Recurrence Interval (ARI) (or 1% Annual Exceedance Probability[1]). The mapping indicates which areas are at risk from beach erosion/recession, cliff recession and coastal inundation

[1] 1% Annual Exceedance Probability refers to a storm event that has a probability of being exceeded of 1% in any given year.

over the various planning periods, to assist in defining which assets are subject to the highest level of risk, with these risks considered in defining coastal management options in Stage 3.

The investigation provided a detailed register of both private and public assets impacted by coastal hazards for each of the planning periods. Those areas most affected include MacMasters Beach/Copacabana, Avoca, Terrigal/Wamberal, The Entrance/The Entrance North. That study has provided updated coastal hazard mapping for the entire LGA, which updates previous mapping carried out under the Gosford Open Coast and Broken Bay Beaches Coastal Zone Management Plan (CZMP) and the Wyong Coastlines CZMP.

Further, the Central Coast Recreational Use Study (Vision Environment, 2022) was undertaken as part of Stage 2, to identify the coastal recreational activities occurring in the area and determine the adequacy of public amenities and infrastructure to accommodate for those activities now and into the future.

1.2.3 Stage 3

Stage 3 involves identifying and evaluating management options to select preferred coastal management actions with a focus on achieving the objectives of the CM Act. As per the CM Manual, there are four main steps in completing Stage 3 of the CMP process (Figure 1-2).

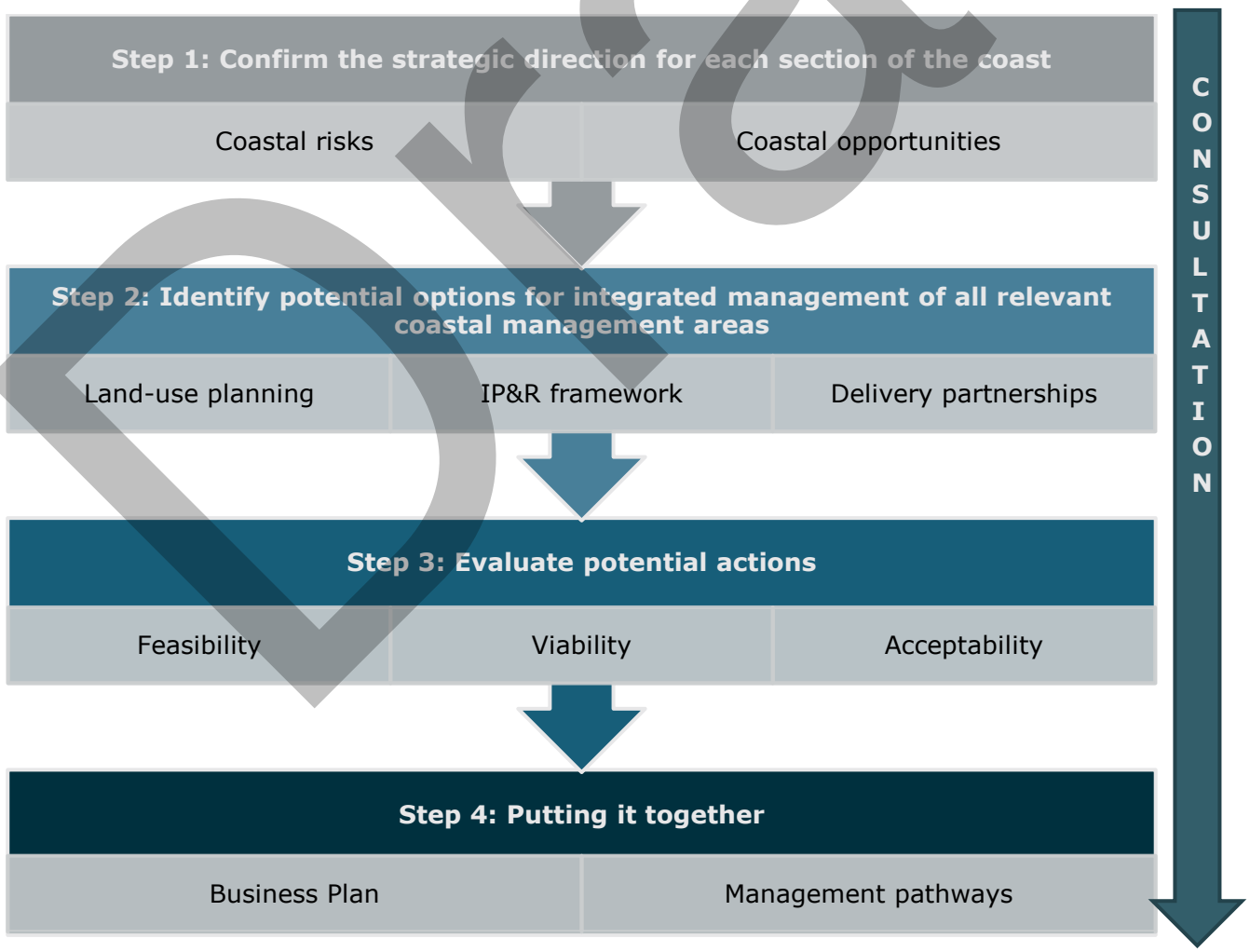


Figure 1-2: Four Main Steps in action identification and evaluation

Council has, and continues, to undertake a range of community engagement and consultation activities as part of developing the CMP, including further engagement undertaken as part of Stage 3.

As part of Stage 3 of the CMP, a Detailed Risk Assessment (Worley Consulting, 2024a) was undertaken for the Central Coast Open Coast. The Risk Assessment categorises the main risks for the study area in terms of the Coastal Management Areas as referred to in the CM Act and RH SEPP, detailed in Section 1.5.2.

The Detailed Risk Assessment builds upon the first-pass risk assessment undertaken for the coastal zone as part of the Stage 1 Scoping Study (Royal Haskoning DHV, 2021), by identifying key issues, opportunities and risks in greater detail.

From the Risk Assessment (Worley Consulting, 2024a) and the outcome of the Stage 2 Coastal Hazard Assessment (Bluecoast Consulting Engineers, 2024-2025), a suite of potential management actions has been developed and categorised in terms of the issues and particular locations which they relate to.

1.3 Area covered by this CMP

The study area for the CMP includes the Central Coast open coast areas. In particular, the Study Area includes those areas mapped as Coastal Wetlands/Coastal Wetland Proximity Areas, Coastal Environment Areas and Coastal Use Areas under the *State Environment Planning Policy (Resilience and Hazards) 2021* (the SEPP).

The study area for the Open Coast CMP is shown in Figure 1-3:. The rationale for the Study Area for the CMP is discussed in the Scoping Study (Royal Haskoning DHV, 2021), with several CMPs being developed in parallel for the coastal zone within the Central Coast. The study area for the CMP includes the open coast of the Central Coast LGA (between Killcare and Budgewoi Beach) and the land bounded by the Coastal Management Areas within the coastal zone as defined in the RH SEPP and the CM Act. The beaches of Broken Bay (Ettalong, Umina, Pearl and Patonga Beaches) are included in the Hawkesbury Nepean CMP. The Open Coast CMP also does not include the national parks, the estuaries or their entrances (i.e. Cockrone, Avoca, Terrigal and Wamberal Lagoons, Tuggerah Lakes or Lake Macquarie), which are covered in separate CMPs. The Central Coast Open Coast CMP covers part of the coastal zone of the Central Coast LGA, and does not apply to any areas outside of the coastal zone.

The CM Act sets out mandatory requirements for the preparation of a CMP. Under S13 (b) of the CM Act, the CMP must "consider and promote the objects of (the) Act" and "give effect to the management objectives for the coastal management areas covered by the program". The RH SEPP commenced on 1 March 2022. It supports implementation of the management objectives set out in the NSW CM Act.

1.3.1 Sediment Compartments

A sediment compartment is a spatial unit along the coast, based on sediment movement and coastal types. Primary sediment compartments are those defined by large landforms such as headlands or rivers. Secondary compartments are those defined by sediment movement on the shoreface, and tertiary compartments are defined by sediment movement in the nearshore

area (i.e. beaches) (CoastAdapt 2024). The compartment boundary is usually a feature such as a headland or river mouth which effectively divides the compartment and its processes from its neighbour. The compartment boundaries act as natural barriers to sediment transport, enabling the area between boundaries to be treated as a semi-closed system with quantifiable sediment sources and sinks.

The majority of the Central Coast is contained within the Central Coast coastal sediment compartment listed within Schedule 1 of the CM Act, however the northern extent of the LGA encompassing the open coast north of Norah Head connects with the Newcastle coastal sediment compartment, as shown in Figure 1-4:.

The dominant regional processes of the Central Coast sediment compartment include south-easterly Tasman Sea swells, easterly seas, northerly longshore transport, and the El Nino Southern Oscillation driving beach erosion/accretion cycles. Regional hazards or processes driving large scale rapid coastal changes include East Coast Lows (extra-tropical cyclones), mid-latitude cyclones (depressions), and storm surges (<1m) (CoastAdapt 2024).

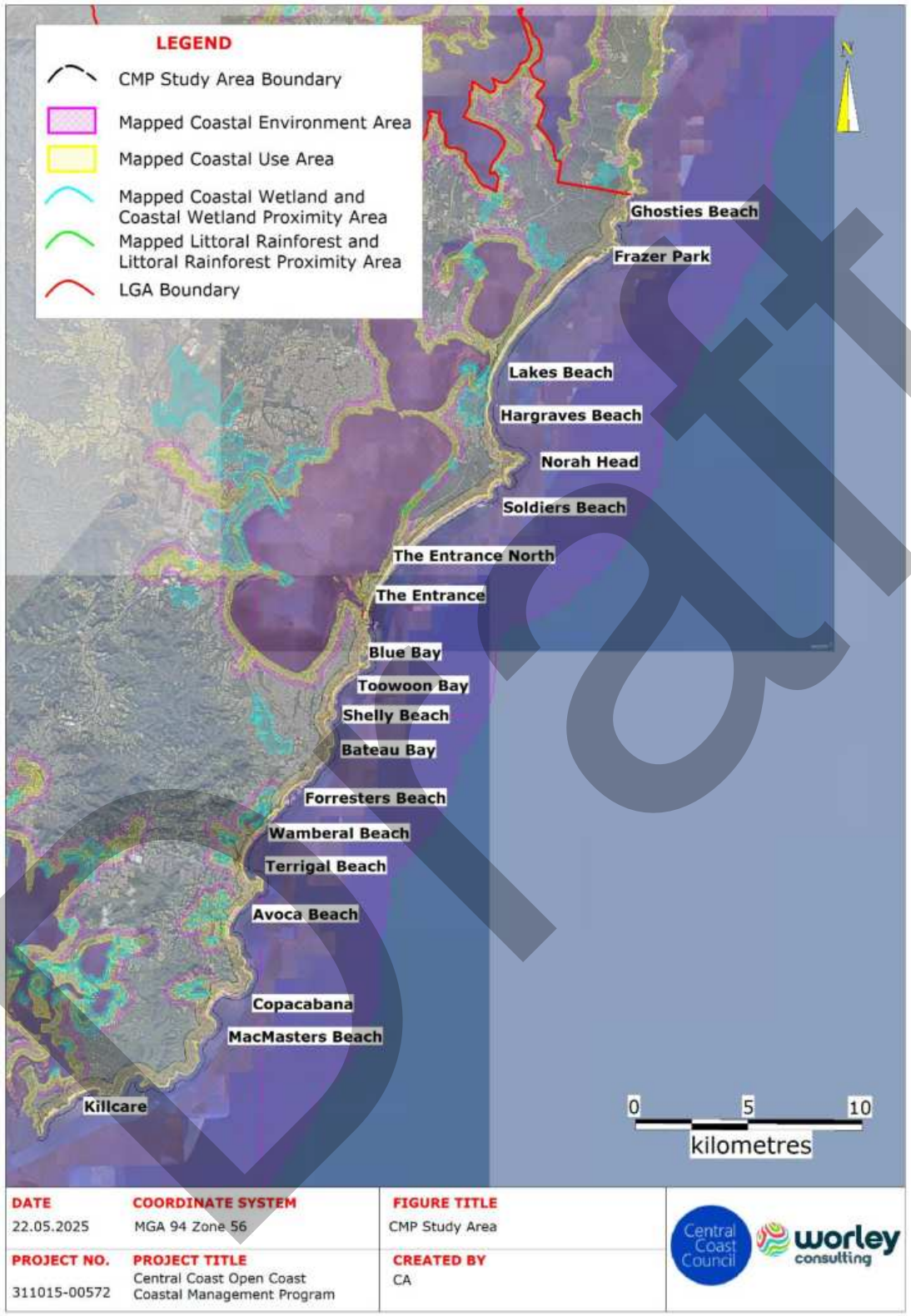


Figure 1-3: Central Coast Open Coast CMP Study Area

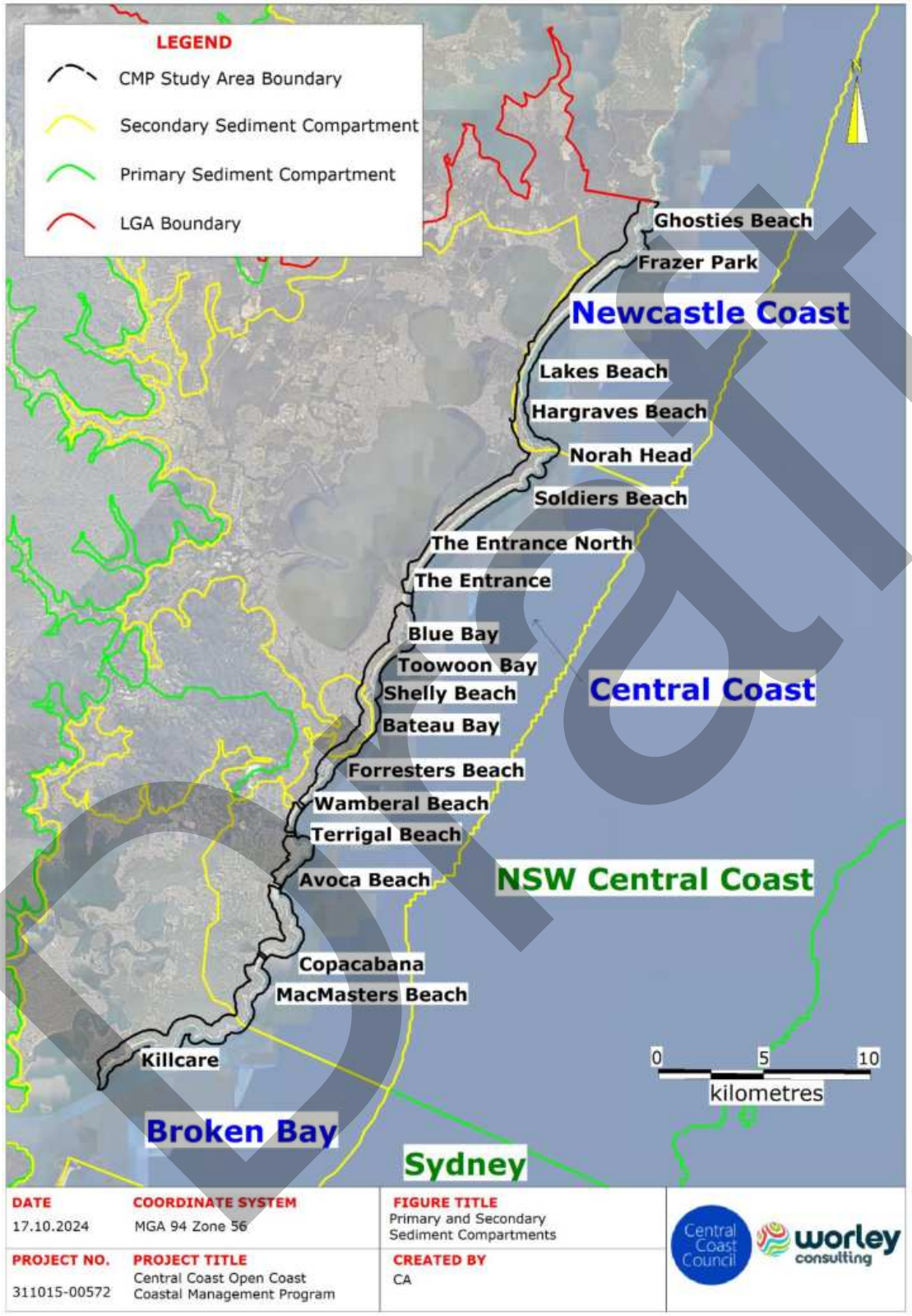


Figure 1-4: Central Coast Coastal Sediment Compartments (McPherson, 2015)

1.3.2 Social values

As detailed in the Central Coast Council Community Strategic Plan, 2018-2028:

> *The central coast community are strongly tied to our local natural environment, including our beaches, waterways, ridges, estuaries, lakes, and valley floors.*
>
> *We are committed to leaving a positive legacy for future generations through responsible stewardship of our natural areas – this is our shared responsibility as residents of the Central Coast. We encourage our community to contribute to that stewardship by minimizing resource use (energy, water, and waste) and treating these natural areas with respect.*
>
> *Creating a vibrant, liveable and sustainable future for the Central Coast is a key priority (Central Coast Council, 2018).*

The Central Coast highly values the preservation and enhancement of its natural environment. The community is supportive of activating public spaces in a way that increases access to its coastal areas and green spaces as well as enhances overall liveability of the region. Central to this is also the ongoing protection of the environment (Central Coast Council, 2018).

1.3.3 Cultural heritage values

Across the Central Coast there are numerous areas of significant Aboriginal and non-Aboriginal heritage value to the wider community. First Nations people have been custodians of the Central Coast area for 60,000 years and there are thousands of registered sites of cultural significance on the Central Coast. It is noted that 'the Central Coast local government area is one of the largest and fastest growing Aboriginal communities in Australia. This population grew by 38% in the last Census reporting period' (Central Coast Council, 2023).

In recognition of this and the Central Coast Council's commitment to reconciliation and developing and a shared future vision with First Nations people, the Council adopted a Central Coast Council First Nations Accord on 13 December 2022. As a part of this, an Aboriginal Advisory Committee has been established to support the incorporation of Aboriginal views and sentiment into key Council activities. This Committee will be engaged in the CMP process via external agency meetings as representatives.

As per the Accord:

> *The Darkinjung Local Aboriginal Land Council is the largest non-government land holder on the Central Coast, giving them the ability to take care of their community and create programs that are meaningful* (Central Coast Council, 2022).

At a regional level, the Barang Regional Alliance, consisting of seven Central Coast Aboriginal organisations, is the voice of the local First Nations Community. The organisations include: ara Barang Corporation, Gudjagang Ngara li-dhi Aboriginal Corporation, NAISDA, Ngaimpe Aboriginal Corporation – The Glen, Mingaletta Aboriginal

Corporation, Yerin Eleanor Duncan Aboriginal Health Services Ltd and Darkinjung Local Aboriginal Land Council (Central Coast Council, 2022).

1.3.4 Socio-economic context

At the time of the 2021 Census, the population of the Central Coast Council was recorded at 346,956. The median age of residents was 43, as opposed to 38 Australia wide (ABS, 2021). Key demographic data of the Central Coast LGA is presented in Figure 1-5:.

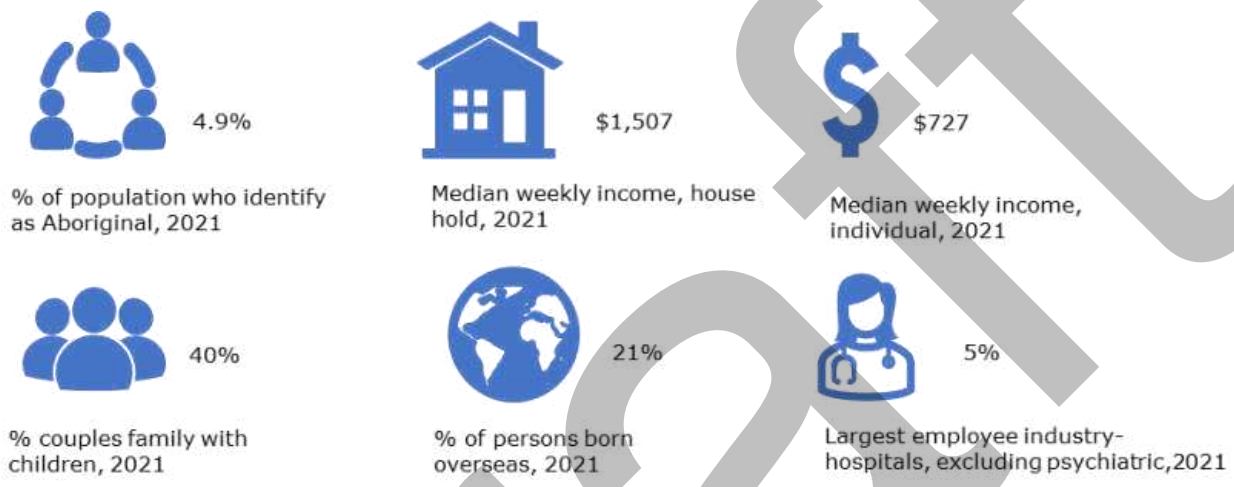


Figure 1-5: Central Coast LGA Statistics (ABS, 2021).

Between 2021 and 2046, the population for Central Coast NSW is forecast to increase by 64,124 persons (18.41% growth), at an average annual change of 0.68% (https://forecast.id.com.au/central-coast-nsw/population-summary). Most of the growth is forecast to occur in inland areas of the Central Coast, with the coastal areas on average expected to grow in population by less than 10% between 2021 and 2046 (Figure 1-6). However, the coastal areas are expected to grow in population by more than 10% for people over 55.

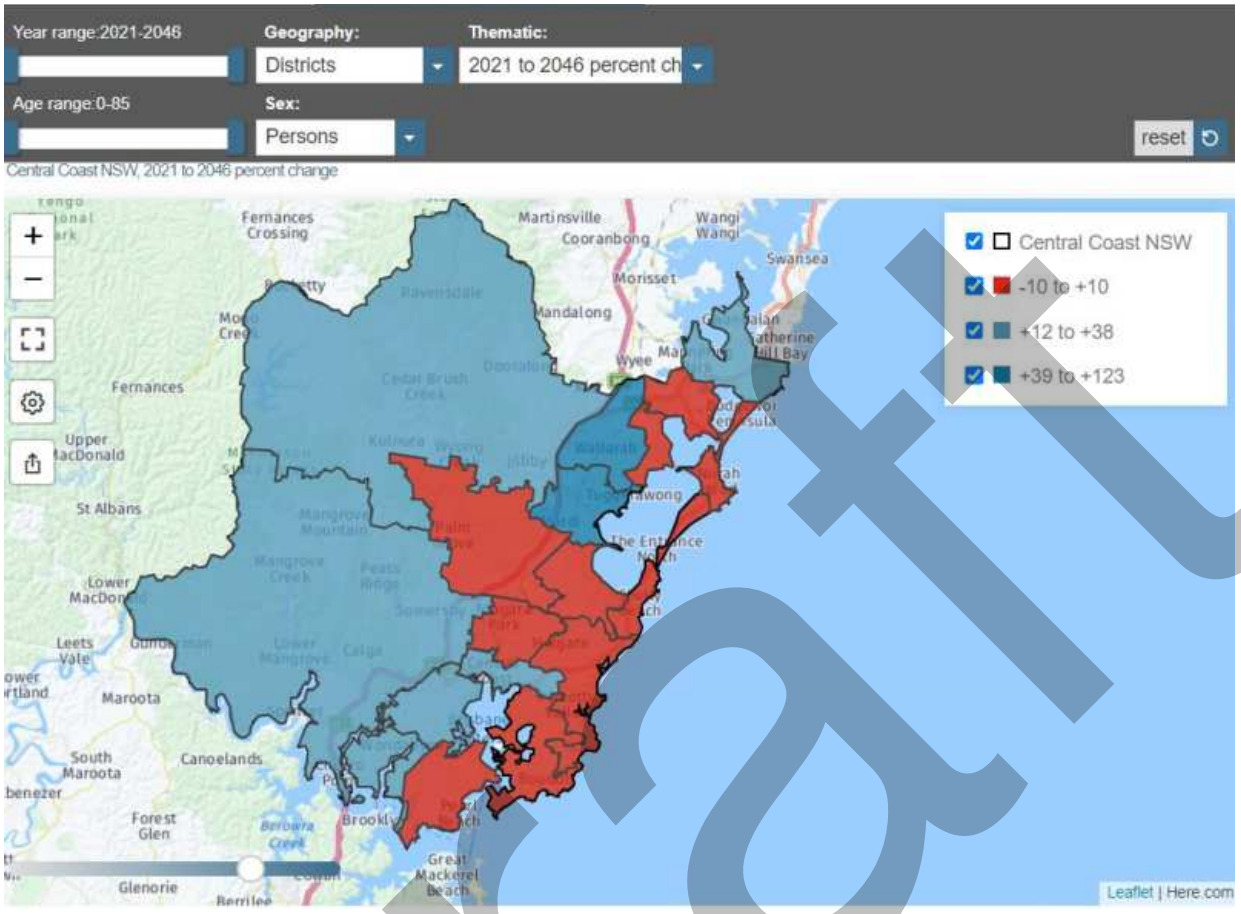


Figure 1-6: Expected % population growth between 2021 and 2046

(https://forecast.id.com.au/central-coast-nsw/population-age-structure-map?CustomAgeFrom=0&CustomAgeTo=85&themtype=PerChangeY1Y3&OverlayID=10)

1.4 Vision, Purpose and Objectives

The Vision, Purpose and Objectives of the CMP were set out by Council during Stage 1 of the CMP process (Royal Haskoning DHV, 2021).

Aligned with the purpose of CMPs as set out by the CM Act, the purpose of the Central Coast CMP for the Open Coast will be to provide an integrated, adaptive and long-term strategy for the co-ordinated management of the of the open coastline of the Central Coast's coastal zone. The CMP will confirm the focus of coastal zone management by Council and by public authorities and co-ordinate the delivery of priority management actions.

The CMP will seek to assist the smart and coordinated management, and environmentally sustainable development, of the dynamic open coastline of the Central Coast's coastal zone in order to protect the social, cultural, economic and environmental values, and identity of the region against current and future coastal hazards.

In keeping with the **"One – Central Coast"** developed during the Community Strategic Plan 2018 – 2028 a draft Vision was proposed to be further developed and refined in consultation with the local community and stakeholders during CMP development.

We are ONE Central Coast – A smart, green and liveable region with a shared sense of belonging and responsibility.

1.4.1 CMP Objectives and Objects of the Coastal Management Act 2016

The CMP Objectives provide a clear and tangible path towards fulfilling the strategic objectives. They provide an operational roadmap for development of specific actions and targets.

The Objectives of the CMP adopted in the Scoping Study were based on the objects of the *Coastal Management Act* 2016 (CM Act). The objectives and management actions developed as part of the CMP are strategically aligned with the objectives and strategies as outlined in the Community Strategic Plan.

In addition, the objectives and management actions consider and promote the objects of the CM Act, by having undertaken rigorous assessments of the risks associated with coastal processes and environmental values.

The CMP gives effect to the management objectives for the Coastal Management Areas covered by the program, by mapping and identifying issues, threats and opportunities directly impacting the Coastal Management Areas, and developing management actions specifically for these areas.

The CMP considers relevant State and regional policies and plans, as CMP actions have been reviewed and discussed with partner Agencies to obtain their support prior to inclusion in the CMP.

Table 1-1: outlines the objects of the CM Act, together with how they have been achieved in this CMP.

A detailed explanation of how the CMP promotes the objects of the CM Act and gives effect to the management objectives for the Coastal Management Areas is provided in Appendix C.

Table 1-1: How the CMP achieves the Objects of the Coastal Management Act 2016

Objects of the Coastal Management Act 2016 (Section 3)	How achieved
(a) to protect and enhance natural coastal processes and coastal environmental values including natural character, scenic value, biological	Rigorous assessment of the risks associated with coastal processes and coastal environmental values, as evidenced through the detailed studies undertaken to understand coastal processes and environmental values, the identification of risks associated with

Objects of the Coastal Management Act 2016 (Section 3)	How achieved
diversity and ecosystem integrity and resilience	these and the identification of management actions to address the risks.
(b) to support the social and cultural values of the coastal zone and maintain public access, amenity, use and safety	Rigorous assessment of the risks associated with social and cultural values, as evidenced through community engagement and the detailed studies undertaken to identify risks associated with these, together with the identification of management actions to address the risks.
(c) to acknowledge Aboriginal peoples' spiritual, social, customary and economic use of the coastal zone	Specific management actions have been included to specifically acknowledge and protect Aboriginal peoples' spiritual, social, customary and economic use of the coastal zone, including engagement with the Darkinjung Local Aboriginal Land Council seeking input to the CMP.
(d) to recognise the coastal zone as a vital economic zone and to support sustainable coastal economies	The importance of the CMP Study Area for recreation, and economic activities associated with recreational activities in the CMP Study Area has been specifically recognised, with a specific risk category developed for amenity and community and social issues, with these issues being explored in detail within the Central Coast Recreational Use Study (Vision Environment, 2022). The CMP has included development of management actions with a focus on improving recreational amenity in the CMP Study Area.
(e) to facilitate ecologically sustainable development in the coastal zone and promote sustainable land use planning decision-making	The CMP has identified actions to promote sustainable land use planning and decision-making, including actions to identify areas which are subject to coastal hazards, as well as environmentally sensitive areas that would require planning controls to facilitate ecologically sustainable development.
(f) to mitigate current and future risks from coastal hazards, taking into account the effects of climate change	The CMP has identified natural and built assets impacted by current and future risks from coastal hazards with these hazards clearly articulated in the Stage 2 Coastal Hazard Assessment (Bluecoast Consulting Engineers, 2024-2025), and has devised management actions to address these hazards.
(g) to recognise that the local and regional scale effects of coastal processes, and the inherently ambulatory and dynamic nature of the shoreline, may result in the loss of coastal land to the sea (including estuaries and other arms of the sea), and to manage coastal use and development accordingly	The CMP has identified areas subject to coastal erosion and slope instability, as well as areas subject to coastal inundation with sea level rise, and has identified actions to address the risks posed by loss of coastal land caused by future climate change, including the development of an overarching coastal planning framework to guide future coastal development in the Central Coast open coast coastal zone.

Objects of the Coastal Management Act 2016 (Section 3)	How achieved
(h) to promote integrated and co-ordinated coastal planning, management and reporting	The CMP actions and timeframes have been developed in accordance with the NSW Integrated Management & Reporting Framework, with responsible and partner agencies identified for each management action.
(i) to encourage and promote plans and strategies to improve the resilience of coastal assets to the impacts of an uncertain climate future including impacts of extreme storm events	The CMP has provided actions that include strategies to improve the resilience of coastal natural and built assets to impacts of an uncertain climate future, including recognising the need for long-term adaptation planning for land subject to coastal erosion, slope instability and inundation. These strategies are explored in more detail in the CMP Planning Report (Worley Consulting 2025), which articulates how Council can apply planning controls to improve the resilience of coastal natural and built assets against coastal hazards.
(j) to ensure coordination of the policies and activities of government and public authorities relating to the coastal zone and to facilitate the proper integration of their management activities	CMP actions have been reviewed and discussed with partner Agencies to obtain their support prior to inclusion in the CMP.
(k) to support public participation in coastal management and planning and greater public awareness, education and understanding of coastal processes and management actions	The CMP includes management actions that specifically solicit public participation in coastal management and planning, and improve education, awareness and understanding of coastal processes. The CMP has been developed with input from the public through each stage of the process.
(l) to facilitate the identification of land in the coastal zone for acquisition by public or local authorities to promote the protection, enhancement, maintenance and restoration of the environment of the coastal zone	The CMP recognises the need for the protection of sensitive environmental communities in the coastal zone, and has identified management actions to facilitate the preservation of these communities.
(m) to support the objects of the Marine Estate Management Act 2014	The CMP promotes a biologically diverse, healthy and productive marine estate by specifically including management actions which enhance: • economic opportunities for regional communities (by improving local recreational facilities) • the cultural, social and recreational use of the marine estate (by improving local recreational amenity) • the maintenance of ecosystem integrity (by including actions to enhance ecological integrity)

Objects of the Coastal Management Act 2016 (Section 3)	How achieved
	• the use of the marine estate for scientific research and education (by including actions for public education, monitoring and scientific research/collaboration).

1.5 NSW Coastal Management Framework

1.5.1 The Framework

Sustainable management of the coastal zone often involves councils, their communities and public authorities balancing a diverse range of challenges and opportunities. The context is one of rapid environmental, social and economic change along with dynamic coastal processes affecting the open coast, estuaries and coastal lakes (OEH 2018).

In order to achieve sustainable management of the coastal zone, NSW has developed a new coastal management framework through the *Coastal Management Act 2016* (CM Act), State Environmental Planning Policy (Resilience and Hazards) 2021 (the RH SEPP) and the NSW Coastal Management Manual 2018 (the CM Manual). The CM Manual sets out the framework in detail and defines the requirements for a CMP. The purpose of a CMP is to set the long-term strategy for the coordinated management of the coastal zone with a focus on achieving the objects of the CM Act.

Key components of the framework include:

- **Coastal Management Act 2016 (CM Act):** An act that provides for the integrated management of the coastal environment of NSW, consistent with the principles of ecologically sustainable development, for the social, cultural, and economic wellbeing of the people of the state.
- **State Environmental Planning Policy (Resilience and Hazards) 2021 (RH SEPP):** One of the key environmental planning instruments for land use planning in the coastal zone. It gives effect to the objectives of the CM Act 2016 and delivers the statutory management objectives of the act by specifying how development proposals are to be assessed if they fall within the coastal zone.
- **Environmental Planning and Assessment Act 1979 (EP&A Act):** This Act governs land use planning and development in NSW. While this Act is not directly part of the NSW Coastal Framework, it is relevant from a planning perspective and ties into the RH SEPP.
- **Coastal Management Programs (CMP):** A five stage coastal management process intended to set the long-term strategy for the coordinated management of the coastal zone for a given region.

- **The NSW Coastal Management Manual (The CM Manual):** A manual that sets forth mandatory requirements and provides guidance to coastal councils in connection with the preparation, development, adoption, implementation, amendment, and review of CMPs.
- **The NSW Coastal Council:** Is responsible for providing independent and expert advice on matters relating to the Minister's functions under the CM Act, and in relation to the development and implementation of CMPs by local councils.
- **The NSW Coastal and Estuary Grants Program:** Provides technical and financial support to local government to help manage the coastal zone.

The NSW Coastal Management Framework is illustrated schematically in Figure 1-7:.

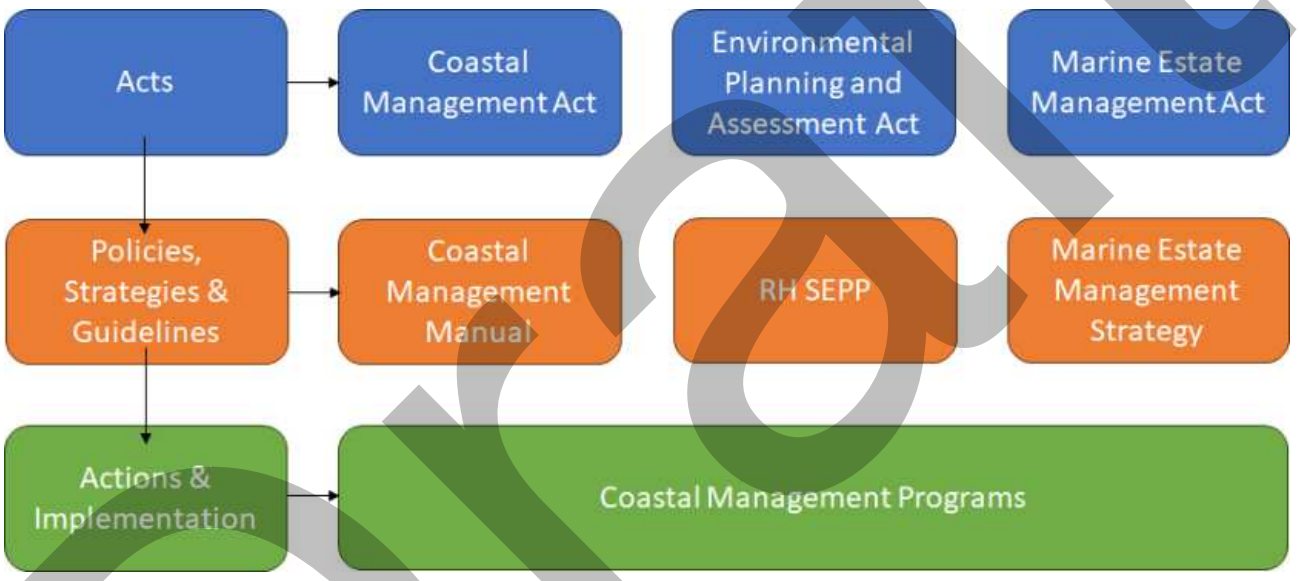


Figure 1-7: The NSW Coastal Management Framework (OEH 2018)

1.5.2 The RH SEPP

The CM Act sets out mandatory requirements for the preparation of a CMP. Under S13 (b) of the CM Act, the CMP must "consider and promote the objects of (the) Act" and "give effect to the management objectives for the Coastal Management Areas covered by the program". The RH SEPP commenced on 1 March 2022. It supports implementation of the management objectives set out in the NSW CM Act. The hierarchy of Coastal Management Areas as referred to in the CM Act and RH SEPP are identified below, from highest to lowest priority:

- **coastal wetland and littoral rainforest area** (CWLRA) - areas which display the characteristics of coastal wetlands or littoral rainforests. Development controls for the mapped CWLRA aim to continue existing protection for these important ecological communities. Areas within a 100 m buffer zone bordering coastal wetlands or littoral rainforest are mapped within the RH SEPP as Coastal Wetland Proximity Areas or Littoral Rainforest Proximity Areas.

- **coastal vulnerability area** (CVA) - areas subject to coastal hazards such as coastal erosion and tidal inundation. Development controls for the CVA are concerned with managing risk to human life, infrastructure, and public and private property that may be impacted by coastal hazards and ensuring that legacy issues are not created for future generations to deal with. Note that the CVA for the open coast within the CMP Study Area is yet to be determined.

- **coastal environment area** (CEA) - areas that are characterised by natural coastal features such as beaches, rock platforms, coastal lakes and lagoons and undeveloped headlands. Marine and estuarine waters are also included. Development controls for the CEA aim to protect and improve natural coastal features, coastal waters and environmental values for places such as beaches, dunes, surf zone and undeveloped headlands.

- **coastal use area** (CUA) - land adjacent to coastal waters, estuaries and coastal lakes and lagoons where impacts of development on the use and enjoyment of the beaches, foreshores, dunes, estuaries, coastal lakes and lagoons, and the ocean, need to be considered. Development controls for CUA are concerned with ensuring appropriate urban development for coastal areas, considering urban design issues such as the bulk, scale and size of proposed development, water sensitive urban design, and preventing adverse impacts on scenic qualities, visual amenity and Aboriginal cultural heritage.

Each of the above areas has outcome-oriented management objectives (as outlined in Section 1.5.2) so that councils can apply appropriate management tools and development controls.

1.5.3 Coastal Management Program

The purpose of a CMP is to set the long-term strategy for the coordinated management of the coastal zone with a focus on achieving the objects of the CM Act. It provides an opportunity for councils, public authorities and local communities to plan for, and implement, actions that will help achieve coastal management objectives at a local level, consistent with the objects of the CM Act.

The CM Manual provides information to help councils evaluate and select management actions that are feasible and effective in managing the coastal environment. These actions are then incorporated into councils' land use planning instruments and Integrated Planning and Reporting (IP&R) Framework, established under the *Local Government Act 1993* (LG Act).

This CMP has been prepared in accordance with the process described in Section 1.2 and depicted in Figure 1-1.

1.6 Roles and Responsibilities

1.6.1 Governance Context

The current governance across the coastal zone is multi-layered, with the shorelines, waterways and reserves of the CMP Study Area (and associated assets) owned and managed by a number of stakeholders across multiple levels of government. One of the objectives of the CMP is to facilitate the integration of management responsibilities across the CMP Study Area, including the council, land managers and public authorities.

The following agencies have a role in management of the coastal zone.

1.6.1.1 Central Coast Council

Council has a central role in managing the coast, specifically in preparing the CMP that sets out the long-term strategy for management of the coastal zone in its area. Local councils also identify the costs of the actions, proposed cost-sharing arrangements and viable funding mechanisms to ensure delivery.

1.6.1.2 NSW Government

There are numerous state government agencies with management roles and responsibilities across the CMP Study Area that are relevant to the CMP. These agencies are spread across five (5) separate state government departments (or clusters). These agencies and their role in coastal management in NSW are listed in Table 1-2:. Some of these agencies have a land and asset management role, whilst others are issues based.

Table 1-2: Agencies with a role in Coastal Management

Agency	Role
Marine Estate Management Authority (MEMA)	The Marine Estate Management Authority (MEMA) advises the NSW government on the management of the NSW marine estate, and coordinates policies and programs for maintaining and improving the marine environment. MEMA brings together the heads of the NSW government agencies with key marine estate responsibilities – including DCCEEW, Department Primary Industries and Regional Development (DPIRD) Fisheries, and TfNSW (MEMA, 2019).
NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW)	The Conservation Programs, Heritage and Regulation Group of DCCEEW (DCCEEW-CPHR) has the role of supporting councils and communities in managing the open coast, estuaries and coastal lakes. The Department provides oversight of the State's coastal management program. The Department is the first point of contact for local councils planning to prepare and implement a CMP. The Department's role is to work in partnership with councils and local communities to manage the coast in accordance with the Coastal Management Framework. DCCEEW-CPHR provides the following data and technical advice: • wave data and data on historical coastline changes

Agency	Role
	• information on coastal and estuarine processes, sediment cells and coastal geomorphology/coastal engineering • information on coastal hazard and risk assessment • advice on ecosystem health and habitat mapping. The Department also administers the Coastal and Estuary Grants Program that provides funding for councils to prepare and implement their coastal management program.
National Parks and Wildlife Service (NPWS)	NPWS manage over 7 million hectares of land across NSW, including more than 870 national parks and reserves, 4 World Heritage-listed sites, a number of Australian National Heritage sites and 17 Ramsar wetlands. These protected areas play a critical role in conserving biodiversity, as well as natural and cultural heritage. NPWS manages the estuaries and beaches within national parks on the Central Coast coastline and is responsible for provision of facilities such as picnic areas, boardwalks and lookouts in the national park areas. Much of the CMP Study Area is managed by NPWS as part of Bouddi National Park, Wamberal Lagoon Nature Reserve, Wyrrabalong National Park and Munmorah State Recreation Area.
Crown Lands Department of Planning, Housing and Infrastructure (DPHI)	Crown Lands are responsible for the management of NSW's Crown land, covering 42% of the state, including parks, reserves, roads and cemeteries. Much of the land in the coastal zone of the Central Coast is Crown Land. Crown Lands work in partnership with a range of agencies to make sure that natural resource management is managed across public land in NSW, and regulations and policies are met.
Transport for NSW (TfNSW)	TfNSW, through Roads and Maritime Services, is the operating agency responsible for provision and management of road and maritime networks as part of the transport system. Through the maritime division, TfNSW is responsible for managing recreational boating activities, navigable waterways and assets in the Central Coast. It is also responsible for the direct delivery of a number of maritime infrastructure projects, as well as investment in many others across the state. Other responsibilities include property administration, policy development, strategic planning and infrastructure management related to commercial and recreational boating – including some of the boat ramps and public jetties, wharves and pontoons across the CMP Study Area (noting that most boat ramps are generally owned and managed by local councils).
NSW State Emergency Service (NSW SES)	NSW SES is the combat agency for floods, storms and tsunami. NSW SES is responsible for planning for and responding to flood, storm and tsunami events, including evacuation of those at risk. Coastal erosion events that are not caused by storms are the responsibility of the Local Emergency Operations Controller (LEOCON). The NSW State Storm Plan (2023) aligns with the CM Act. Under this Act, Local Government Councils have the responsibility for developing CMPs (which

Agency	Role
	outline the management of the coastal zone). Part of this plan outlines actions that can be undertaken during emergency situations, to minimise damage to the coastal zone (known as a Coastal Zone Emergency Action Subplan).
NSW Department of Primary Industries and Regional Development (DPIRD Fisheries)	DPIRD Fisheries has a regulatory role which seeks to ensure that developments comply with the requirements of the *Fisheries Management Act 1994*, (FM Act, namely the aquatic habitat protection and threatened species conservation provisions in Part 7 and 7A of the Act, respectively), and the associated Policy and Guidelines for Fish Habitat Conservation and Management (2013). CMPs should take into account the objectives of the FM Act and associated regulations.
Infrastructure NSW	Infrastructure NSW was established in July 2011 to assist the NSW Government in identifying and prioritising the delivery of critical public infrastructure for NSW. It is an independent statutory agency, established under the Infrastructure NSW Act 2011. Among other functions as outlined in the *Infrastructure NSW Act 2011*, Infrastructure NSW is responsible for preparing project implementation plans for major infrastructure projects, reviewing and evaluating proposed major infrastructure projects by government agencies or the private sector, overseeing and monitoring the delivery of major infrastructure projects and other infrastructure projects identified in plans adopted by the Premier and managing and assessing the risks involved in planning, funding, delivering and maintaining infrastructure.
NSW Environment Protection Authority (NSW EPA)	The NSW Environment Protection Authority (EPA) is the primary environmental regulator for New South Wales. The EPA's role includes protecting, restoring and enhancing the quality of the environment in NSW and reducing risk to human health. The EPA's role in emergency management is to respond to emergencies where the environment is at risk of being impacted. Waste management and clean-up are a key function of this role in natural disaster and disease outbreak responses (pandemics and biosecurity emergencies). The EPA also issue environment protection licences to control activities that could have an impact on the environment or human health, and to encourage better environmental performance. They also monitor emissions and compliance, conduct audits and investigate reports of pollution, and enforce NSW environmental laws.
NSW Police	The NSW Police Force has an important role in emergency management, being the agency responsible for: • law enforcement and search and rescue • controlling and coordinating the evacuation of victims from the area affected by the emergency in conjunction with the combat agency being the combat agency for terrorist acts.

Agency	Role
	Some members of the NSW Police may also be appointed as Emergency Operations Controllers. Police would typically become involved in a coastal erosion or inundation event as follows: • assisting NSW SES where required (for example controlling and coordinating evacuation) when NSW SES was acting in its Combat Agency role or • if NSW SES was not mobilised, police may undertake or coordinate activities such as evacuation, barricading, removal of the contents of buildings and the like.
NSW Local Land Services (LLS)	Local Land Services is a regional-focused NSW Government agency delivering quality customer services to farmers, landholders and the wider community. Local Land Services connect people with groups, information, support and funding to improve agricultural productivity and better manage our natural resources. The agency's remit covers agricultural production, biosecurity, natural resource management and help during emergencies. Local Land Services administer a variety of funding opportunities to assist farmers, landholders, Landcare, Aboriginal community groups and other partners to assist and promote the adoption of sustainable land management practices.
NSW Reconstruction Authority **(RA)**	The Reconstruction Authority was established under the NSW *Reconstruction Authority Act 2022* and is responsible for promoting community resilience to the impact of disasters in New South Wales through: (a) disaster prevention, preparedness and adaptation, and (b) recovery and reconstruction following disasters. The Authority has functions and powers to: • facilitate the protection, recovery and reconstruction of affected communities • mitigate against the impact of potential disasters on communities, and • improve the resilience and adaptability of affected communities in relation to potential disasters, including, for example, by the betterment of affected communities.

1.6.2 Traditional Owner Groups

First Nations people have been custodians of the Central Coast area for 60,000 years and there are thousands of registered sites of cultural significance on the Central Coast. It is noted that 'the Central Coast local government area is one of the largest and fastest

growing Aboriginal communities in Australia. This population grew by 38% in the last Census reporting period' (Central Coast Council, 2023).

The Darkinjung Local Aboriginal Land Council (LALC) is active along the Central Coast, with its boundaries stretching from Catherine Hill Bay to the Hawkesbury River. The LALCs have a degree of governance and interface with the Council, as well as the various State and Federal Government bodies. LALCs have a right to be informed in the planning, protection and preservation of cultural sites and areas under the *NSW Aboriginal Land Rights Act 1983* on land within their boundaries. The LALCs aim to achieve long term economic and social solutions for the Aboriginal communities, and to conserve and maintain cultural and heritage land management.

Barang Regional Alliance Ltd (Barang) is the recognised regional governance structure for the Aboriginal community living on Darkinjung land. Their mandate is to empower the whole of the Aboriginal community through advocacy and the advancement of leadership, which is underpinned by culture. Barang supports improved outcomes for the local Aboriginal Community in early childhood development, youth empowerment, employment, health and across various other socioeconomic indicators, by collaborating with the community and partner organisations through targeted programs.

1.6.3 Stakeholders

Stakeholders are persons or groups who are affected, or whom can affect, the outcome of a project (IFC, 2008). Stakeholder identification and analysis is ongoing and those identified in stage 1 and 2 remain relevant to Stages 3, 4 and 5 of CMP development. Council has undertaken extensive Community and Stakeholder consultation as described in Section 3.

There are a number of stakeholders across the Central Coast with an interest in this CMP, and a non-exhaustive list is provided below in Table 1-3:.

Table 1-3: Stakeholders with an interest in coastal management for the purpose of this CMP

Stakeholder groups	Interests	Communication tools and engagement methods
Central Coast Council – internal teams	• Strong Coastal Management in Council and community values, aspirations and long-term vision • Developing a CMP which is accepted by the community and maintains good relationships with the local community • Protection of the environment, community and coastal way of life	• Meetings/Face-to face or MS Teams • Email updates • Reports and study updates
Relevant Ministers and Members of Parliament	• Being across the CMP development to	• Formal letters and emails

Stakeholder groups	Interests	Communication tools and engagement methods
(State and Federal)	inform local constituents, if required	• Council website • Media releases as appropriate
State Government, including • NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) • NSW Coastal Council • NSW Department of Planning, Housing and Infrastructure (DPHI) • National Parks and Wildlife Services (NPWS) • Crown Lands • NSW Department of Primary Industry (DPI) – Fisheries • Infrastructure NSW • Heritage NSW • Transport for NSW (TfNSW) • NSW Local Land Services • NSW State Emergency Service (SES) • Marine Estate Management Authority • NSW Local Land Services	• Involvement in CMP development and updates on progress as required • Alignment with government regulations • Coastal management, including management of coastal hazards and any changes to processes • Maritime safety • Boating infrastructure and facilities • Environmental management- impacts and opportunities • Crown land • Fisheries management and habitat conservation	• Meetings/Face-to face or MS Teams if required • External workshops • Formal letters • Presentations • Emails/Email updates • Council website • Public exhibition
Local boating and fishing clubs, for example: • Central Coast Game Fishing Club • Social Fishing Club • Central Coast Rock Fishing NSW	• Maritime safety • Potential constraints and opportunities associated with water and fishing access and boating navigation • Protection of fishing areas and marine species • Involvement in and updates on CMP development	• Council website • Social media updates • Email updates • Community information sessions • Facilitated workshops • Public exhibition • Interactive maps and online surveys
Local community associations and groups, for example: • Surf lifesaving clubs • Walking groups • Save our Sands	• Involvement in and updates on CMP development • Management of coastal areas in a way that protects and enhances the local environment and community safety • Potential impacts and opportunities relating to the environment, coastal areas and hazards, ongoing access and use of coastal areas	• Council website • Social media updates • Email updates • Community information sessions • Facilitated workshops • Public exhibition • Interactive maps and online surveys

Stakeholder groups	Interests	Communication tools and engagement methods
Local environment groups, including: • Landcare groups • Bushcare groups • Coastcare groups • Dune care groups	• Involvement in and updates on CMP development • Management of coastal areas in a way that protects and enhances the local environment and community safety • Potential impacts and opportunities relating to the environment, coastal hazards, access and use of coastal areas, cultural heritage, protection of flora and fauna- marine and terrestrial	• Council website • Social media updates • Email updates • Community information sessions • Facilitated workshops • Public exhibition • Interactive maps and online surveys
Aboriginal groups and stakeholders, including: • Darkinjung Local Aboriginal Land Council • Aboriginal Advisory Committee • Traditional owners • Barang Regional Alliance	• To improve, protect and foster the best interests of Aboriginal persons in the region • Protection of habitats, ecosystems, plant and animal species, landforms and cultural heritage sites of significance • Involvement in and updates on CMP development	• Council website • Social media updates • Email updates • Community information sessions • Facilitated workshops • Meetings • Public exhibition • Interactive maps and online surveys
Central Coast Community- including those who live and/or own properties in the LGA.	• Involvement in and updates on CMP development • Management of coastal areas in a way that protects and enhances the local environment and community safety • Local benefits, opportunities and impacts from any changes to coastal management processes	• Council website • Social media updates • Email updates • Community information sessions • Facilitated workshops • Meetings • Public exhibition • Interactive maps and online surveys
Local business and industry groups, including: • Chamber of Commerce • Tourism operators • Recreational boating and surfing hire	• Involvement in and updates on CMP development • Management of coastal areas in a way that protects and enhances the local environment and community safety • Potential impacts and opportunities relating to the environment, coastal hazards, access and use of coastal areas, cultural heritage, protection of flora and fauna- marine and terrestrial • Potential impacts and opportunities to local business operations and future development	• Council website • Social media updates • Email updates • Community information sessions • Facilitated workshops • Meetings • Public exhibition • Interactive maps and online surveys
Police and Emergency Services: • NSW Water Police • Australian Border Force	• Community and maritime safety • Boating facilities and water access • Management of natural and coastal hazards	• Council website • Email updates • Meetings • Public exhibition

Stakeholder groups	Interests	Communication tools and engagement methods
• Ambulance Services • NSW SES • Fire Brigade • Marine Rescue NSW		• Interactive maps and online surveys
Educational services, such as schools	• Local benefits and opportunities as well as any potential impacts • Future coastal management	• Council website • Social media updates • Email updates • Community information sessions • Facilitated workshops • Meetings • Public exhibition • Interactive maps and online surveys
Media	• Project updates and progress • Potential impacts and opportunities	• Council website • Media releases

1.6.4 Legislative Context

1.6.4.1 Coastal Management Act 2016

The *Coastal Management Act* 2016 (CM Act), commencing on 3 April 2018 and replacing the *Coastal Protection Act* 1979, communicates 13 key objects (section 3) to achieve the NSW Government's vision for ecologically sustainable management, usage and development of the coast to best protect the natural, social, cultural and economic values of the coast and its communities.

The 'coastal zone' is redefined in the CM Act (section 5) as a broad system composed of four different management areas: Coastal Wetland and Littoral Rainforest Zones, Coastal Vulnerability Zones, Coastal Environmental Zones and Coastal Use Zones, each with their own management objectives.

The CM Act mandates the requirement for local councils with land within coastal zones to prepare a CMP in accordance with the CM Manual (section 13 and 14). The CMP places emphasis on implementation of coastal management by requiring the program to be given effect within the councils' strategic planning documents such as their IP&R framework (section 22). This will involve performance auditing powers to ensure that programs are appropriately implemented.

The programs and activities undertaken as a result of the Act will aim to be feasible, financially viable and sustainable, reflect community priorities and align strongly with the broader community strategic plans.

1.6.4.2 State Environment Planning Policy (Resilience and Hazards) 2021

The State Environment Planning Policy (Resilience and Hazards) 2021 (the SEPP), supports implementation of the management objectives set out in the CM Act. It consolidates the three now-repealed coastal-related SEPPs; SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection), including clause 5.5. of the Standard Instrument – Principal Local Environmental Plan, into one planning policy. The four Coastal Management Areas, defined in the Act, are mapped in the RH SEPP. Each area has outcome-oriented management objectives so that councils can apply appropriate management tools and development controls.

1.6.4.3 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act* (EP&A Act) 1979 forms the statutory basis for planning and environmental assessment in NSW. The EP&A Act 1979 ensures that consent authorities duly consider environmental concerns and the potential impacts of a proposed development on threatened species, populations and ecological communities listed under the *NSW Biodiversity Conservation Act* 2016 (which replaced the *Threatened Species Conservation Act* (TSC Act) 1995) and the *NSW Fisheries Management Act* (FM Act) 1994. Section 5A (7-part test) of the EP&A Act assesses whether the impact of a proposal on the above groups will be significant.

This assessment is undertaken to determine whether any proposed works will have a significant impact on the environment, threatened species, populations, ecological communities and their habitats. It also assesses the type, nature and severity of potential environmental impacts in accordance with state planning legislation and allows the determining authority to decide whether a significant environmental impact will occur by:

- Identifying all environmental issues relevant to a proposal;
- Assessing the significance of potential adverse environmental issues; and
- Outlining measures to minimise these impacts.

1.6.4.4 Central Coast Local Environmental Plan 2022

A Local Environmental Plan (LEP) is the primary legal planning document for guiding land use and planning decisions made by Council. An LEP describes what can be undertaken on land and is supported by mapping (including land use zones, height of building, lot size maps etc.). Through zoning and development controls, the LEP allows Council to manage the way in which land is used to strategically plan for the region and shape and support our local communities.

The Central Coast Local Environmental Plan 2022 (CCLEP 2022) is a consolidation of Gosford LEP 2014 and Wyong LEP 2013 into one plan for the entire Central Coast. The CCLEP 2022, and the corresponding Central Coast Development Control Plan 2022 (CCDCP 2022) currently provides two separate sets of controls underpinning the

approach to planning decisions for the northern and southern half of the Central Coast LGA.

Currently, the CCLEP 2022 does not include any provision for development controls relating to coastal hazards, or any mapping of coastal vulnerability.

1.6.4.5 Crown Land Management Act 2016

The *Crown Land Management Act* 2016 (CLM Act) commenced on 1 July 2018, introducing a consolidated, modern piece of legislation to govern the management of Crown land in NSW.

The CLM Act requires Councils to manage their dedicated or reserved land as if it were public land under the *Local Government Act 1993* (LG Act). Most of this land is classified as "community land" under the LG Act, meaning that councils are required to have plans of management in place for the land. Under the Local Government Act, a plan of management (POM) must be adopted by council for all community land.

1.6.4.6 Fisheries Management Act 1994

The objects of the *Fisheries Management Act* 1994 (FM Act) are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. This act applies to all waters within the Central Coast area and sets out guidelines for the management of recreational and commercial fisheries.

The Fisheries Management (FM) Act also has provisions within it to protect key fish habitat and threatened aquatic species. The FM Act also applies to the management of commercial, recreational and aboriginal fishing and aquaculture in NSW.

1.6.4.7 Local Government Act 1993

The *Local Government Act* 1993 sets out the legal framework and responsibilities of a system of local government in NSW. The Act states that a council may levy an annual charge for the provision of coastal protection services to land that benefits from the services (Section 496B (1)). Section 606C sets out a process of review for the cost of coastal management in response to the administering of the *Coastal Management Act* 2016.

1.6.4.8 Biodiversity Conservation Act 2016

The purpose of the *Biodiversity Conservation Act* 2016 is set out in Section 1.3 of the Act:

"to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development"

Set out in the Act are a range of bioregions and ecological communities present in the Central Coast region. The CMP must consider these communities and support the objectives of this Act in conserving biodiversity.

1.6.4.9 National Parks and Wildlife Act 1974

The NPW Act is the primary statute for management of Aboriginal cultural heritage in New South Wales. Items of Aboriginal heritage (Aboriginal objects) or Aboriginal places (declared under section 84) are protected and regulated under the NPW Act.

Under the Act, an Aboriginal object is defined as 'any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains'. As such, Aboriginal objects are confined to physical evidence and are commonly referred to as Aboriginal sites.

Aboriginal objects are protected under section 86 of the Act. It is an offence to harm or desecrate an Aboriginal object, either knowingly (section 86(1)) or unknowingly (section 86(2)). There are offences and penalties relating to the harm to, or desecration of, an Aboriginal object or declared Aboriginal place. Harm includes to destroy, deface, damage or move.

Within the Central Coast area there are many sites with significant Aboriginal heritage value. Along the coast and associated estuaries, identified sites include middens, burial sites, artefacts and ceremonial areas.

1.6.4.10 Marine Estate Management Act 2014

The *Marine Estate Management Act* 2014 guides management of marine estates to promote ecologically sustainable development, scientific research, economic and recreational use at the state level. Under the Act, a marine estate is defined as coastal water, estuaries, lakes, lagoons, partially enclosed bodies of water that are open to the sea, coastal wetlands and land adjacent to coastal waters that are subject to oceanic processes.

Part 3 of the Act states that a marine estate management strategy must state the vision and priorities for management of the marine estate, in consultation with relevant stakeholders and subject to periodic review by the ministers. Part 4 of the Act requires an assessment and report of the threats and risks to the marine estate in an environmental, economic and social context.

The Act also sets out regulations for the management of declared marine parks to conserve biological diversity, ecosystem integrity and function. To ensure these objectives are met, management plans for these areas are required by section 47 of the Act.

A CMP for the Central Coast open coast must support the objects of this Act.

1.6.4.11 Aboriginal Land Rights Act 1983

The *Aboriginal Land Rights Act* 1983 (ALRA) recognises the Aboriginal people as the traditional owners and occupants on the land and introduces the following key legislations. The ALRA provides land rights to Aboriginal persons in NSW, provides the mechanisms to form Aboriginal Land Councils, and vests land in those Councils.

The ARLA was established with the purpose of returning land in NSW to the Aboriginal people through the process of lodging claims for certain Crown Lands.

The Central Coast LGA is within the administrative areas of the Darkinjung LALC. The CMP study area is incorporated entirely within the boundaries of the Darkinjung LALC, whose boundaries extend from Catherine Hill Bay to the Hawkesbury River.

1.6.4.12 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) and regulations are Australia's main national environmental legislation. The EPBC Act refers to the living things (including plants and animals), habitats and places that need protecting as 'matters of national environmental significance'. These include:

- World Heritage areas
- Commonwealth Heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and listed ecological communities
- listed migratory species (protected under international agreements)
- Commonwealth marine areas
- Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- water resources (relating to unconventional gas development and large coal mining development).

When actions (projects) are taken that can have an impact on protected matters or Matters of National Significance under the EPBC Act, these may need approval from both the Australian government and state or territory or local governments, which may require an Assessment of Significance to assess the project's impact on protected matters listed in the EPBC Act. In the Central Coast coastal zone, an example of a Protected Matter under the EPBC Act is the presence of Little Terns at North Entrance.

2. A Snapshot of Issues

2.1 Overview

The CMP Study Area is impacted by the hazards of:

- beach erosion
- shoreline recession
- coastal lake or watercourse entrance instability
- coastal inundation
- tidal inundation
- coastal cliff or slope instability.

These coastal hazards are expected to become more severe in the future with sea level rise. The areas impacted by these hazards have been mapped based on the outcome of the supporting studies, with maps presented in Appendix A. These hazard maps will be used to develop the future Coastal Vulnerability Area to be included in the RH SEPP.

The issues identified within the CMP Study Area are summarised below, with existing controls in place to reduce the impact of these issues identified as part of the Stage 3 CMP Risk Assessment (Worley Consulting 2024a).

Table 2-1: A Snapshot of Issues

Issue/ Theme	Key Issues
Access & Safety	• Increased erosion/scour associated with stormwater assets • Stormwater assets impacted by coastal inundation • Risk to public safety due to wave run up, wave overtopping, cliff instability, rockfalls and coastal erosion • Informal private access and use damaging vegetation and impacting on recreational amenity for the public • Inaccessible beach accessways impacted by coastal erosion • Damage to dunes and safety concerns due to generation of informal/unauthorised beach accessways • Safety concerns regarding exposure and mobilisation of buried remnants of historic foreshore protection works • Injury to beach users caused by structures mobilising during storm events • Dune instability/steep dune scarp impacted by coastal erosion • Damage to coastal recreational assets from storm events • Limited or out-dated information available on key indicators of coastal hazards and coastal dynamics • Coastal hazards impacting viability of existing and future infrastructure long term, need for long-term coastal adaptation planning • Coastal erosion threatening coastlines and infrastructure • Inconsistent standards of SLSC's patrol towers along the coast. Unable to provide sufficient public services. • Safety hazard due to unfenced cliffline at southern carpark of Soldiers Beach

Issue/ Theme	Key Issues
Amenities	• Aging or incompatible coastal recreation amenity infrastructure not compliant with engineering standards or industry best practice • Lack of guidance for implementing and assessing coastal protection works • Insufficient waste facilities and collection at coastal locations impacting amenity
Coastal Hazards	• Need for stronger planning controls to manage development in the coastal zone in relation to coastal hazards • Legacy coastal emergency works on beaches which no longer serve purpose, causing detrimental impacts or timeframe expired. • Structural integrity/slope stability • Unknown impacts associated with legacy landfill sites or other contamination that be become exposed following erosion. • Coastal erosion threatening private properties and public infrastructure • Flat beach profile, no protection from wave overtopping at some of the beaches in the Study Area • Depletion of sand and undermining of coastal protection infrastructure •
Community & Social	• Need for community and agency representation to support decision making • Lack of detailed cultural and heritage assessments across the LGA. Need for Aboriginal Heritage Impact Permits in areas affected by coastal erosion. • Unapproved memorial sites • Community awareness of coastal hazards and issues • Community awareness of cultural issues and practices, lack of understanding of traditional knowledge for managing the coast
Development	• Need for stronger development controls for development in the coastal zone, particularly for areas under extreme risk from coastal hazards • Need for geotechnical information to inform planning decisions • Infrastructure at risk from coastal hazards • Coastal recreational amenity infrastructure as identified in the Central Coast Recreational Use Study (Vision Environment, 2022) at risk from or not resilient against coastal hazards • Rock/ocean pools maintenance and accessibility • Lack of awareness of property owners for properties affected by coastal hazards
Ecological Environment	• Reduced water quality from urban catchments, leading to reduced water quality in open coast receiving waters • Invasive weeds and pests reducing the diversity and abundance of native species. • Lack of guidance for appropriate planting in the coastal zone. • Lack of guidance for appropriate fencing/dune stabilisation controls in the coastal zone. • Illegal vegetation clearing. • Lack of Marine Park areas in Central Coast • Dune blowout at southern carpark at Soldiers Beach

Information gathered throughout the development of the CMP, including from community and stakeholder engagement and the results of the supporting studies, was compiled into a detailed risk assessment (Worley Consulting 2024a) to identify the key issues and risks throughout the Central Coast Open Coast. The sources of information included:

- Stage 1 Scoping Study (Royal Haskoning DHV 2021), which included a review ofd pre-existing information
- Stage 2 Coastal Hazard Study (Bluecoast Consulting Engineers, 2024-2025), investigating beach erosion/recession, cliff recession, coastal inundation and tidal inundation for immediate, 2040, 2050, 2070 and 2120 planning periods throughout the Central Coast LGA. A detailed register of both private and public assets impacted by coastal hazards for each of the planning periods was compiled

as part of Stage 2. Those areas most affected include Macmasters Beach/Copacabana, Avoca, Terrigal/Wamberal, The Entrance/The Entrance North.

- A series of community engagement activities held during Stages 1 to 3 including online surveys and input on the social pinpoint page, targeted engagement with community groups and workshops (as discussed in Section 3).

2.1.1 Stage 1

The first pass risk assessment, undertaken as part of the Scoping Study (Royal Haskoning DHV, 2021), identified Central Coast LGA-wide hazards and risks along with control measures/management actions while recognising the uncertainties associated with natural systems and future scenarios. Risks were identified together with existing management measures, with the key risks for the Open Coast evaluated in accordance with a risk matrix and recorded in a risk register.

For the Open Coast of the study area, the key risks and challenges identified from the first pass risk assessment were split into four impact areas; Public Safety, Infrastructure Damage, Environmental Risk and Public Amenity.

The key threats identified throughout the study area related to:

- Coastal Erosion and beach recession
- Coastal and tidal inundation/flooding
- Wave runup and overtopping
- Stormwater erosion and discharge
- Coastal Lagoon entrance dynamics
- Slope and cliff instability
- Water quality

Key gaps identified from the First Pass Risk Assessment include:

- Outdated coastal process and hazard information. The recommendation was made to undertake a coastal hazard study for the entire open coast and lagoons to define updated risk based derived coastal hazard lines for use in assessing risks to current and future development.
- Further update the definition of other hazards within the LGA including coastal inundation and coastal cliff or slope instability
- No register/database of public/private structures within the open coast area. Recommendation was made in the scoping study to undertake an audit of existing structures, including consideration of:
  - Ownership (public or private)
  - Permissibility

- Extent
- Year of construction (if known)
- Current condition
- Design standard (if known)

In addition, listed within the First Pass Risk Assessment as a risk control is to establish an ongoing coastal monitoring program to inform actions relating to coastal hazards, and to implement development and planning controls within the CCDCP/CCLEP.

2.1.2 Stage 2

The coastal hazard study undertaken in Stage 2 (Bluecoast Consulting Engineers, 2024-2025) provided a detailed register of both private and public assets impacted by coastal hazards for immediate, 2040, 2050, 2070 and 2120 planning periods. Those areas most affected include MacMasters Beach/Copacabana, Avoca, Terrigal/Wamberal, The Entrance/The Entrance North. Further, the Central Coast Recreational Use Study (Vision Environment, 2022) identified the coastal recreational activities occurring in the area and determine the adequacy of public amenities and infrastructure to accommodate for those activities now and into the future. The definition of the areas most at risk from coastal hazards was used to inform the detailed risk assessment undertaken in Stage 3.

2.1.3 Stage 3

The main issues, risks and opportunities for the Central Coast Open Coast were explored further during Stage 3, building upon the issues identified in the Stage 1 Scoping Study (Royal Haskoning DHV, 2021), by identifying key issues and risks in greater detail. This was informed by community and stakeholder consultation, which involved:

- the launch of a dedicated online *Our Coast, Our Waterways* consultation hub and community survey
- Interactive Social Pinpoint page
- Six community pop-up events and two targeted community stakeholder workshops
- Eight internal Council stakeholder workshops
- Agency stakeholder workshops

The key management issues identified through Stage 3 of the CMP process following stakeholder and community consultation are shown in Table 2-3. These relate to the six themes shown in Figure 2-1.

Figure 2-1: Key Issues/Themes Adopted for the Central Coast Open Coast CMP

Table 2-2: Key themes from Stage 3 Engagement

Coastal Hazards	Pathways and Access	Ecological Environment	Building and Encroachment	Amenities
– Sand nourishment and vegetation preferred over hard protection – Guidance for homeowners to implement seawalls – Council to plant natives along the dunes, grow in nursery and make available for the public to access – Install training walls at North Entrance – Sand scraping after storm events – Improve stormwater outlets to reduce erosion – More communication pre/post hazards – Plant low lying vegetation species to maintain line of sight for patrolling members – Secure rock escarpments – Lifeguards to patrol all year round	– Carparks to be remarked/reconfigured to ensure safety and maximum parking – More parking at all beaches, create overflow parking (multistorey parking) – Parking designated for patrol members – Install clear signage in parking lots and boat ramps and regulate non-conformances – Reduce speed limits near beaches – Develop inclusive coastal walks along beaches – Develop inclusive viewing platforms – Provide adequate signage around boat ramps and regulate it – Secure bike and scooter parking – Safe beach access for families – Increase sand volume for accessibility – Provide disabled beach access	– Need for educational signage to encourage the community to protect/value the environment and recognise cultural significance – Improve accessibility of ecological data – Council to grow/supply native/endemic coastal vegetation. More dune care groups and better resourcing to support them. – Increase vegetation to improve water quality and retain sand – Stronger stance and regulation on environmental vandalism – Increase wildlife habitat, build environmental corridors for animals – Control shark fishing/remove shark nets/restore fish habitats – Sand nourishment to replenish beaches – GPT's on all beaches to reduce rubbish – Create/implement Bitou and Lantana eradication plan – Educate Nippers about dune vegetation and to stay off the dunes – Compliance and targeting removal of unauthorised accessways – Support and host citizen science events – education programs	– Softer engineering techniques – Don't allow development along the coastline. Buildings to be removable – Cost a buy back scheme – Reduce development in high-risk locations – Develop engineering guidelines to guide coastal protection on all beaches – No rezoning for C2 to R2 – No high rises – No subdivisions on any sand dune – Active compliance program to enforce DCP rules – Active compliance on illegal works, encroachment and environmental vandalism – Sustainable development for new housing population i.e., green spaces/community infrastructure/educational facilities – Council to challenge seaward boundaries	– Ensure all amenity blocks and beach showers are fit for purpose, meet user demand, are inclusive and use water saving devices – Better signage to locate amenities – Install after hours defib and CPR signage – Bins for recycling, soft plastics and dog poo – Bin and collection required all year round – Moveable bins to be placed on the beaches – Consultation prior to changing amenities – More kids parks and shading – More public tables and seating

The outcome of the coastal hazard studies, as well as the community and State Government Agency engagement that has been carried out throughout the project, has enabled the key issues to be identified and risks quantified through a separate Detailed Risk Assessment (Risk Assessment report and Risk Register, Worley Consulting 2024a).

The Risk Assessment report and Risk Register categorises the main risks for the Central Coast Open Coast in terms of the Coastal Management Areas as referred to in the CM Act and RH SEPP (detailed in Section 1.5). The Risk Assessment builds upon the first-pass risk assessment undertaken as part of the Stage 1 Scoping Study (Royal Haskoning DHV, 2021), by identifying key issues and risks in greater detail. From the Risk Assessment and the outcome of the individual studies, a suite of potential management actions were developed and categorised in terms of the issues and particular locations which they relate to.

2.2 Social and Economic Context

There is widespread residential development along the Central Coast open coast with beachfront properties generally highly valued within the property market. A large number of these properties are at immediate risk from coastal hazards, as identified in Stage 2 (Bluecoast Consulting Engineers, 2024-2025). This risk increases into the future as a result of shoreline recession and climate change projections.

The Central Coast's Gross Regional Product is estimated at $19.79 billion in 2022/23 (.id, 2025). Tourism directly or indirectly employed 11,500 people in 2022/23 (.id 2025). Tourism has added over $2.5 billion to the local economy in 2022/23.

The importance of tourism to the local economy underscores the importance of planning for the enhancement of the local environment and public infrastructure along the coast.

The Central Coast Regional Plan 2041 identifies the need for strategic planning and local plans to consider opportunities to:

- review planning controls so that they are creating flexible and feasible conditions for housing supply
- align infrastructure and service delivery to match housing supply needs
- explore public domain improvements and limit development in hazard areas
- identify policies and processes that could be reviewed to improve certainty and streamline development processes
- promote urban design outcomes to support healthy and vibrant communities.

The coastal zone supports activities such as tourism that have important economic values for the region and local communities.

2.3 Coastal Hazards

The coastal hazards to be considered in a CMP are defined in Table 2-3. Of these, the coastal hazards relevant to the CMP Study Area and therefore covered by this CMP are:

The CMP Study Area is impacted by the hazards of:

- beach erosion
- shoreline recession
- coastal lake or watercourse entrance instability
- coastal inundation
- tidal inundation
- coastal cliff or slope instability.

Beach Erosion is defined as occurring when wind, waves, currents or elevated ocean water levels are removing sediment that comprises the beach and frontal dune system, landward of the fully accreted condition. Beach erosion can create risks to public and private assets and present public safety risk. Areas assessed to be at immediate risk from beach erosion are mapped in Appendix A and depicted in Table 2-4.

Key locations in the CMP Study Area that are subject to extreme risk from beach erosion include Wamberal and The Entrance North, with both public and private infrastructure to the value of hundreds of millions of dollars are at immediate risk from erosion.

Consequences of beach erosion can include social impacts (loss of beach access, impacts on beach amenity), ecological impacts (beach and dune ecology), and economic impact (damage to infrastructure). Direct damage can occur to built assets such as dwellings, water and sewer infrastructure, roads, fencing and public amenities. Damage could be catastrophic, such as the destruction of dwellings or loss of life; or could be less serious, such as the temporary loss of services or damage to dune fencing. A temporary loss of beach amenity can occur due to beach erosion, which can have a direct impact on the economy or perceived values at the locality. Direct damage to natural assets such as beach dune ecology can also occur as a result of beach erosion – these systems are often resilient and may recover fully over time as the eroded dune system is restored under natural beach processes.

Figure 2-2: Beach Erosion at Wamberal. Top: June 1978 (News Limited); Bottom: June 2016 (Central Coast Council)

Shoreline recession refers to the continuing landward movement of the shoreline, or the net landward movement of the shoreline over a specified period of time, often over decadal timescales. This may be caused by an imbalance in the local sediment budget

(e.g. longshore sediment transport out of a sediment compartment exceeding the sediment inflow, or permanent losses of sand due to offshore sediment transport to "sediment sinks" from which the sediment does not return, from a sediment compartment, or the landward transport of wind-blown sand out of the system, and long term impacts of sea level rise). The process is illustrated in Figure 2-3.

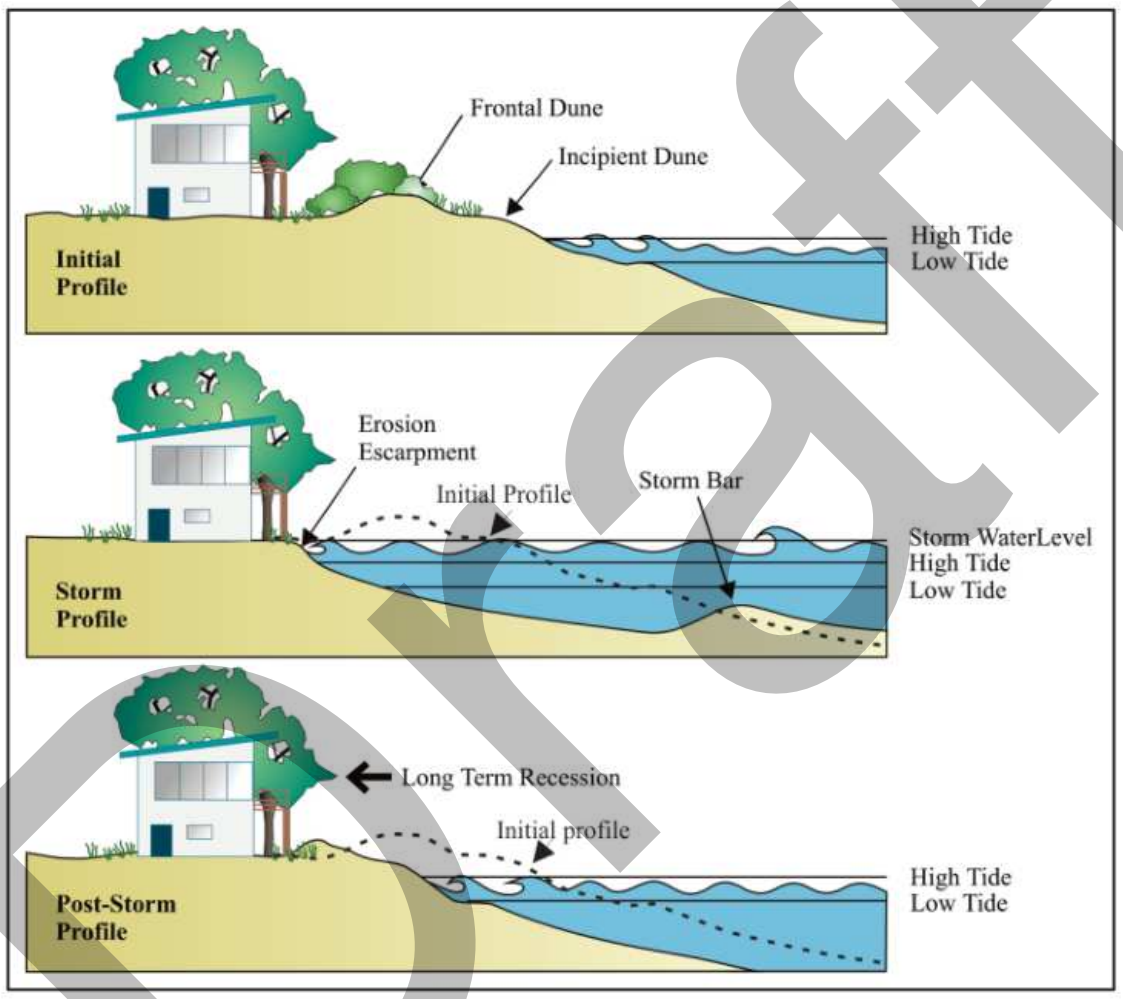


Figure 2-3: Beach erosion and shoreline recession (OEH 2018)

Cliff or slope instability refers to a variety of geotechnical processes on coastal cliffs and bluffs, including rock fall, slumps and landslides. It may be driven by coastal processes such as wave undercutting and overtopping, or by differential weathering of rock layers in cliffs and bluffs by surface and groundwater flows. Instability may occur during or following a coastal storm event, but may also occur at other times. The concept of cliff instability is shown in Figure 2-4. Areas affected by coastal cliff or slope instability are shown in Figure 2-5 and mapped in Appendix A.

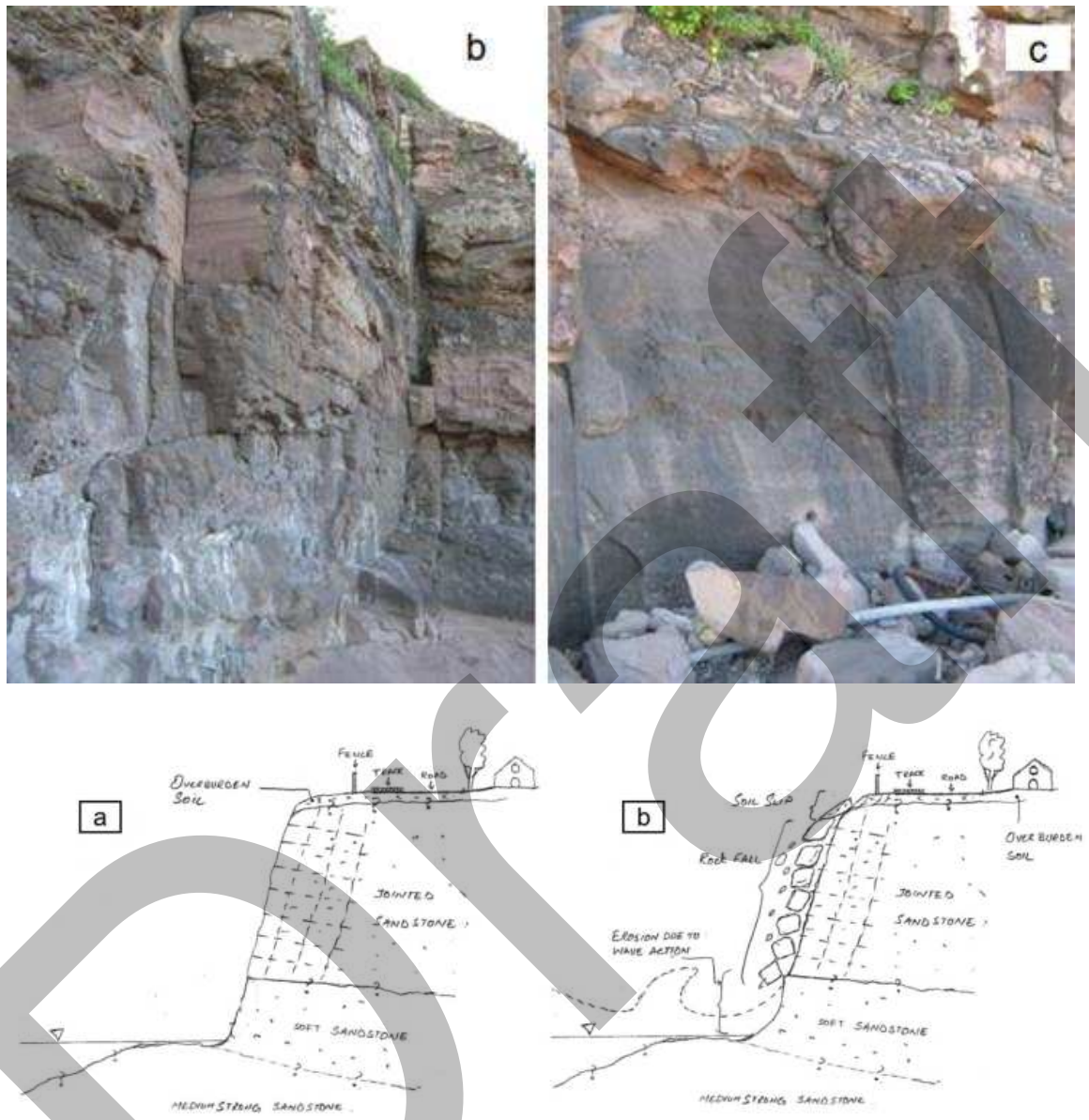


Figure 2-4: Concept of cliff instability (SMEC 2010)

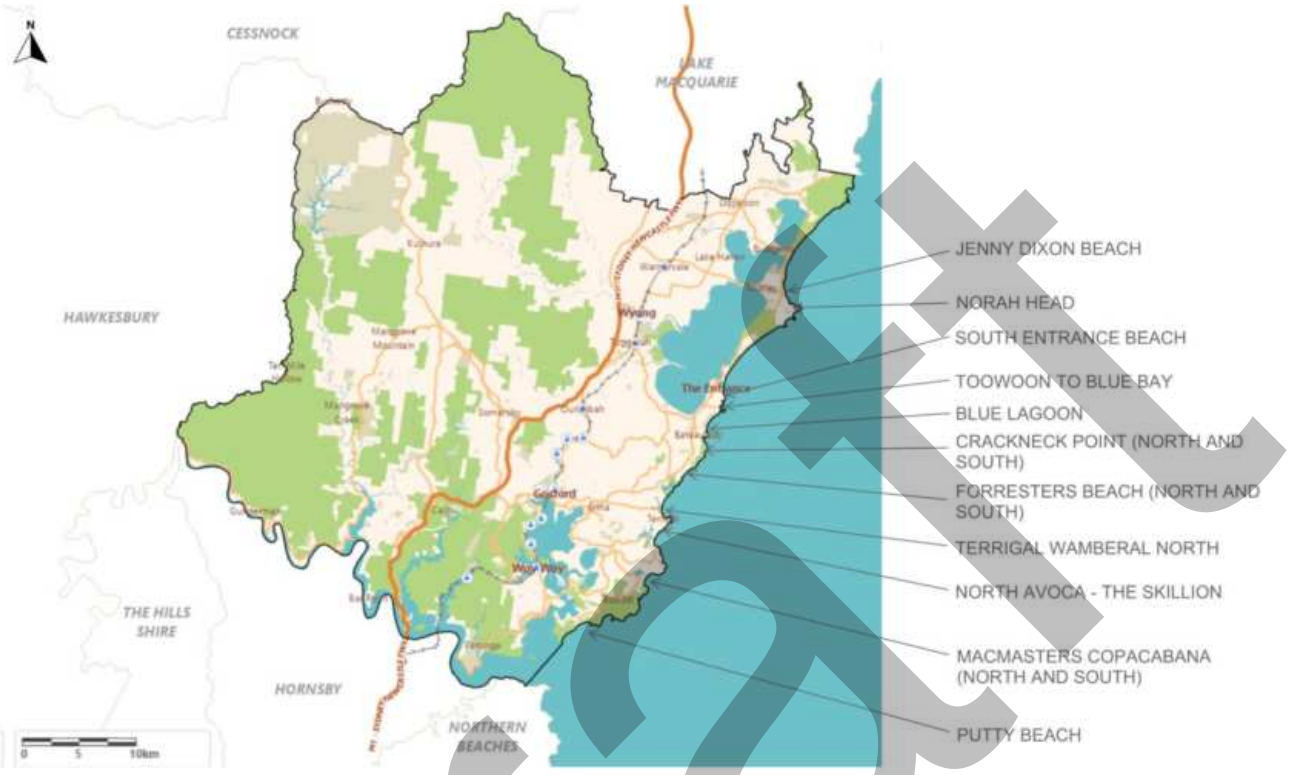


Figure 2-5: Areas subject to Coastal Cliff and Slope Instability

Coastal inundation is defined in the CM Manual Part B (OEH 2018) as occurring when a combination of marine and atmospheric processes raises ocean water levels above normal elevations, inundating low-lying areas. It is often associated with storms resulting in elevated still water levels (storm surge), wave setup, wave runup and wave overwash flows. For estuaries, this type of inundation is the result of water levels at the estuary entrances being elevated above normal levels due to coastal storms, with the elevated water levels propagating inside the estuary. Ocean waves can have an impact on the inundation level due to *wave setup*, which is the elevation of the nearshore still water level resulting from breaking waves. *Wind setup* can further cause an increase in oceanic water levels, due to ocean water "piling up" against the coastline caused by wind stress. Coastal inundation may also exacerbate foreshore erosion, which can impact infrastructure. Areas subject to immediate risk from coastal inundation are depicted in Table 2-5.

Built assets subject to inundation may not necessarily suffer catastrophic damage, depending on the depth and duration of the inundation. Inundation risk can sometimes be managed by applying certain design criteria to the building. Assets such as sewer and water pipelines may not be damaged or adversely impacted by coastal inundation, and dune ecology may be relatively adapted to occasional inundation. Inundation due to wave runup may pose a threat to public safety and the consequence could be injury or loss of life. There may also be temporary loss of access to properties as a result of coastal inundation.

Note that the NSW State Flood Plan (NSW State Flood Plan, 2021) under the *State Emergency and Rescue Management Act 1989* covers emergency actions for floods, which include "…***coastal inundation*** resulting from super-elevated sea levels and/or waves (including tsunami) overtopping coastline defences".

An example of coastal inundation at Avoca in May-June 1974 is shown in Figure 2-6.

Figure 2-6: Coastal inundation at Avoca Beach, May-June 1974

Tidal Inundation (also known as "sunny-day flooding") is defined in the CM Manual as the inundation of land by tidal action under average meteorological conditions. Tidal inundation may include shorter-term incursion of seawater onto low-lying land during an elevated water level event such as a "king" or spring tide or more permanent inundation due to land subsidence, changes in tidal range or sea level rise.

Coastal Lake or Watercourse Entrance Instability - Both natural and trained entrances of estuaries and coastal lakes present a variety of potential hazards and risks. The entrance dynamics and the condition of the entrance also affect flood hazards, water quality and ecological health in the estuary or coastal lake (OEH 2018). Entrances are highly dynamic environments with their shape constantly changing in response to processes such as alongshore sediment transport, tidal flows, storms, and catchment flooding. Four of the beaches within the study area are backed by lagoons, namely Cockrone (behind MacMasters Beach), Avoca, Wamberal and Terrigal. All four of the lagoons are intermittently open to the oceans and are classed as Intermittently Closed and Open Lakes or Lagoons (ICOLLs). In addition, the dynamics at the entrance to Tuggerah Lakes have a strong influence on the dynamics of the surrounding beaches at The Entrance and The Entrance North. Entrance processes are covered by the CMPs for

individual coastal lagoons or lakes, but their impact can extend some distance along the beach, impacting the area covered by the Open Coast CMP.

Table 2-3: Coastal Hazards covered by this CMP

Hazard	Rationale
Beach Erosion and Recovery	**Covered in this CMP** – this CMP covers the open coast beaches, which are all impacted to varying degrees by beach erosion due to coastal storm events. Beach erosion hazard has been mapped for different planning periods in Stage 2 (Bluecoast Consulting Engineers, 2024-2025). Mapping of beach erosion and recession has been undertaken for immediate, 2040, 2050, 2070 and 2120 planning periods, and for 1%, 2%, 5% and 10% Annual Exceedance Probability (AEP) storm events. Mapping has considered the landward limit of the *Zone of Slope Adjustment* (ZSA), which is an area that encompasses that portion of the seaward face of the beach that would slump to a natural angle of repose following removal by wave erosion of the design storm demand. It represents the steepest stable beach profile under the conditions specified.
Shoreline Recession	**Covered in this CMP** – this CMP covers the open coast beaches. Stage 2 considered the sediment budget of all the beaches and considered long term adjustments to the shoreline due to sea level rise, longshore sediment transport, and known sediment sources and sinks (Bluecoast Consulting Engineers, 2024-2025). Mapping of this hazard has considered the position of the ZSA under different planning periods, following long term shoreline recession that is predicted to occur at some of the beaches in the CMP study area.
Coastal Lake or Watercourse Instability	**Partially covered in this CMP** – This CMP covers the impact of coastal lake and watercourse instability on the beaches of the open coast near the estuary entrances. The entrance areas themselves, and entrance management policies for each entrance, are not covered by this CMP but are covered separately in the CMPs for the coastal lagoons, and Tuggerah Lake.
Coastal Cliff or Slope Instability	**Covered in this CMP** – this CMP covers the cliffs of the open coast, with the geotechnical hazards defined and mapped as part of Stage 2, and management actions developed to manage these hazards. Mapping of the predicted cliff line in 2120 for the Study Area, and mapping of zones of geotechnical instability, has been undertaken by (Bluecoast Consulting Engineers, 2024-2025) and J&K Geotechnics (2024), and is presented in Appendix A.
Coastal Inundation	**Covered in this CMP** – This CMP covers coastal inundation in the CMP Study Area caused by elevated oceanic water levels, wave

Hazard	Rationale
	runup and wave overtopping of the dunes that results in inundation of low-lying areas on the landward side of the dunes. This hazard has been mapped as part of Stage 2 (Bluecoast Consulting Engineers, 2024-2025). It does not cover coastal inundation caused by propagation of elevated water levels into the lagoons and estuaries, with this hazard covered separately in the CMPs for the coastal lagoons and Tuggerah Lake.
Tidal Inundation	**Covered in this CMP** – This CMP covers tidal inundation of low-lying land adjacent to the open coast. It does not cover tidal inundation of low-lying lands adjacent to the lagoons and estuaries, where water levels at the estuary entrances are elevated due to astronomic tides under average meteorological conditions, with the elevated water levels propagating inside the estuary and inundating adjacent foreshores. Tidal inundation of the low-lying areas surrounding the estuaries is covered separately in the CMPs for the coastal lagoons and Tuggerah Lake.
Erosion and Inundation of Foreshores Caused by the Action of Waves and Catchment Floodwaters	**Not Covered in this CMP** – This CMP does not cover foreshore erosion of the estuary foreshores of the coastal lagoons and Tuggerah Lakes – this is covered separately in the CMPs for the estuaries. This CMP does cover erosion and inundation of the foreshores of the open coast, with some of these areas being adjacent to estuary entrances (e.g. erosion/undermining at Marine Parade at the southern side of The Entrance channel).

"Catchment flooding" refers to flooding driven by heavy rainfall in the catchment areas of the estuaries and subsequent freshwater inflows. This type of flooding is often associated with the same weather systems as coastal inundation events, which are typically driven by low pressure systems, usually accompanied by intense rainfall. This CMP does not cover catchment flooding, which is covered under the NSW Floodplain Management process (with catchment flooding in the coastal lagoons covered in the Coastal Lagoon Catchments Overland Flood Study, MHL 2020).

A Coastal Vulnerability Area (CVA) has not yet been developed for the CMP Study Area. However, the mapped areas impacted by coastal erosion, shoreline recession, cliff and slope instability and coastal inundation as presented in Appendix A will be used to develop a CVA for inclusion in the RH SEPP.

Table 2-4: Areas assessed to be at immediate risk from beach erosion

Location	Private Property		Council and non-private property								
							Utilities (m)				
	Buildings (no)	**Land (m^2)**	**Buildings (no)**	**Land (m^2)**	**Roads (m)**	**Pathways (m)**	**Drainage**	**Sewer**	**Water Mains**	**Sewer Pressure Mains**	**Total Utilities**
Killcare	1	1,340									
Macmasters Beach Copacabana	7	54,005	2		112 (Marine Parade, Del Monte Pl)	72	73	103			**176**
Avoca											
Terrigal Wamberal	72	44,490	2			34		15	2		**17**
Forresters Beach				80,260							
Shelly Beach						8					
Toowoon Bay Blue Bay		287				8	9	32			**41**
The Entrance The Entrance North	34	27,285	2	46,066	35 (Hargraves St)		27	8	8		**43**
Norah Head Noraville	5	5,308		7,855		129	198	120		21	**339**
Budgewoi Budgewoi Peninsula Freeman Wybung				273,245					2		**2**

Table 2-5: Areas subject to immediate risk from coastal inundation

Location	Private Property		Council and non-private property								
							Utilities (m)				
	Buildings (no)	**Land (m^2)**	**Buildings (no)**	**Land (m^2)**	**Roads (m)**	**Pathways (m)**	**Drainage**	**Sewer**	**Water Mains**	**Sewer Pressure Mains**	**Total Utilities**
Killcare				2,516							
Macmasters Beach Copacabana	2	46,942	1		11 (Marine Pde)	6	47				**47**
Avoca*	78	54,526	12	-	644 (Ficus Avenue, Avoca Dr)	799	1,052	1,832	932	243	4,059
Terrigal Wamberal	5	6,496	2			557	26				**26**
Forresters Beach				73,039							
Shelly Beach							3				**3**
Toowoon Bay Blue Bay	3	2,683	1		27 (Access road to SLSC)	7	116	299			**415**
The Entrance The Entrance North	3	6,397	2	95,392		38	146	173	37	35	**391**
Norah Head Noraville	2	12,769		11,654	7 (Elizabeth Dr)	166	171	208	9	10	**397**
Budgewoi Budgewoi Peninsula Freeman Wybung				317,589							

2.4 Coastal Management Issues

Key coastal management issues throughout the CMP study area have been identified at particular locations, through community/stakeholder engagement, review of existing information/studies, and detailed reconnaissance of the coastline by the CMP study team.

These issues are summarised below, with issues identified both for key specific locations, and issues which apply generally across the entire study area.

Examples of some of the issues and existing management responses within the CMP study area are provided in Figure 2-7.

2.4.1 Coastal Hazards

The CMP study area has been impacted by coastal hazards historically, and these have been subject to ongoing management at many locations, with management approaches determined from previous studies, the Gosford Beaches CZMP and the Wyong CZMP. Key impacts from coastal hazards across the open coast, together with existing management controls, are summarised in

Table 2-6.

Figure 2-7: Example images of Coastal Hazards and known issues across the Central Coast open coast study area

	
Windblown sand at carpark south of Avoca Lagoon entrance	Wave overtopping and coastal inundation at Avoca Beach (1986)
	
Site of surf club at MacMasters Beach, May-June 1974	Erosion escarpment at Copacabana Beach, May-June 1974

	
Unstable slope and toe protection structure at Cabbage Tree Harbour, photo illustrating landslip occurrence in 2022 (Central Coast Council)	Scour from stormwater outflow at Copacabana
	
Coastal development at risk from erosion at Curtis Parade, The Entrance North (2022, photo courtesy Central Coast Council	Ad-hoc coastal protection works at Curtis Parade, The Entrance North (July 2024, photo courtesy Central Coast Council)

	
Slope instability and scour at stormwater outlet, Forresters Beach	Stormwater scour and damaged pedestrian access at Killcare SLSC
	
Ad-hoc coastal protection works at MacMasters Beach SLSC; works not engineered to provide protection against slope instability or beach erosion	Stormwater scour at North Avoca

	
Windblown dune at Soldier Beach carpark (photo courtesy Central Coast Council)	Wave attack at coastal protection works at Terrigal Haven (photo DCCEEW)
	
Erosion and undermining of seawall at The Entrance channel	Unauthorised coastal protection works across the LGA (example shown at The Entrance North); works subsequently failed and slumped to the bottom of the slope in a storm event in May 2025

	
Coastal development at risk from erosion at Wamberal Beach	Coastal development at risk from erosion and authorised/unauthorised emergency protection works at Wamberal Beach

Table 2-6: Coastal management issues and existing management controls relating to coastal hazards

Beach	Coastal Management Area	Issue	Root Cause	Existing Controls
Avoca/Nth Avoca	Coastal Use	Damage to public and private infrastructure and property, including Council Beach accessways Damage to foreshore vegetation	Coastal erosion	Seawall constructed at Avoca Beach to protect water and sewer infrastructure and improve beach access/amenity in front of SLSC Protocol in place to repair beach accessways and revegetation of dune following erosion in large storm event (Avoca Drive, Ficus Ave Carpark North Avoca) Relocation of sand to improve beach access and amenity (Avoca Lake Entrance) Repair damage to carpark and other infrastructure should coastal erosion occur (Avoca Beach SLSC and Carpark, Ficus Ave Carpark Beach scraping to build dune in front of carpark and properties (165 Avoca Drive to 15 Ficus Avenue) Monitoring of dune erosion Beach scraping to build vegetated dune in front of SLCS and carpark Development controls based on a defined building line with new building to be founded into 2100 Stable Foundation Zone
Avoca/Nth Avoca	Coastal Use	Damage to seawalls caused by scour and/or coastal storms Damage to foreshore and assets seawalls are protecting	Coastal erosion	Monitor performance of existing rock works in front of surf club and carpark following large storm
Avoca/Nth Avoca	Coastal Use	Injury to beach users caused by exposure and mobilisation of buried remnants of historic foreshore protection	Coastal erosion	Monitor Encourage and assist Dunecare group and local residents to maintain and revegetate dune

Beach	Coastal Management Area	Issue	Root Cause	Existing Controls
Avoca/Nth Avoca	Coastal Use	Injury to beach users caused by erosion, instability of erosion scarps following beach erosion and undermining at existing beach accessways	Coastal erosion	Beach scraping (165 Avoca Drive to 15 Ficus Avenue)
Avoca/Nth Avoca	Coastal Use	Damage to public and private infrastructure and property, including Council Beach Accessways, caused by beach recession	Beach recession	Seawall constructed at Avoca Beach to protect water and sewer infrastructure and improve beach access/amenity in front of SLSC Protocol in place to repair beach accessways and revegetation of dune following erosion in large storm event (Avoca Drive, Ficus Ave Carpark North Avoca) Relocation of sand to improve beach access and amenity (Avoca Lake Entrance) Repair damage to carpark and other infrastructure should coastal erosion occur (Avoca Beach SLSC and Carpark, Ficus Ave Carpark Beach scraping to build dune in front of carpark and properties (165 Avoca Drive to 15 Ficus Avenue) Monitoring of dune erosion Beach scraping to build vegetated dune in front of SLCS and carpark
Avoca/Nth Avoca	Coastal Environment	Loss of dune or other coastal habitats due to coastal erosion	Beach recession Coastal Erosion	Repair of beach accessways and revegetation of dune following erosion (properties on Avoca Drive and undermining of Norfolk Pines, North Avoca) Encourage and assist Dunecare group to improve dune vegetation management using appropriate endemic vegetation (Avoca Drive)
Avoca/Nth Avoca	Coastal Use	Reduced beach amenity resulting from beach sand recession	Beach recession	Protocol in place to repair beach accessways and revegetation of dune following erosion in large storm event (Avoca Drive, Ficus Ave Carpark North Avoca)

Beach	Coastal Management Area	Issue	Root Cause	Existing Controls
				Relocation of sand to improve beach access and amenity (Avoca Lake Entrance) Beach scraping to build dune in front of carpark and properties (165 Avoca Drive to 15 Ficus Avenue)
Avoca/Nth Avoca	Coastal Use	Damage to public and private property and infrastructure caused by coastal floodwaters, particularly in the open coast area adjacent to the entrance to Avoca Lagoon Injury to public due to floodwaters caused by high sea level during storm events, particularly in the open coast area adjacent to the entrance to Avoca Lagoon	Coastal Inundation	Development controls for residence to be above inundation levels on redevelopment of properties (Properties south of Austral Avenue, Avoca Lake Entrance) Monitor storm run-up levels (north Avoca) Beach scraping to build vegetated dune in front of surf club and carpark above wave run-up level Monitor performance of existing rock works in front of surf club and carpark
Avoca/Nth Avoca	Coastal Environment	Damage to habitats caused by water in low-lying areas Introduction of hazardous materials/pollutants into the marine/estuarine environment	Coastal Inundation	No controls currently in place
Avoca/Nth Avoca	Coastal Environment	Introduction of hazardous materials/pollutants into the marine/estuarine environment	Coastal Erosion	No controls currently in place
Budgewoi Beach	Coastal Use	Damage to infrastructure and amenity due to lack of dune	Coastal Erosion	Conduct dune stabilisation works and revegetation to encourage sand accretion and stabilisation of frontal dunes - Ongoing. Many dune stabilisation and revegetation works have been done and continue to be done.
Budgewoi Beach	Coastal Use	Damage to infrastructure and amenity due to inundation/overtopping due to lack of dune height	Coastal Inundation	Use beach scraping to reinforce dune and maintain dune crest heights above 7m at affected locations - Ongoing. Beach scraping has been done and continues to be done at many locations, typically before or after major storm events.

Beach	Coastal Management Area	Issue	Root Cause	Existing Controls
Cabbage Tree Harbour	Coastal Use	Damage to amenity and infrastructure due to the slope at Cabbage Tree Harbour being undermined due to ongoing toe trimming by wave action, land slippages at upper part of slope e.g. in 2022	Coastal Erosion	Engineered toe protection installed at the base of the steep unstable slope at Cabbage Tree Harbour
Copacabana/ MacMasters	Coastal Use	Damage to MacMasters beach SLSC from wave run-up	Coastal Inundation	Monitor performance of existing erosion works around base of Norfolk Island Pines and at Surf Club at southern end of beach and replace/improve as required
Copacabana/ Macmasters	Coastal Vulnerability	Damage to Surf Club at the southern end of the beach, as well as carpark along Marine Parade, seaward portion of properties along Tudibaring Parade and future erosion affecting Copacabana Surf Club, Del Monte Place and properties along Del Monte Place	Coastal erosion	Beach scraping to build dune in front of Surf Club, eroded pine tree roots and Marine Parade in the interim until erosion protection works are constructed Landward relocation of sewer infrastructure along Marine Parade if erosion protection works not implemented SLSC reconstructed on deep pile foundations Repair damage to Del Monte Place, Surf Club and surrounding land should it be damaged by future erosion (done on reactive basis) Development controls for residences and commercial premises to be on piled foundations on redevelopment of properties based on defined building line
The Entrance	Coastal Use	Damage to amenity and infrastructure	Coastal Erosion	Historically Council has dredged sand from the active tidal delta in The Entrance channel on occasion and placed the sand on North Entrance beach. Council successfully moved approximately 45,000m^3 from the Entrance Channel in 2018. 2020-21 dredge plan focused on nourishment of North Entrance beach in response to significant erosion experienced. However, there is currently no commitment to dredge or place sand at any preference areas.

Beach	Coastal Management Area	Issue	Root Cause	Existing Controls
Forresters	Coastal Use	Immediate risk of erosion damage to properties and minor structures	Coastal erosion	Monitor beach for erosion and cliff lines for instability (Forresters Beach Dune)
Hargraves Beach	Coastal Use	Damage to infrastructure and amenity due to inundation/overtopping due to lack of dune height	Coastal Inundation	Beach scraping to reinforce dune and maintain dune crest heights above 7m at affected locations - Ongoing. Beach scraping has been done and continues to be done at many locations, typically before or after major storm events.
Hargraves Beach	Coastal Use	Damage to infrastructure and amenity due to lack of dune	Coastal Erosion	Conduct dune stabilisation works and revegetation to encourage sand accretion and stabilisation of frontal dunes - Ongoing.
Killcare	Coastal Use	Immediate risk of inundation to surf club and carpark	Coastal Inundation	Beach scraping to build vegetated dune in front of surf club above wave runup level with vegetation and fencing
Killcare	Coastal Use	Immediate risk of erosion damage to surf club and carpark	Coastal Erosion	Monitor beach for erosion in front of surf club and camping area Beach scraping to build vegetated dune in front of surf club with vegetation and or fencing
Lakes Beach	Coastal Use	Damage to infrastructure and amenity due to inundation/overtopping due to lack of dune height	Coastal Inundation	Beach scraping to reinforce dune and maintain dune crest heights above 7m at affected locations
Lakes Beach	Coastal Use	Damage to infrastructure and amenity due to lack of dune	Coastal Erosion	Dune stabilisation works and revegetation to encourage sand accretion and stabilisation of frontal dunes - Ongoing.
North Entrance Beach	Coastal Use	Loss of sand impacting infrastructure	Coastal Erosion	Development controls in Council's LEP/DCP
North Entrance Beach	Coastal Use	Damage to infrastructure and amenity due to inundation/overtopping due to lack of dune height	Coastal Inundation	Development controls in Council's LEP/DCP

Beach	Coastal Management Area	Issue	Root Cause	Existing Controls
North Entrance Beach	Coastal Use	Damage to infrastructure and amenity due to lack of dune	Coastal Erosion	Dune stabilisation works and revegetation to encourage sand accretion and stabilisation of frontal dunes - Ongoing.
Soldiers Beach	Coastal Use	Damage to infrastructure and amenity due to lack of dune	Coastal Erosion	Dune stabilisation works and revegetation to encourage sand accretion and stabilisation of frontal dunes - Ongoing.
Terrigal (SLSC)	Coastal Use	Immediate damage to assets/infrastructure due to coastal erosion	Coastal Erosion	Monitor performance of existing seawall - Photo monitoring of beaches undertaken on a regular basis to capture beach profiles and reactively during and following storms and large swells. A review has been completed of the "works as executed' plans for the existing seawall including the crest level.
Terrigal (SLSC)	Coastal Use	Immediate threat of inundation	Coastal Inundation	Monitor performance of seawall against inundation - Photo monitoring of beaches undertaken on a regular basis to capture beach profiles and reactively during and following storms and large swells to visually capture wave run up. UNSW WRL have completed bi-annual LiDAR surveys of Central Coast Beaches in recent years. A review has been completed of the 'Work As Executed' plans for the existing seawall including the crest levels.
Terrigal (Terrigal Beach)	Coastal Use	Immediate damage to assets/infrastructure due to coastal erosion	Coastal Erosion	UNSW WRL have completed bi-annual LiDAR surveys of Central Coast Beaches in recent years. A large sand clearance project to move sand out of the Terrigal Lagoon opening area and nourish southern Terrigal Beach was completed in 2017.
Terrigal (The Haven)	Coastal Use	Immediate damage to assets/infrastructure due to coastal erosion	Coastal Erosion	Monitor performance of existing seawall in addressing erosion - Annual stability surveys of the seawall are conducted by Council to monitor any settlement or dislocation of the sandstone block. Regular 6 monthly surveys of the Haven Beach profile and sand volume are also conducted. Investigate beach nourishment to increase buffer against coastal erosion. Ongoing monitoring may indicate that beach nourishment is required in the future for amenity purposes rather than erosion protection given the full length seawall backing the beach Monitor beach profile following significant storm event - Photo monitoring of the beach undertaken of a regular basis to capture beach profiles and

Beach	Coastal Management Area	Issue	Root Cause	Existing Controls
				reactively prior, during and following storms and large swells to visually capture wave runup. A new boat ramp was completed by Council in 2016. Reconstruction of the Marine Rescue ramp and concrete apron was completed in 2019/20.
Wamberal	Coastal Use	Immediate damage to assets/infrastructure due to coastal erosion	Coastal Erosion	In May 2020, Council engaged Manly Hydraulics Laboratory to prepare concept plans for a terminal protection structure (seawall or sloping revetment) and sand nourishment solutions for Wamberal Beach. The study included: • literature review, • coastal protection assessment, • concept design options • sand nourishment investigation • cost benefit analysis Following the studies, MHL further developed the Wamberal Beach Terminal Protection Structure Engineering Design Requirements (EDRs) outlining specific criteria for the assessment of Wamberal Beach coastal protection development applications. The EDRs were adopted by Council in October 2022 and now form part of the development assessment criteria. Continue and enhance dune vegetation - Annual bush restoration works have been completed at the 'ruins'. Council facilitates and supports the dune restoration work completed by the Bushcare group in the dunes fronting the Wamberal SLSC and adjacent to the southern shores of Wamberal Lagoon.
Wamberal Lagoon Entrance	Coastal Use	Damage to infrastructure	Coastal Inundation	Coastal Lagoon Catchments Overland Flood Study, completed (MHL 2020
former Wyong Shire Coastline	Coastal Use	Coastal erosion impacting assets and infrastructure	Coastal Erosion	

Beach	Coastal Management Area	Issue	Root Cause	Existing Controls
former Wyong Shire Coastline	Coastal Use	Changing shoreline	Coastal Erosion and inundation	LiDAR data, combined with aerial photogrammetry and satellite imagery for evaluating changes to coastal terrain and terrestrial coastal ecology as sea levels rise - ongoing. Many LiDAR surveys have been done, typically before and after major coastal events. A 2 year contract with WRL for LiDAR survey for every 6 months was competed from Dec 2017 to Dec 2019
former Wyong Shire Coastline	Coastal Use	Damage to assets	Coastal Erosion and inundation	Asset register and maintenance program established for major council infrastructure in the coastal risk areas, such as stormwater systems, sea walls and sewage pumping stations for streamlined asset and infrastructure management, including condition records, storm impacts. Major Council coastal infrastructures were registered in 2018-19.

2.4.2 Access and Safety

Coastal management issues relating to access and safety apply across the entire coastal zone of the Central Coast. The issues identified during the course of this CMP are

Coastal management issues relating to access and safety apply across the entire coastal zone of the Central Coast. The issues identified during the course of this CMP are provided in Table 2-7.

Table 2-7: Coastal management issues relating to access and safety

Issue Description	Root Cause
Injury to beach users caused by exposure and mobilisation of buried remnants of historic foreshore protection or unauthorised protection works/development Injury to beach users and/or residents caused by structures mobilising during storm events Injury to beach users caused by erosion, instability of erosion scarps following beach erosion, undermining at existing beach accessways	Coastal Erosion
Injury to the public due to the erosion and instability of erosion scarps caused by stormwater outlets and runoff	Stormwater Erosion
Injury to public due to floodwaters caused by high sea level during storm events, particularly in the areas surrounding the lagoon Injury to public caused by structures and/or debris mobilising during storm events	Coastal Inundation
Injury to public caused by wave runup or wave overtopping during storm conditions	Wave runup and overtopping
Injury to public caused by rock falls from instable cliff faces at beach headlands	Slope and Cliff Instability
Informal accessways and use damaging vegetation and impacting on recreational amenity for the public	Management and cost

2.4.3 Public Amenity

Specific coastal management issues relating to public recreational use and amenity identified during the course of the CMP are outlined below in Table 2-8.

Table 2-8: Coastal management issues relating to recreational use and public amenity

Beach	Issue	Consequence	Existing Controls
LGA-wide	Degrading infrastructure	Infrastructure degrading and thus not providing high level amenity for users	
LGA-wide	Impact on recreational amenity resultant from private landowners constructing seawalls	Degradation and impediment of beach amenity Increased risk to public safety	Council-issued orders to remove unauthorised works
LGA-wide	Poor accessibility and degradation of Council-managed rock/ocean pools	Lack of all-ability access to rock/ocean pools	Council Disability Inclusion Plan
LGA-wide	Damage to amenity/infrastructure due to loss of structural integrity of existing coastal protection works e.g. the Entrance seawall - damage to community infrastructure including road, parking and pedestrian promenade	Damage to Amenity/infrastructure	Review the structural integrity of existing coastal protection works e.g. The Entrance seawall and schedule structural upgrades as necessary to balance risk and cost - This is underway for The Entrance seawall - several inspections have been done. External consultants will be engaged to conduct an assessment and concept design.

2.4.4 Coastal Environment

Specific coastal management issues impacting the ecological environment of the Central Coast Open Coast identified in the CMP study area are illustrated in Table 2-9.

Table 2-9: Specific coastal management issues affecting coastal environment

Beach	Issue	Existing Controls
LGA-wide	Invasive weeds and pests reducing the diversity and abundance of native species. Illegal vegetation clearing.	NSW Dune Management manual for vegetation and fencing guidance
LGA-wide	Reduced water quality from urban catchments, leading to reduced water quality in open coast receiving waters	Council water quality monitoring program
Avoca/Nth Avoca	Various adverse impacts on aquatic ecology due to poor water quality, caused by erosion and urban run off, climate change resulting in more frequent extreme events	Development controls, public education, stormwater treatment Water quality monitoring

Beach	Issue	Existing Controls
Copacabana/ MacMasters	Scour and water quality issues due to stormwater management near Copacabana surf club, impacting on recreational amenity, foreshore reserve and ecology	
Killcare	Scour around stormwater outlet impacting on recreational amenity, foreshore reserve and ecology	

2.4.5 Cultural and Social Issues

Key cultural and social issues identified during the CMP are shown in Table 2-10 which applies across the entire CMP Study Area.

Table 2-10: Key Cultural and Social Management Issues applying across entire Open Coast

Coastal Management Area	Issue	Existing Controls
Coastal Use	Need for community and agency representation to support decision making	Coastal, estuary and floodplain management Advisory Committee
Coastal Environment	Lack of detailed cultural and heritage assessments across the LGA, although these are completed at a local level for specific projects. Need for Aboriginal Heritage Impact Permits in areas affected by coastal erosion.	Development controls, public education program, Aboriginal heritage mapping, statutory and non-statutory planning controls.
Coastal Use	Unapproved memorial sites	Council Policy for Memorials, Naming of Council Facilities and Donations of Park Furniture and Trees (Central Coast Council 2018)
Coastal Use	Community awareness of coastal hazards and issues	Council website, existing public education measures.
Coastal Use	Community awareness of cultural issues and practices, lack of understanding of traditional knowledge for managing the coast	Council website, existing public education measures.
Coastal Use	Lack of awareness of property owners for properties affected by coastal hazards Lack of guidance for implementing and assessing coastal protection works	Coastal hazard notations, planning controls, Council website, existing public education measures Engineering Design Requirements for Wamberal Beach

2.5 Coastal Risks and Opportunities

A first pass risk assessment was undertaken as part of the Scoping Study (Royal Haskoning DHV, 2021), which identified LGA-wide hazards and risks along with control measures/management actions while recognising the uncertainties associated with natural systems and future scenarios.

Risks were identified together with existing management measures, with the key risks for the Open Coast evaluated in accordance with a risk matrix, recorded in a risk register. The risk assessment considered timeframes of 20 years, 50 years and 100 years, as stipulated by the CM Manual. The consideration of these planning timeframes allows a range of possible future scenarios to be incorporated into the assessment, including future scenarios for climate change, population growth, development and use of the coast. As outlined in the CM Manual, when considering future scenarios for critical infrastructure or long-term land use planning decisions, it is appropriate to gain an understanding of the full range of risks over longer timeframes and high range projections.

The key issues identified as part of the Scoping Study have been updated as part of Stage 3 of the CMP process to include more specific local issues and risks, with the risk register acting as a tool to monitor the effectiveness of management actions as well as the development of specific management actions to address each risk. This has resulted in the development of a detailed risk assessment to inform the CMP and inform potential management actions.

2.5.1 Detailed Risk Assessment

Risk can be quantified as the integration of probability (i.e., frequency analysis of the hazard) and consequences. The Risk Assessment has taken into account both the "likelihood" (or probability) of the hazard occurring and the "consequence" to define the level of risk.

The Risk Assessment is documented in detail in the Risk Assessment Report and Risk Register (Worley Consulting 2024a). The steps involved in the risk management process are outlined in Figure 2-8 and Figure 2-9. The risk matrix applied to quantify the risk is provided in Table 2-11.

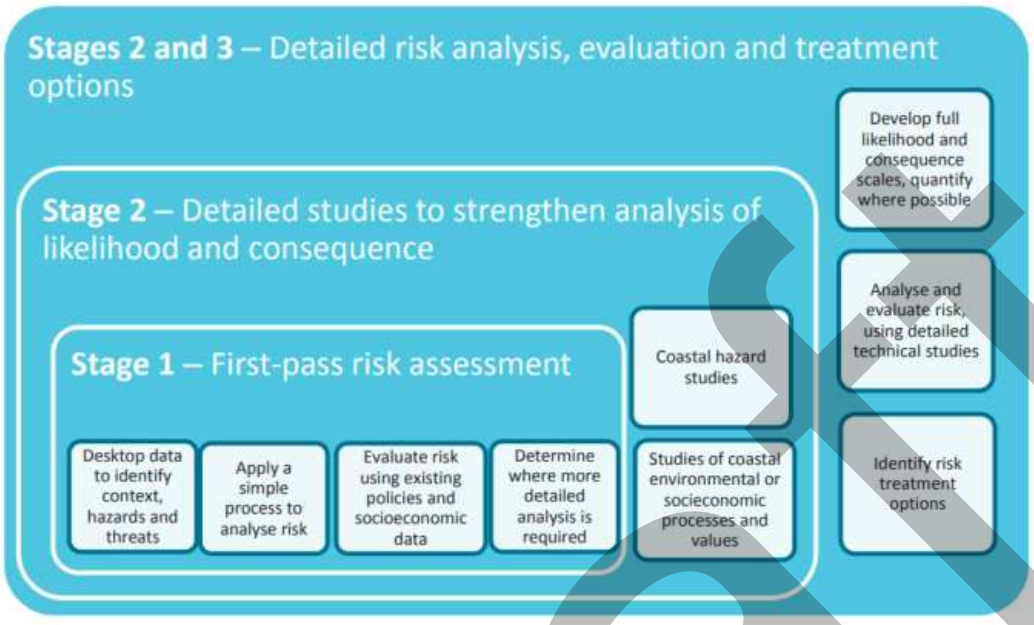


Figure 2-8: Detailed Risk Assessment Process (from NSW Coastal Management Manual 2018)

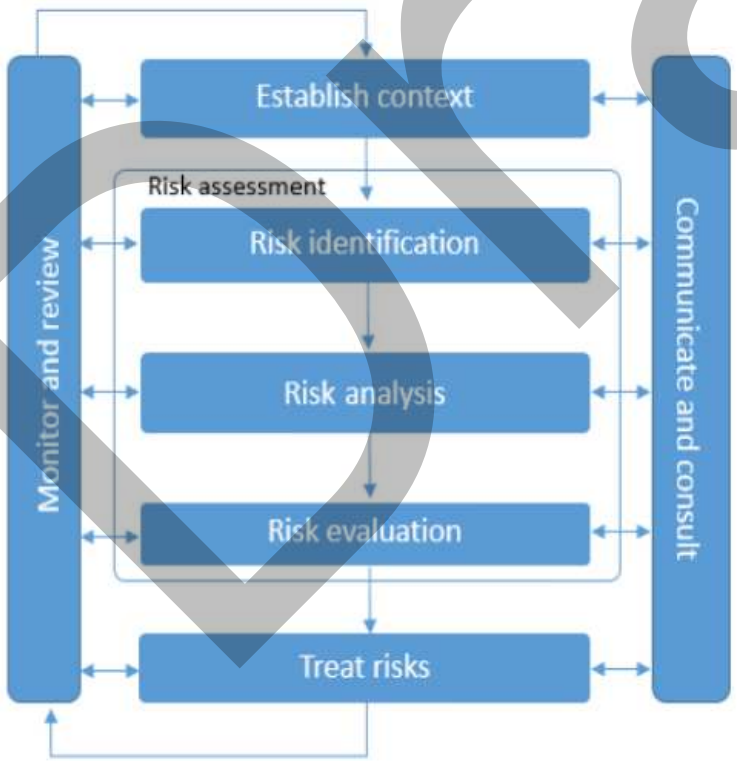


Figure 2-9: Risk Management Process (AS/NZS ISO 31000: Risk Management – Principles and Guidelines, as documented in the NSW Coastal Management Manual 2018)

Table 2-11: Risk Matrix applied to evaluate risk

Likelihood	Consequence				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Almost Certain 5	MODERATE	HIGH	HIGH	EXTREME	EXTREME
Likely 4	LOW	MODERATE	HIGH	HIGH	EXTREME
Possible 3	LOW	MODERATE	HIGH	HIGH	HIGH
Unlikely 2	LOW	LOW	MODERATE	MODERATE	HIGH
Rare 1	LOW	LOW	LOW	LOW	MODERATE

2.5.2 Results

The results of the risk assessment for the Open Coast are summarised below, with the risks identified as having a "MODERATE", "HIGH" or "EXTREME" rating based on the existing controls listed in Table 2-12 for the risks that apply to the Open Coast.

A detailed Risk Register has been developed (Worley Consulting 2024a) that categorises the risks for the Central Coast Open Coast in terms of the four Coastal Management Areas as referred to in the RH SEPP:

- coastal wetland and littoral rainforest area
- coastal vulnerability area
- coastal environment area
- coastal use area.

The Risk Register is intended to be used as a living document that can act as a tool for ongoing assessment of the effectiveness of the management actions. The Risk Register has been developed in collaboration with stakeholders, including asset managers, Agency representatives and the community via the engagement undertaken for the project. The Register was used in Stage 3 to develop an initial suite of potential management actions, which were identified through the Register as additional actions that could be taken to mitigate the risks. Following stakeholder consultation in Stage 3, these were refined and combined into the list of management actions in Section 4 of this CMP.

Table 2-12: Detailed Risk Assessment Results

KEY: Likelihood: AC = Almost Certain, L = Likely. P = Possible, U = Unlikely, R = Rare
Consequence: C = Catastrophic, Maj = Major, Mod = Moderate, Min = Minor, I = Insignificant

								Present Day						20 years						50 years						100 years					
No.	**Beach**	**Coastal Management Area**	**Risk Category**	**Risk Description**	**Root Cause**	**Consequence**	**Existing Controls**	**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**		**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**		**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**		**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**	
1	Terrigal (Terrigal Beach)	Coastal Use	Coastal Hazard	Immediate damage to assets/infrastructure due to coastal erosion	Coastal Erosion	Damage to infrastructure	UNSW WRL have completed bi-annual LiDAR surveys of Central Coast Beaches in recent years. A large sand clearance project to move sand out of the Terrigal Lagoon opening area and nourish southern Terrigal Beach was completed in 2017..	4	L	4	Maj	16	High	4	L	4	Maj	16	High	5	AC	5	C	25	Extreme	5	AC	5	C	25	Extreme
2	Terrigal (The Haven)	Coastal Use	Coastal Hazard	Immediate damage to assets/infrastructure due to coastal erosion	Coastal Erosion	Damage to infrastructure	Monitor performance of existing seawall in addressing erosion - Annual stability surveys of the seawall are conducted by Council to monitor any settlement or dislocation of the sandstone block. Regular 6 monthly surveys of the Haven Beach profile and sand volume are also conducted. Investigate beach nourishment to increase buffer against coastal erosion. Ongoing monitoring may indicate that beach nourishment is required in the future for amenity purposes rather than erosion protection given the full length seawall backing the beach Monitor beach profile following significant storm event - Photo monitoring of the beach undertaken of a regular basis to capture beach profiles and reactively prior, during and following storms and large swells to visually capture wave runup. A new boat ramp was completed by Council in 2016. Reconstruction of the Marine Rescue ramp and concrete apron was completed in 2019/20.	4	L	4	Maj	16	High	4	L	4	Maj	16	High	5	AC	4	Maj	20	Extreme	5	AC	5	C	25	Extreme
3	Terrigal (SLSC)	Coastal Use	Coastal Hazard	Immediate damage to assets/infrastructure due to coastal erosion	Coastal Erosion	Damage to infrastructure	Monitor performance of existing seawall - Photo monitoring of beaches undertaken on a regular basis to capture beach profiles and reactively during and following storms and large swells. A review has been completed of the "works as executed' plans for the existing seawall including the crest level.	3	P	3	Mod	9	High	3	P	3	Mod	12	High	4	L	4	Maj	16	High	5	AC	4	Maj	20	Extreme
4	Wamberal	Coastal Use	Coastal Hazard	Immediate damage to assets/infrastructure due to coastal erosion	Coastal Erosion	Damage to infrastructure	In May 2020, Council engaged Manly Hydraulics Laboratory to prepare concept plans for a terminal protection structure (seawall) and sand nourishment solutions for Wamberal Beach. The study included: • literature review, • coastal protection assessment, • concept design options • sand nourishment investigation • cost benefit analysis Following the studies, MHL further developed the Wamberal Beach Terminal Protection Structure Engineering Design Requirements (EDRs) outlining specific criteria for the assessment of Wamberal Beach coastal protection development applications. The EDRs were adopted by Council in October 2022 and now form part of the development assessment criteria. Continue and enhance dune vegetation - Annual bush restoration works have been completed at the 'ruins'. Council facilitates and supports the dune restoration work completed by the Bushcare group in the dunes fronting the Wamberal SLSC and adjacent to the southern shores of Wamberal Lagoon.	4	L	3	Mod	12	High	4	L	3	Mod	12	High	4	L	4	Maj	16	High	5	AC	4	Maj	20	Extreme
5	Budgewoi Beach	Coastal Use	Coastal Hazard	Damage to infrastructure and amenity due to lack of dune	Coastal Erosion	Damage to Amenity /infrastructure	Dune stabilisation works and revegetation to encourage sand accretion and stabilisation of frontal dunes - Ongoing.	2	U	3	Mod	6	Mod	2	U	3	Mod	6	Mod	2	U	4	Maj	8	Mod	4	L	4	Maj	16	High
6	Budgewoi Beach	Coastal Use	Coastal Hazard	Damage to infrastructure and amenity due to	Coastal Inundation	Damage to Amenity/ infrastructure	Beach scraping to reinforce dune and maintain dune crest heights above 7m at affected locations	2	U	4	Maj	8	Mod	3	P	4	Maj	12	High	4	L	4	Maj	16	High	4	L	4	Maj	16	High

KEY: Likelihood: AC = Almost Certain, L = Likely. P = Possible, U = Unlikely, R = Rare
Consequence: C = Catastrophic, Maj = Major, Mod = Moderate, Min = Minor, I = Insignificant

								Present Day					20 years					50 years					100 years				
No.	**Beach**	**Coastal Management Area**	**Risk Category**	**Risk Description**	**Root Cause**	**Consequence**	**Existing Controls**	**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**	**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**	**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**	**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**
				inundation/ overtopping due to lack of dune height																							
7	Copacabana/ Macmasters	Coastal Vulnerability	Coastal Hazard	Damage to Surf Club at the southern end of the beach, as well as carpark along Marine Parade, seaward portion of properties along Tudibaring Parade and future erosion affecting Copacabana Surf Club, Del Monte Place and properties along Del Monte Place	Coastal erosion	Damage to assets and foreshore	Beach scraping to build dune in front of Surf Club, eroded pine tree roots and Marine Parade in the interim until erosion protection works are constructed Landward relocation of sewer infrastructure along Marine Parade if erosion protection works not implemented SLSC reconstructed on deep pile foundations Repair damage to Del Monte Place, Surf Club and surrounding land should it be damaged by future erosion (done on reactive basis) Development controls for residences and commercial premises to be on piled foundations on redevelopment of properties based on defined building line	2	U	3	Mod	6	Mod	2	U	3	Mod	6	Mod	3	P	3	Mod	9	High	4	L	4	Maj	16	High
8	LGA-wide	Coastal Use	Amenities	Impact on recreational amenity resultant from private landowners constructing seawalls	Planning	Degradation and impediment of beach amenity Increased risk to public safety	Council-issued orders to remove unauthorised works	3	P	4	Maj	12	High	3	P	4	Maj	12	High	3	P	4	Maj	12	High	3	P	4	Maj	12	High
9	North Entrance Beach	Coastal Use	Coastal Hazard	Loss of sand impacting infrastructure	Coastal Erosion	Damage to Amenity/ infrastructure	Development controls in Council's LEP/DCP.	3	P	3	Mod	9	High	3	P	3	Mod	9	High	4	L	3	Mod	12	High	4	L	3	Mod	12	High
10	Terrigal (SLSC)	Coastal Use	Coastal Hazard	Immediate threat of inundation	Coastal Inundation	Damage to infrastructure	Monitor performance of seawall against inundation - Photo monitoring of beaches undertaken on a regular basis to capture beach profiles and reactively during and following storms and large swells to visually capture wave run up. UNSW WRL have completed bi-annual LiDAR surveys of Central Coast Beaches in recent years. A review has been completed of the 'Work As Executed' plans for the existing seawall including the crest levels.	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High	4	L	3	Mod	12	High
11	Wamberal Lagoon Entrance	Coastal Use	Coastal Hazard	Damage to infrastructure	Coastal Inundation	Damage to infrastructure	Coastal Lagoon Catchments Overland Flood Study, completed (MHL 2020)	3	P	3	Mod	9	High	3	P	3	Mod	9	High	4	L	3	Mod	12	High	4	L	3	Mod	12	High
12	LGA-wide	Coastal Use	Coastal Hazard	Coastal erosion impacting assets and infrastructure	Coastal Erosion	Damage to Amenity/ infrastructure	Coastal hazard mapping updated (Bluecoast Consulting Engineers, 2024-2025)	3	P	3	Mod	9	High	3	P	3	Mod	9	High	4	L	3	Mod	12	High	4	L	3	Mod	12	High
13	LGA-wide	Coastal Use	Access & Safety	Injury to public caused by rock falls from instable cliff faces at beach headlands	Slope and Cliff Instability	Public Safety at risk from rock falls		2	U	5	C	10	High	2	U	5	C	10	High	2	U	5	C	10	High	2	U	5	C	10	High
14	LGA-wide	Coastal Use	Access & Safety	Informal private access and use damaging vegetation and impacting on recreational amenity for the public	Management and cost	Damage to recreational amenity and vegetation from informal access tracks		3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High
15	Avoca/Nth Avoca	Coastal Environment	Ecological Environment	Various adverse impacts on aquatic ecology due to poor water quality	Catchment inputs - erosion and urban runoff, climate change	Impact on recreational amenity, foreshore reserve and ecology	Development controls, public education, stormwater treatment Water quality monitoring	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High

KEY: Likelihood: AC = Almost Certain, L = Likely. P = Possible, U = Unlikely, R = Rare
Consequence: C = Catastrophic, Maj = Major, Mod = Moderate, Min = Minor, I = Insignificant

								Present Day						20 years						50 years						100 years					
No.	**Beach**	**Coastal Management Area**	**Risk Category**	**Risk Description**	**Root Cause**	**Consequence**	**Existing Controls**	**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**		**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**		**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**		**Likelihood (1-5)**		**Consq.(1-5)**		**Pre Treatment Rating**	
					resulting in more frequent extreme events	Illness for users																									
16	The Entrance	Coastal Use	Coastal Hazard	Damage to amenity and infrastructure	Coastal Erosion	Damage to Amenity/ infrastructure	Currently no existing controls in place, other than development controls in Council's DCP/LEP.	2	U	3	Mod	6	Mod	2	U	3	Mod	6	Mod	3	P	3	Mod	9	High	3	P	3	Mod	9	High
17	Forresters	Coastal Use	Coastal Hazard	Immediate risk of erosion damage to properties and minor structures	Coastal erosion	Damage to foreshore infrastructure and foreshore vegetation	Monitor beach for erosion and cliff lines for instability (Forresters Beach Dune)	2	U	3	Mod	6	Mod	2	U	3	Mod	6	Mod	2	U	3	Mod	6	Mod	3	P	3	Mod	9	High
18	Hargraves Beach	Coastal Use	Coastal Hazard	Damage to infrastructure and amenity due to lack of dune	Coastal Erosion	Damage to Amenity/infrastr ucture	Conduct dune stabilisation works and revegetation to encourage sand accretion and stabilisation of frontal dunes - Ongoing.	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High
19	Killcare	Coastal Use	Coastal Hazard	Immediate risk of erosion damage to surf club and carpark	Coastal Erosion	Damage to amenity and infrastructure	Monitor beach for erosion in front of surfclub and camping area Beach scraping to build vegetated dune in front of surf club with vegetation and or fencing	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High
20	Lakes Beach	Coastal Use	Coastal Hazard	Damage to infrastructure and amenity due to lack of dune	Coastal Erosion	Damage to Amenity/ infrastructure	Dune stabilisation works and revegetation to encourage sand accretion and stabilisation of frontal dunes.	2	U	3	Mod	6	Mod	2	U	3	Mod	6	Mod	2	U	3	Mod	6	Mod	3	P	3	Mod	9	High
21	North Entrance Beach	Coastal Use	Coastal Hazard	Damage to infrastructure and amenity due to inundation/overtopping due to lack of dune height	Coastal Inundation	Damage to Amenity/ infrastructure	Development controls in Council's LEP/DCP	2	U	3	Mod	6	Mod	2	U	3	Mod	6	Mod	3	P	3	Mod	9	High	3	P	3	Mod	9	High
22	North Entrance Beach	Coastal Use	Coastal Hazard	Damage to infrastructure and amenity due to lack of dune	Coastal Erosion	Damage to Amenity/ infrastructure	Conduct dune stabilisation works and revegetation to encourage sand accretion and stabilisation of frontal dunes - Ongoing. Many dune stabilisation and revegetation works have been done and continue to be done.	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High
23	Soldiers Beach	Coastal Use	Coastal Hazard	Damage to infrastructure and amenity due to lack of dune	Coastal Erosion	Damage to Amenity/ infrastructure	Dune stabilisation works and revegetation to encourage sand accretion and stabilisation of frontal dunes - Ongoing.	2	U	3	Mod	6	Mod	2	U	3	Mod	6	Mod	3	P	3	Mod	9	High	3	P	3	Mod	9	High
24	Former Wyong Shire Coastline	Coastal Use	Coastal Hazard	Changing shoreline	Coastal Erosion and inundation	Damage to Amenity/infrastr ucture	LiDAR data, combined with aerial photogrammetry and satellite imagery for evaluating changes to coastal terrain and terrestrial coastal ecology as sea levels rise - ongoing. Many LiDAR surveys have been done, typically before and after major coastal events. A 2 year contract with WRL for LiDAR survey for every 6 months was competed from Dec 2017 to Dec 2019	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High
25	Former Wyong Shire Coastline	Coastal Use	Coastal Hazard	Damage to assets	Coastal Erosion and inundation	Damage to Amenity/infrastr ucture	Asset register and maintenance program established for major council infrastructure in the coastal risk areas, such as stormwater systems, sea walls and sewage pumping stations for streamlined asset and infrastructure management, including condition records, storm impacts. Major Council coastal infrastructures were registered in 2018-19.	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High	3	P	3	Mod	9	High

3. Stakeholder Engagement

3.1 Overview

There has been significant community consultation undertaken across the Local Government Area (LGA) during development of the "One – Central Coast", Community Strategic Plan 2018 – 2028 (Central Coast Council, 2018), with many objectives and actions having clear relevance to coast and catchment management. Similarly, there was significant community consultation undertaken during development of each of the existing CZMPs, however this engagement was primarily limited to within the relevant former local government areas. Significant community engagement was undertaken separately from the CMP between 2020 and 2022, as part of the MHL Wamberal Beach project. That consultation included the opportunity for all residents and stakeholders to make a written submission via email and online through Council's website, as well as eight virtual information sessions (Central Coast Council, 2022a).

Council have undertaken extensive community and stakeholder engagement throughout Stage 1, 2 and 3 of the CMP process which have informed the management actions presented in this CMP. The engagement activities undertaken are detailed below.

3.2 Stage 1 and 2 Engagement

In Stage 1, Scoping Study, a comprehensive Community and Stakeholder Engagement Plan was prepared for the CMP. It was developed with reference to existing knowledge of interest, issues, concerns and opportunities for coastal management as cited by the community to date. It was designed to provide an overarching framework for subsequent community and stakeholder engagement activities to be undertaken as part of Stages 2 to 5 of CMP development.

Significant community engagement was undertaken as part of the MHL Wamberal Beach project (Central Coast Council, 2022a).Results from phase one of the Community Consultation for Wamberal included:

- 19 people actively participated in online virtual information sessions
- 247 written submissions received through Council's online submission portal
- 363 emails were sent directly to previously engaged individuals

In parallel with the MHL-led study, Council led a detailed program of community consultation in Stage 1, that aimed to:

(i) provide baseline information on the CZMP, erosion issue and preferred strategy;

(ii) understand how the community use and value Wamberal beach; and

(iii) seek feedback on the range of concept options to guide decision making, going forward.

Community Consultation LGA-wide was and continues to be undertaken. The launch of a dedicated online *Our Coast, Our Waterways* consultation hub from April 2021 enabled community survey and raised awareness ahead of targeted community engagement undertaken as part of Stage 2. Consultation activities included:

- 3,918 visits to the Your Voice Our Coast project page;
- 1,168 survey responses received;
- Over 350 respondents have entered the focus group candidate pool;
- Over 220 stakeholder emails sent;
- 3 focus groups hosted with over 20 participants;
- 403 community members reached at pop up events; and,
- Over 500 postcards distributed.
- Prior to the commencement of Stage 3, council undertook both stakeholder and community engagement during January/February 2024. This engagement comprised:
- Pop up sessions held throughout the LGA (Terrigal, Avoca, Toowoon Bay, The Entrance, Soldiers Beach and Killcare);
- Meetings with key stakeholders including state agencies and different divisions of Council;
- Communication materials to support engagement – Facebook notifications, emails;
- Online input for those unable to attend the pop-up sessions via the interactive maps on the Pinpoint website - https://centralcoastcouncil.mysocialpinpoint.com/opencoastcmp#/
- Drop-in sessions/community workshops held at Copacabana and Toowoon Bay.

3.2.1 Social Values

During the consultation undertaken as part of Stages 1 and 2 of the CMP development a number of key issues, concerns and opportunities have been raised as requiring enhanced coastal management. These include, but are not limited to:

- Improvement of local amenities – including improved disability access at coastal locations; scooter racks, increased shade at benches and improved parking.
- Consideration of the creation of a Marine Park near Toowoon Bay and/or Terrigal Haven.
- Improvement and maintenance of water quality at beach locations.
- Improvement of rubbish collection and management across the coast to enhance amenity, reduce pollution and preserve water quality.
- Measures to prevent and manage erosion and coastal inundation in key areas such as Avoca, MacMasters and Copacabana Beach.
- Management of erosion and beach protection at Wamberal: the beach has required emergency protection works to be installed following storm events in 2016 and 2020, and investigations into the design of a terminal protection structure at Wamberal have been ongoing.
- Management of tourism and recreation in a way that prevents overuse and congestion and protects local values and the environment.
- Concerns regarding intensifying land use on the coast from foreshore development, to impact to urban stormwater discharge.

3.3 Agency and Internal Stakeholder Engagement

Prior to the commencement of Stage 3 in November 2023, Council met with Agency stakeholders to obtain input to inform Stage 3 of the CMP.

Agencies involved included:

- Central Coast Council
- Darkinjung Local Aboriginal Land Council (DLALC)
- Department of Planning and Environment (DPE, now DCCEEW)
- Department of Primary Industries Fisheries (DPI Fisheries)
- NSW Crown Lands
- Transport for NSW – Marine Infrastructure Delivery Office (MIDO)
- NSW State Emergency Services (SES)
- National Parks and Wildlife Service (NPWS).

In addition to the above, Council undertook eight internal unit sessions to assess particular issues of relevance to the CMP. The sessions covered the following topics:

- Leisure Beach Safety and Community Facilities
- Waste Services
- Community Development
- Environmental Compliance and Systems
- Flooding
- Environmental Management
- Development Assessment
- Water and Sewer Assets

3.3.1 Agency Stakeholder Issues

Key issues of relevance to the CMP raised during this engagement session included:

DLALC (Darkinjung): Issues raised on Darkinjung Land included illegal access (e.g., Soldiers, Pelican, Tuggerah beaches and Tooheys Rd and Lake Munmorah), unauthorised vehicles on the beach, illegal dumping asbestos/syringes which is all resource intensive to manage. Need for reliable (vandal proof) surveillance monitoring to capture issues above. Need for agencies to liaise with DLALC to coordinate controlled burnings/culture burning and ensure this is captured in the cooler months (Jun, July, Aug).

Crown Lands: Issues raised on Crown Land (DPHI) include coastal erosion with hotspots identified at North Entrance Hutton Road, Wamberal, Norah Head, MacMasters and Cabbage Tree Harbour. Places like Mazlan Reserve require a holistic approach in effort to address public access and restrict people from areas of instability. Other issues include residual land parcels (difficulty locating owner/descendants), contaminated lands and unauthorised works.

Crown Lands would like to see emergency sub action plans developed and new developments to be consistent with the CMP and Plans of Management. Crown Lands advised the release of the new Coastal Crown Land Guidelines. CL would like to be advised of CMP actions which impact CL. In terms of management actions, CL advised the need to identify legacy assets such as rock pools.

MIDO: TfNSW noted any coastal project funding secured should align with Marine estate management strategy guidelines. It was noted that the NSW Maritime Infrastructure Plan is due for review. MIDO are receiving enquiries related to perceived impacts to the Entrance Beach associated with the groyne.

National Parks: Issues and feedback raised on National Park land include:

- Implications from land slippages (e.g., Wyrrabalong, Forresters Beach) to adjacent land.
- Need to have a holistic approach to LIDAR/coastal hazard studies.
- Coastal erosion impacting Rushby St (Bateau Bay) threatening access ramp, viewing platform, stormwater, and sewer outfall, exposing asbestos.
- Bouddi National Park is experiencing risk to coastal infrastructure associated with storm debris from the Hawkesbury River. Material along the Hawkesbury is being trapped in the mangroves and redistributing in line with spring tides. There is a need to capture this material upstream.
- Ongoing issues with unauthorised access and safety.
- Ongoing issues with dogs in the parks. Need for education and stronger compliance.
- Ongoing issues with weeds.
- There is a need for a coordinated approach to fox control and shorebird/sea bird management.

NSW SES: The NSW SES are the lead agency for coastal erosion events if it's a result of storm activity not general long/short term erosion. The NSW SES advise the LEOCON what to do. Things NSW SES would like to see included in a CMP emergency sub-action plan to assist the agency include:

- Erosion hotspots identified and mapped out
- Identify hazards and vulnerable communities
- Identify agencies/staff personal and roles

- Identify communications available, how to reach people
- Identify egress and access locations for machinery
- Identify road closures likely required and areas of congestion, need to liaise with NSW Police to move people away (storm event observers)
- Identify priority evacuation areas based on at risk properties within a mapped polygon and not individual properties based on foundation type
- How illegal works taking place during an event will be managed. Specify what works homeowners can legally undertake pre/during/post storm event
- NSW SES will provide homeowners with a "return with caution" to return to properties following evacuation. May need to highlight/suggest (in sub – action plan or website) what owners may need to undertake following that order (e.g., engineering advice)
- It was noted that the Reconstruction Authority has replaced the Public Works Authority.

DPI Fisheries: There is a new bank erosion decision support tool now available.

Council mentioned the need for Surf Life Saving Club equipment to be available during the winter months and ensure emergency vehicle accessways are maintained in the event they are required for use.

This report will be provided to Agencies to gain feedback on the proposed management actions, which would then be updated for inclusion in the Draft CMP in Stage 4.

3.3.2 Council Stakeholder Issues

The following issues were raised by internal Council stakeholders for consideration in the CMP:

- Need for a whole of open coast cultural heritage assessment to be undertaken as a "pre-cultural" assessment.
- Need for a policy for headland slippages/areas of instability to warn the public of the risk, while avoiding the need for signage.
- Need for an LGA wide action item for reinstating beach access/emergency ways to secure funding following any storm event or related erosion.
- Need for development application assessments to specify that stormwater runoff cannot be discharged over the dunes which causes erosion, and any bushfire related clearing needs to ensure it does not impact on cliff instability areas.
- Minimum floor levels for flooding and coastal wave run up need to be addressed during development application assessment.
- Need to consider coastal processes for installation of stormwater devices in the coastal zone, leading to outfalls causing erosion or structure being undermined. Need to provide a set of recommendations/specifications from a coastal engineer as a useful guide.

- It is costly for Council to implement long term solutions and in the absence of offshore sand nourishment options, Council cannot place structures with extensive footprints (i.e., rock revetments) on the beach which require sand nourishment to offset.
- Unauthorised coastal protection works occurring across the entire LGA which are not adequately engineered or built to withstand coastal conditions and pose public safety risk and risk of material migrating onto public land/waters, website information and education is required to shine a light on this issue and in effort to control it.
- there is a need to update the coastal chapter in the Development Control Plan (DCP) and discuss required changes or issues that need to be addressed.

3.4 Stage 3 Community Engagement and Outcomes

3.4.1 Methods

During Stage 3, the engagement process aimed to inform, engage and obtain input from stakeholders and the wider community on costal management actions and their viability and acceptability, including timing.

From December 2023 to March 2024, Council undertook the Stage 3 community consultation and engagement. This phase included:

- Project dedicated website Your Voice Our Coast – Open Coast Coastal Management Program with project background, FAQ's, links to studies and coastal staff contact email.
- Interactive Social Pinpoint page
- Six community pop up events
    - Terrigal Boadwalk 12th Jan
    - Avoca Beach SLSC 13th Jan
    - Toowoon Bay SLSC 19th Jan
    - Memorial Park The Entrance 27th Jan
    - Soldiers Beach SLSC 3rd Feb
    - Killcare Beach 10th Feb
- Two targeted community stakeholder sessions:
    - Copacabana SLSC 13th of Feb
    - Toowoon Bay SLSC 15th of Feb

A summary report on the outcomes of consultation for Stage 3 is provided in Appendix B.

3.4.2 Objectives of consultation

The purpose of the Stage 3 consultation for the CMP was to:

- Inform the community of the status of CMP development

- Hear from stakeholders and the community to identify issues in the coastal zone and how they would like to see issues managed
- Provide the community an opportunity to speak directly with project staff
- Report back to the community on the outcomes of community consultation and the next steps.

3.4.3 Community Engagement Outcomes

Community feedback from the six pop up sessions was entered into the Social PinPoint page. Key themes from the pop up and targeted sessions covered the topics of coastal hazards, access, ecological environment, building and encroachment and local amenities, and are presented in detail in Section 2.1.

3.5 Stage 4

The feedback was incorporated into the Risk Assessment and draft management actions developed to address the issues raised in the community engagement. Stage 4 community engagement will comprise gaining feedback from the community on the draft management options, during the public exhibition of the draft CMP. These management options will take into consideration feedback already collected on the community's preferences in regard to management of the coast.

4. Actions to be implemented by the Council or by public authorities

4.1 Overview

Stage 3 of the CMP involved identifying and evaluating management options to select preferred coastal management actions with a focus on achieving the objectives of the CM Act. The management options developed following the Risk Assessment were evaluated through Stage 3 of the CMP (Stage 3 report, Worley Consulting 2024) to determine those actions which would be carried into the final CMP. As per the CM Manual, there are four main steps in completing Stage 3 of the CMP process (Figure 4-1).

Information from Stages 1 and 2 was used to inform Stage 3. This involved:

- Confirming that the strategic direction identified in Stage 1 had not changed
- identifying and collating information on management options
- evaluating potential management actions, considering:
    - feasibility (is it an effective and sustainable way to treat the risks?)
    - viability (economic assessment) and
    - acceptability to stakeholders.
- engaging public authorities about implications for their assets and responsibilities
- evaluating mapping options and implication if a planning proposal is being prepared
- identifying pathways and timing of actions, and
- preparing a business plan for implementation.

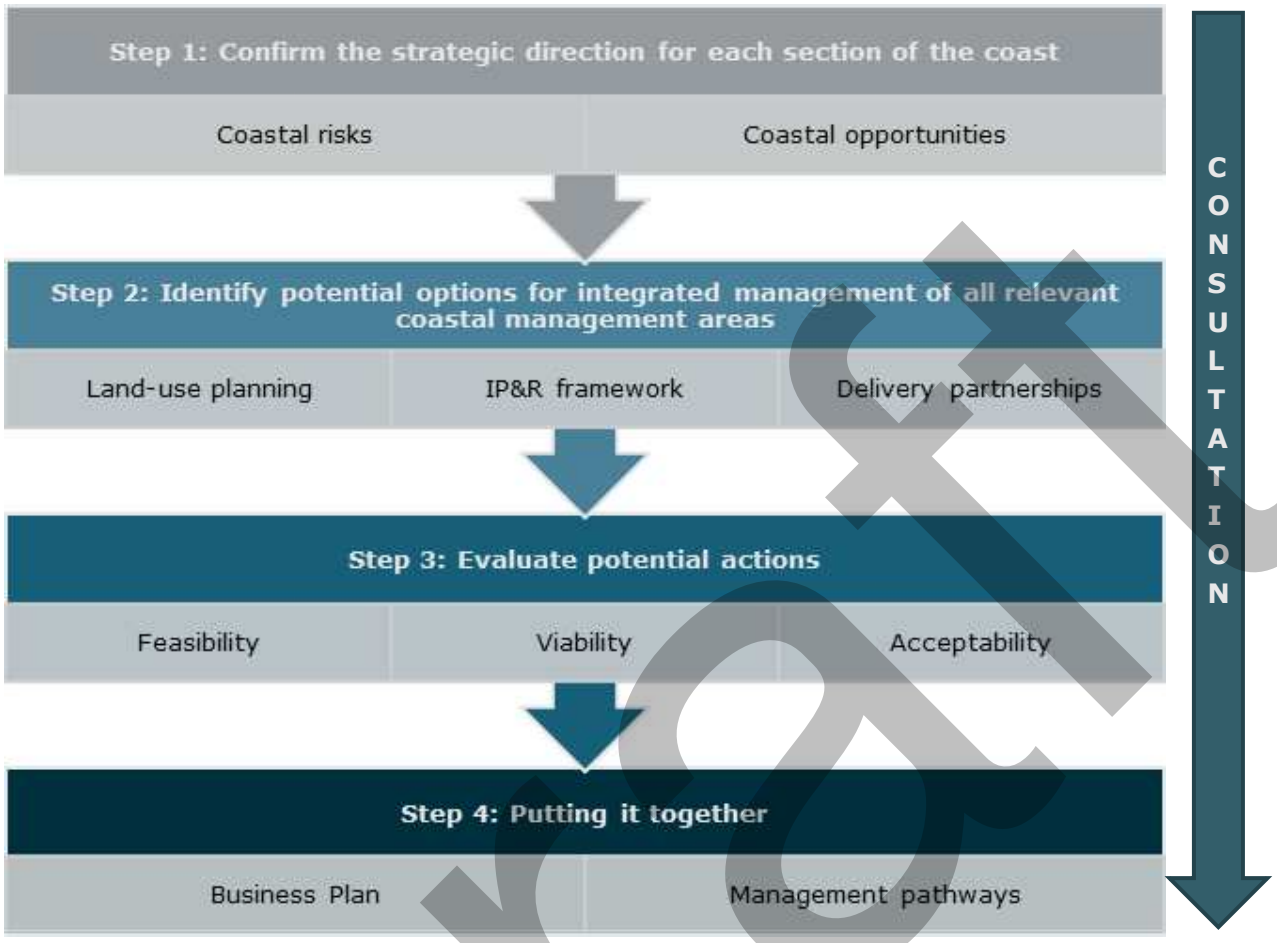


Figure 4-1: Four Main Steps in action identification and evaluation

4.1.1 Step 1 – Confirm Strategic Direction

During Stage 1 of the CMP (Royal Haskoning DHV, 2021), Council developed a purpose, vision and objectives for the program. The vision and purpose are crucial in defining the strategic objectives. The strategic objectives then enable the establishment of specific more detailed objectives that provide a clear path towards fulfilling the strategic objectives.

In Step 1, the strategic direction was reviewed to confirm:

- the character, values and management objectives of the coastal management areas
- the vulnerability and risks to coastal assets and values identified in studies conducted in Stage 2
- opportunities to enhance the environmental, social, cultural and economic wellbeing of coastal communities.

The key issues for the Central Coast Open Coast were identified through Stages 1 and 2 of the CMP process. Many of the proposed actions from the Gosford Beaches Coastal Zone Management Plan (WorleyParsons 2017) and the Wyong Coastal Zone Management Plan (Umwelt 2011) have either been implemented, or are no longer current and require review.

Some of these issues remain relevant today, whereas others have been addressed or are in the process of being addressed.

As discussed in Section 3, the community and Agency engagement that has been carried out throughout the project has enabled the key issues to be identified and risks quantified through a separate Detailed Risk Assessment, documented in the Risk Assessment report and Risk Register (Worley Consulting 2024a).

The Risk Assessment report and Risk Register categorises the main risks for the Central Coast Open Coast in terms of the Coastal Management Areas within the CMP Study Area as referred to in the CM Act and RH SEPP, as detailed in Section 2.5.

The strategic direction of the CMP was confirmed following the detailed assessment of the risks, issues and opportunities, through the community engagement and consultation activities as part of developing the CMP, as discussed in Section 3.

4.1.2 Step 2 - Identify potential options for integrated management

From the Risk Assessment (Worley Consulting 2024a), the Central Coast Recreational Use Study (Vision Environment, 2022) and the outcome of the coastal hazard study (Bluecoast Consulting Engineers, 2024-2025), a suite of potential management actions was developed and categorised in terms of the issues and particular locations which they relate to. As part of this process, the strategic partnerships required to deliver these options were identified, and engagement with relevant stakeholders (including Government Agencies and community) was undertaken to canvass and refine the potential management actions. The actions taken to address this Step are discussed in Section 4.2.

4.1.3 Step 3 – Evaluate Potential Actions

Step 3 involved evaluating the potential management actions in terms of Feasibility, Viability and Acceptability as discussed in detail in Section 4.2.3. This assessment was completed to ensure the final Stage 4 program of management options are appropriate, achievable, and meet the objectives of the CM Act.

4.1.4 Step 4 – Putting it together

In Step 4, a business plan (refer Section 6) was developed which outlined how the proposed coastal management actions will be implemented over time, within an adaptive pathway that includes thresholds and triggers for change. The business plan demonstrates viable funding mechanisms for implementing proposed CMP actions that are consistent with Council's IP&R framework, including its resourcing strategy and asset management plan.

4.2 Selection and Assessment of Management Actions

There are five overarching strategies, as detailed in the CM Manual, relevant to different levels of risk and attitudes to risk. The management options can be organised into the five broad strategies as depicted in Figure 4-2.

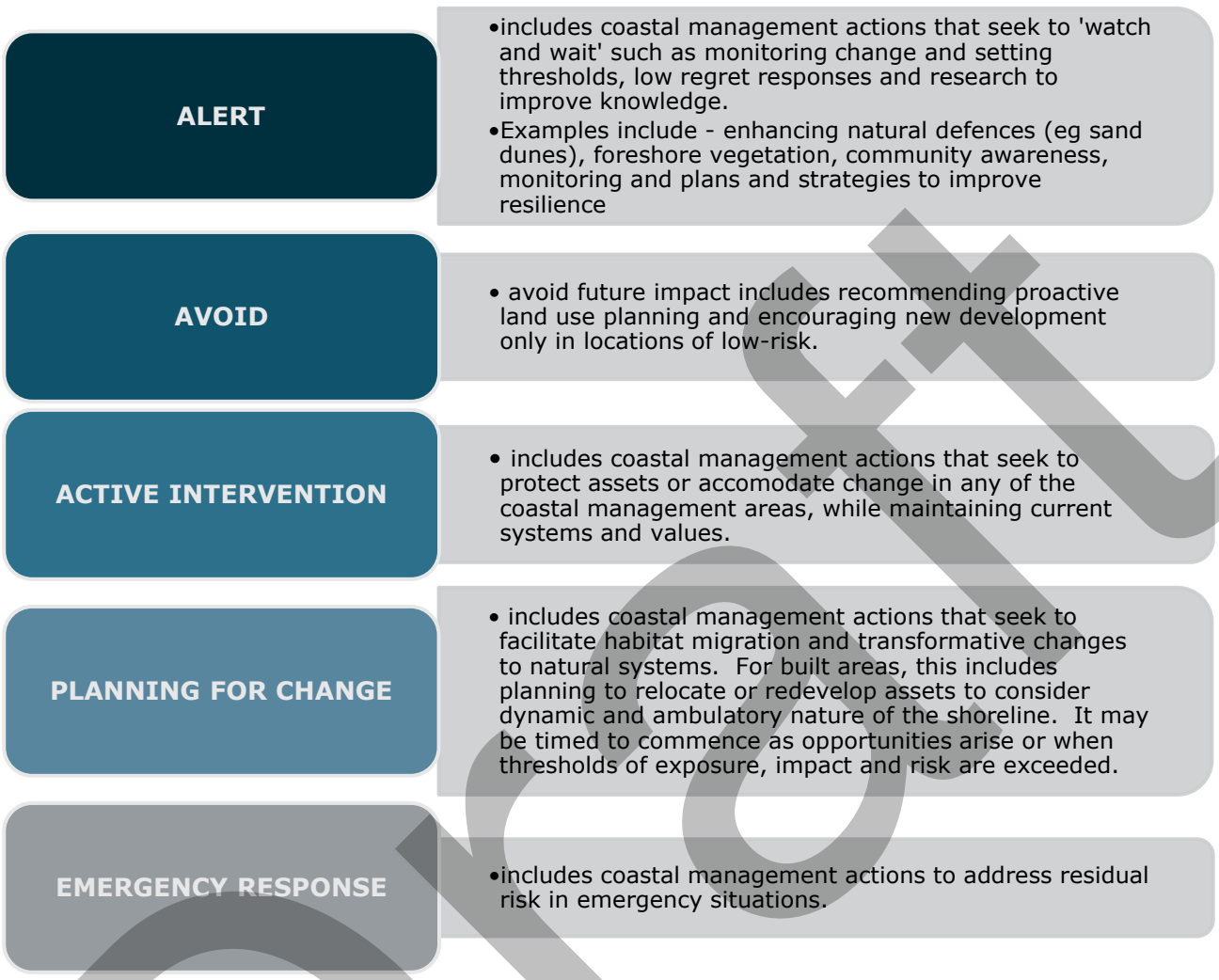


Figure 4-2: Five Strategic Approaches for Coastal Management

Management actions fall under the overarching strategies above and within the risk categories discussed in Section 2.5.

The identification of management options was undertaken with consideration of the strategic approaches to risk detailed in Figure 4-2. In addition, the following strategic outcomes aligned with the objectives of the CM Act were considered in developing the management options:

- Community and Stakeholder Engagement
- Protecting, restoring and enhancing the natural environment of the open coast
- Protecting, enhancing and restoring the cultural heritage of the open coast
- Research and collaboration
- Mitigation and adaptation to current and future risks (including asset management)
- Emergency planning and response
- Recognising the coastal zone as a vital economic zone.

4.2.1 Strategic Direction

The five strategic approaches for Coastal Management as outlined in Figure 4-2 are described below. Elements of each of these strategic approaches have been adopted within this CMP, to address the level of risk that applies both spatially and temporally along the coast. Some of these actions apply on an LGA-wide basis to address issues that are common along the entire coastline, where others have been proposed to address specific issues identified at particular locations.

Actions within the CMP that fall under each of the five strategic approaches described in Figure 4-2 are detailed below.

Strategy 1 - ALERT - Where the risks from coastal hazards are relatively low, 'watch and wait' actions have been adopted, including monitoring change, low regret responses and research to improve knowledge.

This approach has been adopted across much of the CMP area, and broadly includes the following types of no-regrets actions:

- Dune Management/vegetation management
- Stormwater management
- Monitoring, research and data collection
- Community education
- Repair of damaged public infrastructure

Figure 4-3: ALERT actions include no-regrets options such as public education, enhancement of natural defences e.g through dune management

Specific management actions that apply across the entire coastal zone of the Central Coast and fall within this strategic category are outlined in Table 4-1.

Table 4-1: Actions falling under the ALERT Strategy

CMP Actions falling under the ALERT Strategy
• **Monitoring and improvement of coastal stormwater outlets**
• **Develop and implement an integrated coastal processes and hazards education and awareness program**
• **Review and implement updated Beach Maintenance Program**
• **Develop and implement a Coastal Monitoring Program**
• **Review waste collection assets and servicing in coastal public spaces**
• **Monitor and manage risk of contamination from closed landfill sites**
• **Undertake a detailed wave overtopping and inundation assessment for high risk locations**

CMP Actions falling under the ALERT Strategy
• **Continue the role of a coastal, estuary and floodplain management Advisory Committee**
• **Work with First Nation groups and stakeholders to evaluate arrangements for undertaking beach maintenance operations**
• **Management of unapproved memorials in public coastal spaces**
• **Update and maintain Council's website to improve awareness and make information on coastal processes, hazards and issues more accessible**
• **Knowledge sharing and protection of cultural heritage**
• **Develop and maintain a coastal geotechnical database**
• **Conduct geotechnical investigations to improve understanding of underlying geology along the coast**
• **Develop a coastal assets at risk register and update asset management program**
• **Continue to improve accessibility and inclusiveness of coastal and foreshore areas**
• **Review and implement Council's coastal water quality monitoring program**
• **Develop and implement a Coastal Vegetation Strategy**
• **Undertake and support research projects and citizen science initiatives aimed at enhancing and conserving marine biodiversity, science, recreation and education**
• **Undertake dune management works at the southern carpark of Soldiers Beach**

Strategy 2 – AVOID – These options seek to avoid the risk, by implementing proactive planning controls and encouraging development only in areas of low risk. This is appropriate where the risk is currently known and well-defined, with planning controls tailored to the changing risk profile over time. The approach recognises that it may not be possible to avoid the risk at some locations in the future and seeks to limit development in areas of high risk. The types of measures that fit into this category include:

- Planning/Development controls
- Infrastructure setbacks
- Building and infrastructure design criteria.

The CMP has included a detailed review of Council's planning controls, which is documented in the CMP Planning Report (Worley Consulting 2025) and discussed in Section 5. The review includes tailored specific controls that are appropriate for the level of risk as defined by the coastal hazard mapping for different planning horizons, while recognising that there is existing development subject to coastal hazards and reducing the risk to any new development.

The most recent coastal hazard mapping (Bluecoast Consulting Engineers, 2024-2025) provides probabilistic coastal hazard extents for coastal erosion events up to the 100 year ARI (or 1% AEP). In consideration of the risk and probability of exceedance of the mapped coastal hazards, streamlining of coastal hazard planning horizons is recommended for all beaches to provide consistency and simplification. The planning horizon should ideally be consistent across

all areas, and adopted based on the level of risk determined at each beach, which is a function of the intensity of existing development in each area, the quantum of development at risk within the coastal hazard zones and community acceptance. This should include adoption of a unified coastal hazard line across the LGA (for example, the Bluecoast Consulting Engineers 2024-2025 2120 1% erosion risk line). To achieve this, Council is to undertake CVA mapping based on the chosen erosion risk line and coastal inundation hazard extents, and adopt the mapping in the LEP and RH SEPP.

Specific management actions that apply across the entire coastal zone of the Central Coast and fall within this strategic category are outlined in

Table 4-2: Actions falling under the AVOID Strategy

CMP Actions falling under the AVOID Strategy
• **Develop and implement coastal compliance procedures**
• **Investigate and develop a Coastal Hazard Adaptation Strategy for affected coastal communities**
• **Review and update coastal development planning controls and undertake Planning Proposal to adopt Coastal Vulnerability Area**

Strategy 3 – ACTIVE INTERVENTION – These options involve active intervention in an effort to reduce the risk, for example, coastal protection works.

Coastal Protection Works

"Protection" options require physical intervention to slow down or prevent coastal erosion, and provide some degree of protection to public and private property from coastal hazards. Such options may involve construction of engineering works, such as seawalls, groynes and revetments, which can modify coastal processes and allow existing and future property and infrastructure to remain viable into the future by protecting them from damage caused by coastal erosion. Some examples of coastal protection structures are shown in Figure 4-4.

Some types of engineering works may be more effective than others at providing this protection, and all require maintenance. They are designed to protect assets against a storm of a specific magnitude, and have a finite design life.

Some combinations of various engineering structures could be used to provide the dual goals of improvement in beach amenity as well as protection of infrastructure. Other structural interventions may improve protection at the expense of amenity, while still others can improve amenity but provide a lesser degree of protection. Future maintenance will become more costly, and this is a cost that will need to be borne by the community in future generations. Such protection options would in most cases reduce the likelihood of the risk to coastal development, allowing it to persist in the short to medium term. However, future climate change impacts may increase maintenance requirements of structural coastline protection and it may not be viable in the longer term.

Note that coastal protection works are required under the NSW Coastal Management Framework to be strategic and to avoid significant adverse long term environmental or social

impacts on other coastal features, assets, processes, resources, access or use. To mitigate these impacts, compensatory beach nourishment may need to be included with the coastal protection construction to match erosion due to long term recession, storm demand and due to the sand that would be locked up behind the structure. Beach nourishment is described in more detail below.

Seabee revetment (concrete pattern-placed units)

Sandstone block seawall (Terrigal Haven)

Engineered Seawall (Terrigal)

Rock seawall (Patonga)

Rock Revetment (Avoca Surf Club)

Geotextile Revetment (Byron Bay)

Figure 4-4: Examples of coastal protection structures

The draft CMP proposes that property owners that own properties at risk of coastal erosion, continue to be responsible for the funding and implementation of any coastal protection works

for their own properties. This is consistent with the resolution by Council for Wamberal Beach in October 2022.

Private coastal protection works will continue to have a planning pathway under the NSW planning legislation and the NSW Coastal Framework. The CMP does not outline where private residents should or should not lodge development applications for coastal protection works. Regardless of any actions or directions indicated within the CMP regarding private coastal protection works, private owners remain entitled to lodge a development application for coastal protection works for their properties, i.e. the CMP cannot dictate how private owners manage coastal protection on their land. These development applications will continue to be assessed on their merits by the Regional Planning Panel. The proposed action by Council to develop region wide Engineering Design Requirements for Coastal Protection Works will help guide the preparation and assessment of development applications for coastal protection works.

Even with the completion of the actions in this CMP there will still be a significant residual risk to private property on the Central Coast from coastal hazards over the life of the plan. There is limited scope for Council or other public authorities to mitigate this risk over the life of the plan. The responsibility for private coastal protection ultimately remains with private owners via approved planning pathways (obtaining development consent). In the absence of suitable private coastal protection works, and with continuing coastal erosion impacts occurring in these locations, there will be a continued burden on Council and emergency services when coastal erosion events occur.

Beach Nourishment

Another form of protection works is beach nourishment. Beach nourishment involves placement of sand onto the beach profile, which provides a buffer against erosion. The term beach nourishment usually refers to nourishment of the entire beach profile, including the dune, beach berm and the portion of the active beach below the shoreline. Such nourishment depends on locating a suitable source of sand. It works best when the sand placed on the eroded beach closely matches the grain size and characteristics of the native beach sand, or when the sand is sourced from within the same coastal sediment compartment as the beach.

Examples of beach nourishment work are shown in Figure 4-5.

Figure 4-5: Examples of Sand Nourishment. Left: Jimmys Beach NSW. Right: "Rainbowing" – dredge pumping nourishment sand from offshore into the active beach zone (NSW Reconstruction Authority State Disaster Mitigation Plan, 2023)

Council has undertaken beach nourishment opportunistically at The Entrance North and The Entrance beach, using sand dredged from the entrance to Tuggerah Lakes. There is an action in the CMP to continue this practice as beneficial reuse of dredge sand to reduce erosion risk at The Entrance North.

Council is aware of the current action in the NSW State Disaster Mitigation Plan to: "*Assess the feasibility of large-scale offshore sand reserves and other sources for beach nourishment including where it might be suitable*" and will continue to work with the NSW Government on the outcomes of this study. This study is due for completion by end of June 2025 and Wamberal/Terrigal and The Entrance North Beaches were included in the list of beaches that were given a more detailed assessment of feasibility of beach nourishment in the study. Council has included an action in the CMP to work with the NSW Government on the next stages of this project such as physical testing of potential sand source locations.

Active Intervention Strategy Actions

Actions that fall under this category in the CMP are outlined in Table 4-3.

Table 4-3: Actions falling under the Active Intervention Strategy

CMP Actions falling under the ACTIVE INTERVENTION Strategy
• **Investigate and develop a Coastal Hazard Adaptation Strategy for affected coastal communities**
• **Investigate feasibility and responsibilities of long-term sand nourishment licences**
• **Develop and implement Coastal Engineering Design Requirements**
• **Identify the extent, nature and condition of existing coastal emergency works (including potential removal or remediation)**
• **Design and construct Stage 2 of the existing Cabbage Tree Harbour toe drainage structure**
• **Complete coastal risk and options assessment for Marine Parade at MacMasters Beach**
• **Continue to nourish The Entrance North Beach with sand from The Entrance channel berm management or dredging activities when available to increase beach amenity and resilience.**
• **Review the structural integrity and extent of the foreshore revetment and embankment protecting Marine Parade, The Entrance, and undertake remedial works as required**
• **Undertake an engineering review of the Wamberal Beach engineering design requirements (EDR) so that they may be referred to in future revisions of Council's Coastal Development Control Plan (DCP)**
• **Implement whole of embayment terminal protection solution for Wamberal Beach Council owned land in accordance with the principles of the Engineering Design Requirements**
• **Options study for replacement of aging seawall at The Haven**

Strategy 4 – PLANNING FOR CHANGE – includes coastal management actions that seek to facilitate habitat migration and transformative changes to natural systems. For built areas,

this includes planning to relocate or redevelop assets to consider dynamic and ambulatory nature of the shoreline. It may be timed to commence as opportunities arise or when thresholds of exposure, impact and risk are exceeded.

The key action included in the CMP under the Planning for Change strategy is to:

- Investigate and develop a Coastal Hazard Adaptation Strategy for affected coastal communities

This action recognises that even with active intervention in areas that are currently at the highest risk from coastal hazards (e.g. Wamberal and The Entrance North), the risk will eventually become so great that it cannot be reduced to a tolerable level by interventions such as engineering works, and that some form of retreat or relocation from the high risk area may be necessary in the future (e.g. Planned Retreat or Managed Retreat).

A "retreat" approach recognises that coastal processes and coastline hazards are impacting on the coastline, and that the nature of this impact is likely to worsen in the future. As the impact of coastline hazards worsens, and in the absence of actions to change likelihood of risk, the ability of the community to maintain infrastructure and keep existing properties in their current locations begins to decline. Infrastructure such as water supply, electricity and sewer becomes increasingly exposed to coastal erosion, and eventually it will be more difficult to maintain services for some of the more exposed seaside properties. With future coastal erosion and beach recession due to sea level rise, seaside properties may eventually lose their access, as portions of their access are lost due to future coastal erosion. Eventually, if no action is taken, loss of structural integrity of seaside buildings themselves may result and the existing housing may become unsuitable for habitation.

A retreat option provides a strategy for gradual movement of infrastructure inland to avoid potential threats. It may in the first instance involve providing temporary access for properties that have lost their road access due to coastal erosion, and restrictions on future development, recognising that the threat to property will increase in the future.

Mechanisms for planned retreat include:

- planning controls (e.g. time limited occupation, re-locatable buildings)
- buy-back of properties at risk (for example, through the NSW Government's Coastal Lands Protection Scheme), and
- landward relocation of at-risk infrastructure.

Through limiting development in high-risk areas via Council's development controls, urban development becomes less exposed to coastal hazards over time, leading to the development at higher risk gradually retreating from the areas at highest risk as the risk increases with time. However, Council does not have the resources or powers to acquire private properties that are at risk from coastal hazards. For example, buy back of properties alone along Wamberal Beach is estimated at $500 million to $1 billion. Other costs would include demolition of buildings, disposal to landfill and dune restoration costs.

Since the early 1970's, five properties have been purchased by the NSW Government through the NSW Coastal Lands Protection Scheme. Today's property values along Wamberal well exceed the Scheme's annual budget of $3 million.

Council is aware of the current action in the State Disaster Mitigation Plan to: "*Develop a State policy for large-scale multi-hazard managed relocation*" and will continue to work with the NSW Government on what this means for the Central Coast and coastal hazards.

Strategy 5 – Emergency Response

These coastal management actions address residual risk in emergency situations. The Coastal Zone Emergency Action Subplan (CZEAS) in Appendix B provides a list of management actions for Council to undertake specifically in a coastal emergency. Council has on occasion installed emergency protection works under the provisions of the *State Emergency and Rescue Act* 1989, for example at Wamberal in July 2020 (Figure 4-6). However, private landholders are responsible for their own land parcels, and Council does not have an obligation to protect private property from erosion events. Council must, however, consider development applications lodged by property owners for coastal protection works.

Figure 4-6: Council-installed emergency works at Wamberal Beach in July 2020 under direction of the Local Emergency Operations Controller under provisions of the ***State Emergency and Rescue Management Act 1989***

4.2.2 Option Identification

Council has historically identified and implemented extensive management options/actions for the LGA within the overarching strategies and categories as detailed in Figure 4-2 and as discussed above. At a high level, these actions have included the following:

- Various seawall and shoreline protection structures implemented throughout the LGA (e.g., Avoca)
- Protocols to repair accessways and beaches after coastal erosion/damage – beach scraping etc.
- Terminal Protection Structure Design Requirements - Wamberal
- Ongoing monitoring – e.g. monitoring performance of existing rock structures, erosion monitoring, run up level monitoring, LiDAR surveys typically before and after storm events,
- Development controls – redevelopment requirements e.g., setbacks, floor levels, piled foundations
- Entrance management policies
- Landward relocation
- Investigations into beach nourishment
- Vegetation profiling and works
- Maintenance programs

During Stage 2, an updated coastal hazard assessment (Bluecoast Consulting Engineers, 2024-2025) was undertaken to inform the assessment of the coastal risks used to develop the Detailed Risk Assessment and potential management actions to address the identified risks.

In addition, Council has undertaken an audit of all relevant previous studies, community engagement, technical expertise and actions (Wyong/Gosford CZMP actions). Actions were reviewed to determine their status, appropriateness and whether they could be carried over to this CMP.

With the risks and strategies taken into consideration, along with the Stage 3 Community and Stakeholder engagement outcomes, appropriate management options were developed to address overall LGA wide issues, and then more specific options for individual locations.

This initial list of potential actions was further refined, scored and assessed as detailed in Section 4.2.3. The outcomes from the community engagement are summarised in Section 3.4, with details of community engagement materials provided in the Stage 3 Summary Report (Worley Consulting 2024). A suite of 38 management actions has been prepared to address the risks and issues identified by previous studies, the community and the CMP study team.

The management options were developed to address overall coast-wide issues common to the entire open coast, and then more specific options for individual locations.

4.2.3 Options Assessment

4.2.4 Overview

Following on from the identification of management options, the options needed to be assessed and subsequently prioritised. This assessment was completed to ensure the final Stage 4 program of management options are appropriate, achievable, and meet the objectives

of the CM Act. A Multi Criteria Analysis (MCA) was implemented based on evaluating the feasibility, viability and acceptability of each potential action as depicted in Figure 4-7.

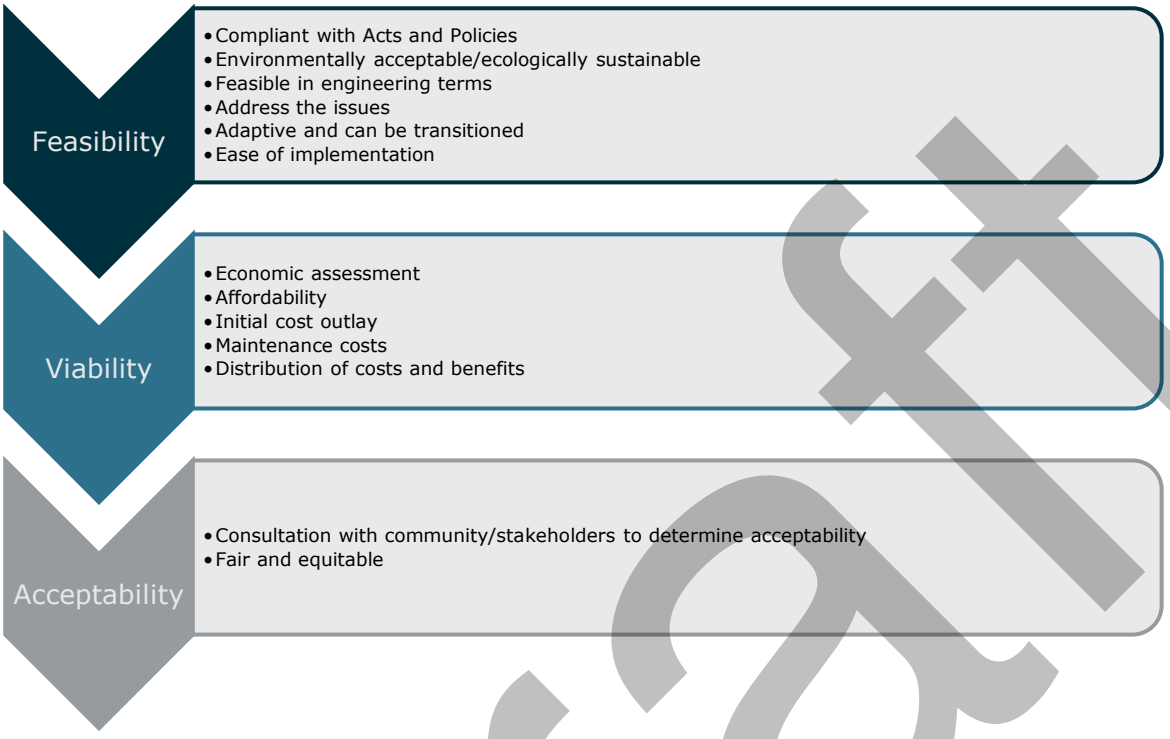


Figure 4-7: Criteria in Evaluating Management Options

4.2.5 Multi Criteria Analysis (MCA)

A detailed Multi Criteria Analysis (MCA) was undertaken across a broad range of evaluation criteria to assess the feasibility, viability and acceptability of the options as required by the CM Manual. In evaluating each of the identified options, the criteria based on Figure 4-7 were scored and weighted against the relative importance of each, with a higher overall weighted score representing a more favourable management option. The criteria, definitions and methods for scoring options is shown in Table 4-4. This process was used to rank the options and determine those actions suitable to progress to Stage 4. Table 4-4 provides details of the criteria and definitions for scoring options. A score of zero automatically ruled out the action from further consideration. The evaluation process was developed in conjunction with the Project Team which included expert representatives from Council and DCCEEW, with definitions, scores and weightings assigned, reviewed and agreed by all members of the Team.

The results of the MCA including scores and ranks for each option are provided in the Stage 3 Summary Report (Worley Consulting 2024).

Table 4-4: Criteria and Definitions for Scoring Options

		Definition - Score 1-5	Reflects relative Importance of criterion Weighting	Definitions	Any score of zero will automatically rule-out this action as being not feasible. 0	0.2	0.4	0.6	0.8	1
Economic	**Total estimated cost (implementation & maintenance)**	Initial cost outlay plus maintenance cost over 10 years of option. Lower cost =1, higher cost = 0.2	2	To assign score against actual cost ranges		>$5million and/or detailed CBA required	$500k - $5m	$100k - $500k	$10k - $100k	<$10k
Social	**Impact on Safety**	Does the action improve safety? 1 = yes, 0.2 = no	1	Captures concerns re coastal use area	Action would likely compromise public safety.	No improvement in safety	Action would provide only minor improvement in safety	Action would provide minor to moderate improvement in safety	Action would provide moderate to substantial improvement in safety	Action would provide substantial improvement safety
	Approvals, Statutory and Policy Compliance	How complex are the approvals for the action, will it take a long time to implement? 1 = simple to implement and can be done now, 0.2 = complex approvals required with multiple agencies involved and difficult to implement	1	Is the action legal? Is it a "no-regrets" action or will it be complex to implement? Is it consistent with statutory approvals and current policy settings? Is it consistent with the objects of the Coastal Management Act?	Action is not currently legal, and no legal approvals pathway exists for its implementation.	Potentially inconsistent/ lengthy approvals required with detailed environmental assessments necessary		Largely consistent with existing approvals/policy.		Action fully consistent with statutory and policy settings, or with existing approvals in place
Environment	**Impact on coastal processes**	Will the action cause a significant disruption to coastal processes? 1 = no, 0.2 = yes	2	Are we enhancing or disrupting the natural coastal processes?	Action is likely to interfere with the natural coastal processes leading to unforeseen or negative outcomes across the area	Action is likely to interfere with the natural coastal processes and is likely to cause a negative impact	Action may interfere with the natural coastal processes and may cause a negative impact	Action may interfere with the local coastal processes by design but is not likely to cause a negative impact	Action is not likely to interfere with the natural coastal processes	Action is likely to enhance or restore the natural coastal processes
	Overall environmental benefit and Ecological Impact	Will the action have an overall environmental benefit? 1 = yes, 0.2 = no	1	Are we improving the resilience of the Coastal Wetland Area, Coastal Environment Area? Is it ecologically sustainable?	Action is likely to have a demonstrated or irreversible negative impact on resilience of the Coastal Wetland Area, Coastal Environment Area.	Action is likely to cause a localised or reversible negative impact on Coastal Wetlands and/or Coastal Environment Area	Action may cause a negative impact on the Coastal Environment or Coastal Wetland areas	Action is not expected to cause a positive or negative impact on the Coastal Environment or Coastal Wetland areas	Action is likely to provide a minor to moderate benefit to the Coastal Environment or Coastal Wetland Areas	Action is likely to provide a substantial benefit to the Coastal Environment and Coastal Wetland Areas
	Effectiveness of Option	How effective is the action in reducing the risk or managing the issue? 1 = very effective, 0.2 = not effective	2	From Risk assessment, would the action address the risk? E.g. would it reduce coastal risk/vulnerability? How well would the risk be addressed by the action?	Action would increase identified risk	Action would only provide minimal reduction in identified risk	Action would provide minor benefits in reducing the identified risk	Action would provide minor to moderate reduction in identified risk	Action would provide moderate to substantial reduction in risk	Action would provide substantial, measurable reduction in identified risk
Social	**Social Impact**	Does the action enhance the social and cultural values of the coastal zone? 1 = yes, 0 = no	1	Social values e.g. education initiatives, improve scientific and/or traditional knowledge, recreational amenity, visual amenity and natural character	Action would have a negative cultural and social impact	Action does not provide any benefit to social values of the coast, and may have a negative impact, or may not be acceptable to stakeholders		Action provides moderate benefit to social values of the coast		Action provides substantial benefit to social values of the coast, and has a high degree of support from the community

4.2.6 Feasibility

As per the details provided in the NSW Coastal Management Manual, feasible coastal management actions are those which:

- are consistent with the objectives of the CM Act
- comply with statutory and policy requirements
- are environmentally acceptable and consistent with the principles of Ecologically Sustainable Development (ESD)
- are feasible in engineering terms i.e. can realistically be built
- can address identified issues
- are adaptive and can transition to alternative approaches
- are broadly able to be implemented
- are likely to contribute new knowledge about effective management.

The feasibility assessment has considered both social and environmental aspects as shown in Table 4-4 and has been undertaken in accordance with the above.

Feasibility scores were assigned against the following criteria:

- **Impact on Safety** – does the action improve safety?
- **Approvals, Statutory and Policy Compliance** - Is the action legal? Is it a "no-regrets" action or will it be complex to implement? Is it consistent with statutory approvals and current policy settings? Is it consistent with the objects of the CM Act?
- **Impact on coastal processes** – will the action enhance or disrupt the natural coastal processes? This criterion was given a weighting of 2 to reflect its importance in defining the management action.
- **Overall environmental benefit and ecological impact** – will the action have an overall environmental benefit? Will the action improve the resilience of the Coastal Wetland Area, Coastal Environment Area? Is it ecologically sustainable?
- **Effectiveness of Option** - How effective is the action in reducing the risk or managing the issue? From the Risk assessment, would the action address the risk? e.g. would it reduce coastal risk/vulnerability? How well would the risk be addressed by the action? This criterion was given a weighting of 2 to reflect its importance in defining the management action.
- Scores for each individual option were added and multiplied by their weighting to derive an overall MCA score for each option.

Actions that were deemed to fail any of the above criteria were assigned a score of zero, which precluded them from being carried through to Stage 4.

4.2.7 Viability

The viability assessment was completed to identify the cost (implementation and maintenance) for the options being assessed. The scope and level of detail of the economic assessment was proportionate to the nature and scale of the coastal issues. From the CM Manual, Figure 4-8 provides guidance on the method used for selecting the appropriate level of economic assessment.

Coastal management actions operating over long timeframes with potentially larger direct and indirect costs/benefits may warrant a CBA to determine whether the benefits outweigh the costs. However, CBA is not considered warranted for the actions proposed in this CMP given no actions are anticipated to have a capital cost greater than $5 million, and as limited information is available to be able to accurately quantify tangible benefits to inform a detailed assessment.

The primary purpose of the viability assessment was to determine:

- the cost of the option
- the distribution of costs and benefits
- proposed cost sharing arrangement and funding mechanisms
- whether the proposed management options are affordable and thus viable for progressing through to Stage 4.

For the Stage 3 assessment, an estimate of the capital and maintenance cost has been undertaken for each action, with the Viability score obtained from the capital cost plus the maintenance costs over the 10 year CMP planning period. The Viability score was assigned a weighting of 2 and scores were allocated against each of the options according to the following rules:

Table 4-5: Assignment of Viability scores against total capital and maintenance costs for each action

Score	Criteria for total capital outlay plus maintenance costs over 10 year timeframe
0.2	>$5million and/or detailed CBA required
0.4	$500k - $5m
0.6	$100k - $500k
0.8	$10k - $100k
1	<$10k

		Complexity	
		Low • Limited number of stakeholders • Little or no quantitative data	**High** • Disagreement or conflicting views among stakeholders • Difficulty defining beneficiaries or apportioning costs • Good quantitative data
Risks and impacts	**Low** • Limited spatial scale • Low risk and low impact	**Simple economic assessment** These assessments ask similar questions as the more complex analysis, but use qualitative analysis and expert opinion rather than quantitative data.	**Intermediate level assessment** These assessments ask the same questions as the more complex analysis, but may use detailed costings.
	High • Addressing high or extreme risks • An option involves major investments	**Intermediate level assessment** Monte Carlo modelling or significant social analysis may not be necessary, but some detailed costing e.g. for maintenance, is required.	**Detailed cost-benefit analysis** This may involve a systematic comparison of all foreseeable costs and benefits and the probability that they will arise over the planning period.

Figure 4-8: Matrix of risk and complexity for selecting the level of economic assessment

Costings for the actions are provided in the Business Plan in Section 6. As there are no actions involving investments greater than $5 million, and the benefits of the actions are largely intangible, a simple assessment has been carried out and is documented in the Stage 3 Summary report (Worley Consulting 2024). The simple assessment identifies:

- the approximate cost of each action, based on costing information from Council's cost database and the Project Team's experience with similar works. The derived cost was used to assign the assessment score against each option in the option assessment.
- the information used to derive the costs, and
- a qualitative description of the benefits of each action, with these being intangible and qualitative in nature and thus it was not possible to ascribe a dollar value against the benefit of the actions.

4.2.8 Acceptability

Acceptability is the final step in selecting which of the actions were to be included in the CMP. This step involves consulting with the community and stakeholders to determine the acceptability of the actions as well as assessing whether the action improves social and cultural values of the coastal use area. The actions have been directly informed by issues and

suggestions raised during the Stage 3 community and stakeholder engagement, which fed into the Detailed Risk Assessment.

Support for the actions from the community and Agency stakeholders will be gauged through public exhibition of the draft CMP and community engagement sessions which will provide an opportunity for the community to better understand and formally comment on the draft management actions.

Scores were assigned for how well the action addresses Social Values of the coastal zone. Social values include aspects such as education initiatives, improvement in scientific/traditional knowledge, recreational amenity, visual amenity and natural character. Actions which do not provide any benefit to social values, and/or may have negative impact were assigned the lowest score against this criterion. Actions which provide substantial benefit to social values were assigned the highest scores. Actions which have a demonstrable negative social impact were assigned a score of zero, which excludes the action from being carried forward to Stage 4.

4.3 Option Assessment Outcomes

The potential management actions have been assessed against the Feasibility, Viability and Acceptability criteria as described above, which has allowed for the actions to be assigned a total score out of 10, ranked, and therefore prioritised for inclusion in the CMP.

A summary list of each Action, issue addressed, timeframe for implementation, Lead Agency and Supporting Agency is provided in Table 4-6 for both LGA-wide and location-specific actions.

Actions which scored less than 5 out of 10 were considered to be not suitable to be carried forward to Stage 4. A total of 38 actions have been included in the Draft CMP.

4.4 Overview of Management Actions

The CMP structure includes:

- Management actions based on the six categories of management issues described in Section 2.1.3.
- Management actions that apply across the entire open coast within the CMP Study Area, and those which apply at particular locations to manage localised risks and opportunities. Actions at specific locations are identified and mapped in Appendix A.
- Management actions are categorised according to the Coastal Management Area (as defined by the RH SEPP) in which they apply.

The CMP structure is illustrated in Figure 4-9:.

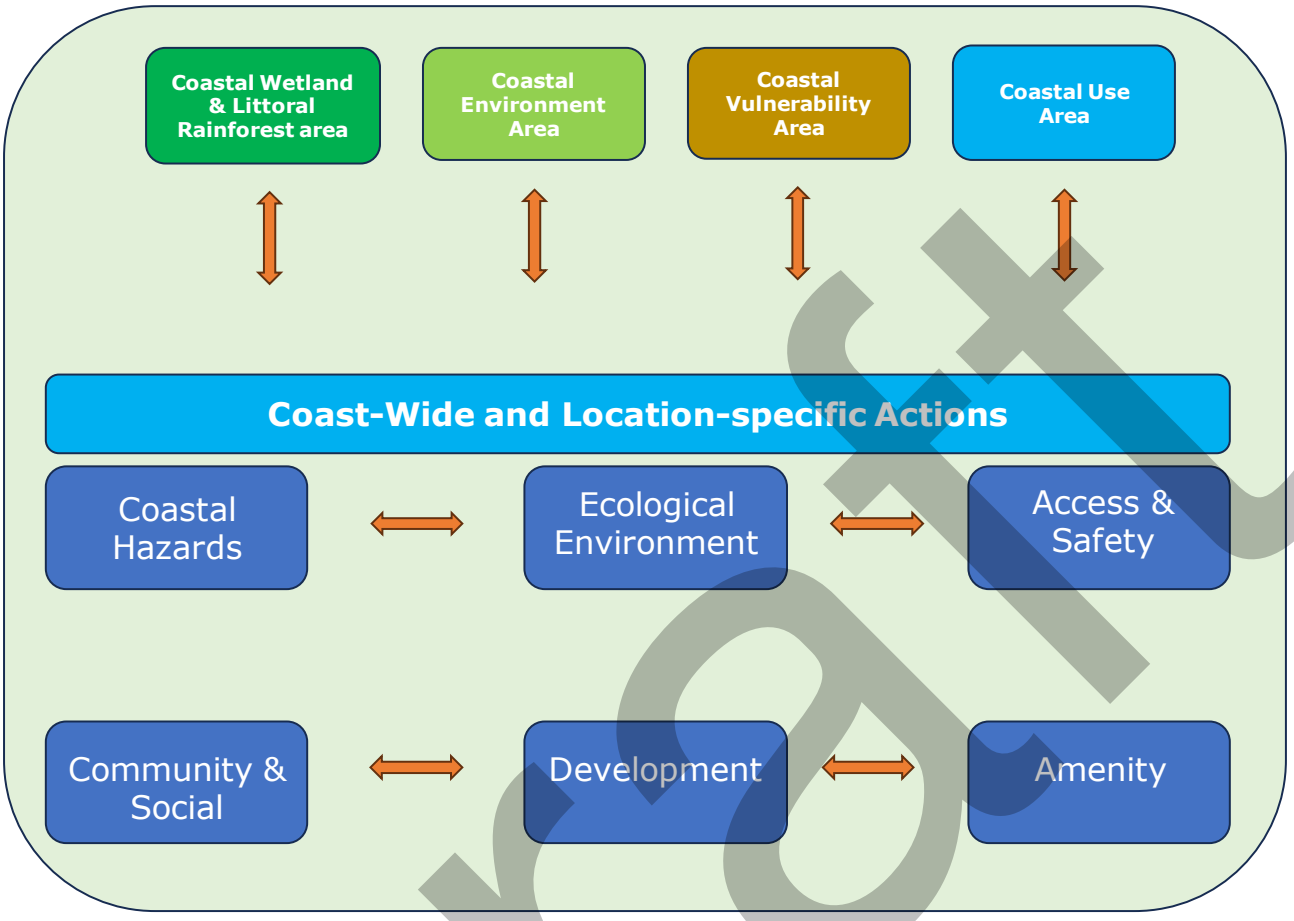


Figure 4-9: Structure of the CMP

4.4.1 Action Timing

The management actions have been designed to be implemented within the 10-year timespan of the CMP, with long-term actions defined that will carry over to subsequent iterations of the CMP at the end of the 10-year cycle.

The timeframes defined against each action within the CMP are:

- **Short-term actions** – designed to be implemented within 1 – 2 years
- **Medium-term actions** – designed to be fully implemented within 3 – 6 years i.e. within the 10-year planning period of the CMP
- **Long-term actions** – designed to be initiated within 7 – 10 years, but which may take longer than 10 years to fully implement and would likely carry over to the next iteration of the CMP.
- **Ongoing** – designed to be implemented on a continual basis throughout the implementation phase of the CMP.

In the Business Plan in Section 6, the action implementation has been timed to match in with the key Council IP&R documents, as follows:

- Short Term Actions – typically are initiated within Council's current Operational Plan (which typically extends for one financial year) and completed within the first upcoming Delivery Program cycle (2025 – 2029), assuming that the CMP will take effect in 2025.
- Medium Term Actions – Initiated in Years 3 – 6 to match with the future Delivery Program 2028 – 2032, with completion in the 2027 – 2031 Delivery Program cycle.
- Long Term Actions – Initiated in Years 7 – 10, to match with the future Delivery Program 2031 – 2035.

All recommended actions that have a specific location associated with them are shown on map series in Appendix A. All actions in this CMP only apply to areas within the legally defined coastal zone that exists within the CMP Study Area (i.e., within one of the existing CMAs, refer Section 1.5.2).

The estimated costs associated with these actions – including capital costs and any ongoing maintenance costs – have been provided in the Business Plan table in Section 6.

4.4.2 Action Priority

Given Council's limited funding and resources, a key element of CMP implementation is the prioritisation and rationalisation of management actions. This is important when considering that Council will need to develop an LGA-wide Action Plan that outlines a prioritisation process for implementing actions across all of its CMPs.

Priority for the management actions has been linked to the level of risk associated with the issue that each action has been designed to address as assigned in the Risk Assessment report (Worley Consulting 2024a), with the action priority indicated in the management action table (Table 4-6).

The action priorities have been set based on the following:

- For actions that address risks rated as "Extreme", the actions have been assigned a "High" priority, indicating that the action is considered critical for the successful implementation of the CMP.
- For actions that address risks rated as "High", these have been assigned a "Medium" priority.
- For actions that address risks rated as "Moderate", these have been assigned a "Low" priority.

For risks that were rated as "Low" in the Risk Assessment report and Risk Register (Worley Consulting 2024a), it was considered that existing management controls to address these risks were adequate, and no additional management actions were required to reduce the risk as the level of risk was considered to be acceptable. These risks should be reassessed through future reviews and iterations of the CMP.

The intention is to undertake or initiate all the actions within the ten-year lifespan of the program, but to consider the priority and urgency of the action when assigning a timeframe, as

the lower priority actions may not need to be (or perhaps may not be able to be) implemented immediately. This could be due to budget or resourcing constraints, or the need to schedule some actions first to allow others to proceed effectively, or by implementing a staged approach for actions that may span multiple Delivery Program cycles or be carried over to the next 10-year CMP cycle.

In considering the action priority, a flexible approach to undertaking works should be adopted as grants and funding opportunities arise from time to time that may allow some options to be progressed ahead of others. Some actions may be assigned "low" or "medium" priority, but could be implemented in the short term as they are low cost, easy to implement and are consistent with Council's existing programs and priorities.

4.4.3 Key Management Actions

Some of the key high profile management actions include:

- Investigate feasibility and responsibilities of long-term sand nourishment licences (including working with the NSW Reconstruction Authority, NSW DCCEEW and other Councils on a state-wide project)
- Review and update coastal development planning controls and undertake Planning Proposal to adopt Coastal Vulnerability Area
- Implement whole of embayment terminal protection solution for Council owned land at Wamberal Beach in accordance with the principles of the Engineering Design Requirements and the resolutions of Council
- Identify the extent, nature, and condition of existing coastal emergency works (including potential removal or remediation)
- Continue to nourish The Entrance North Beach with sand from The Entrance channel berm management or dredging activities when available to increase beach amenity and resilience.

4.4.4 Private Property Protection

As per the requirements of the CM Manual, the CMP outlines the actions that Council and other public authorities will fund and complete. The Manual and the CMP does not provide for any actions for private residents to undertake. Therefore, even with the completion of the actions in this CMP there will still be a significant residual risk to private property on the Central Coast from coastal hazards over the life of this plan.

The draft CMP proposes that property owners that own properties at risk of coastal erosion, continue to be responsible for the funding and implementation of any coastal protection works for their own properties. Private coastal protection works will continue to have a planning pathway under the NSW planning legislation and the NSW Coastal Framework. The CMP does not outline where private residents should or should not lodge development applications for coastal protection works. These development applications will continue to be assessed on their merits by the Regional Planning Panel.

Table 4-6:Management Actions to be implemented by Council

ID	Category	Location	Issue	Action Name	Action Description	Timeframe	Priority	Lead Agency	Support Agencies	Performance Measures
CW-S01	Access & Safety	LGA-wide	Increased erosion/scour associated with stormwater assets. Stormwater assets impacted by coastal inundation	**Monitoring and improvement of coastal stormwater outlets**	The inspection of all coastal stormwater outlets to identify those at risk from coastal hazards and opportunities where upgrades can be implemented or retrofitted in order to protect assets, reduce erosion from stormwater scour and/or improve public safety. These locations would also be regularly monitored to assess performance and improvements.	**Short**	**High**	**Council**		- program for inspection of stormwater outlets developed, inspections undertaken and concept designs developed - improved public safety, water quality and amenity - reduced erosion at stormwater outlets and reduced impact on surrounding assets
CW-S02	Access & Safety	LGA-wide	Risk to public safety due to wave run up, wave overtopping, cliff instability, rockfalls and coastal erosion	**Develop and implement an integrated coastal processes and hazards education and awareness program**	The development and implementation of an integrated education program focused on improving community understanding of local coastal hazards, processes and related topics, such as water quality, marine ecology and marine litter, to promote the safe and sustainable use of our coast. This action should include an update to and installation of new coastal hazard and educational signage and the ongoing monitoring of locations that pose a high risk to public safety.	**Short**	**Medium**	**Council**		Program developed and signage installed. Improved community understanding of coastal hazards and coastal environment
CW-S03	Access & Safety	LGA-wide	Informal private access and use damaging vegetation and impacting on recreational amenity for the public	**Develop and implement coastal compliance procedures**	The procedures would improve public safety and environmental outcomes at our beaches by outlining the actions, processes and responsibilities concerning compliance enforcement and the management of encroachment, illegal dumping, unapproved structures, unlawful activities and vegetation clearing. It will include a review of planning controls and resourcing, provide guidance to homeowners for "steps to remediation", make it easier for the public to "report an issue" and cover signage and monitoring aspects.	**Short**	**Medium**	**Council**	**Crown Lands, Fisheries, Environmental Protection Authority, NSW Police, National Parks, Local Aboriginal Land Services**	Procedures developed, published and implemented. Improved dune environment and recreational amenity
CW-S04	Access & Safety	LGA-wide	- Inaccessible beach accessways impacted by coastal erosion - Damage to dunes and safety concerns due to generation of informal/unauthorised beach accessways - Safety concerns regarding exposure and mobilisation of buried remnants of historic foreshore protection works - Injury to beach users caused by structures mobilising during storm events - Dune instability/steep dune scarp impacted by coastal erosion - Damage to coastal recreational assets from storm events	**Review and implement updated Beach Maintenance Program**	Council's Beach Maintenance Program would be reviewed and implemented to improve public beach access, amenity and safety. The action would include prioritisation and upgrades to beach accessways in line with the Recreational Use Study and Council's Disability Inclusion Action Plan. The program would outline the management of post-storm beach access and safety, where small-scale works such as beach scraping for amenity purposes may be undertaken and beach and dune fencing. It will also include an audit on beach maintenance operations to maximise inhouse efficiencies to ensure that the necessary plant and equipment is available to effectively implement the program.	**Short**	**Medium**	**Council**		Beach Maintenance Program reviewed, updated and implemented in conjunction with Council's beach maintenance crews. Improved beach access, safety and amenity, improved dune environment
CW-S05	Access & Safety	LGA-wide	Limited or out-dated information available on key indicators of coastal hazards and coastal dynamics	**Develop and implement a Coastal Monitoring Program**	The coastal monitoring program would use progressive monitoring techniques to collect essential information about coastal processes and hazards to improve the management of our beaches. It would include beach surveys to monitor changes in sand volumes, risk exposure, dune condition and beach amenity.	**Short**	**High**	**Council**	**DCCEEW**	Development of coastal monitoring program, considering existing initiatives such as CoastScan. Improved understanding of

ID	Category	Location	Issue	Action Name	Action Description	Timeframe	Priority	Lead Agency	Support Agencies	Performance Measures
					The data collected would allow annual Beach Health Reports to be developed and better inform future coastal hazard studies and investigations. Beach usage should be included in the monitoring to better understand current demand and locations requiring further investment in the future.					local coastal processes, beach usage
CW-S06	Access & Safety	LGA-wide	Coastal hazards impacting viability of existing and future infrastructure long term, need for long-term coastal adaptation planning	**Investigate and develop a Coastal Hazard Adaptation Strategy for affected coastal communities**	Develop a Coastal Hazard Adaptation Strategy that will consider future risk to our community from coastal hazards and investigate adaptation measures and pathways to support and enhance the resilience of our coastal communities.	**Long**	**Medium**	**Council**	**DCCEEW Reconstruction Authority**	Long-term Coastal Hazard Adaptation strategy developed and communicated for high-risk areas. Improved resilience of coastal infrastructure from long term coastal hazards
CW-S07	Access & Safety	LGA-wide	Coastal erosion threatening coastlines and infrastructure	**Investigate feasibility and responsibilities of long-term sand nourishment licences**	Investigate the feasibility, process and responsibilities of long-term sand nourishment licences and work with the State Reconstruction Authority to support their actions on offshore sand nourishment in the State Disaster Mitigation Plan (SDMP)s.	**Short**	**High**	**Council**	**Reconstruction Authority DCCEEW**	Approval pathway confirmed and feasible options developed for large scale offshore beach nourishment at priority locations
CW-S08	Access & Safety	LGA-wide	Inconsistent standards of SLSC's patrol towers along the coast. Unable to provide sufficient public services.	**Prioritise and upgrade beach life guard patrol towers and ancillary structures**	This action would involve undertaking an audit of beach life guard patrol towers and ancillary structures to ensure their adequacy, performance and safety from coastal hazards. Necessary upgrades and improvements required would be prioritised and implemented to ensure required functions continue to be performed.	**Medium**	**Medium**	**Council**		Vulnerable life guard patrol towers identified and improvements/upgrades implemented
SB02	Access & Safety	Pebbly Beach	Safety hazard due to unfenced cliff line at southern carpark of Soldiers Beach	**Investigate options to improve public safety at Soldiers Point headland**	Undertake an assessment of public safety at the Soldiers Point headland overlooking Pebbly Beach and investigate options to manage the risks associated from the exposed cliff and instability.	**Medium**	**Medium**	**Council**	**NPWS**	Public safety hazard assessed and eliminated
CW-A01	Amenities	LGA-wide	Aging or incompatible coastal recreation amenity infrastructure not compliant with engineering standards or industry best practice	**Coastal recreation assets and infrastructure renewal program**	This action involves the review, prioritisation and delivery of coastal recreation assets, public amenities and infrastructure upgrades and investigations to support and enhance beach visitation and recreational opportunities, now and into the future, guided by the recommendations from the Recreational Use Study.	**Short**	**Medium**	**Council**		Priority locations for coastal recreation assets identified, upgrades designed and delivered
CW-A02	Amenities	LGA-wide	Lack of guidance for implementing and assessing coastal protection works	**Develop and implement Coastal Engineering Design Requirements**	The Coastal Engineering Design Requirements will help to achieve a more a sustainable and resilient coastline by clarifying expectations to designers, engineers and architects concerning coastal development. It will outline key design principles to ensure that development is appropriately designed for coastal hazards, addresses coastal processes, considers public safety and mitigates environmental impacts.	**Short**	**High**	**Council**		Coastal Engineering Design Requirements developed, reviewed, adopted and implemented for assessment of DAs
CW-A03	Amenities	LGA-wide	Insufficient waste facilities and collection at coastal locations impacting amenity	**Review waste collection assets and servicing in coastal public spaces**	Work with internal business units and service providers to review the adequacy of waste collection assets and servicing along the coast. The review would be focused on ensuring that infrastructure and assets are sufficient to meet current demands, seasonal and event	**Short**	**Low**	**Council**		Waste collection assets identified and upgraded. Management plan for removal of post-storm

ID	Category	Location	Issue	Action Name	Action Description	Timeframe	Priority	Lead Agency	Support Agencies	Performance Measures
					variations and opportunities for improvement to reduce the environmental and amenity impacts from marine litter and debris. This action should also include the management of post-storm and flood debris.					debris developed and implemented
CW-H01	Coastal Hazard	LGA-wide	Need for stronger planning controls to manage development in the coastal zone in relation to coastal hazards	**Review and update coastal development planning controls and undertake Planning Proposal to adopt Coastal Vulnerability Area**	The review, update and implementation of new coastal hazard planning controls within the Development Control Plan, based on the latest available coastal hazard study and information, will ensure a consistent and best-practice approach to protecting the environment and communities from coastal hazards. Council will also prepare and submit a Planning Proposal to adopt a Coastal Vulnerability Area (CVA).	**Short**	**High**	**Council**	**DCCEEW**	DCP updated and implemented, Planning Proposal submitted, CVA developed and included in RH SEPP/LEP
CW-H02	Coastal Hazard	LGA-wide	Legacy coastal emergency works on beaches which no longer serve purpose, causing detrimental impacts or timeframe expired.	**Identify the extent, nature and condition of existing coastal emergency works (including potential removal or remediation)**	This investigation will identify and document existing emergency, legacy and unauthorised coastal protection works, including the type of works, extent, condition and the risk they pose to public safety and coastal processes. This information will allow these works to be strategically managed, decommissioned, remediated or modified as necessary and at the appropriate time.	**Medium**	**Medium**	**Council**		Legacy and unauthorised coastal protection works identified, assessed and site specific plan developed for each
CT01	Coastal Hazard	Cabbage Tree	Structural integrity/slope stability	**Design and construct Stage 2 of the existing Cabbage Tree Harbour toe drainage structure**	Design and construct Stage 2 of the toe drainage structure at Cabbage Tree Harbour to further reduce the incidence of landslip and improve beach safety. The works were originally constructed with a 15 year design life and Stage 2 is required to add an additional layer and increase the crest height to ensure adequacy for future coastal conditions. Refer Appendix D for concept and further details.	**Medium**	**Medium**	**Council**	**DCCEEW Crown Lands**	Detailed design undertaken and works implemented
MM01	Coastal Hazard	MacMasters	Coastal erosion impacting Marine Parade	**Complete coastal risk and options assessment for Marine Parade at MacMasters Beach**	This action will involve completing a local detailed coastal hazard assessment to better understand the erosion and recession risk at this location. The updated information will be used to inform an options assessment which would investigate the most appropriate long-term adaptive management approach.	**Medium**	**Medium**	**Council**	**DCCEEW, Crown Lands**	Management options identified, design undertaken and works implemented
EN01	Coastal Hazard	LGA-wide	Unknown impacts associated with legacy landfill sites or other contamination that be become exposed following erosion.	**Monitor and manage risk of contamination from closed landfill sites**	Monitoring and management of legacy closed landfill sites within the coastal hazard area to reduce the risk of contamination during severe weather events.	**Medium**	**Low**	**Council**		Legacy landfill sites identified, risk of contamination assessed and appropriate management measured designed/implemented.
EN02	Coastal Hazard	The Entrance North	High risk from beach erosion at North Entrance Beach	**Continue to nourish The Entrance North Beach with sand from The Entrance channel berm management or dredging activities when available to increase beach amenity and resilience.**	Historically Council has dredged sand from the active tidal delta in The Entrance channel on occasion and placed the sand on North Entrance beach. However, there is currently no commitment to dredge or place sand at any preference areas. This action would allow Council to place sand nourishment sourced from maintenance activities in the channel	**Short**	**High**	**Council**	**DCCEEW, TfNSW, Fisheries, Crown Lands**	Sand nourishment placed onto North Entrance Beach, erosion risk reduced.

ID	Category	Location	Issue	Action Name	Action Description	Timeframe	Priority	Lead Agency	Support Agencies	Performance Measures
					onto North Entrance Beach to reduce (but not eliminate) the risk from coastal erosion. Refer to Appendix D for more information regarding the rationale for this action.					
EB01	Coastal Hazard	The Entrance	Structural integrity	**Review the structural integrity and extent of the foreshore revetment and embankment protecting Marine Parade, The Entrance and undertake remedial works as required**	Review the structural integrity and extent of the foreshore embankment stabilising Marine Parade that extends north from The Entrance Surf Life Saving Club. Following construction of the groyne on The Entrance Beach by State Government, the structure has been increasingly exposed and impacted. Undertake upgrades, extensions or replacement as required. This action may incorporate outcomes from MIDO's review into the existing rock groyne.	**Short**	**Medium**	**Council**	**TfNSW, Crown Lands**	Foreshore protection works assessed, upgrade designed and implemented
WB01	Coastal Hazard	Wamberal Beach	Coastal erosion threatening private properties and public infrastructure	**Undertake an engineering review of the Wamberal Beach engineering design requirements (EDR) so that they may be referred to in future revisions of Council's Coastal Development Control Plan (DCP)**	Review the Wamberal Beach EDR's to include geotechnical engineering design requirements and allow for a design that can be implemented, with a view to being able to include in Council's DCP to ensure all development applications for the Wamberal Beach coastal protection works are in accordance with the guidelines. • The EDRs should be seen as a "living document", a guideline that should be regularly reviewed and updated to keep it up to date with the latest available information and best practice. The EDR's themselves recognise this e.g. on page 13 "The sand nourishment triggers and replenishment volumes to maintain beach amenity are to be reviewed periodically." • As they currently stand the key criteria for terminal protection design on page 5 of the EDRs specify a "seawall" rather than simply "coastal protection works" – this appears to limit the type of structure, being to a vertical seawall (by definition), which would present a number of technical difficulties for implementation, for example, the need for ground-anchors to be installed which may not be practical due to the need to excavate under proximity of the houses and their foundations. The EDRs need to be flexible enough to allow other types of coastal protection works designs to be put forward and considered for assessment in a DA and not be limited to a vertical seawall.	**Short**	**High**	**Council**	**DCCEEW**	Future DAs compliant with Engineering Design Requirements and able to be supported/approved by the Regional Planning Panel Development and assessment of coastal protection works in accordance with NSW Planning legislation.
WB02	Coastal Hazard	Wamberal Beach	Coastal erosion impacting Planning Ministerial Corporation land at Wamberal	**Implement whole of embayment terminal protection solution for Wamberal Beach Council owned lands in accordance with the principles of the Engineering Design Requirements**	The CMP acknowledges Council's resolution of 11 October 2022 to adopt Engineering Design Requirements for the Wamberal beachfront. Council and the NSW Government to work together to implement whole of embayment terminal protection solution for Wamberal Beach public owned lands in accordance with the Key Criteria for Terminal Protection Design at Wamberal Beach as documented in the Engineering Design Requirements. The	**Short**	**High**	**Council**		Whole of embayment solution approved and implemented in conjunction with adequately designed and funded beach nourishment program

ID	Category	Location	Issue	Action Name	Action Description	Timeframe	Priority	Lead Agency	Support Agencies	Performance Measures
					solution will need to complement any approved development that is led and put forward by private landowners along the Wamberal beach frontage noting that the approved solution may not necessarily be a vertical seawall.					
A01	Coastal Hazard	Avoca, other low-lying areas as identified in the coastal hazard assessment	Flat beach profile, no protection from wave overtopping	**Undertake a detailed wave overtopping and inundation assessment for high risk locations**	Undertake a detailed wave overtopping and inundation assessment at high risk locations identified in the coastal hazard study to improve public safety and better inform coastal planning. The detailed assessment should include analysis of the current and future risk, as well as the consideration of options for managing the risk to public and private assets and public safety. Short term management options may include updating local planning controls and/or soft engineering strategies	**Short**	**High**	**Council**	**DCCEEW**	Options developed and implemented for management of overtopping at high risk locations
EB02	Coastal Hazard	The Entrance	Depletion of sand along southern side of The Entrance channel and undermining of seawall	**Investigation and management of adverse groyne impacts**	Collaborate and support the Marine Infrastructure Delivery Office in the investigation of options, including removal, and management of all adverse impacts caused by the construction of the rock groyne at The Entrance beach. The structure was installed by the NSW Government in 2017 with the context of a short-term 10-year trial.	**Medium**	**Medium**	**TfNSW (MIDO)**		Discussions held with MIDO and agreement on management of future impacts from groyne developed
T02	Coastal Hazard	Terrigal (The Haven)	Structural Integrity of seawall at The Haven	**Options study for replacement of aging seawall at The Haven**	Undertake an options study to assess feasible foreshore masterplans and design options for the upgrade, or replacement, of the sandstone block seawall at The Haven and surrounding area, with reference to recommendations of the engineering review of the existing structure.	**Medium**	**High**	**Council**	**Crown Lands**	Options study undertaken and seawall upgraded
CW-C01	Community & Social	LGA-wide	Need for community and agency representation to support decision making	**Continue the role of a coastal, estuary and floodplain management Advisory Committee**	Continue to support the role of an Advisory Committee responsible for providing advice and input on the sustainable management of our coastal, estuarine and flood liable areas.	**Short**	**High**	**Council**		Committee established, terms of reference established, meets regularly and comprises appropriate cross-section of the community and agency representatives
CW-C02	Community & Social	LGA-wide	Lack of detailed cultural and heritage assessments across the LGA. Need for Aboriginal Heritage Impact Permits in areas affected by coastal erosion.	**Work with First Nation groups and stakeholders to evaluate arrangements for undertaking beach maintenance operations**	Collaborate with First Nation groups and stakeholders to evaluate beach maintenance operations to ensure their appropriateness for works in sensitive areas. This action will include update of protocols to be followed in the event Aboriginal sites or heritage is discovered and/or threatened by erosion during storms, information to be communicated through interpretive signage along the coast and obtaining Aboriginal Heritage Impact Permits where they may be required to support essential works for public safety and access, such as post-storm management of beach accessways.	**Medium**	**Medium**	**Council**	**LALC**	Culturally sensitive sites identified. Beach maintenance undertaken in accordance with statewide code of practice.
CW-C03	Community & Social	LGA-wide	Unapproved memorial sites	**Management of unapproved memorials in public coastal spaces**	Work with internal business units to review the appropriateness and/or removal of unapproved memorials installed in public	**Medium**	**Low**	**Council**		Unapproved memorials removed from public areas

ID	Category	Location	Issue	Action Name	Action Description	Timeframe	Priority	Lead Agency	Support Agencies	Performance Measures
					coastal spaces on Council land or Council managed Crown Land.					
CW-C04	Community & Social	LGA-wide	Community awareness of coastal hazards and issues	**Update and maintain Council's website to improve awareness and make information on coastal processes, hazards and issues more accessible**	Update Council's website to provide accessible information relating to coastal processes, hazards, coastal management issues, educational resources, coastal projects and coastal data. Website to be regularly reviewed and updated as appropriate to ensure relevancy and accuracy of information as new information is obtained or new coastal management issues emerge.	**Short**	**High**	**Council**		Website updated and maintained according to regular review schedule, level of public engagement analysed
CW-C05	Community & Social	LGA-wide	Community awareness of cultural issues and practices, lack of understanding of traditional knowledge for managing the coast	**Knowledge sharing and protection of cultural heritage**	Engage and collaborate with local First Nations groups to share cultural knowledge, understand their concerns and priorities and identify opportunities to acknowledge and protect and preserve cultural heritage sites and values from coastal hazards.	**Medium**	**Medium**	**Council**	**LALC**	Vulnerable cultural heritage values and assets identified and protected from coastal hazards
CW-D01	Development	LGA-wide	Need for geotechnical information to inform planning decisions	**Develop and maintain a coastal geotechnical database**	Develop and maintain an internal database of coastal geotechnical information to better understand the underlying geology of the region and inform coastal management and planning decisions. It will involve the collation of all available geotechnical data along our coast from all available sources and include geotechnical and structural constraints. Information to be provided to NSW SES for consideration for use in emergency management.	**Medium**	**Medium**	**Council**	**DCCEEW**	Database of geotechnical information developed and provided to NSW SES
CW-D02	Development	LGA-wide	Geotechnical investigation	**Conduct geotechnical investigations to improve understanding of underlying geology along the coast**	Complete a gap analysis to identify where additional or contemporary geotechnical information is required to support improved management, emergency response and planning decisions and conduct investigations as required.	**Medium**	**Medium**	**Council**	**DCCEEW**	Gaps in geotechnical information identified and geotechnical investigations undertaken
CW-D03	Development	LGA-wide	Infrastructure at risk	**Develop a coastal assets at risk register and update asset management program**	This action involves auditing coastal assets and infrastructure to inform development of a register identifying those at risk of coastal hazards, now and into the future. This information would be integrated with Council's asset management program to ensure effective maintenance, management and planning of coastal assets to improve amenity, resilience and community safety.	**Medium**	**High**	**Council**	**Crown Lands**	Coastal assets register developed, condition inspections undertaken, assets at risk identified and upgrades designed/implemented
CW-D04	Development	LGA-wide	Rock/ocean pools maintenance and accessibility	**Continue to improve accessibility and inclusiveness of coastal and foreshore areas**	As guided by Council's Disability Inclusion Action Plan, this action involves continuing to improve the accessibility and inclusiveness of our beaches and foreshore areas, such as investigating and implementing access upgrades and ensuring that new infrastructure projects consider and incorporate universal design principles.	**Medium**	**Medium**	**Council**	**Crown Lands**	Access upgrade locations identified, designed and implemented
CW-D05	Development	LGA-wide	Lack of awareness of property owners for properties affected by coastal hazards	**Review coastal hazard notations and planning certificates**	As new coastal hazard mapping and information becomes available, planning certificates should be regularly reviewed to ensure properties potentially affected by coastal hazards contain an appropriate notation.	**Medium**	**Medium**	**Council**	**DCCEEW**	Planning certificates reviewed and appropriate notations added

ID	Category	Location	Issue	Action Name	Action Description	Timeframe	Priority	Lead Agency	Support Agencies	Performance Measures
CW-E01	Ecological Environment	LGA-wide	Reduced water quality from urban catchments, leading to reduced water quality in open coast receiving waters	**Review and implement Council's coastal water quality monitoring program**	Council's existing coastal water quality monitoring program will be reviewed, updated and implemented to continue protecting and enhancing the water quality along our coastline. The program will be expanded to include the monitoring or ocean wastewater and stormwater outfalls, improved education and awareness initiatives and public accessibility to water quality information, including the potential expansion of sites to be included in the Beachwatch program.	**Short**	**Medium**	**Council**		Water quality program reviewed, updated and implemented. Program integrated with that for the Coastal Lagoons.
CW-E02	Ecological Environment	LGA-wide	Invasive weeds and pests reducing the diversity and abundance of native species. Lack of guidance for appropriate planting in the coastal zone. Lack of guidance for appropriate fencing/dune stabilisation controls in the coastal zone. Illegal vegetation clearing.	**Develop and implement a Coastal Vegetation Strategy**	This action would involve surveying coastal and dune vegetation to inform the development of a Coastal Vegetation Strategy aimed at supporting and enhancing coastal resilience, ecosystem integrity, beach amenity and conservation outcomes. The strategy will guide the on-ground management to achieve these outcomes and involve elements such as the management of priority weed species, dune stabilisation and planting, tree restoration and succession planting, education opportunities for the public and community groups and remediation actions required in instances of illegal clearing.	**Short**	**Medium**	**Council**		Strategy developed, published and implemented
T01	Ecological Environment	Terrigal, Toowoon, Copacabana	Would like to see the area from The Anchor to Terrigal beach made into a Marine Park same as what is at Nelson Bay. (Pinpoint) Shark management. Threatened species management. Biodiversity conservation. Education.	**Undertake and support research projects and citizen science initiatives aimed at enhancing and conserving marine biodiversity, science, recreation and education**	Collaborate and support agencies, universities, organisations and community groups undertaking projects or research aimed at enhancing and conserving marine biodiversity, science, recreation and education. This may include initiatives such as shark management, threatened species management, marine protected areas or citizen science projects, such as CoastSnap.	**Long**	**Medium**	**DPIRD-Fisheries**	**Council, Crown Lands**	Specific research projects and partnerships identified
SB01	Ecological Environment	Soldiers Beach	Dune blowout at southern carpark	**Undertake dune management works at the southern carpark of Soldiers Beach**	Undertake works aimed at reducing the volume of wind transported sand into the carpark, including the installation of dune forming fencing, dune revegetation and upgrade/replacement of the dune retaining wall. Also investigate whether the vehicle access from the southern slip rail is still required following completion of the new vehicle access ramp.	**Medium**	**Medium**	**Council**		Dune fencing installed dune vegetated and stabilised

4.5 Implementation of CMP actions

Under Section 22 of the CM Act, CMP actions that are to be implemented by Council are to be given effect through the Integrated Planning and Reporting (IP&R) Framework, which is required to conform to the state-based Integrated Planning and Reporting (IP&R) structure mandated in the LG Act. This framework is illustrated in Figure 4-10:.

Council's future planning documents (including the CMP) are made up of four key components:

1. Community Strategic Plan "One – Central Coast" (CSP, 10 years) – this represents the highest level of strategic planning undertaken by Council and identifies the main priorities and aspirations of the Central Coast community. The CMP must reflect and support implementation of the CSP. Under the CM Act, the objectives and management actions developed as part of CMPs are required to be strategically aligned with the objectives and strategies outlined in the CSP.

2. Delivery Program Objectives (3 years) - Council has developed its 3-year Delivery Program 2022-2025. A new Delivery Program will be developed in financial year 2024-25, which will cover the financial years of 2025-26, 2026-27, 2027-28, and 2028-29. Forthcoming and ongoing CMP actions for the relevant 4-year period must be included in the associated delivery program.

3. Operational Plan & Budget (annual) - The Operational Plan details the actions that Council will take (through projects, programs and other activities) to deliver the CSP. Forthcoming and ongoing CMP actions are scheduled into each years' operational plan.

4. Council's Resourcing Strategy (4 years) - In order to meet service levels and deliver the projects and actions outlined in the Delivery Program and subsequent Operational Plans, Council needs to allocate its resources - finances, people and assets. Council's Resourcing Strategy was developed as part of the Delivery Program 2022-2025 and includes a 10-year Long Term Financial Plan, four-year Workforce Management Strategy, and a 10-year Asset Management Strategy.

The IP&R Framework recognises that council plans and policies should not exist in isolation - that they are inter-connected. This framework allows NSW councils to draw their various plans together, understand how they interact and get the maximum leverage from their efforts by planning holistically and sustainably for the future (https://www.olg.nsw.gov.au/councils/integrated-planning-and-reporting).

It is intended that the CMP will fit into the Framework under "Other Strategic Plans".

The timing of the actions as articulated in the Business Plan in Section 6 has been developed to fit in with the timing of each of the elements of the IP&R Framework as indicated above.

4.5.1 Planning Instruments relevant to implementing CMP actions

The following planning instruments are relevant to implementing actions for the CMP:

- **Coastal Management Act 2016 (CM Act):** provides for the integrated management of the coastal environment of NSW, consistent with the principles of ecologically sustainable development, for the social, cultural, and economic wellbeing of the people of the state.
- **The NSW Environmental Planning and Assessment Act 1979 (EP&A Act):** Governs land use planning and development in NSW, focusing on sustainable development, environmental protection, community participation, and compliance measures.
- **The State Environmental Planning Policy (Resilience and Hazards) 2021 (RH SEPP)** provides development controls for each of the management areas (CWLRA, CUA, CEA, CVA, discussed in Section 1.5.2). Chapter 2 of the RH SEPP covers how development proposals are assessed if they are in a coastal zone, and is supported by detailed mapping. Each of the above areas has outcome-oriented management objectives so that councils can apply appropriate management tools and development controls.
- **The State Environmental Planning Policy (Transport and Infrastructure) 2021** - also known as the Transport and Infrastructure State Environment Planning Policy (SEPP) outlines the planning rules for delivering most infrastructure works and facilities across NSW. 'Chapter 2 – Infrastructure' contains planning rules and controls from the Infrastructure SEPP for infrastructure in NSW, such as for hospitals, roads, railways, emergency services, water supply and electricity delivery. This includes rules for:
    - providing greater flexibility in the location of infrastructure and services
    - allowing for efficient development of land for infrastructure
    - identifying projects where environmental impacts are likely to be minimal as exempt or complying development
    - outlining the approval process and assessment requirements for infrastructure proposals
    - allowing for consultation with relevant public authorities and communities about infrastructure development.
- **The Central Coast Local Environment Plan 2022 (LEP)**: A Local Environmental Plan (LEP) is the primary legal planning document for guiding land use and planning decisions made by Council. An LEP describes what can be undertaken on land and is supported by mapping (including land use zones, height of building, lot size maps etc.). Through zoning and development controls, the LEP allows Council to manage the way in which land is used to strategically plan for the region and shape and support our local communities. The Central Coast LEP is discussed further in Section 1.6.4.3.
- **The Central Coast Development Control Plan 2022 (DCP)**: aims to unify and develop a consistent approach to planning assessment as it applies to those areas mapped within the coastal zone. Chapter 3.2 of the DCP, "Coastal Hazard

Management", addresses coastal processes, risks and hazard management along the open Pacific Ocean coastline of the Central Coast, between Budgewoi Beach in the North and Patonga Beach in the South. The aims of the existing DCP are:

- To provide guidelines for development of land having regard to minimising coastal hazard risks to development.
- To minimise risk to life and property from coastal hazards associated with building on land within the Coastal Vulnerability Area.
- To maintain and improve public access to public land potentially affected by coastal hazards.
- To identify relevant assessment considerations for various types of developments within the Coastal Vulnerability Area including minor ancillary structures, new development and community infrastructure.

Figure 4-10: Central Coast Council's Integrated Planning & Reporting Framework (IP&R)

4.5.2 Linkages with Council's Community Strategic Plan

The Community Strategic Plan (CSP) sits at the top of Council's planning hierarchy and identifies the community's main priorities and expectations for the future and ways to achieve these goals. All Councils across NSW are required by the *Local Government Act 1993* to develop a CSP, forming part of an Integrated Planning and Reporting (IP&R) framework.

Council developed the Community Strategic Plan (CSP) "One – Central Coast" which provided an opportunity for Council to understand the aspirations and concerns of the Central Coast Community. "One – Central Coast" provides a 10-year plan that defines priorities of the community and provides a considered and evidence-based roadmap for the future of the Central Coast. "One – Central Coast" provides 17 overarching goals, each with four unique objectives, which the CMP will need to support. The relevant linkages between the CSP and future CMP are shown in Table 4-7 (Royal Haskoning DHV, 2021).

Table 4-7: Linkages Between the CSP and CMP

Linkages between the CMP and "One – Central Coast Community Strategic Plan 2018 – 2028
A1 Work within our communities to connect people, build capacity and create local solutions and initiative
A2 Celebrate and continue to create opportunities for inclusion where all people feel welcome and participate in community life
A4 Enhance community safety within neighbourhoods, public spaces and places
B4 Activate spaces and places to complement activity around town centres, foreshores, lakes and green spaces for families, community and visitors
C1 Target economic development in growth areas and major centres and provide incentives to attract businesses to the Central Coast
C2 Revitalise Gosford City Centre, Gosford Waterfront and town centres as key destinations and attractors for businesses, local residents, visitors and tourists
C3 Facilitate economic development to increase local employment opportunities and provide a range of jobs for all residents
C4 Promote and grow tourism that celebrates the natural and cultural assets of the Central Coast in a way that is accessible, sustainable and eco-friendly
E1 Educate the community on the value and importance of natural areas and biodiversity and encourage community involvement in caring for our natural environment
E2 Improve water quality for beaches, lakes and waterways including minimizing pollutants and preventing litter entering our waterways
E3 Reduce littering, minimise waste to landfill and educate to strength positive environmental behaviours
E4 Incorporate renewable energy and energy efficiency in future design and planning and ensure responsible use of water
F1 Protect our rich environmental heritage by conserving beach, waterways, bushland, wildlife corridors and inland areas and the diversity of local native species

Linkages between the CMP and "One – Central Coast Community Strategic Plan 2018 – 2028
F2 Promote greening and ensure the wellbeing of communities through the protection of local bushland, urban trees, tree canopies and expansion of the Coastal Open Space System (COSS)
F3 Improve enforcement for all types of environmental non-compliance including littering and illegal dumping and encourage excellence in industry practices to protect and enhance environmental health
F4 Address climate change and its impacts through collaborative strategic planning and responsible land management and consider targets and actions
G1 Build strong relationships and ensure our partners and community share the responsibilities and benefits of putting plans into practice
G2 Communicate openly and honestly with the community to build a relationship based on transparency, understanding, trust and respect
G3 Engage with the community in meaningful dialogue and demonstrate how community participation is being used to inform decisions
I1 Preserve local character and protect our drinking water catchments, heritage and rural areas by concentrating development along transport corridors and town centres east of the M1
I2 Ensure all new developments are well planned with good access to public transport, green space and community facilities and support active transport
I3 Ensure land use planning and development is sustainable and environmentally sound and considers the importance of local habitat, green corridors, energy efficiency and stormwater management
K3 Provide signage, public facilities, amenities and playgrounds to encourage usage and enjoyment of public areas
K4 Repair and maintain wharves, jetties, boat ramps and ocean baths to increase ease of access to and enjoyment of natural waterways and foreshores

In response to the projected impact from climate change, Council has developed a Climate Change Policy (2019). The Policy provides a framework for Council to progress its planning for climate change, providing a set of guiding principles and a framework to help with decision making. Key items in the Climate Change Policy that are relevant to the CMP development are:

Table 4-8: Climate Change Policy Strategic Principles Linking with the CMP

Climate Change Policy Strategic Principles
C4 Principle 1: Council endorse the Ecologically Sustainable Development values through integrating social, economic and environmental considerations into Council's decision making through the implementation of the four principles a) precautionary principles, b) inter-generational equity, c) conservation of biological diversity and ecological integrity and d) improved valuation, pricing and incentive mechanism.

Climate Change Policy Strategic Principles
C5 Principle 2: Council implement a holistic approach to anticipate and adapt to climate change actions that comprise the time scales such as now and the future as well as the impacts of the complex interactions and interdependencies between the human and the environment systems.
C6 Principle 3: Council implement an evidence-based decision making to respond, to adapt and build resilience to Climate Change.
C8 Principle 5: Council implement a proactive approach and ensure continuity to better anticipate and adapt to complex challenges posed by the changing climate.
C9 Principle 6: Council implement a Place-based approach to enhance Council and community capacity for climate resilience that is context specific, knowledge based and collaborative.
Governance
(D2) Embed climate change planning within Council's Integrated Planning and Reporting Framework, namely the Community Strategic Plan, Delivery and Operational Plans and Council's Corporate Plan.
(D4) Develop Place Based Climate Change Action Plans in partnership with the community that establishes regional targets for mitigation and prioritises local adaptation planning (e.g. sea level rise, coastal hazards, disaster management).
Risk Management & Resilience Planning
(D6) Undertake ongoing monitoring and assessment of climate change risks and their impacts on ecological, social, economic and physical built forms systems based on best available science.
(D7) Incorporate climate change risks in strategic and infrastructure planning for the region to maximise local liveability through informed land use planning, development of planning controls and guidelines that facilitates regional urban growth, transport connectivity and utility services.
(D9) Undertake climate change risk assessment and incorporate risks and vulnerabilities to inform asset life cycle analysis for all new and existing infrastructure assets, to meet current and projected demands and develop relevant adaptation and mitigation strategies to ensure climate resilience.
(D10) Support initiatives and education programs to enhance the Central Coast community's understanding of and build resilience to climate change risks.
(D11) Develop strategies, plans and development controls to protect, conserve and work in partnerships with community and local agencies to enhance resilience of biodiversity across the Central Coast region.

Under the CM Act, the objectives and management actions developed as part of the CMP are required to be strategically aligned with the objectives and strategies outlined in the Community Strategic Plan (CSP). Those linkages have been provided above and have been aligned with the proposed management actions in this CMP.

5. Whether the CMP identifies recommended changes to the relevant planning controls, including any proposed maps

5.1 Overview

CVA mapping has not been established under the RH SEPP for the Central Coast LGA or CMP Study Area. It is the intent of Council to propose, by way of a planning proposal, the adoption of a map in indicating a CVA as part of Action CW-H01. This will involve the preparation of a planning proposal to seek formal inclusion of a CVA (beach erosion, shoreline recession, cliff and slope instability, coastal inundation) into the RH SEPP based on mapping undertaken in the Stage 2 Coastal Hazard Study (Bluecoast Consulting Engineers, 2024-2025). The Planning Proposal will be submitted in conjunction with a proposal for a CVA for other areas within the Central Coast LGA subject to a CMP. Any updates to the LEP or DCP will be sequenced in accordance with Council's new land use planning scheme. This is detailed in Action CW-H01. Note that maps that show the areas subject to coastal hazards in the CMP study area, that may be used to develop a CVA map in the future, are presented in Appendix A2.

The CVA map would consider areas where coastal wetlands and littoral rainforest areas are vulnerable to impacts from future sea level rise or foreshore erosion.

This CMP does not propose any amendments to the existing mapping of the CEA, CUA, or CWLR areas currently gazetted with the RH SEPP.

It should be noted that the CM Act requires the consideration of future climate change. As such, all extents used in defining the CVA should be based on a suitable forward planning horizon, which incorporates the projected effects of sea level rise on coastal hazards. Note that the coastal and hazard mapping undertaken as part of the Stage 2 Coastal Hazard Study (Bluecoast Consulting Engineers, 2024-2025) has considered a range of scenarios for sea level rise for the 20 year, 50 year and 100 year planning periods as discussed in Section 2.3.

Other CMPs for specific estuaries across the Central Coast LGA are also currently being prepared that are to include mapping of additional coastal hazards such as coastal and tidal inundation, which council may combine as part of a single planning proposal to prepare a CVA once they are also completed.

5.2 Changes to Council Development Control Plan

The CMP provides an opportunity to improve the planning framework for managing the coastal zone areas across the LGA and unifying this approach in a suite of planning instruments that reflect the priorities of the CMP.

The development of the revised coastal hazard assessment provides an opportunity to update planning controls in the coastal zone that can apply to the entire Central Coast.

In light of the review of the existing DCP documents, the following observations are made:

- The former Wyong Council planning controls for the coast adopted a 2050 planning period for new residential development on land already appropriately zoned and a 2100 planning period for major infrastructure, new subdivisions and strategic land use studies.
- The former Gosford Council adopted the 2050 planning period to define a Coastal Building Line that would apply to each lot, and defined the Coastal Hazard Area as the area subject to reduced foundation capacity by 2100, coastal inundation or geotechnical instability.

The two approaches outlined above are not consistent across the LGA, which can lead to difficulties in assessing applications, and inconsistent risks from coastal hazards applying to developments, depending on which assessment criteria are used. A unified approach across the LGA is required to simplify the development assessment process for both applicants and the Council assessment team.

5.2.1 Planning for Coastal Risk

The appropriate risk standard for the update of development controls for the Central Coast is dependent on the level of risk that Council is willing to accept. For example, a 100 year ARI event would have a 40% probability of being exceeded during a design life of 50 years (Figure 5-1). In contrast, a 500 year ARI event would have a 10% chance of being exceeded within the design life (Figure 5-1). The most recent coastal hazard mapping (Bluecoast Consulting Engineers, 2024-2025) provides probabilistic coastal hazard extents for coastal erosion events up to the 100 year ARI (or 1% AEP). With reference to Figure 5-1, it is important to note that such an event has a 1% probability of being exceeded in any one year, or a 40% probability of being exceeded in a given 50 year period.

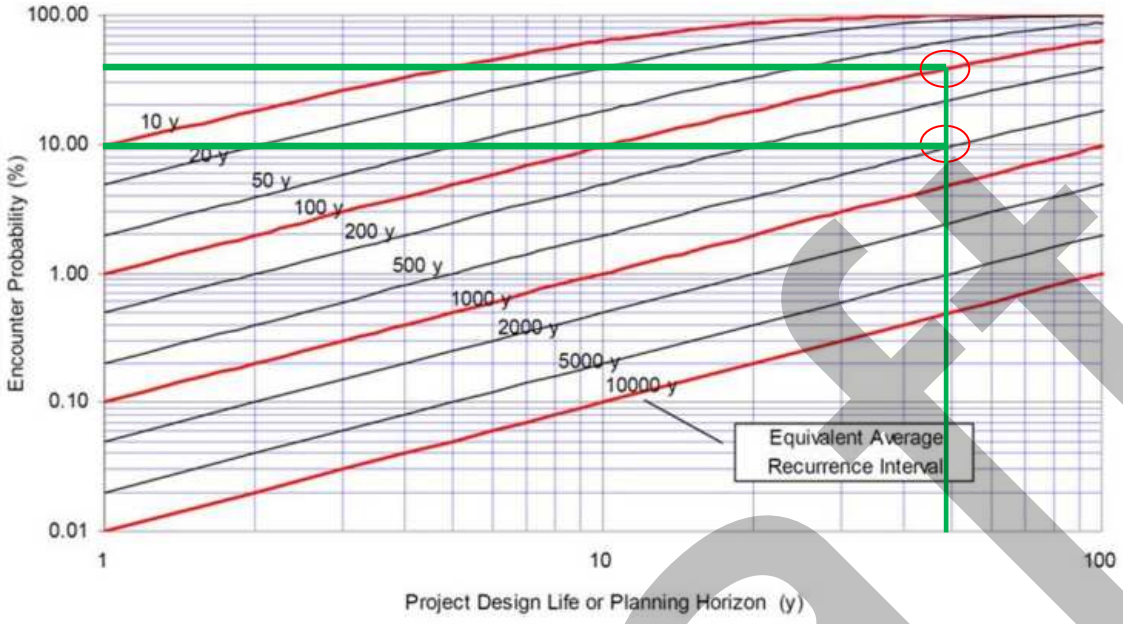


Figure 5-1: Design event encounter probability vs. Project Design life or planning horizon

In consideration of the risk and probability of exceedance of the mapped coastal hazards, streamlining of coastal hazard planning horizons is recommended for all beaches to provide consistency and simplification. The planning horizon should ideally be consistent across all areas, and adopted based on the level of risk determined at each beach, which is a function of the intensity of existing development in each area, the quantum of development at risk within the coastal hazard zones and community acceptance. This should include adoption of a unified coastal hazard line across the LGA (for example, the Bluecoast Consulting Engineers 2024 2120 1% erosion risk line). To achieve this, Council is to undertake CVA mapping based on the chosen erosion risk line and coastal inundation hazard extents, and adopt the mapping in the LEP and RH SEPP.

Recommended changes to the DCP are discussed in detail in the Coastal Hazard Planning Report (Worley Consulting 2025).

6. Business Plan – Implementing the CMP

6.1 The Benefits of Implementing the CMP

The open coast and beaches of the Central Coast are a major environmental, social and economic asset to the Central Coast community.

The Central Coast's beaches provide visual amenity, recreational opportunities that link closely with community lifestyle choices, indigenous, spiritual and cultural values and heritage, habitat and nursery grounds for many coastal and estuarine plants and animals and sand dunes that have biodiversity values and protect our developments during storms.

The value of the natural environment is a paramount consideration in the sustainable management of the coastline. Sandy beaches are an important ecosystem that links the ecology of sand dunes, the surf zone, intertidal zones, and nearby rocky reefs.

Several natural coastal and marine ecosystems are at risk from human use and coastal hazards now and into the future. They are impacted through landward migration and erosion, recreational activities (i.e. fishing, harvesting), coastal development and construction of protective works, beach cleaning and nourishment. The endangered ecological communities of Umina Sands Coastal Woodland, Coastal Sand Swamp Forest, Coastal Headland Grassland and other forest and wetland vegetation occur in a number of locations within or near the study area. Littoral rainforest occurs at Avoca Beach, along a steep escarpment area on the landward side of Avoca Drive, as mapped in the RH SEPP. Regionally significant vegetation such as coastal sand foreshore scrub, coastal sand banksia scrub, coastal headland shrubland and coastal headland low forest are found at most of the beaches.

The beaches provide substantial economic value to the Central Coast. The economic value of our coastline includes the value of private dwellings, public infrastructure and the income provided through tourism, recreation and fishing. Tourism directly or indirectly employed 11,500 people in 2022/23 (.id 2025). Tourism has added over $2.5 billion to the local economy in 2022/23 (.id 2025).

There are a range of issues identified in this CMP that currently present a risk to the environmental, social, and economic values of the CMP Study Area. Further, the coastal zone will come under increasing pressure over coming decades from climate change, population growth and associated urban development.

The core objective of this CMP is to address and mitigate threats to the environmental, social, cultural, and economic values of the, both in the present and for the future. It encompasses a comprehensive range of initiatives, including physical works, monitoring programs, technical investigations, and educational programs. The CMP will set the long-term strategy for the coordinated management of the coastal zone in the CMP Study Area.

Investment in the CMP provides an opportunity to directly improve and preserve the resilience of the CMP Study Area to coastal hazards, water quality, environmental habitats, cultural

values, and recreational amenity of the coastline – and in doing so, bring significant public benefits.

A range of management actions have been proposed in this CMP to mitigate risks to social, environmental and economic values, for the benefit of the public. For this reason, there are no cost-sharing arrangements in this CMP for funding of actions by private beneficiaries, and there is no provision for implementing a coastal protection service charge.

The benefits of implementing the individual management actions have been identified for each management action and are listed in Table 6-1:.

Table 6-1: Benefits of implementing the CMP

Management Action	Benefits
Access & Safety	• improved public safety, water quality and amenity • reduced erosion at stormwater outlets and reduced impact on surrounding assets • improved community understanding of coastal hazards and coastal environment • improved dune environment and recreational amenity • improved understanding of local coastal processes, beach usage • improved resilience of coastal infrastructure from long term coastal hazards
Amenities	• Improved recreational amenity, flow-on effects from increased tourism revenue due to regularly maintained assets and infrastructure • Improved safety benefits due to assets being maintained in serviceable condition. • Reduced risk of loss of assets from erosion • Improved public amenity and safety • Improved resilience of foreshore development against coastal hazards • Improved safety, water quality, recreational amenity
Coastal Hazard	• Improve resilience of coastline against coastal hazards • Improve recreational amenity and safety • Improved resilience of foreshore development against coastal hazards • Improved safety against coastal hazards and resilience of public roads & infrastructure • Improved resilience of foreshore development against coastal hazards • Reduced risk of injury and death due to planning and proactive management of risks and clear protocols for emergency response

Management Action	Benefits
Community & Social	• Improved community and agency communications and participation in coastal management • Improved community understanding of coastal hazards and coastal environment • Improved coastal amenity • Improved First Nations participation in coastal management, protection of cultural heritage values from coastal hazards
Development	• Improved understanding of risks to infrastructure from coastal hazards • Reduction in risk to property due to development in areas where coastal hazard impacts are expected to increase in the future. • Improved infrastructure resilience from coastal hazards • Improved accessibility to the coast • Improved resilience of foreshore development against coastal hazards
Ecological Environment	• Improved water quality • Improved beach access, safety and amenity, improved dune environment • Improved community and agency communications and participation in coastal management • Improved beach access, safety and amenity, improved dune environment • Improved environmental outcomes through enhancement of environmental values in the coastal zone • Improved environmental outcomes through an improved understanding of environmental and coastal processes

6.2 Potential Funding Mechanisms

A Business Plan has been developed for the CMP which outlines the key components of the funding strategy for the CMP, including the cost of proposed actions, proposed cost-sharing arrangements and other potential funding mechanisms. Delivery of the CMP for the Central Coast Open Coast is estimated to cost $22.4 Million (2025 dollars) over 10 years.

Sustainable funding and financing arrangements for management actions will be established in consultation with key stakeholders. Funding for management actions may be gained from various sources, including Council's internal funds, competitive State Government grant programs, and local third parties.

6.2.1 Council Funding

Council funding is allocated based on the Resource Strategy, Long Term Financial Plan, which supports the Delivery Program (3-yearly) and the Operational Plan (yearly) under the IP&R Framework.

Key funding sources for Council are statutory rates and charges (e.g., water, sewer, and waste), which can be applied to private landowners and businesses. Under the LG Act, ordinary rates can be applied to all rateable land within an LGA. Ordinary rates fund a range of Council operations and services, and therefore may also be a key revenue stream to support the implementation of activities recommended in this CMP. According to the Central Coast Council Operational Plan 2023/24, Council's annual revenue from ordinary rates and charges is around $700 million per year (Central Coast Council, 2023).

6.2.2 External Sources of Funding

It will not be possible for Council to implement all actions identified in this CMP without additional sources of funding. As such, the identification of grants and the submission of successful funding applications is an important component of this CMP.

There are a range of other funding mechanisms available for financing the implementation of the CMP. For example, Council can take advantage of various state grant programs, as listed in Table 6-2. The value of this funding cannot be accurately quantified until such time as it is awarded through competitive processes. It should be noted that this is not an exhaustive list of all funding opportunities, and that over the ten-year lifecycle of the CMP additional or new funding sources may become available.

Table 6-2: Summary of potential funding sources of the CMP

Funding Source	Description
NSW Coastal and Estuary Grants Program	The costs associated with delivery of the CMP can be partly funded by the NSW Coastal and Estuary Grants Program administered by DCCEEW. The program supports coastal and estuary planning projects and the implementation of works identified in certified CMPs. Funding is available under five funding streams: • A planning stream: for planning and studies including investigation, design and cost-benefit analyses for infrastructure works recommended in a certified CMP. • Four implementation streams – one for each of the Coastal Management Areas. The focus of these streams are projects that manage risks from coastal hazards, and improve the health of estuaries, wetlands and littoral rainforests across NSW. For projects that address a documented action in a certified CMP funding is $2 from the State Government for every $1 provided by Council. Certification of

Funding Source	Description
	this CMP will facilitate eligibility for funding of many of the actions proposed in this CMP under the program. This grant funding program is contestable, prioritised to Council applications with certified CMPs and subject to State government funding priorities and allocations.
Marine Estate Management Strategy	A number of management actions in the CMP may be eligible for funding under the NSW Marine Estate Management Strategy (MEMS). The MEMS provides an overarching, strategic approach to the coordination and management of the marine estate through to 2028. The management of priority threats is grouped into 9 management initiatives that summarise the objectives, benefits, threats, stressors and proposed management actions. An implementation plan (developed by the Authority's member agencies in consultation with key stakeholders) articulates the management actions in more detail. CMPs are key delivery mechanisms for the MEMS.
NSW Disaster Risk Reduction stream grants	Under two funding pathways, Discovery and Scale, the State Risk Reduction stream aims to reduce or enable the reduction of state-level risks, risks of state significance and systemic risks potentially impacting NSW (NSW Government, 2024). The Discovery Projects pathway offers funding of up to $500,000, for projects that will test and pilot new approaches to achieve breakthrough disaster risk reduction outcomes. The projects must have potential for state-wide significance or impact. The Scale Projects pathway offers funding of up to $2.5 million, for projects that aim to generate a new product, technology, platform, or approach that will have state-wide impact at a scale beyond piloting or testing.
Saving our Species program	Administered by DCCEEW, the Saving our Species (SoS) sets out the NSW Government's threatened species management plan. The main objectives of SoS are to increase the number of threatened species that are secure in the wild in NSW for 1 year and control the key threats facing the states threatened plants and animals.
NSW Heritage Grants	This program is administered by DCCEEW and aims to fund projects that provide sustainable, long-term heritage benefits and provide public benefit and enjoyment from heritage. Funding may be available for the management of heritage items in the coastal environment. Areas of interest include: • Aboriginal Cultural Heritage grants • Caring for State Heritage grants • Community Heritage grants

Funding Source	Description
	• Grants for local government.
NSW Environment Trust Grants	Funding is available under the NSW Environment Trust to a broad range of organisations for projects that enhance the environment of NSW. Grants may be awarded for on ground rehabilitation and improvement works, research applications, land acquisition, waste reduction and promotion of environmental education. The NSW Environment Trust is an independent statutory body established by the NSW Government to make and supervise the environment grants. The Trust is administered by DCCEEW. Suitable coastal management grant applications may relate to dune care, for example.
Protecting Our Places Grant	The Protecting Our Places Grant is a NSW Environmental Trust Grant, and is specifically for NSW Aboriginal community organisations or groups and funds protection and rehabilitation for culturally important land and water.
Crown Reserves Improvement Fund Program	Administered by Crown Lands, the Crown Reserves Improvement Fund Program provides financial support for the development, maintenance, and improvement of Crown reserves. Funding under this program is subject to a competitive grant application process and eligibility requirements which may change from year to year and in accordance with departmental priorities.
Disaster Ready Fund **(Federal Government)**	The Disaster Ready Fund (DRF) is the Australian Government's flagship disaster resilience and risk reduction initiative which will deliver projects that support Australians to manage the physical, social and economic impacts of disasters caused by climate change and natural hazards (NEMA, 2024). The DRF was established through the *Disaster Ready Fund Act* 2019. The DRF is intended to be an enduring fund, to provide all levels of government and affected stakeholders the certainty they need to plan for robust investments in resilience projects to reduce the impacts of disasters.
Landcare Grants	Landcare Australia works with governments, corporate and philanthropic organisations, and donors to facilitate funding for good quality, hands on projects and programs that will improve environmental outcomes for the Landcare community (Landcare Australia, 2024).
Coastcare Grants	Coastcare grants support community groups working on projects across Australia. Grants support Landcare and Coastcare groups with projects like dune protection, revegetation of native coastal environments, protection of endangered coastal species habitats, collection and prevention of stormwater pollution, weed and non-native plant removal, and control of human access to sensitive and vulnerable areas (Landcare Australia, 2024).
TfNSW / MIDO Grants	Transport for NSW Maritime administers the Boating Infrastructure and Dredging Scheme (BID Scheme).

Funding Source	Description
	The scheme replaces the previous grants program, providing $28 million in new funding for the development of new and improved public boating infrastructure and enhanced public access to NSW waterways. The scheme also confirms $16 million to deliver dredging works along the NSW coast. The BID Scheme consists of five sub-programs: • Boating Infrastructure for Communities Grants Program – Replaces the previous Boating Now Program with greater emphasis on enhancing access for aging boaters and those with disabilities. • Boating Infrastructure Maintenance Grants Program – Provides funding for minor repairs and maintenance of public boating infrastructure across NSW. • Boating Infrastructure Emergency Repair Pool Scheme – Supports the repair or replacement of public assets impacted by natural disasters and severe weather events. • Priority Dredging Program – Supports new dredging projects at key sites to ensure safe waterway navigation. • Committed Dredging Projects – Supports committed dredging projects at Swansea, Ettalong, Coffs Harbour and Myall River, plus 10-year planning approvals for 9 high-priority areas
NSW Floodplain Management Grants Program	The Floodplain Management Program provides financial support to local councils and eligible public land managers to help them manage flood risk in their communities. The program supports the implementation of the NSW Government's Flood Prone Land Policy, which is outlined in the Flood Risk Management Manual. Support provided under the programs usually involves $2 from government for every $1 provided by the applicant. Grant funding is contestable and subject to State government funding priorities and allocations. Where a management action to mitigate tidal inundation risk also has a benefit with respect to catchment flood mitigation, there may be opportunity to consider this grant program.
Recreational Fishing Trust Grant	All revenue raised by the NSW Recreational Fishing License Fee is placed into the Recreational Fishing Trusts. There are two Trusts – one for freshwater and one for saltwater. Grants are provided from the Trusts to deliver a wide range of programs to boost recreational fishing opportunities in NSW. Projects funded include: • Recreational fishing education - fishing workshops and clinics including teaching kids and adults how to fish and fishing for therapy, schools

Funding Source	Description
	education programs, fishing advisory, increasing participation in recreational fishing & other fishing club events to promote fishing • Fishing access and facilities - fishing amenities such as platforms, cleaning tables, kayak launching platforms, access upgrades, fishing safety infrastructure, fishing line bins & other angler facilities, enhancement of fishing access • Research on fish and recreational fishing - fishing surveys, biology of popular recreational species, angler catch projects, effectiveness of stocking practices • Enhancement of recreational fishing
Habitat Action Grants / Flagship Habitat Action Grants	The Habitat Action Grants are funded from the Recreational Fishing Trusts which direct revenue generated by the NSW Recreational Fishing Fee towards onground actions to improve fish habitat and recreational fishing in NSW. Angling clubs, individuals, community groups, local councils and organisations interested in rehabilitating fish habitats in freshwater and saltwater areas throughout NSW can apply for grants of up to $40,000. The "Flagship Fish Habitat Rehabilitation Grant program" (Flagship Grants) builds upon the Habitat Action Grants and offers up to $400,000 for projects that significantly enhance fish habitat, water quality and fish passage opportunities within the coastal catchments of NSW. Example of on-ground outcomes include: • rehabilitation of significant riparian lands / coastal wetlands (river banks, mangrove forests, saltmarsh), including addressing poor water quality from the disturbance of acid sulfate soils • removal or modification of barriers to fish passage including addressing floodgates, road-crossings and construction of fishways • re-snagging of waterways with timber structures • environmentally sensitive bank stabilisation works, including riparian restoration where these works are identified and part of a large scale remediation program.
Conservation Partners Grants	Conservation Partners Grants support landholders working to protect and manage biodiversity on their land. The grants are available on an on-going basis for landholders who are not seeking or are ineligible for conservation management payments under the Biodiversity Conservation Trust's Conservation Management Program.
National Indigenous Australians	The Australian Government funds and delivers a range of programs specifically for First Nations peoples. Funding is allocated through the Indigenous

Funding Source	Description
Agency (Federal Government)	Advancement Strategy (IAS), National Partnership Agreements, Special Accounts and Special Appropriations. The NIAA administers the IAS and works to improve the way the Australian Government does business with First Nations peoples to ensure funding outcomes improve the lives of First Nations peoples. Grant funding is also available through Indigenous-specific and mainstream programs delivered by other agencies.

Public authorities responsible for supporting Council with the delivery of actions in this CMP have been consulted during its development and have indicated their support. However, delivery of the actions will depend on the availability of funding which is yet to be confirmed. Despite the priority of each action listed in the CMP, the timeframe of implementation will be influenced by the availability of resources and funding.

6.3 Cost-Benefit Distribution

As per the CM Manual (OEH, 2018), an analysis of the distribution of costs and benefits to Council, public authorities, stakeholders and the environment is recommended when preparing a CMP. During Stage 3, a multi-criteria analysis (MCA) was undertaken across a broad range of evaluation criteria to assess the feasibility, viability and acceptability of the options, with the benefits identified for each option.

For clarity, all actions in this CMP to be undertaken by Council and public authorities, will be 100% for public benefit. Public money is not proposed in this CMP to address existing or future coastal risks on private lands, as such there are no public private cost sharing arrangements proposed. While none of the actions provide a direct benefit to private beneficiaries, they may do so indirectly as a result of improved environmental health and natural hazards resilience (e.g., to commercial businesses in the nearby area including tourism operators and hospitality). Council will work with other land managers, where relevant, to drive outcomes for areas not under Council's management that are consistent with the principles of the CMP.

As there are no actions involving investments greater than $5 million, and the benefits of the actions are largely intangible, a simple cost-benefit assessment has been carried out and is documented in the Stage 3 Summary Report (Worley Consulting 2024). The simple assessment identified:

- the approximate cost of each action, based on costing information from Council's cost database and the Project Team's experience with similar works. The derived cost was used to assign the assessment score against each option in the option assessment.
- the information used to derive the costs, and
- a qualitative description of the benefits of each action, with these being intangible and qualitative in nature and thus it was not possible to ascribe a dollar value against the benefit of the actions.

6.4 Implementation Plan

The Business Plan summarised in Table 6-3 provides the following information:

- Action ID and Name.
- Responsibilities – including the lead agency for implementation and any supporting agencies.
- Priority and timeframe for delivery.
- Forward cost estimates – including capital costs, and ongoing implementation and maintenance costs. These costs have been divided into the forthcoming Delivery Program (DP) periods of the Council's IP&R framework. Where an action would only require Council staff time, assets, and services, these are noted in the table. It should be noted that capital costs in Table 6-3 refer to the costs associated with the initial design, development, construction, and renewal of physical assets or facilities, with maintenance costs identified over the 10-year life cycle of the CMP. For many of the management actions, maintenance costs would continue beyond the lifecycle of the CMP.
- Potential funding sources (given a numeric identifier in accordance with the key below):

Funding Source ID	Funding Source
1	Council
2	NSW Coastal and Estuary Grants Program
3	Marine Estate Management Strategy
4	NSW Disaster Risk Reduction stream grants
5	Saving our Species program
6	NSW Heritage Grants
7	NSW Environment Trust Grants
8	Protecting Our Places Grant
9	Crown Reserves Improvement Fund Program
10	Disaster Ready Fund (Federal Government)
11	Landcare Grants
12	Coastcare Grants
13	TfNSW / MIDO Grants
14	NSW Floodplain Management Grants Program
15	Recreational Fishing Trust Grant
16	Habitat Action Grants / Flagship Habitat Action Grants
17	Conservation Partners Grants
18	National Indigenous Australians Agency (Federal Government)
19	Land Manager (private)
20	Other State or Federal Government sources

Despite the nominated priority and expected timeframe of each action, the implementation of actions will be largely controlled by the availability of resources and the prioritisation across all of Council's functions via the Operational and Delivery Plans.

Table 6-3: Business Plan for actions for Open Coast CMP

ID	Category	Location	Action Name	Capital Cost (A)	Operational & Maintenance Cost (B)	Years 1 – 2 (C)	Years 3 – 6 (D)	Years 7 - 10 (E)	Total Cost (=A+B) (=C + D + E)	Timeframe	Lead Agency	Support Agencies	Funding Source
CW-S01	Access & Safety	LGA-wide	**Monitoring and improvement of coastal stormwater outlets**	$500,000	$600,000	$300,000	$400,000	$400,000	$1,100,000	**Short**	**Council**		**1, 9**
CW-S02	Access & Safety	LGA-wide	**Develop and implement an integrated coastal processes and hazards education and awareness program**	$30,000	$100,000	$130,000	$0	$0	$130,000	**Short**	**Council**		**1, 2, 14**
CW-S03	Access & Safety	LGA-wide	**Develop and implement coastal compliance procedures**	$0	$70,000	$70,000	$0	$0	$70,000	**Short**	**Council**	**Crown Lands, Fisheries, Environmental Protection Authority, NSW Police, National Parks, Local Aboriginal Land Services**	**1, 9**
CW-S04	Access & Safety	LGA-wide	**Review and implement updated Beach Maintenance Program**	$0	$1,550,000	$350,000	$600,000	$600,000	$1,550,000	**Short**	**Council**		**1, 9, 12**
CW-S05	Access & Safety	LGA-wide	**Develop and implement a Coastal Monitoring Program**	$140,000	$100,000	$160,000	$40,000	$40,000	$240,000	**Short**	**Council**	**DCCEEW**	**1, 2**
CW-S06	Access & Safety	LGA-wide	**Investigate and develop a Coastal Hazard Adaptation Strategy for affected coastal communities**	$0	$100,000	$0	$0	$100,000	$100,000	**Long**	**Council**	**DCCEEW Reconstruction Authority**	**1, 2, 4, 10**
CW-S07	Access & Safety	LGA-wide	**Investigate feasibility and responsibilities of long-term sand nourishment licences**	$0	$120,000	$120,000	$0	$0	$120,000	**Short**	**Council**	**Reconstruction Authority DCCEEW**	**1, 2, 4, 10**
CW-S08	Access & Safety	LGA-wide	**Prioritise and upgrade beach life guard patrol towers and ancillary structures**	$250,000	$0	$50,000	$100,000	$100,000	$250,000	**Medium**	**Council**		**1**
SB02	Access & Safety	Pebbly Beach	**Investigate options to improve public safety at Soldiers Point headland**	$100,000	$0	$0	$100,000	$0	$100,000	**Medium**	**Council**	**NPWS**	**1, 7**
CW-A01	Amenities	LGA-wide	**Coastal recreation assets and infrastructure renewal program**	$1,500,000	$0	$300,000	$600,000	$600,000	$1,500,000	**Short**	**Council**		**1, 9, 20**

ID	Category	Location	Action Name	Capital Cost (A)	Operational & Maintenance Cost (B)	Years 1 – 2 (C)	Years 3 – 6 (D)	Years 7 - 10 (E)	Total Cost (=A+B) (=C + D + E)	Timeframe	Lead Agency	Support Agencies	Funding Source
CW-A02	Amenities	LGA-wide	**Develop and implement Coastal Engineering Design Requirements**	$0	$90,000	$90,000	$0	$0	$90,000	**Short**	**Council**		**1**
CW-A03	Amenities	LGA-wide	**Review waste collection assets and servicing in coastal public spaces**	$0	$100,000	$100,000	$0	$0	$100,000	**Short**	**Council**		**1**
CW-H01	Coastal Hazard	LGA-wide	**Review and update coastal development planning controls and undertake Planning Proposal to adopt Coastal Vulnerability Area**	$0	$50,000	$50,000	$0	$0	$50,000	**Short**	**Council**	**DCCEEW**	**1, 2**
CW-H02	Coastal Hazard	LGA-wide	**Identify the extent, nature and condition of existing coastal emergency works (including potential removal or remediation)**	$1,500,000	$150,000	$150,000	$600,000	$900,000	$1,650,000	**Medium**	**Council**		**1, 2, 4, 10**
CT01	Coastal Hazard	Cabbage Tree	**Design and construct Stage 2 of the existing Cabbage Tree Harbour toe drainage structure**	$2,000,000	$0	$0	$2,000,000	$0	$2,000,000	**Medium**	**Council**	**DCCEEW Crown Lands**	**1, 2**
MM01	Coastal Hazard	MacMasters	**Complete coastal risk and options assessment for Marine Parade at MacMasters Beach**	$0	$300,000	$150,000	$150,000	$0	$300,000	**Medium**	**Council**	**DCCEEW, Crown Lands**	**1, 2, 9**
EN01	Coastal Hazard	LGA-wide	**Monitor and manage risk of contamination from closed landfill sites**	$0	$100,000	$0	$100,000	$0	$100,000	**Medium**	**Council**		**1, 9**
EN02	Coastal Hazard	The Entrance North	**Continue to nourish The Entrance North Beach with sand from The Entrance channel berm management or dredging activities when available to increase beach amenity and resilience.**	$0	$1,000,000	$200,000	$400,000	$400,000	$1,000,000	**Short, ongoing**	**Council**	**DCCEEW, TfNSW, Fisheries, Crown Lands**	**1, 2, 3, 4, 13**
EB01	Coastal Hazard	The Entrance	**Review the structural integrity and extent of the foreshore revetment and embankment protecting Marine Parade, The Entrance, and undertake**	$4,400,000	$100,000	$500,000	$4,000,000	$0	$4,500,000	**Short**	**Council**	**TfNSW, Crown Lands**	**1, 9, 13**

ID	Category	Location	Action Name	Capital Cost (A)	Operational & Maintenance Cost (B)	Years 1 – 2 (C)	Years 3 – 6 (D)	Years 7 - 10 (E)	Total Cost (=A+B) (=C + D + E)	Timeframe	Lead Agency	Support Agencies	Funding Source
			remedial works as required										
WB01	Coastal Hazard	Wamberal Beach	**Undertake an engineering review of the Wamberal Beach engineering design requirements (EDR) so that they may be referred to in future revisions of Council's Coastal Development Control Plan (DCP)**	$0	$100,000	$100,000	$0	$0	$100,000	**Short**	**Council**	**DCCEEW**	**1, 2**
WB02	Coastal Hazard	Wamberal Beach	**Implement whole of embayment terminal protection solution for Wamberal Beach Council owned land in accordance with the principles of the Engineering Design Requirements**	$1,800,000	$0	$1,800,000	$0	$0	$1,800,000	**Short**	**Council**		**1, 2, 4, 9, 10**
A01	Coastal Hazard	Avoca, LGA-wide	**Undertake a detailed wave overtopping and inundation assessment for high risk locations**	$0	$150,000	$70,000	$40,000	$40,000	$150,000	**Short**	**Council**	**DCCEEW**	**1, 2**
EB02	Coastal Hazard	The Entrance	**Investigation and management of adverse groyne impacts**	$0	$100,000	$0	$100,000	$0	$100,000	**Medium**	**TfNSW (MIDO)**	**Council**	**1, 13**
T02	Coastal Hazard	Terrigal (The Haven)	**Options study for replacement of aging seawall at The Haven**	$0	$150,000	$0	$150,000	$0	$150,000	**Medium**	**Council**	**Crown Lands**	**1, 9**
CW-C01	Community & Social	LGA-wide	**Continue the role of a coastal, estuary and floodplain management Advisory Committee**	$0	$0	$0	$0	$0	$0	**Short**	**Council**		**Council Staff Time**
CW-C02	Community & Social	LGA-wide	**Work with First Nation groups and stakeholders to evaluate arrangements for undertaking beach maintenance operations**	$0	$100,000	$20,000	$40,000	$40,000	$100,000	**Medium**	**Council**	**LALC**	**1, 6, 8, 18**
CW-C03	Community & Social	LGA-wide	**Management of unapproved memorials in public coastal spaces**	$0	$20,000	$0	$20,000	$0	$20,000	**Medium**	**Council**		**1**
CW-C04	Community & Social	LGA-wide	**Update and maintain Council's website to improve awareness and make information**	$0	$100,000	$40,000	$40,000	$20,000	$100,000	**Short**	**Council**		**1**

ID	Category	Location	Action Name	Capital Cost (A)	Operational & Maintenance Cost (B)	Years 1 – 2 (C)	Years 3 – 6 (D)	Years 7 - 10 (E)	Total Cost (=A+B) (=C + D + E)	Timeframe	Lead Agency	Support Agencies	Funding Source
			on coastal processes, hazards and issues more accessible										
CW-C05	Community & Social	LGA-wide	**Knowledge sharing and protection of cultural heritage**	$0	$0	$0	$0	$0	$0	**Medium**	**Council**	**LALC**	**Council Staff Time**
CW-D01	Development	LGA-wide	**Develop and maintain a coastal geotechnical database**	$0	$100,000	$0	$100,000	$0	$100,000	**Medium**	**Council**	**DCCEEW**	**1, 2**
CW-D02	Development	LGA-wide	**Conduct geotechnical investigations to improve understanding of underlying geology along the coast**	$0	$600,000	$120,000	$240,000	$240,000	$600,000	**Medium**	**Council**	**DCCEEW**	**1, 2**
CW-D03	Development	LGA-wide	**Develop a coastal assets at risk register and update asset management program**	$0	$200,000	$0	$200,000	$0	$200,000	**Medium**	**Council**	**Crown Lands**	**1, 2, 9**
CW-D04	Development	LGA-wide	**Continue to improve accessibility and inclusiveness of coastal and foreshore areas**	$2,150,000	$100,000	$450,000	$900,000	$900,000	$2,250,000	**Medium**	**Council**	**Crown Lands**	**1, 2, 9**
CW-D05	Development	LGA-wide	**Review coastal hazard notations and planning certificates**	$0	$0	$0	$0	$0	$0	**Medium**	**Council**	**DCCEEW**	**1, 2**
CW-E01	Ecological Environment	LGA-wide	**Review and implement Council's coastal water quality monitoring program**	$0	$400,000	$80,000	$160,000	$160,000	$400,000	**Short**	**Council**		**1**
CW-E02	Ecological Environment	LGA-wide	**Develop and implement a Coastal Vegetation Strategy**	$0	$1,200,000	$400,000	$400,000	$400,000	$1,200,000	**Short**	**Council**		**1, 5, 6, 7, 8**
T01	Ecological Environment	Terrigal, Toowoon, Copacabana	**Undertake and support research projects and citizen science initiatives aimed at enhancing and conserving marine biodiversity, science, recreation and education**	$0	$100,000	$20,000	$40,000	$40,000	$100,000	**Long**	**DPI-Fisheries Various**	**Council, Crown Lands**	**1, 2, 7, 9, 11, 12, 16**
SB01	Ecological Environment	Soldiers Beach	**Undertake dune management works at the southern carpark of Soldiers Beach**	$40,000	$40,000	$40,000	$20,000	$20,000	$80,000	**Medium**	**Council**		**1**
				$14,410,000	**$7,990,000**	**$5,860,000**	**$11,540,000**	**$5,000,000**	**$22,400,000**				

7. Coastal Zone Emergency Action Subplan - If the *Coastal Management Act 2016* requires that subplan to be prepared

A Coastal Zone Emergency Action Subplan (CZEAS) has been developed for the Central Coast Open Coast CMP Study Area based on the requirements of the CM Act as outlined in the CM Manual (NSW OEH 2018), for those areas subject to immediate hazards from coastal inundation.

The CMP study area is subject to a high level of risk from coastal hazards (coastal erosion, coastal inundation and cliff/slope instability). Some of these areas are also subject to catchment derived flooding, for which a framework is available for emergency response through the central Coast Council Flood Emergency Subplan (CCC/NSW SES, 2021). Actions from the Flood Plan are relevant for coastal hazards also, but the CZEAS provides actions specific to Council for implementation prior to, during and following a coastal emergency.

Under Section 7 of the CM Act, one of the management objectives for the coastal vulnerability area is "*to prioritise actions that support the continued functionality of essential infrastructure during and immediately after a coastal hazard emergency*".

Due to the large area of land affected by coastal inundation, it is not possible or practical to provide emergency protection works that would provide protection against coastal inundation. The NSW SES prepares the NSW State Storm Plan, NSW Flood Plan and State Tsunami Plan, which are subplans to the NSW State EMPLAN 2023. NSW SES is the agency responsible for the coordination of operations to protect property, with protection measures described in the Central Coast Council Flood Emergency Subplan.

The legislative framework for emergency management in NSW and its relationship with coastal management legislation and the CMP is articulated in the Guideline for Preparing a Coastal Zone Emergency Action Subplan (Department of Planning, Industry & Environment 2019).

The CZEAS is included in Appendix C.

The objectives of the CZEAS are to:

- outline measures to reduce the risk to public safety, the coastal environment and public assets arising from the coastal hazards of coastal erosion, inundation and cliff/slope instability brought about by storm activity
- identify key actions to be carried out by Council before, during and following a coastal emergency to reduce the risk to public safety, the coastal environment and public assets
- identify the responsibilities of other public authorities during a coastal emergency
- identify key areas and assets subject to immediate hazards and prioritise actions to reduce the risks to those areas and assets.

8. Monitoring, Evaluation and Reporting

8.1 Overview of the Monitoring and Evaluation Process

Monitoring, evaluation, and reporting (MER) is an essential component of any CMP and is a mandatory requirement for CMPs under the CM Act. The purpose of the MER component is to monitor progress towards implementing the coastal management actions outlined in the CMP, and to assess the performance of the CMP in achieving its intended outcomes, and the objects of the CM Act.

"Monitoring" is the planned, systematic and continuous collection and analysis of data and other information, to track the progress of the CMP. Data and other information gathered by monitoring contribute to evaluation: the evaluation process integrates it with other data and information collected periodically. "Evaluation" is defined as "a planned and periodic assessment of the quality and value of a program, where a judgement is made about the achievement of or progress towards the program's objectives and outcomes" (Markiewicz and Patrick 2016).

The MER process for the CMP should be fit-for-purpose and focus on the information needed to evaluate the status of coastal management actions and their outcomes. As per the CM Manual (OEH, 2018), key elements of a MER program should consider the outcomes that the CMP is trying to achieve over the short, medium, and long term.

The proposed MER program has followed the structure of a "Program Logic Model", that sets out the program's vision, objectives, activities, outputs and short-term, intermediate and longer term outcomes. The program logic model supports a systematic and integrated approach to CMP planning, implementation, and evaluation. There is a logical flow to this process, which is summarised in Figure 8-1: below. It comprises:

- Component 1: The implementation status of the CMP actions. The MER should constantly monitor and evaluate the implementation of the management actions – see Section 8.2.
    - It aims to answer the question: "Were the management actions implemented as planned in the implementation schedule, in terms of content, timing, location, format, quality?"
- Component 2: Measurement of outcomes through monitoring of environmental indicators. As per Section 1.4, one of the main goals of the CMP is to improve the environmental and social values of the coastline. Therefore, the MER should also include a component that monitors key environmental indicators – see Section 8.3.
    - It aims to answer the question: "Has the implementation of individual management actions, and the CMP more generally, resulted in an improvement in the health of the coastal environment and the social / cultural values of the study area?".

- Component 3: The performance of the CMP in terms of meeting the objects of the CM Act. This includes a holistic review of the CMP and its performance against its long-term objectives – see Section 8.4.
    - It aims to answer the questions – based on the outcomes of Components 1 and 2:
        - "Has the CMP achieved its intended objectives?"
        - "How has the CMP made a difference?" and
        - "Has the level of risk associated with the various stressors and hazards facing the coastline been reduced?".

The 3 components of the MER are described in more detail in Section 8.2 to 8.4.

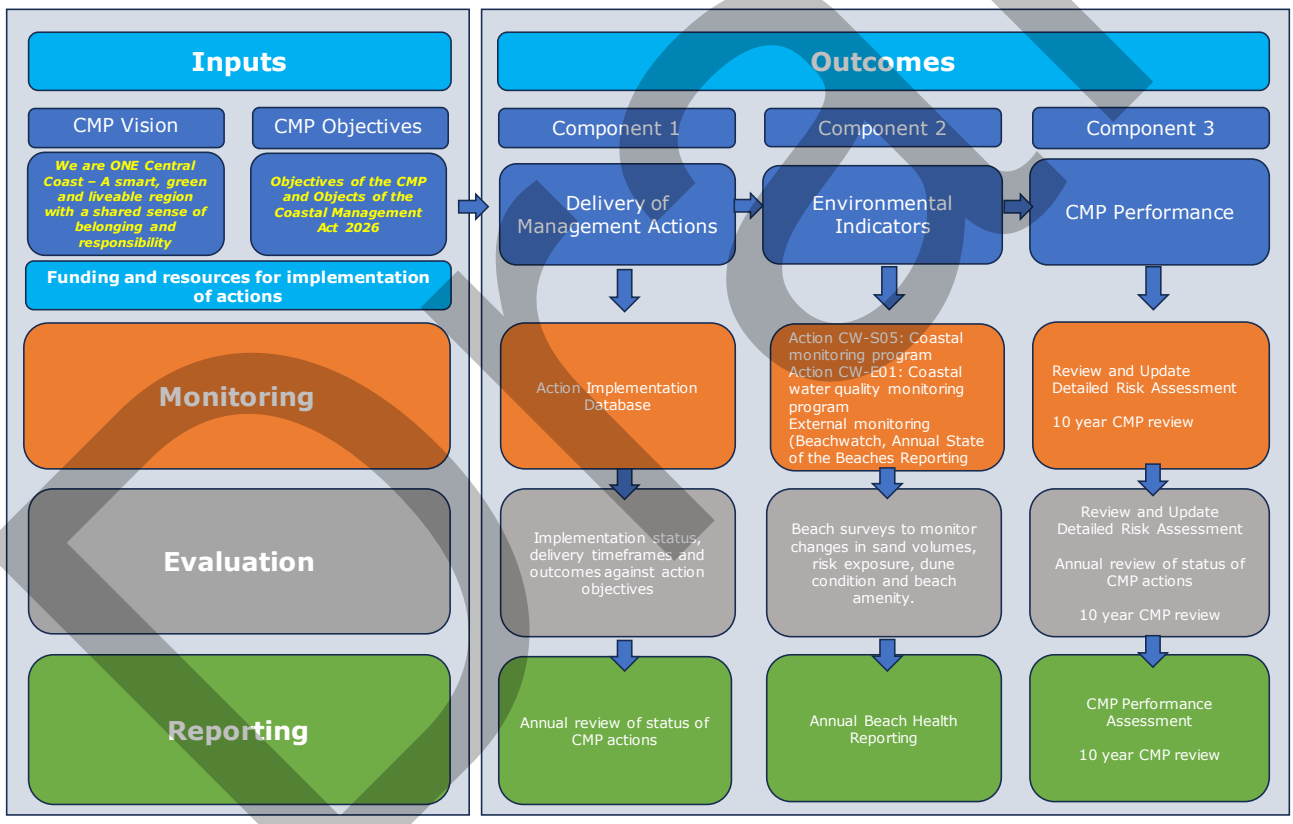


Figure 8-1: Overview of MER program for the CMP

8.2 Component 1 – Delivery of Management Actions

In the first instance, Council will need to monitor the implementation status of the various CMP actions – including which actions have been implemented, the progress of actions, barriers and issues, allocated funding and resources, and timeline of implementation.

It is recommended that an Action Implementation Database (AID) be maintained to monitor the status of the various CMP actions and support the CMP requirements. The fields include

information relating the practical implementation of the works, and the overall status of the action. For each action, a monitoring designation should be provided regarding the current status of that action using one of 5 categories:

- Completed: Where discrete (one-off) action items have been completed and no further actions are required.
- Implemented and Ongoing: Where actions have an ongoing component and are currently being implemented.
- In progress/Incomplete: This includes actions that are in progress or not yet finalised.
- Not Yet Commenced/Outstanding: Where outstanding actions have not yet commenced - but have been marked for future implementation.
- No Longer Applicable: Where actions are no longer applicable due to changed circumstances or superseding actions from other management plans.

Dates of commencement and practical completion should also be monitored and recorded, in addition to other supporting documentation.

Each action in this CMP has been assigned a corresponding performance indicator(s). Each CMP action should be evaluated for its performance in achieving its objectives, using the established indicator(s). These should be recorded in the AID.

The IP&R reporting system provides the opportunity to formally report on monitoring of coastal management and its outcomes. Council delivers an Annual Report to document its progress in implementing its 4 Year Delivery Program and Annual Operational Plan activities over each financial year. This provides for a yearly evaluation of the implementation status of each action in the CMP.

Where actions have not been included in the IP&R Framework, a yearly evaluation of those CMP actions by the officer(s) responsible for implementation of the CMP is recommended. This may be undertaken through the annual review of the Business Plan, or as a separate process.

8.3 Component 2 – Environmental Indicators

A key component of the MER process will be to use physical datasets that can provide an indication of key physical and environmental parameters and track the progress of the CMP towards key achieving intended outcomes.

The monitoring of environmental indicators provides information on the state of the coastal environment, but cannot necessarily be used to gauge the success of individual management actions. This is because the coastline is subject to short-term variability (due to erosion/recovery processes acting over timeframes of weeks to months), medium-term variability (e.g. due to changes in wave climate and storminess caused by the El Niño Southern Oscillation, acting at inter-decadal scales), and long-term changes (e.g. due to climate change). Longer-term monitoring of environmental indicators is therefore necessary to assess overall trends in environmental health and to monitor the overall success of measures in the

CMP. Assessing outcomes over the short to medium term will require consideration of the physical processes context, and expert technical judgement.

With this in mind, a pragmatic approach to monitoring and evaluation is proposed for the CMP. There are a number of Actions in the CMP which will provide data that can inform the MER. The primary CMP Action associated with collecting environmental parameters for MER purposes is:

- Action CW-S05: Develop and implement a coastal monitoring program

Additional Actions include:

- Action CW-E01: Review and implement Council's coastal water quality monitoring program
- Action CW-S01: Monitoring and improvement of coastal stormwater outlets
- Action CW-S02: Develop and implement an integrated coastal processes and hazards education and awareness program
- Action EN01: Monitor and manage risk of contamination from closed landfill sites

There are also a number of monitoring programs external to the CMP process that can provide physical datasets to support the MER, including:

- The NSW Beachwatch Programs.
- Annual State of the Beaches Reporting (DPIE 2024).

A summary of these environmental parameters may also be reported as part of Council's annual reporting requirements.

The 'environmental indicators' proposed to be monitored through action CW-S05 (which include shoreline position, beach volume, dune vegetation condition, and water quality) may be applied to inform and 'trigger' certain management actions such as beach scraping or post storm re-profiling etc. This information may also be applied to facilitate an adaptive approach to defining when coastal protection works are constructed at specific locations.

8.4 Component 3 – Achievement of Objectives of the CMP and CM Act

The CMP should be viewed as a 'living document' that is reviewed and updated over time. While a review of the performance of the actions within the CMP occur on an annual basis (as per Council's IP&R framework), a key component of the MER process is to undertake a strategic review of the CMP at designated timeframes to assess its overall performance.

The CM Act (Section 18(1)) and CM Manual requires Council to ensure that the CMP is reviewed at least once every 10 years. However, it may be reviewed and/or updated sooner for any reason, including if there are significant new circumstances which need to be considered.

The review of the CMP should be undertaken through a formal process to assess the overall performance of the CMP in meetings its objectives. The review should consider, as a minimum:

- The extent to which the CMP has achieved its objectives.
- The extent to which the CMP has achieved the objectives of the CM Act.
- The performance of the CMP as an instrument for improving coastal management.

8.4.1 Review of Key Issues

The primary mechanism for gauging whether the CMP has been successful should be the re-evaluation of the threats and risks across the study area through a repeat of the Risk Assessment (Worley Consulting, 2024a). Controls that assist with managing the threats should be included when assessing the level of risk, particularly those actions that have or are being implemented through the CMP. There are 3 specific questions to be answered:

- Has the level of risk changed?
- Have the risks rated as "high" or "extreme" been adequately managed?
- Are there any new or emerging risks that need to be captured?

During this process, particular focus should be given to evolving or emerging risks – including those associated with climate change. These emerging and evolving risks include the impacts of sea level rise on beach erosion and shoreline recession, and habitat squeeze and migration.

8.4.2 Assess CMP Performance

This will include a formal review of the implemented management strategies. The review should include a granular assessment of:

- The status of CMP actions, including the extent to which actions proposed to be wholly implemented within that 10-year period have been implemented.
- Identification of the CMP's successes, highlights, limitations, and any barriers to the effective implementation.
- Where applicable, the identification of possible avenues for increasing the effectiveness of the CMP.
- Consideration of any new or updated scientific knowledge, including data collected and compiled from the monitoring programs in the CMP.
- The progress of any actions and commitments which continue beyond the original 10-year timeframe.

If the need arises, new actions or items can also be added to the CMP as part of the review process. Any such changes to the CMP would need to be endorsed by stakeholders and relevant government agencies, as well as the communities.

9. Maps

High level mapping provided in this CMP includes:

- An overview of the CMP Study Area (Figure 1-3:).
- Coastal sediment compartment mapping across the CMP Study Area (Figure 1-4:).

A detailed companion mapping set has also been provided in Appendix A. This mapping set includes a suite of local level maps with the following information:

- Locality plan and land tenure – which includes details regarding key coastal features and major townships. It also includes land tenure arrangements such as Council Reserves, Crown Land Reserves and NPWS Estate.
- RH SEPP Coastal Management Areas – including the state government mapping of CUA, CEA, and CWLR areas.
- Mapping of coastal inundation, beach erosion, shoreline recession and coastal cliff and slope instability risk in the present day and with sea level rise across the CMP Study Area.
- Maps of individual management actions for each locality.

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Appendix A. Mapping

CMP Maps

Appendix A1: Coastal Management Areas

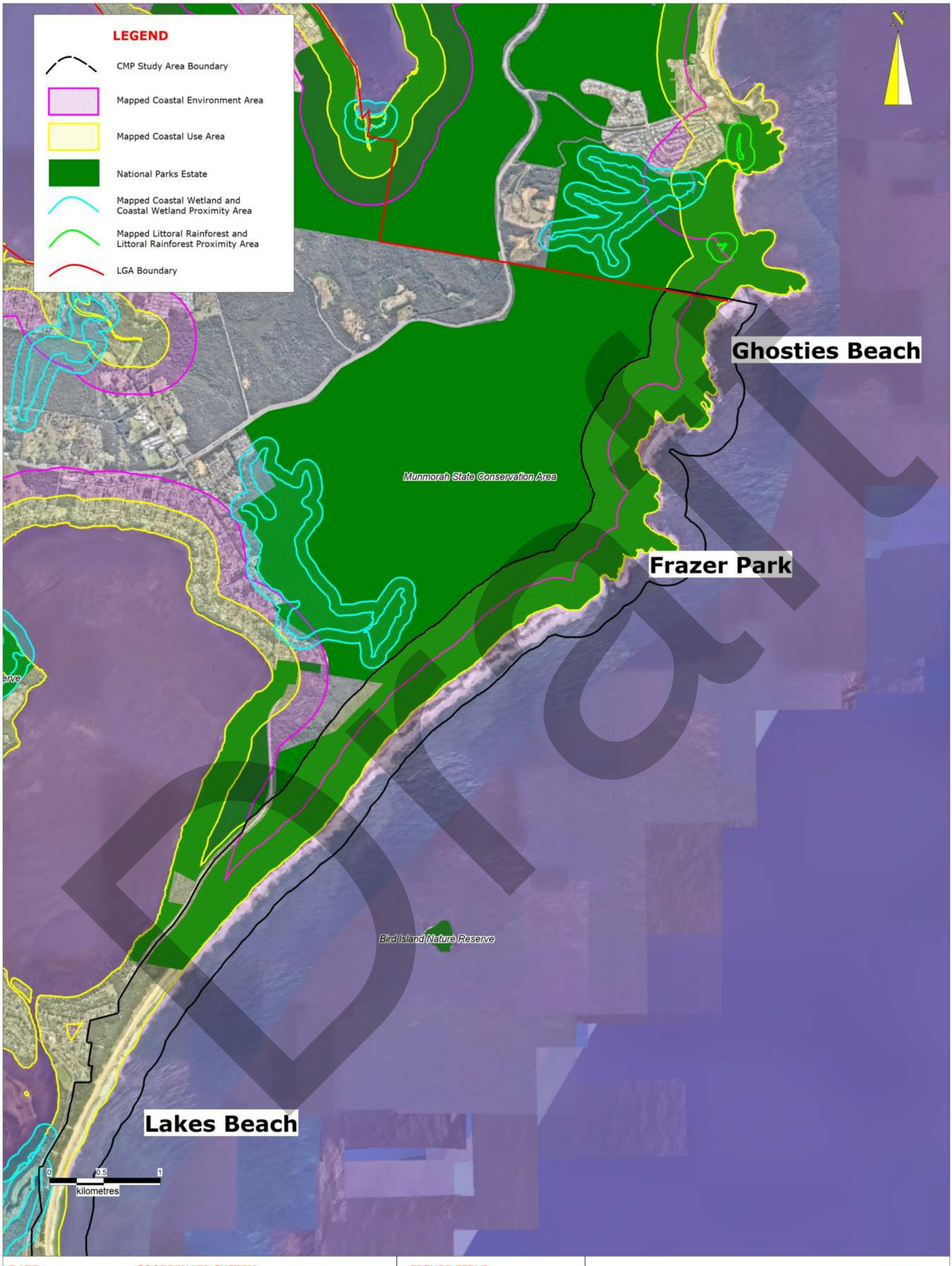
Maps A1 to A6 – Coastal Management Areas and Land Tenure Maps

Appendix A2: Coastal Hazard Mapping (Bluecoast Consulting Engineers, 2024-2025)

Map A7 Lakes Beach
Map A8 Hargraves Beach
Map A9 Soldiers Beach & Norah Head
Map A10 The Entrance North (Magenta Shores)
Map A11 The Entrance North
Map A12 Toowoon Bay & Blue Bay
Map A13 Shelly Beach
Map A14 Bateau Bay
Map A15 Forresters Beach
Map A16 Terrigal & Wamberal Beach
Map A17 Avoca & North Avoca
Map A18 MacMasters & Copacabana
Map A19 Killcare

Appendix A3: Location-specific Management Actions

Map A20 Hargraves Beach and Lakes Beach
Map A21 Soldiers Beach & Norah Head
Map A22 The Entrance North
Map A23 Toowoon Bay, Blue Bay and The Entrance
Map A24 Bateau Bay and Shelly Beach
Map A25 Forresters Beach
Map A26 Terrigal & Wamberal Beach
Map A27 Avoca & North Avoca
Map A28 MacMasters & Copacabana
Map A29 Killcare



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23.03.2025	MGA 94 Zone 56	Coastal Management Areas and Land Tenure Map A1
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

Central Coast Council

worley consulting

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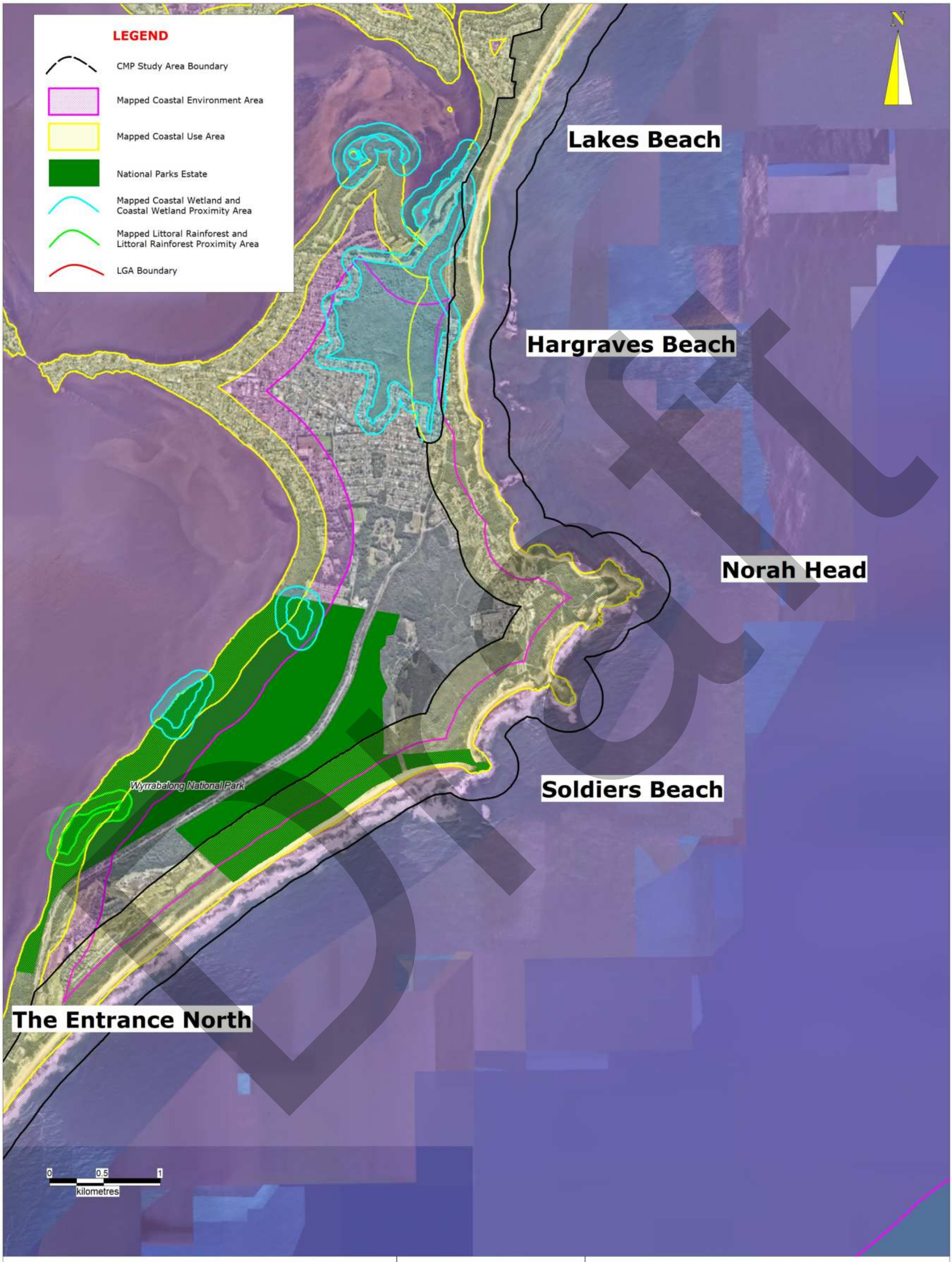

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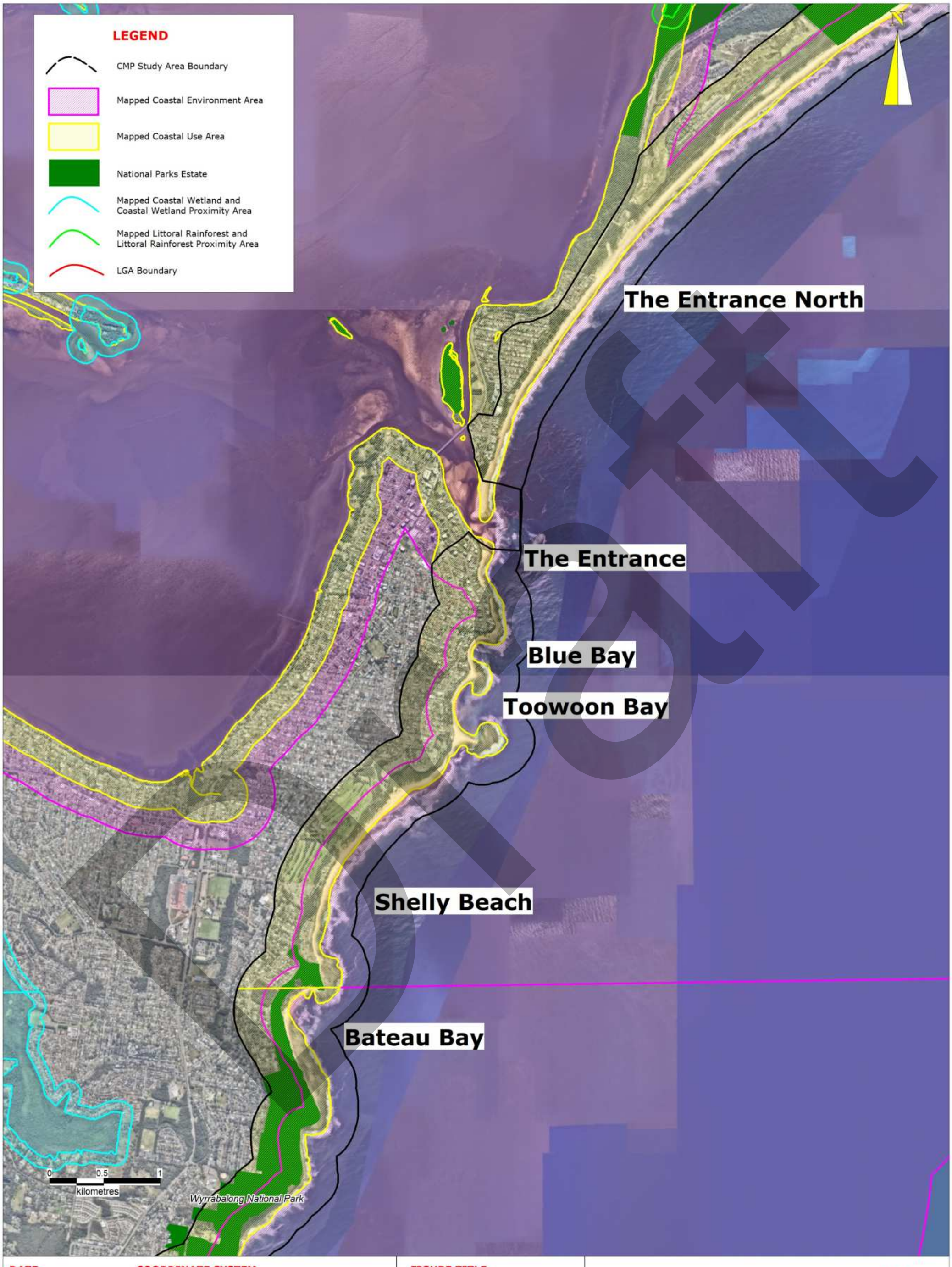

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PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

Central Coast Council

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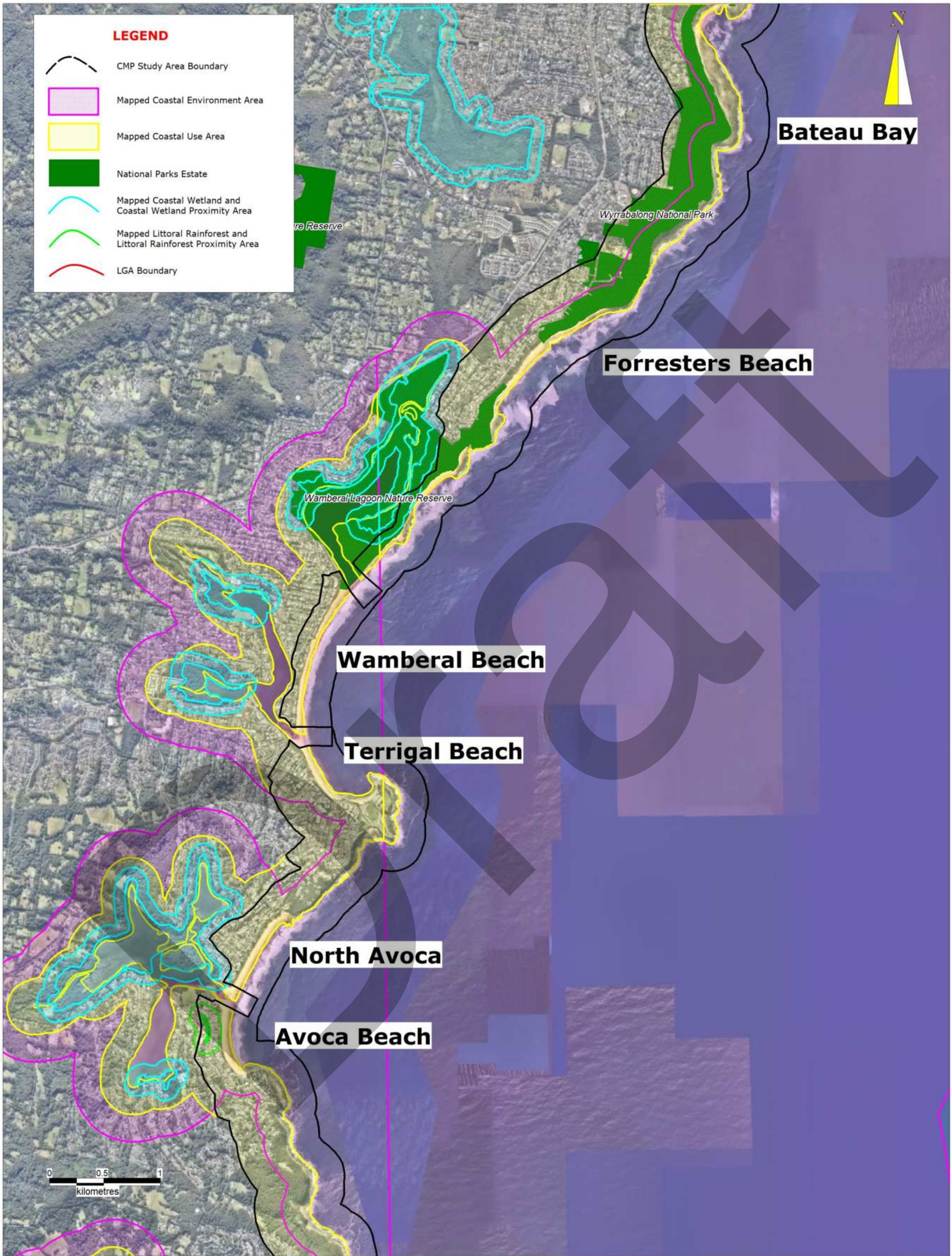

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PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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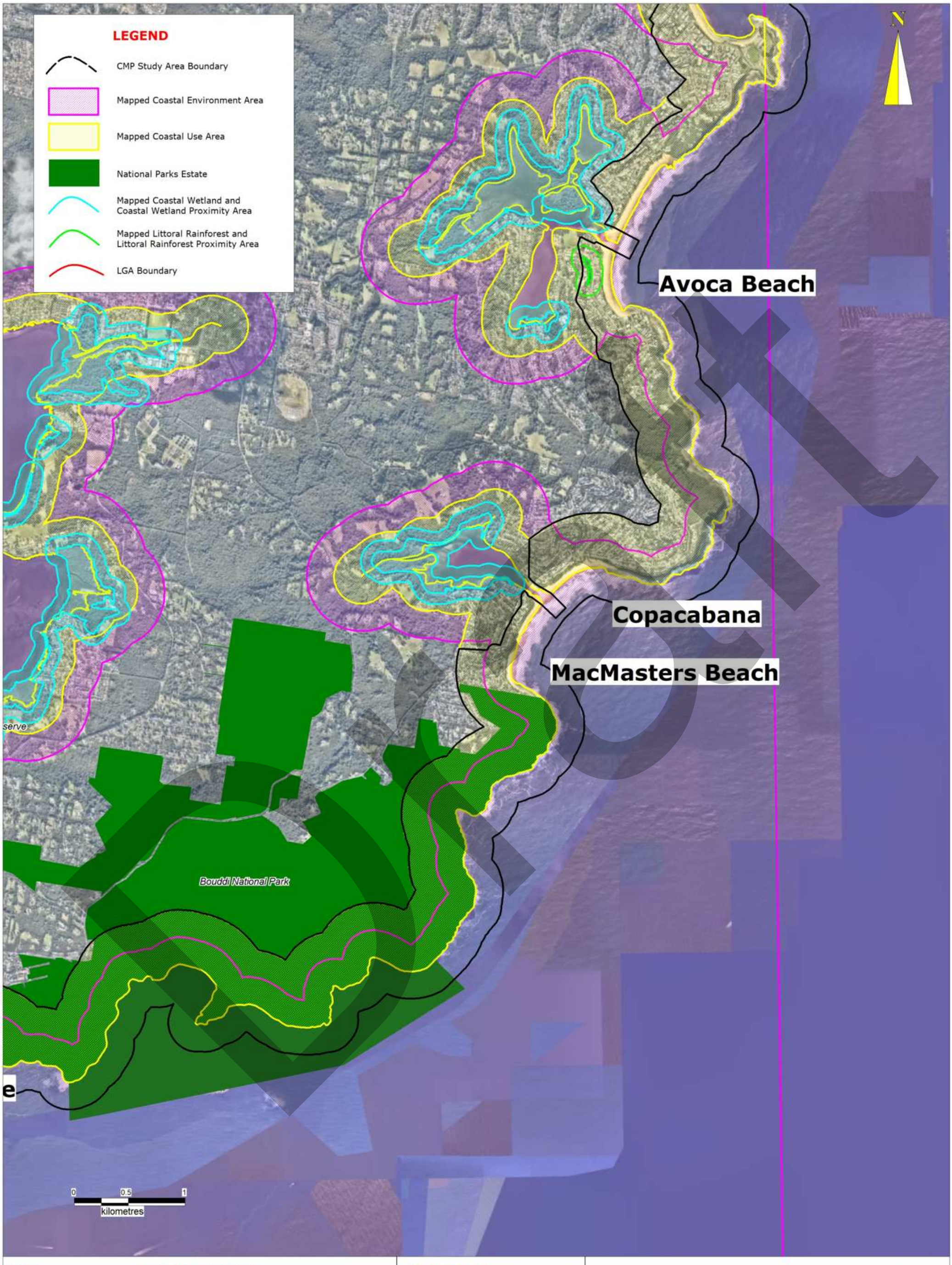

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23.03.2025	MGA 94 Zone 56	Coastal Management Areas and Land Tenure Map A5
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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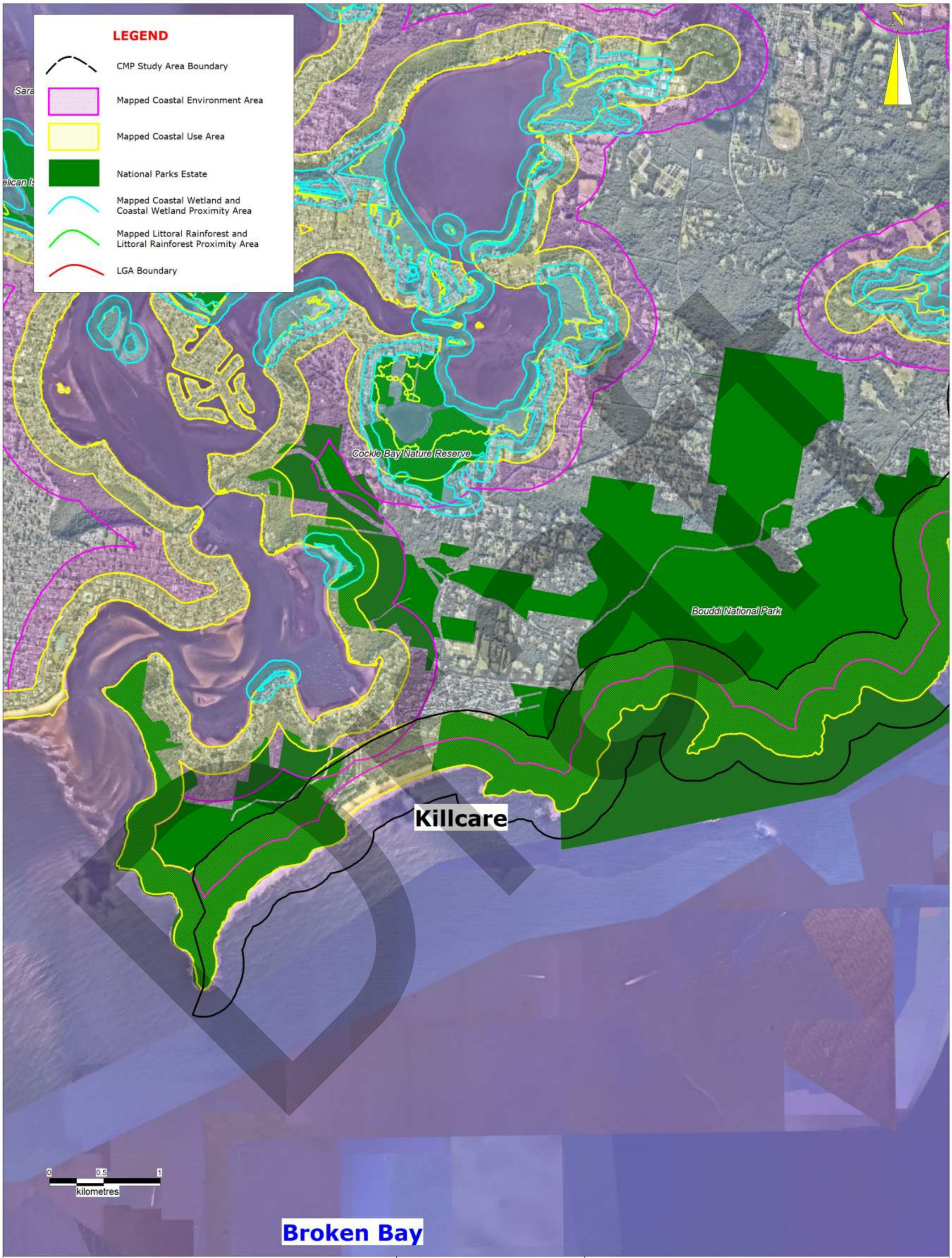

DATE	COORDINATE SYSTEM	FIGURE TITLE
23.03.2025	MGA 94 Zone 56	Coastal Management Areas and Land Tenure Map A6
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2120 Beach Erosion limit (Bluecoast 2024)
- Mapped 2120 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2070 Beach Erosion limit (Bluecoast 2024)
- Mapped 2070 Cliff Line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)

N

Bird Island Nature Reserve

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
23.03.2025	MGA 94 Zone 56	Map A7 Coastal Hazard Areas Lakes Beach
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2120 Beach Erosion limit (Bluecoast 2024)
- Mapped 2120 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2070 Beach Erosion limit (Bluecoast 2024)
- Mapped 2070 Cliff Line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)

N

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
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PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

Central Coast Council

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LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2120 Beach Erosion limit (Bluecoast 2024)
- Mapped 2120 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2070 Beach Erosion limit (Bluecoast 2024)
- Mapped 2070 Cliff Line (JK Geotechnics 2024)
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N

0 250 500
metres

DATE 23.03.2025	**COORDINATE SYSTEM** MGA 94 Zone 56	**FIGURE TITLE** Map A9 Coastal Hazard Areas Soldiers Beach and Norah Head	Central Coast Council · worley consulting · NSW GOVERNMENT
PROJECT NO. 311015-00572	**PROJECT TITLE** Central Coast Open Coast Coastal Management Program	**CREATED BY** CA	

LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2120 Beach Erosion limit (Bluecoast 2024)
- Mapped 2120 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2070 Beach Erosion limit (Bluecoast 2024)
- Mapped 2070 Cliff Line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)

Wyrrabalong National Park

N

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
23.03.2025	MGA 94 Zone 56	Map A10 Coastal Hazard Areas The Entrance North - Magenta Shores
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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LEGEND

- CMP Study Area Boundary
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- National Parks Estate
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- Mapped 2120 Cliff line (JK Geotechnics 2024)
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- Mapped 2070 Cliff Line (JK Geotechnics 2024)
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N

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
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PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
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- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2120 Beach Erosion limit (Bluecoast 2024)
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- Mapped 1% AEP 2070 Beach Erosion limit (Bluecoast 2024)
- Mapped 2070 Cliff Line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)

N

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
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PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

Central Coast Council

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LEGEND

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- Mapped Tidal Inundation Area (Bluecoast 2024)
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- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2120 Beach Erosion limit (Bluecoast 2024)
- Mapped 2120 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2070 Beach Erosion limit (Bluecoast 2024)
- Mapped 2070 Cliff Line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
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N

0 250 500
metres

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PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2120 Beach Erosion limit (Bluecoast 2024)
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- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)

N

0 250 500

metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
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PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

Central Coast Council

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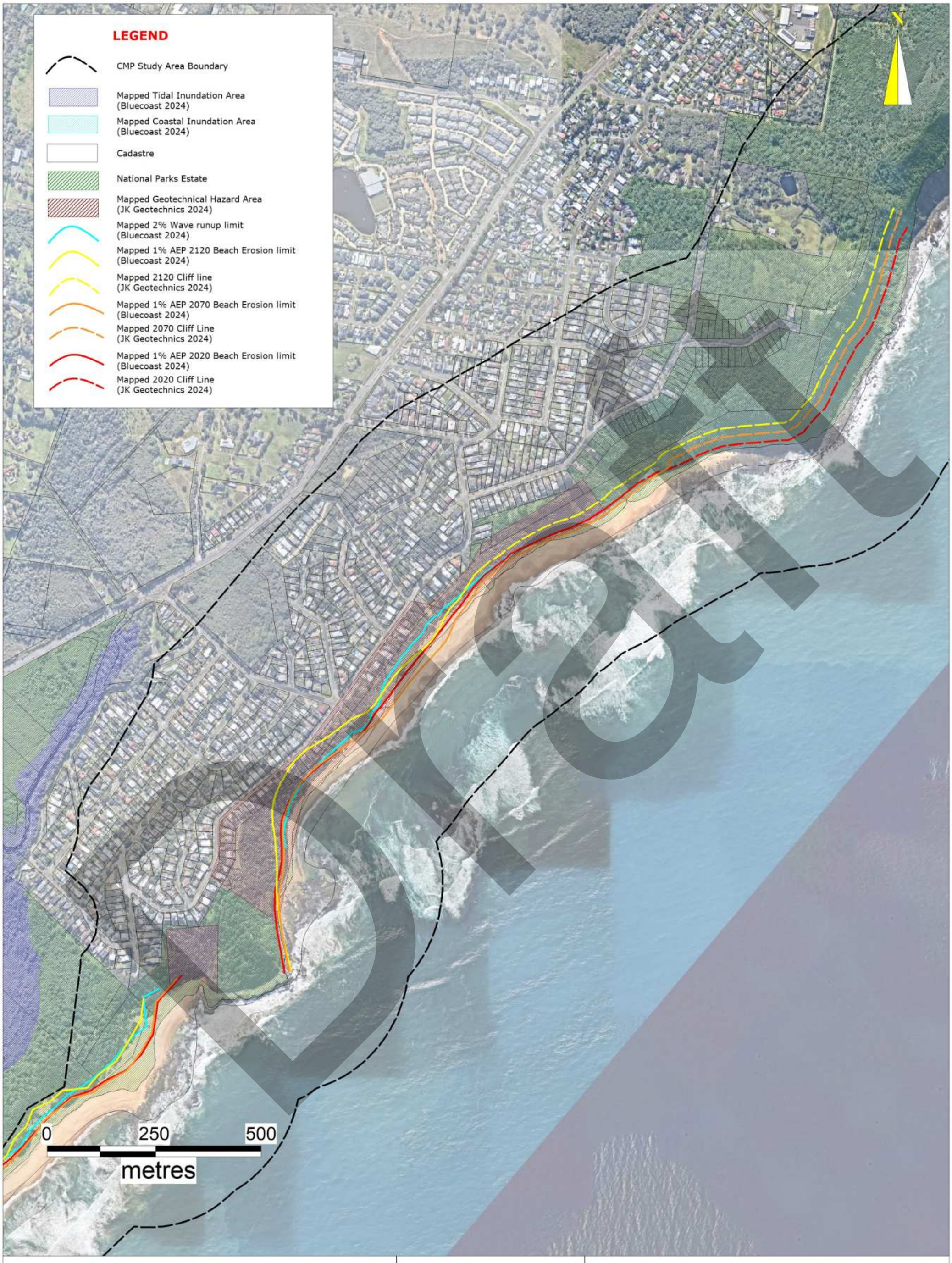

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PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

Central Coast Council

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LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2120 Beach Erosion limit (Bluecoast 2024)
- Mapped 2120 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2070 Beach Erosion limit (Bluecoast 2024)
- Mapped 2070 Cliff Line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)

Wamberal Lagoon Nature Reserve

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
23.03.2025	MGA 94 Zone 56	Map A16 Coastal Hazard Areas Terrigal/Wamberal
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

Central Coast Council

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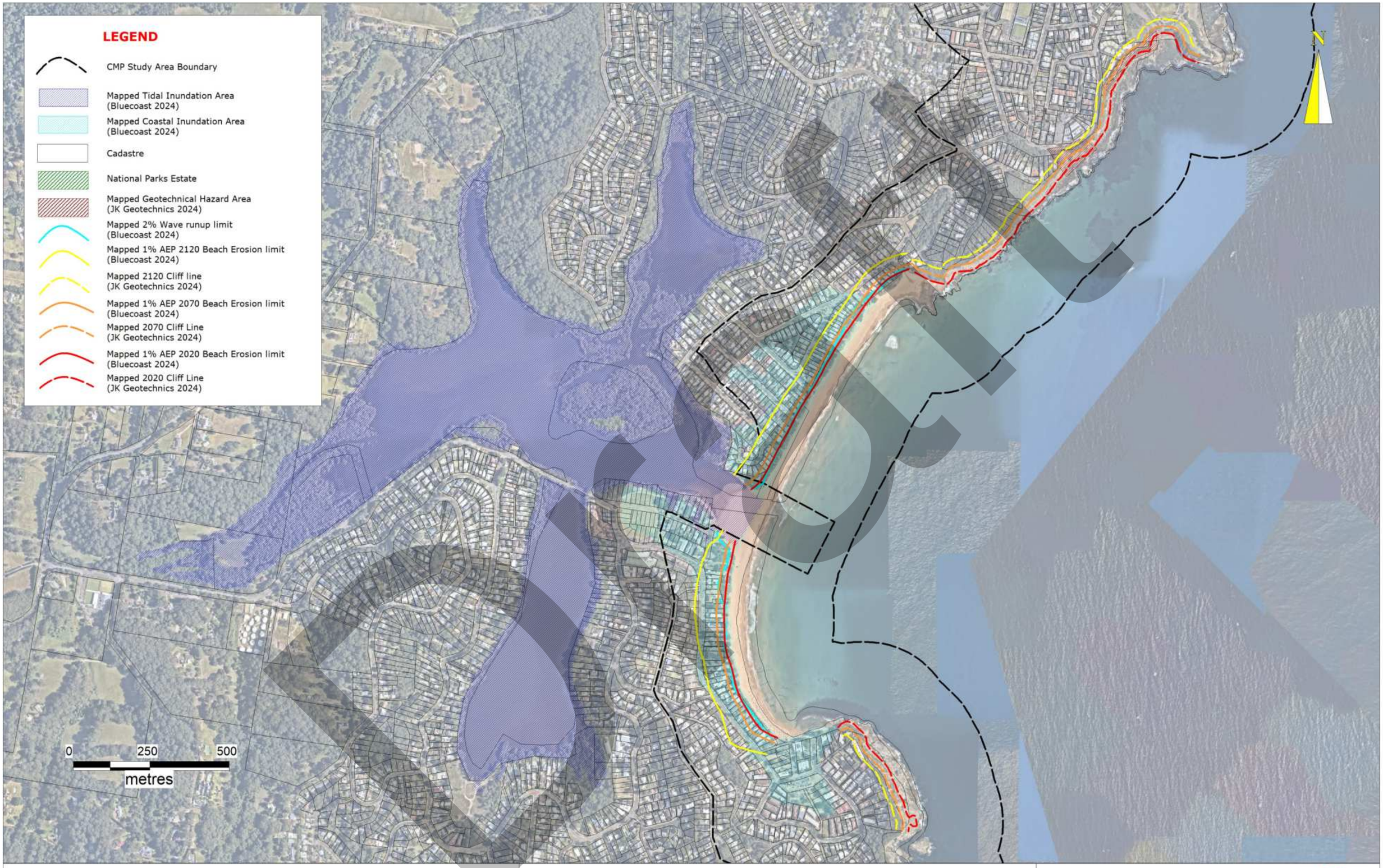
NSW GOVERNMENT



DATE 23.03.2025

COORDINATE SYSTEM MGA 94 Zone 56

PROJECT NO. 311015-00572

PROJECT TITLE Central Coast Open Coast Coastal Management Program

FIGURE TITLE Map A17
Coastal Hazard Areas
Avoca/North Avoca

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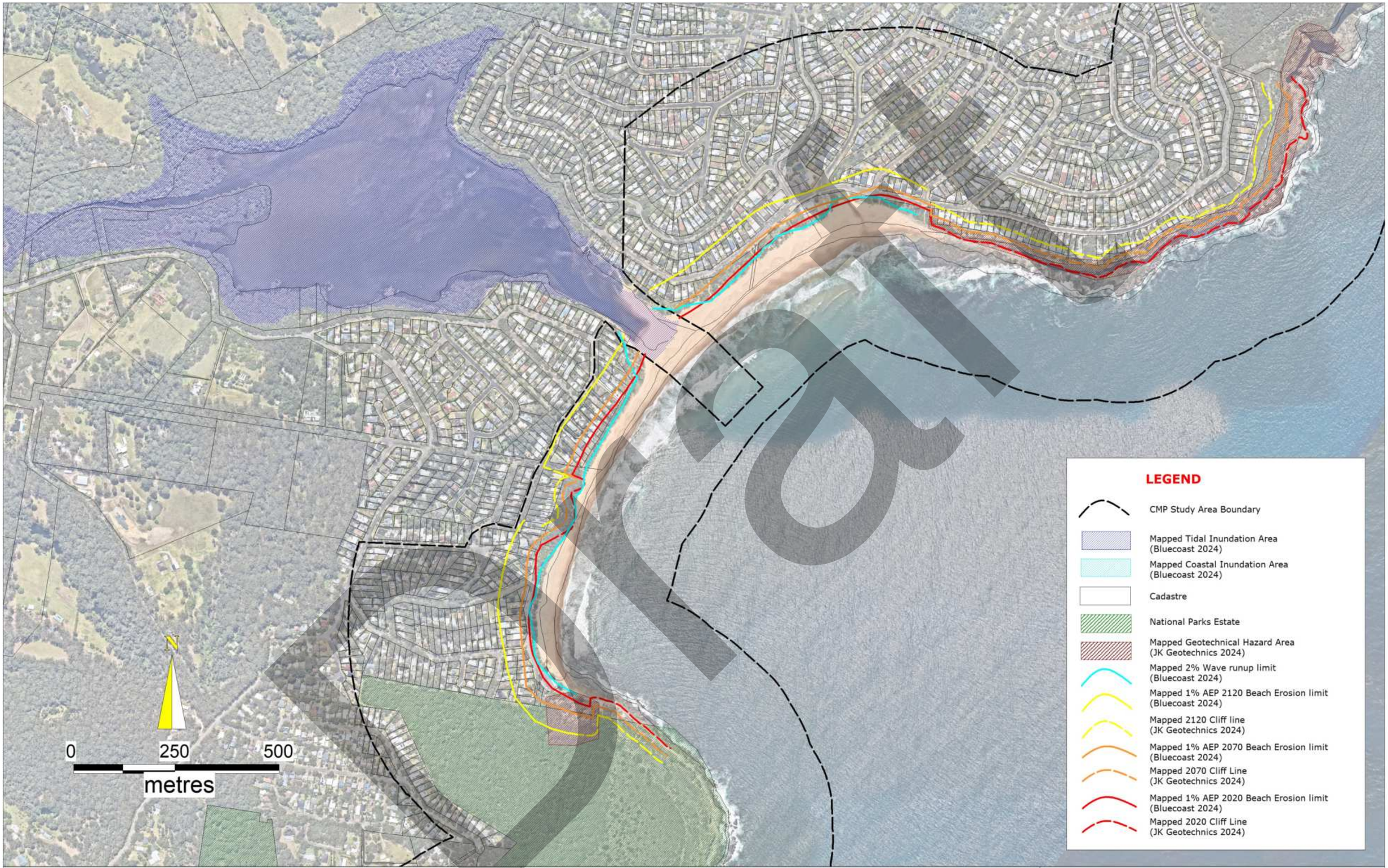

DATE 23.03.2025

COORDINATE SYSTEM MGA 94 Zone 56

PROJECT NO. 311015-00572

PROJECT TITLE Central Coast Open Coast Coastal Management Program

FIGURE TITLE Map A18
Coastal Hazard Areas
MacMasters/Copacabana

CREATED BY CA

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LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2120 Beach Erosion limit (Bluecoast 2024)
- Mapped 2120 Cliff line (JK Geotechnics 2024)
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- Mapped 2070 Cliff Line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)

N

0 100 200
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
23.03.2025	MGA 94 Zone 56	Map A19 Coastal Hazard Areas Killcare
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

Central Coast Council

worley consulting

NSW GOVERNMENT

LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2120 Beach Erosion limit (Bluecoast 2024)
- Mapped 2120 Cliff line (JK Geotechnics 2024)
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- Mapped 2070 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Management Action (Ecological Environment)
- Management Action (Development)
- Management Action (Access & Safety)
- Management Action (Coastal Hazard)

N

CW-E02
Develop and implement a Coastal Vegetation Strategy

CW-S08
Prioritise and upgrade beach life guard patrol towers and ancillary structures

CW-D04
Continue to improve accessibility and inclusiveness of coastal and foreshore areas

CW-H01
Review and update coastal development planning controls and undertake Planning Proposal to adopt Coastal Vulnerability Area

CW-E02
Develop and implement a Coastal Vegetation Strategy

CW-D04
Continue to improve accessibility and inclusiveness of coastal and foreshore areas

CW-D01
Develop and maintain a coastal geotechnical database

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE Map A20
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PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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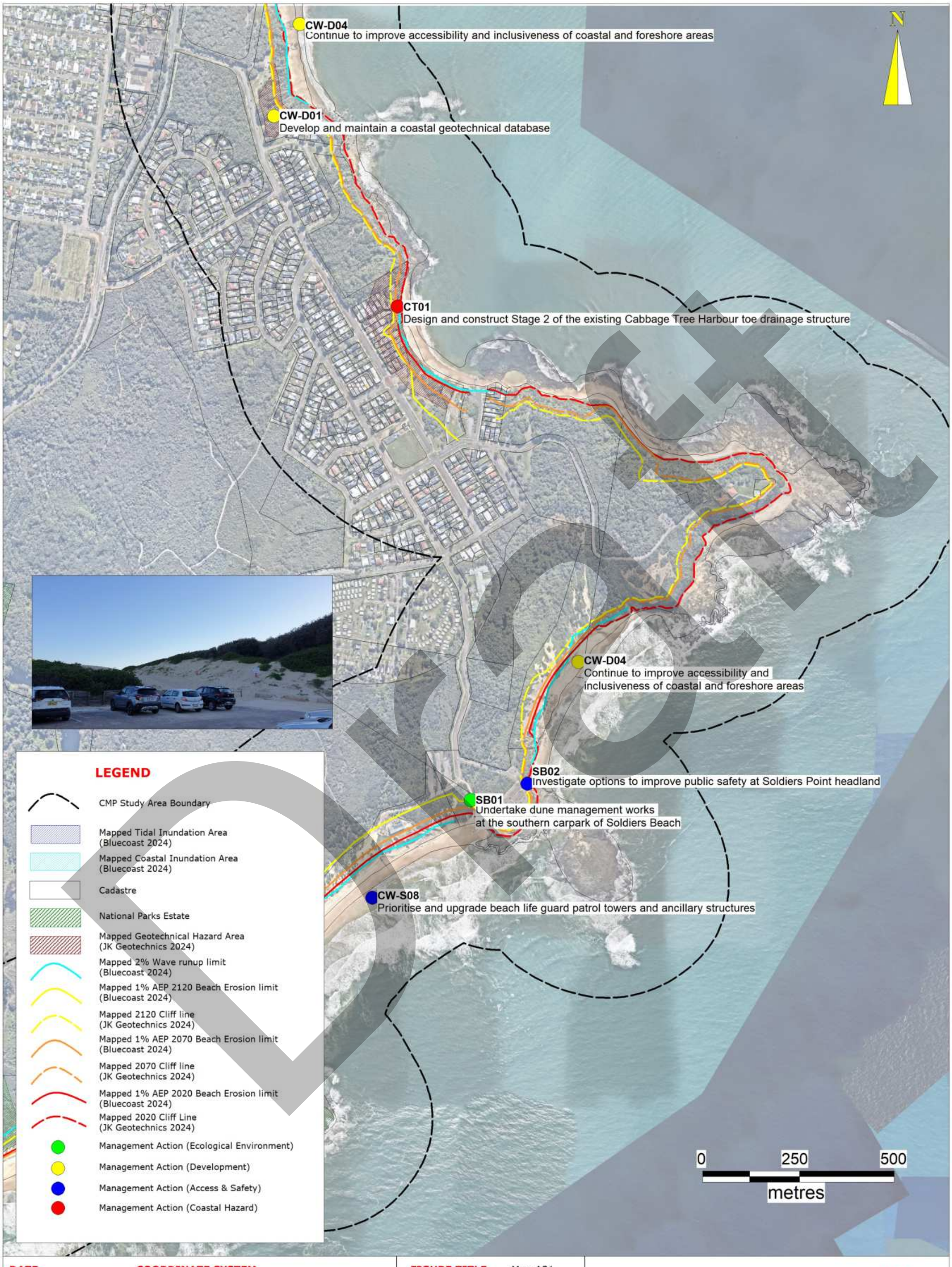

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PROJECT NO.	**PROJECT TITLE**	**CREATED BY**	
311015-00572	Central Coast Open Coast Coastal Management Program	CA	

LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2120 Beach Erosion limit (Bluecoast 2024)
- Mapped 2120 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2070 Beach Erosion limit (Bluecoast 2024)
- Mapped 2070 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Management Action (Ecological Environment)
- Management Action (Development)
- Management Action (Access & Safety)
- Management Action (Coastal Hazard)

EN-01
Monitor and manage risk of contamination from closed landfill sites

CW-E02
Develop and implement a Coastal Vegetation Strategy

CW-A02
Develop and implement Coastal Engineering Design Requirements

CW-H02
Identify the extent, nature and condition of existing coastal emergency works

CW-H01
Review and update coastal development planning controls and undertake Planning Proposal to adopt Coastal Vulnerability Area

CW-E02
Develop and implement a Coastal Vegetation Strategy

CW-S08
Prioritise and upgrade beach life guard patrol towers and ancillary structures

CW-H01
Review and update coastal development planning controls and undertake Planning Proposal to adopt Coastal Vulnerability Area

CW-S07
Investigate feasibility and responsibilities of long-term sand nourishment licences

CW-A02
Develop and implement Coastal Engineering Design Requirements

CW-H02
Identify the extent, nature and condition of existing coastal emergency works (including potential removal or remediation)

EN-02
Continue to nourish The Entrance North Beach with sand from The Entrance channel berm management or dredging activities when available to increase beach amenity and resilience.

CW-S04
Review and implement updated Beach Maintenance Program

T01
Undertake and support coastal research projects and citizen science initiatives

N

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE Map A22
23.03.2025	MGA 94 Zone 56	Coastal Management Actions The Entrance North
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
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N

EB-01
Review the structural integrity and extent of the foreshore revetment and embankment protecting Marine Parade, The trance, a

EB-02
Investigation and management of adverse groyne impacts

CW-D04
Continue to improve accessibility and inclusiveness of coastal and foreshore areas

CW-D01
Develop and maintain a coastal geotechnical database

CW-D05
Review coastal hazard notations and planning certificates

CW-H01
Review and update coastal development planning controls
and undertake Planning Proposal to adopt Coastal Vulnerability Area

CW-A02
Develop and implement Coastal Engineering Design Requirements

CW-D02
Conduct geotechnical investigations to
improve understanding of underlying geology along the coast

T01
Undertake and support coastal research
projects and citizen science initiatives

CW-D01
Develop and maintain a coastal geotechnical database

CW-E01
Review and implement Council's
coastal water quality monitoring program

CW-S08
Prioritise and upgrade beach life guard patrol towers and ancillary structures

CW-S06
Develop and implement a Coastal Monitoring Program

LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
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- Mapped 2120 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2070 Beach Erosion limit (Bluecoast 2024)
- Mapped 2070 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Management Action (Ecological Environment)
- Management Action (Development)
- Management Action (Access & Safety)
- Management Action (Coastal Hazard)

0 100 200
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE	
23.03.2025	MGA 94 Zone 56	Map A23 Coastal Management Actions Toowoon Bay, Blue Bay, The Entrance	
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**	
311015-00572	Central Coast Open Coast Coastal Management Program	CA	

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LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
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- Mapped 1% AEP 2070 Beach Erosion limit (Bluecoast 2024)
- Mapped 2070 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Management Action (Ecological Environment)
- Management Action (Development)
- Management Action (Access & Safety)
- Management Action (Coastal Hazard)

CW-D01
Develop and maintain a coastal geotechnical database

CW-S08
Prioritise and upgrade beach life guard patrol towers and ancillary structures

CW-D01
Develop and maintain a coastal geotechnical database

CW-E01
Review and implement Council's coastal water quality monitoring program

CW-H01
Review and update coastal development planning controls and undertake Planning Proposal to adopt CVA

CW-D01
Develop and maintain a coastal geotechnical database

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE	Map A24
23.03.2025	MGA 94 Zone 56	Coastal Management Actions Bateau Bay and Shelly Beach	
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**	
311015-00572	Central Coast Open Coast Coastal Management Program	CA	

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DATE	COORDINATE SYSTEM	FIGURE TITLE	Map A25
23.03.2025	MGA 94 Zone 56	Coastal Management Actions Forresters Beach	
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**	
311015-00572	Central Coast Open Coast Coastal Management Program	CA	

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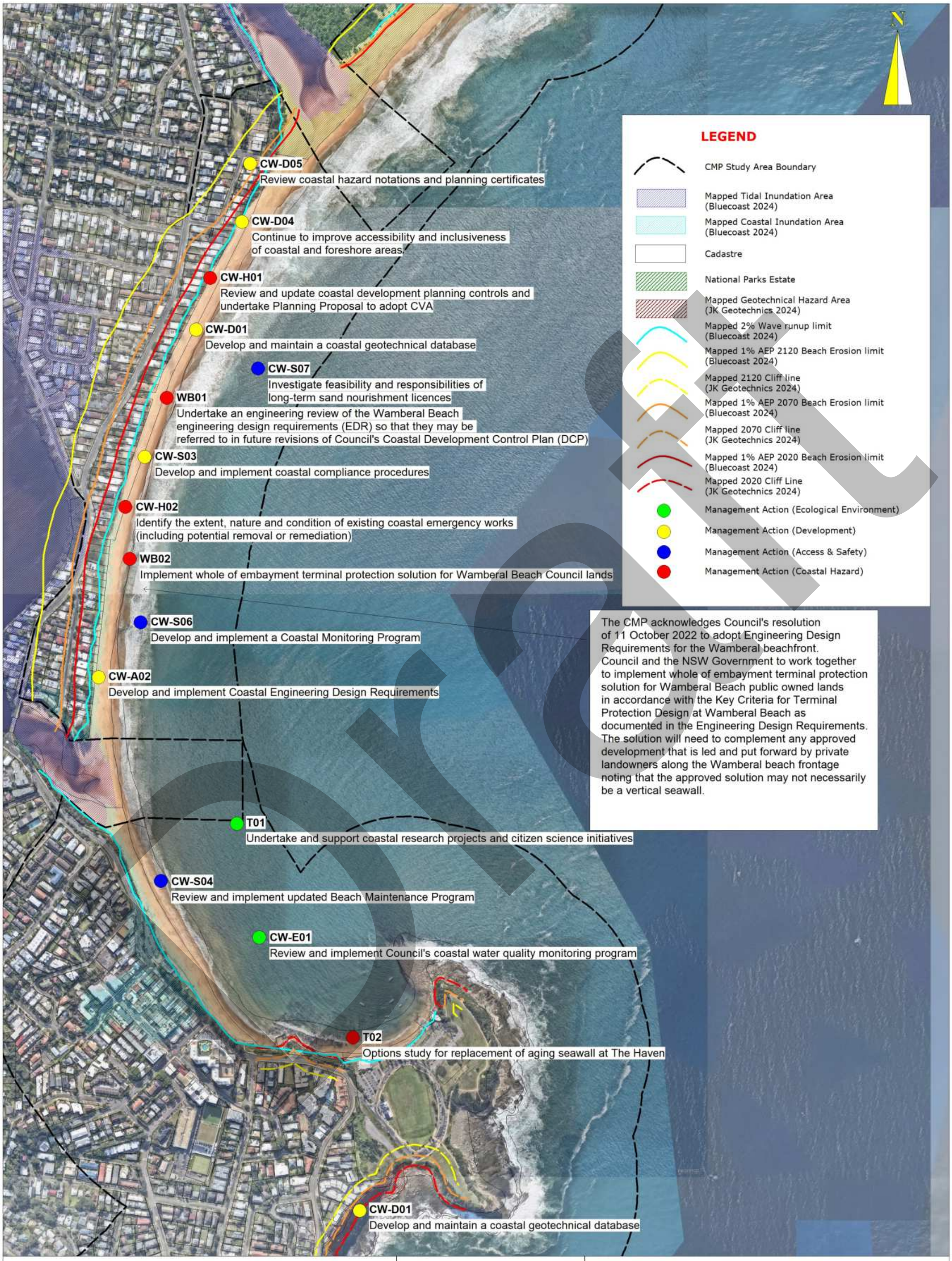

DATE	COORDINATE SYSTEM	FIGURE TITLE	Map A26
23.03.2025	MGA 94 Zone 56	Coastal Management Actions Terrigal/Wamberal	
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**	
311015-00572	Central Coast Open Coast Coastal Management Program	CA	

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CW-D01
Develop and maintain a coastal geotechnical database

CW-S01
Monitoring and improvement of coastal stormwater outlets

CW-D04
Continue to improve accessibility and inclusiveness of coastal and foreshore areas

CW-S03
Develop and implement coastal compliance procedures

CW-D02
Conduct geotechnical investigations to improve understanding of underlying geology along the coast

CW-E01
Review and implement Council's coastal water quality monitoring program

CW-S06
Develop and implement a Coastal Monitoring Program

A01
Undertake a detailed wave overtopping and inundation assessment for high risk locations

CW-S04
Review and implement updated Beach Maintenance Program

CW-E02
Develop and implement a Coastal Vegetation Strategy

CW-E01
Review and implement Council's coastal water quality monitoring program

CW-D04
Continue to improve accessibility and inclusiveness of coastal and foreshore areas

CW-D01
Develop and maintain a coastal geotechnical database

LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
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- Mapped 2070 Cliff line (JK Geotechnics 2024)
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- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Management Action (Ecological Environment)
- Management Action (Development)
- Management Action (Access & Safety)
- Management Action (Coastal Hazard)

DATE 23.03.2025

COORDINATE SYSTEM MGA 94 Zone 56

PROJECT NO. 311015-00572

PROJECT TITLE Central Coast Open Coast Coastal Management Program

FIGURE TITLE Coastal Management Actions Avoca/North Avoca Map A27

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CW-S01
Monitoring and improvement of coastal stormwater outlets

CW-D04
Continue to improve accessibility and inclusiveness of coastal and foreshore areas

CW-D01
Develop and maintain a coastal geotechnical database

CW-E01
Review and implement Council's coastal water quality monitoring program

CW-D03
Develop a coastal assets at risk register and update asset management program

CW-S06
Develop and implement a Coastal Monitoring Program

CW-E02CW-S04
Develop and implement a Coastal Vegetation Strategy.nance Program

CW-S01
Monitoring and improvement of coastal stormwater outlets

CW-E01
Review and implement Council's coastal water quality monitoring program

MM01
Complete coastal risk and options assessment for Marine Parade at MacMasters Beach

CW-D04
Continue to improve accessibility and inclusiveness of coastal and foreshore areas

CW-H02
Identify the extent, nature and condition of existing coastal emergency works (including potential removal or remediation)

CW-D02
Conduct geotechnical investigations to improve understanding of underlying geology along the coast

0 100 200
metres

N

LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
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- Mapped 2070 Cliff line (JK Geotechnics 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Management Action (Ecological Environment)
- Management Action (Development)
- Management Action (Access & Safety)
- Management Action (Coastal Hazard)

DATE 23.03.2025

COORDINATE SYSTEM MGA 94 Zone 56

PROJECT NO. 311015-00572

PROJECT TITLE Central Coast Open Coast Coastal Management Program

FIGURE TITLE Coastal Management Actions MacMasters/Copacabana Map A28

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LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- National Parks Estate
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
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- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Management Action (Ecological Environment)
- Management Action (Development)
- Management Action (Access & Safety)
- Management Action (Coastal Hazard)

N

Council's Beach Maintenance Program would be reviewed and implemented to improve public beach access, amenity and safety. The action would include prioritisation and upgrades to beach accessways in line with the Recreational Use Study and Council's Disability Inclusion Action Plan. The program would outline the management of post-storm beach access and safety, where small-scale works such as beach scraping for amenity purposes may be undertaken and beach and dune fencing. It will also include an audit on beach maintenance operations to maximise inhouse efficiencies to ensure that the necessary plant and equipment is available to effectively implement the program.

CW-E02
Develop and implement a Coastal Vegetation Strategy

CW-S06
Develop and implement a Coastal Monitoring Program

CW-S08
Prioritise and upgrade beach life guard patrol towers and ancillary structures

CW-D04
Continue to improve accessibility and inclusiveness of coastal and foreshore areas

CW-S04
Review and implement updated Beach Maintenance Program

CW-S01
Monitoring and improvement of coastal stormwater outlets

CW-E01
Review and implement Council's coastal water quality monitoring program

The inspection of all coastal stormwater outlets to identify those at risk from coastal hazards and opportunities where upgrades can be implemented or retrofitted in order to protect assets, reduce erosion from stormwater scour and/or improve public safety. These locations would also be regularly monitored to assess performance and improvements.

0 100 200
metres

DATE	**COORDINATE SYSTEM**	**FIGURE TITLE** Map A29	
23.03.2025	MGA 94 Zone 56	CMP Management Actions Killcare	
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**	
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Appendix B. Coastal Zone Emergency Action Subplan

CZEAS

CENTRAL COAST COUNCIL

Central Coast Open Coast Coastal Management Program

Coastal Zone Emergency Action Subplan

Document no. Rev C: 311015-00572-MA-RP-003

30 May 2025

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Synopsis

This report develops a Coastal Zone Emergency Action Subplan (CZEAS) for the Central Coast Open Coast Coastal Management Program (CMP) area based on the requirements of the *Coastal Management Act* 2016 as outlined in the Coastal Management Manual (DP&E, 2018), for those areas subject to immediate hazards from coastal hazards.

Disclaimer

PROJECT 311015-00572 - 311015-00572-MA-RP-003: Central Coast Open Coast Coastal Management Program - Coastal Zone Emergency Action Subplan

Rev	Description	Originator	Reviewer	Worley Approver	Revision Date	Customer Approver	Approval Date
Rev A	Issued for Client Review	L.Freeman	C.Adamantidis	C.Adamantidis	24 May 2024		
Rev B	Final Draft	L.Freeman	C.Adamantidis	C.Adamantidis	01 August 2024		
Rev C	Updated Final Draft	L.Freeman	C.Adamantidis	C.Adamantidis	30 May 2025		

-

30 May 2025

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Worley Consulting Pty Ltd
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Executive Summary

This report develops a Coastal Zone Emergency Action Subplan (CZEAS) for the Central Coast Open Coast Coastal Management Program (CMP) area based on the requirements of the *Coastal Management Act 2016* as outlined in the Coastal Management Manual (DP&E, 2018), for those areas subject to immediate hazards from coastal hazards.

The objectives of the CZEAS are to:

- outline measures to reduce the risk to public safety, the coastal environment and public assets arising from the coastal hazards of coastal erosion, inundation and cliff/slope instability brought about by storm activity
- identify key actions to be carried out by Council before, during and following a coastal emergency to reduce the risk to public safety, the coastal environment and public assets
- identify the responsibilities of other public authorities during a coastal emergency
- identify key areas and assets subject to immediate hazards and prioritise actions to reduce the risks to those areas and assets.

The CZEAS includes actions covering the four phases of emergency management as described in the Coastal Management Manual, namely:

- Prevention
- Preparedness
- Response
- Recovery

The study area for this CZEAS includes all the Coastal Management areas of the Central Coast Open Coast, including the Coastal Wetlands/Littoral Rainforest Areas, Coastal Vulnerability Areas, Coastal Environment Area and Coastal Use Area, as defined in the State Environmental Planning Policy Resilience and Hazards (RH SEPP 2021). The study area is shown in Figure 1-1.

The study area is subject to a high level of risk from coastal hazards (storm erosion, coastal inundation and cliff/slope instability). These areas are also subject to catchment derived flooding, for which a framework is available for emergency response through the central Coast Council Flood Emergency Subplan (CCC/NSW SES, 2021). Actions from the Flood Plan are relevant for coastal hazards also, but this CZEAS provides actions specific to Council for implementation prior to, during and following a coastal emergency.

Due to the large area of land affected by coastal inundation, it is not possible or practical to provide emergency protection works that would provide protection against coastal inundation. NSW SES is the agency responsible for the coordination of operations to protect property, with protection measures described in the Central Coast Council Flood Emergency Subplan.

Note that a CZEAS must not include matters dealt with in any plan made under the *State Emergency and Rescue Management Act 1989* (such as the NSW State Emergency Service Central Coast Council Flood Emergency Sub Plan), and no such duplication of material (or change in defined roles and responsibilities) has been included herein.

The legislative framework for emergency management in NSW and its relationship with coastal management legislation and the CMP is articulated in the Guideline for Preparing a Coastal Zone Emergency Action Subplan (Department of Planning, Industry & Environment (2019), and is illustrated in Figure 3-1.

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
BoM	Bureau of Meteorology
CM Act	*Coastal Management Act* 2016
CMP	Coastal Management Program
CZEAS	Coastal Zone Emergency Action Subplan
DCCEEW	Department of Climate Change, Energy, Environment & Water, formerly Department of Planning & Environment
EMPLAN	State Emergency Management Plan
EOC	Emergency Operations Centre
FRNSW	Fire and Rescue NSW
LEMC	Local Emergency Management Committee
EOCON	Emergency Operations Controller
NPWS	National Parks and Wildlife Service
REOCON	Regional Emergency Operations Controller
RH SEPP	State Environmental Planning Policy, Resilience and Hazards
SERM Act	*State Emergency and Rescue Management Act* 1989
SES	NSW State Emergency Service

1. Introduction

1.1 Background

Coastal communities and local councils are facing difficult issues associated with coastal hazards along the NSW Coastline. NSW has a framework for managing coastal risks through the *Coastal Management Act 2016* and the Coastal Management Manual 2018.

This report develops a Coastal Zone Emergency Action Subplan (CZEAS) for the Central Coast Open Coast Coastal Management Program area based on the requirements of the *Coastal Management Act 2016* as outlined in the Coastal Management Manual for those area subject to immediate hazards from coastal inundation, erosion and cliff instability.

1.2 Purpose and Objectives

According to the statutory provision in the *Coastal Management Act,* a coastal zone emergency action subplan is a plan that outlines the roles and responsibilities of all public authorities (including Council) in response to emergencies immediately preceding or during periods of beach erosion, coastal inundation or coastal cliff and slope instability, where these processes occur through storm activity or an extreme or irregular event. For the purpose of this subsection, these roles and responsibilities include the carrying out works for the protection of property affected or likely to be affected by coastal hazards.

The objectives of the CZEAS are to:

- set a clear definition for what constitutes a coastal emergency, and associated triggers for emergency response actions
- identify key areas and assets subject to immediate hazards from erosion, inundation and/or cliff instability and priorities action to reduce the risks to those areas and assets
- outline the roles and responsibilities of all public authorities, including Central Coast Council, and coordinate their response to emergencies immediately preceding or during periods of beach erosion, coastal inundation and coastal cliff and slope instability
- outline the communication required in the four phases of emergency management
- summarise key actions to be carried out in the four phases of the emergency
- identify approval pathways for CZEAS actions

The Plan includes actions covering the four (4) phases of emergency management as described in the Coastal Management Manual, namely:

- Prevention
- Preparedness
- Response
- Recovery

Note that the emergency action subplan must not include matters dealt with in any plan made under the *State Emergency and Rescue Management Act 1989* (such as the SES Central Coast Flood Emergency Sub Plan), and no such duplication of material (or change in defined roles and responsibilities) has been included herein.

The legislative framework for emergency management in NSW and its relationship with coastal management legislation and the CMP is articulated in the Guideline for Preparing a Coastal Zone Emergency Action Subplan (Department of Planning, Industry and Environment, 2019), and is illustrated in Figure 3-13-1.

1.3 Consultation

A draft copy of the CZEAS will be provided to those agencies involved in the implementation of the CZEAS, such as NSW Department of Climate Change, Energy, Environment & Water (DCCEEW), NSW State Emergency Service (SES) and approval agencies for review and comment. A final CZEAS will be developed that addresses any feedback received.

1.4 Study Area

The study area for the CZEAS includes the Central Coast open coast areas covered in the Central Coast CMP.

The study area is shown in Figure 1-1.

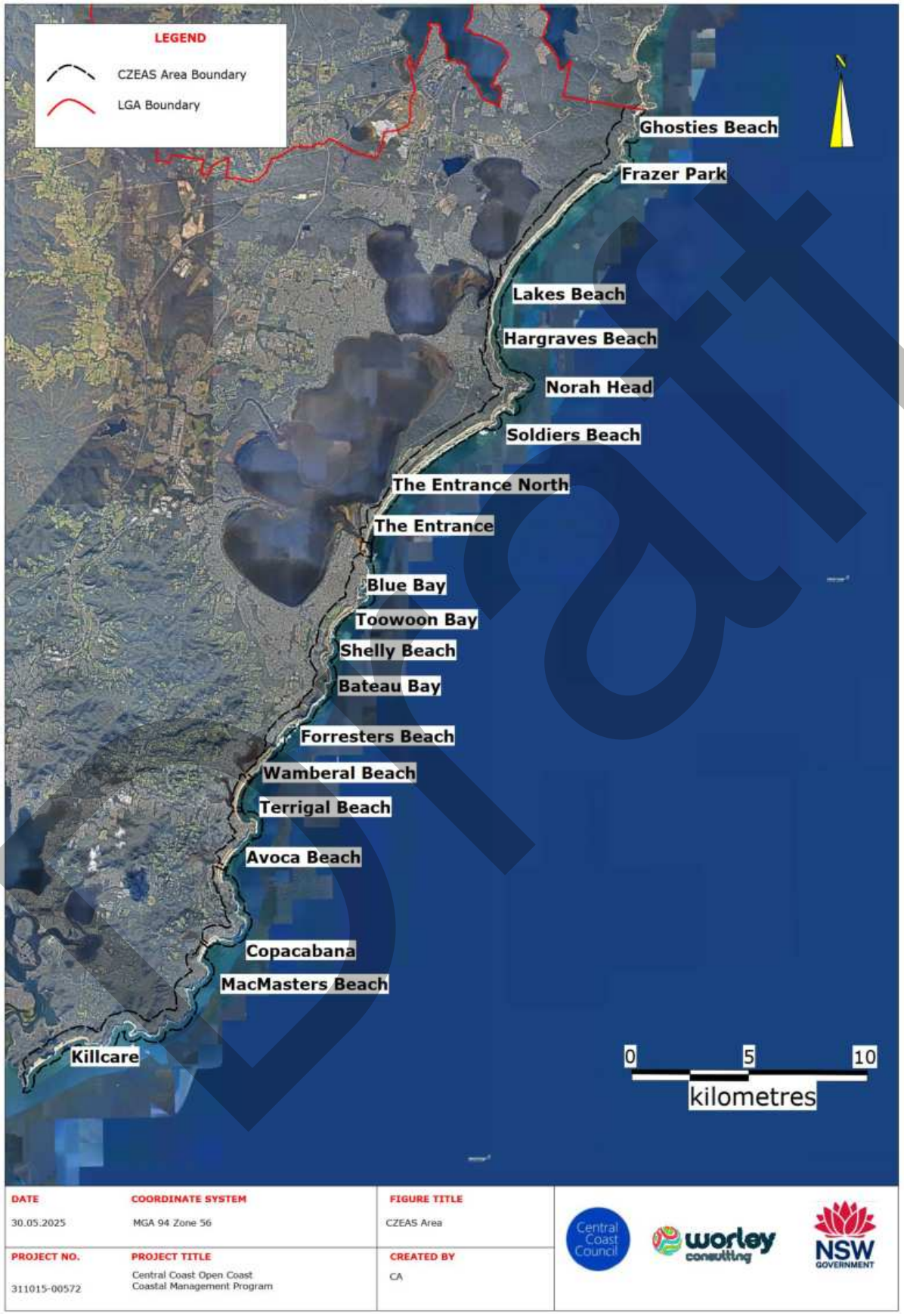

Figure 1-1: CZEAS Area

2. Establishing the Context

2.1 What is an Emergency?

An "emergency" is defined in the *State Emergency and Rescue Management Act 1989* and the NSW State Disaster Plan as:

"an emergency due to an actual or imminent occurrence (such as fire, flood, storm, earthquake, explosion, terrorist act, accident, epidemic or warlike action) which:

(a) endangers, or threatens to endanger, the safety or health of persons or animals in the State; or

(b) destroys or damages, or threatens to destroy or damage, any property in the State, being an emergency which requires a significant and co-ordinated response.

For the purpose of the definition of emergency, property in the State includes any part of the environment of the State. Accordingly, a reference in the Act to:

(a) threats or danger to property includes a reference to threats or danger to the environment, and

(b) the protection of property includes a reference to the protection of the environment."

A "coastal emergency" in the context of this emergency action Subplan can therefore be defined as an actual or imminent occurrence of a **coastal hazard** event which "endangers, or threatens to endanger, the safety or health of persons or animals" or "destroys or damages, or threatens to destroy or damage, any property, being an emergency which requires a significant and co-ordinated response."

Beach erosion is defined as occurring when wind, waves, currents or elevated ocean water levels are removing sediment that comprises the beach and frontal dune system, landward of the fully accreted condition. Beach erosion can create risks to public and private assets and present public safety risk. Not all beach erosion occurring during a storm event will trigger a coastal emergency.

Coastal inundation is defined in the NSW Coastal Management Manual Part B (DP&E, 2018) as occurring when a combination of marine and atmospheric processes raises ocean water levels above normal elevations, inundating low-lying areas. It is often associated with storms resulting in elevated still water levels (storm surge), wave setup, wave runup and wave overwash flows. For the estuaries, this type of inundation is the result of water levels at the estuary entrances being elevated above normal levels due to coastal storms, with the elevated water levels propagating inside the estuary. For the open coast, it is associated with wave overtopping of beach dunes and the extent of wave runup onto the back-beach area.

Note that the NSW State Flood Plan under the State Emergency and Rescue Management Act 1989 covers emergency actions at the state level for floods, which include "…***coastal inundation*** resulting from super-elevated sea levels and/or waves (including tsunami) overtopping coastline defences" (NSW State Flood Plan, 2021).

Cliff or slope instability refers to a variety of geotechnical processes on coastal cliffs and bluffs, including rock fall, slumps and landslides. It may be driven by coastal processes such as wave undercutting and overtopping, or by differential weathering of rock layers in cliffs and bluffs by surface and groundwater flows. Instability may occur during or following a coastal storm event, but may also occur at other times.

A "coastal emergency" in the context of this CZEAS can therefore be defined as an actual or imminent occurrence of a beach erosion, coastal inundation or cliff/slope instability event which "endangers, or threatens to endanger, the safety or health of persons or animals" or "destroys or damages, or threatens to destroy or damage, any property, being an emergency which requires a significant and co-ordinated response."

2.2 Emergency Management Measures

The Emergency Management Measures described in this Subplan have been formulated to cover the four phases of emergency management as described in the NSW Coastal Management Manual and the SERM Act, namely:

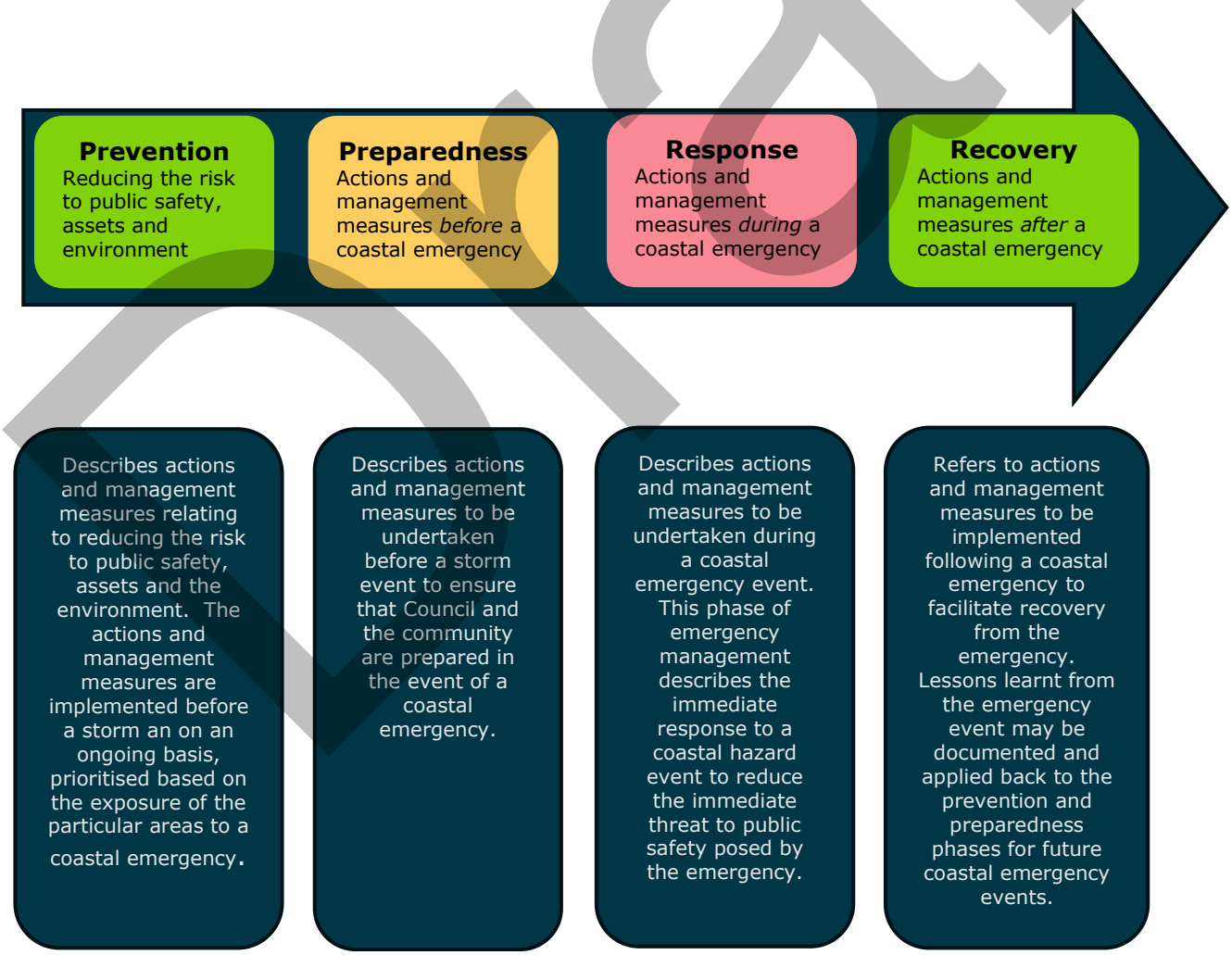

Figure 2-1:The Four Phases of Emergency Management

2.3 Triggers for Action

The actions contained in this CZEAS are triggered by the release of a "Severe Weather Warning for Damaging Surf" or "Severe Weather Warning for Storm Tides" from the Bureau of Meteorology. This is the same trigger as that used by the NSW State Emergency Service (NSW SES) as a primary test of whether or not they should be involved in a potential coastal erosion (and/or inundation) event.

The Bureau of Meteorology specifies thresholds when issuing warnings of 'severe' storms. These are consistent across the range of the Bureau's warning services (as outlined in the NSW State Storm Plan). For coastal emergencies, the relevant thresholds are:

- Waves equal to or exceeding 5m in height in the surf zone.
- Sea level higher than 50cm above the Highest Astronomical Tide (Abnormally High Tides and Storm Surge).

In addition to the official warnings from the Bureau of Meteorology, the NSW State Storm Plan stipulates that the response phase of the storm plan is triggered when information processes or intelligence indicates imminent or actual storm impacts to the community. For example, if there is no official warning from the Bureau of Meteorology, other evidence may be used to determine that there is a coastal hazard risk to the community that will trigger the actions in this CZEAS i.e. verbal advice from the Bureau of Meteorology, advice issued from the Department of Climate Change, Energy, Environment & Water (DCCEEW) Coastal Expert.

A prescriptive set of trigger conditions that would be used to initiate individual Council actions in relation to coastal hazard emergencies is difficult to stipulate, as such conditions would be unlikely to cover every situation. Examples of complexities include variability in storm conditions (wave height and period, wave direction, water level, location of rips), state of the tide, state of the beaches/dunes etc. and forecasts. In practice, expert engineering judgement would need to be applied at times of storms to assess when to initiate particular (during-storm) actions as required. This approach relies on regular monitoring of environmental conditions and seeking appropriate advice when required.

A proposed set of conditions for triggering the Preparedness, Response and Recovery phases of the CZEAS is presented in Figure 2-22-1. This includes proposed local triggers. Monitoring data sources that can be used to determine whether trigger levels have been met are provided in Table 2-1.

Table 2-1 Data sources for monitoring for trigger events, LGA-wide and local triggers

Phase	Trigger	Data Sources
Prevention Phase	Prevention actions are to be undertaken as soon as practicable and are independent of the occurrence of a coastal inundation emergency	**BoM Interactive Weather and Wave Forecast Maps:** http://www.bom.gov.au/australia/charts/viewer/index.shtml **NSW Weather and Warnings Summary:** http://www.bom.gov.au/nsw/index.shtml?ref=hdr
Preparedness Phase	**LGA-wide trigger:** Significant wave height at Sydney to exceed 5 m within next 5 days **Site specific triggers:** Sydney Hs forecast to exceed 3m, direction ESE to NE within next 5 days apply at the following locations, subject to advice/consultation with DCCEEW: • MacMasters Beach (south of lagoon) • Avoca (south of lagoon) • Terrigal • Wamberal (south of Wamberal lagoon) • Toowoon Bay • Blue Bay • The Entrance • The Entrance North • Norah Head	**BoM Interactive Weather and Wave Forecast Maps:** http://www.bom.gov.au/australia/charts/viewer/index.shtml **NSW Weather and Warnings Summary:** http://www.bom.gov.au/nsw/index.shtml?ref=hdr Refer also **Wave forecasts** at NSW Nearshore Wave Tool website: https://nearshore.waves.nsw.gov.au/home/forecast
Response Phase	**LGA-wide trigger:** Significant wave height at Sydney to exceed 5 m within next 12 hours **Site specific triggers:** Sydney Hs forecast to exceed 3m, direction ESE to NE within next 12 hours, **OR** coastal hazards are impacting critical public infrastructure. Site specific triggers apply at the following locations, subject to advice/consultation with DCCEEW: • MacMasters Beach (south of lagoon) • Avoca (south of lagoon) • Terrigal • Wamberal (south of Wamberal lagoon) • Toowoon Bay • Blue Bay • The Entrance • The Entrance North • Norah Head	**BoM Interactive Weather and Wave Forecast Maps:** http://www.bom.gov.au/australia/charts/viewer/index.shtml **NSW Weather and Warnings Summary:** http://www.bom.gov.au/nsw/index.shtml?ref=hdr Refer also **Wave forecasts** at NSW Nearshore Wave Tool website: https://nearshore.waves.nsw.gov.au/home/forecast

Phase	Trigger	Data Sources
Recovery Phase	Wave heights fall below trigger levels for 24 hours, BoM lifts warnings and confirmation that danger has passed received from DCCEEW	**BoM Interactive Weather and Wave Forecast Maps:** http://www.bom.gov.au/australia/charts/viewer/index.shtml **NSW Weather and Warnings Summary:** http://www.bom.gov.au/nsw/index.shtml?ref=hdr

2.3.1 Who is the lead Agency?

During an emergency, hazard specific EMPLANs are implemented by the identified lead Combat Agency.

The State Emergency Service (SES) is the lead Combat Agency during a coastal emergency response which triggers an EMPLAN for storm activity (NSW State Storm Plan 2023). Under the NSW State Storm Plan (2023) Action 1.4.3 identifies that the emergency management of coastal erosion not caused by storm activity will be controlled and coordinated by the Emergency operations Controller (EOCON). Council would follow the direction of the Combat Agency and provide support as outlined within the Central Coast Local EMPLAN, Central Coast Flood Emergency Subplan, NSW State Storm Plan 2023 and this CZEAS.

However, CZEASs can be implemented without enforcement of Local, Regional or State EMPLANs. Coastal emergencies which do not trigger the implementation of EMPLANs under the SERM Act will be managed by Council, with assistance from appropriate response agencies for situations where the coastal emergency exceeds Council's resources and capabilities. For example, if Council's ongoing beach monitoring identifies that the beaches are in a depleted state following recent coastal erosion events, there is a risk of a coastal emergency requiring action by Council being triggered without an EMPLAN for storm activity being triggered.

This relationship is outlined in Figure 2-3.

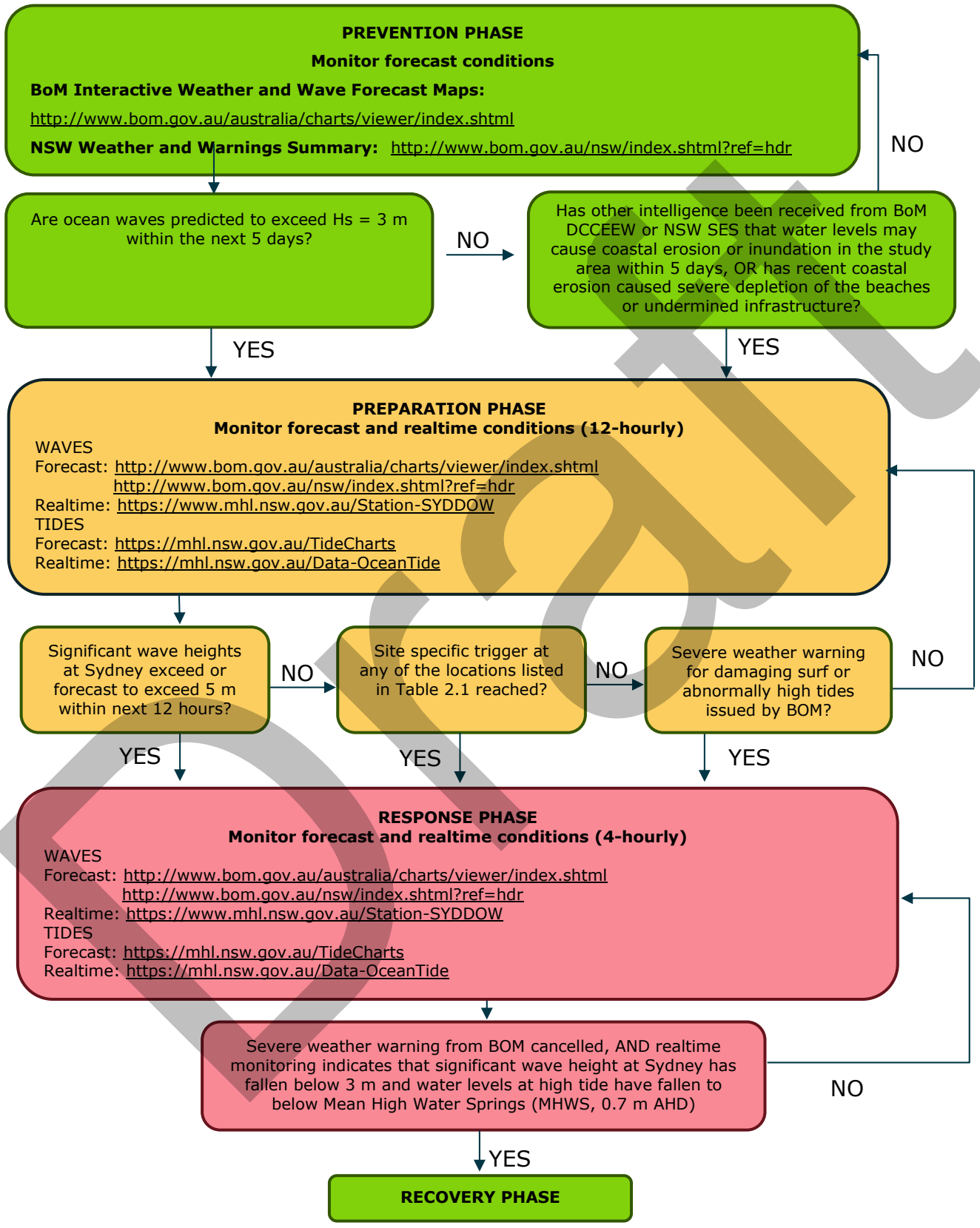

Figure 2-2: Trigger conditions for preparedness, response and recovery phases of CZEAS

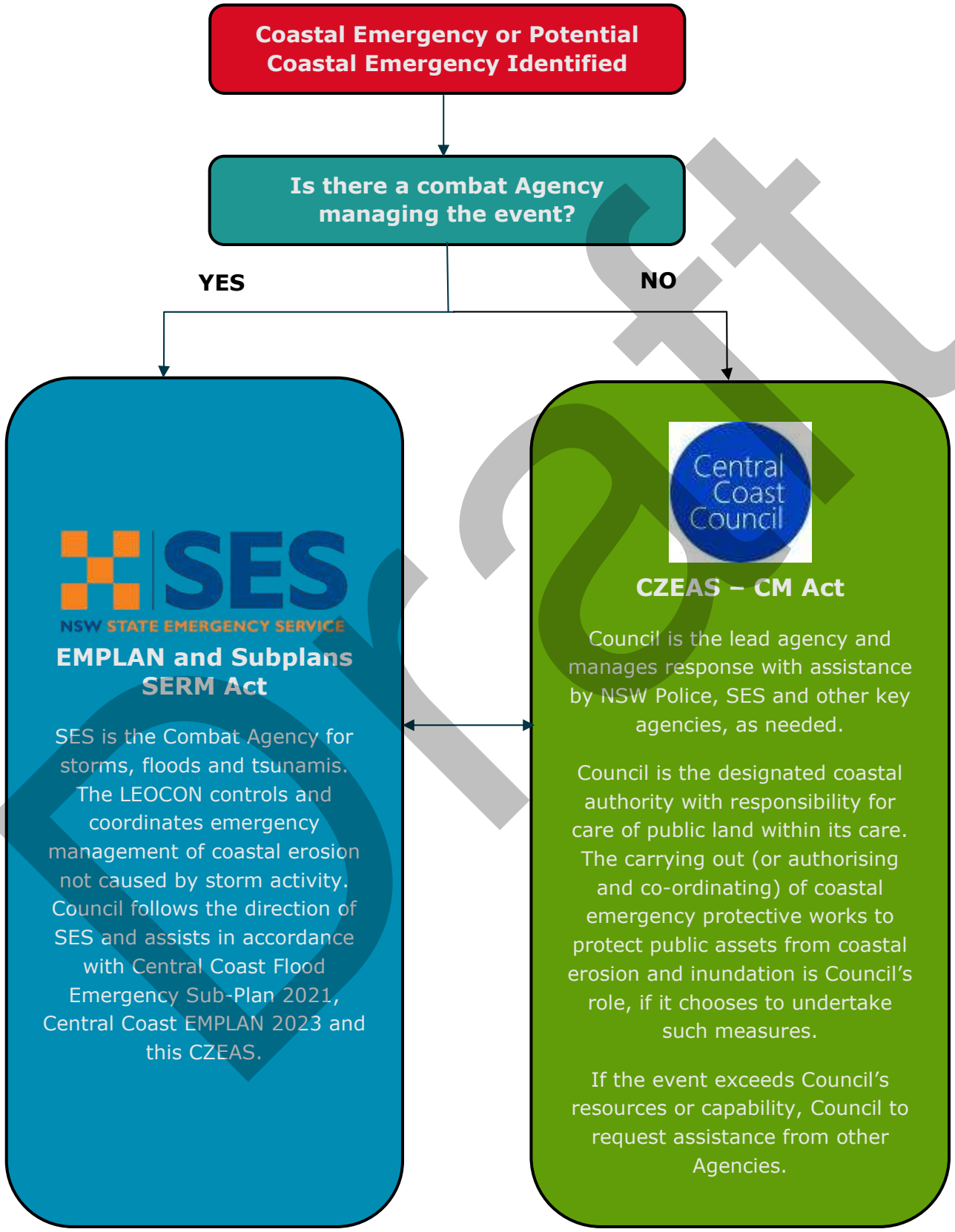

Figure 2-3: Lead Agency for Coastal Emergencies

3. Roles and Responsibility in Coastal Emergency Management

3.1 Overview

The roles and responsibilities of the State Emergency Service (SES), Central Coast Council, Department of Climate Change, Energy & Environment (DCCEEW), Bureau of Meteorology and NSW Police in coastal emergency management are described below. Further discussion on these matters is provided in the *NSW State Storm Plan* (2023) as well as the Local Emergency Plan, State Flood Plan and Local Flood Plan in relation to flooding (coastal inundation).

3.2 CZEAS Relationship to other State Emergency Plans

The relationship of this CZEAS to other State Emergency Plans is illustrated in Figure 3-13-1. A brief overview of these Plans, which are made under the SERM Act, is described below. As noted in Section 1, a CZEAS must not include matters dealt with in any plan made under the SERM Act and no such duplication of material (or change in defined roles and responsibilities) has been included herein.

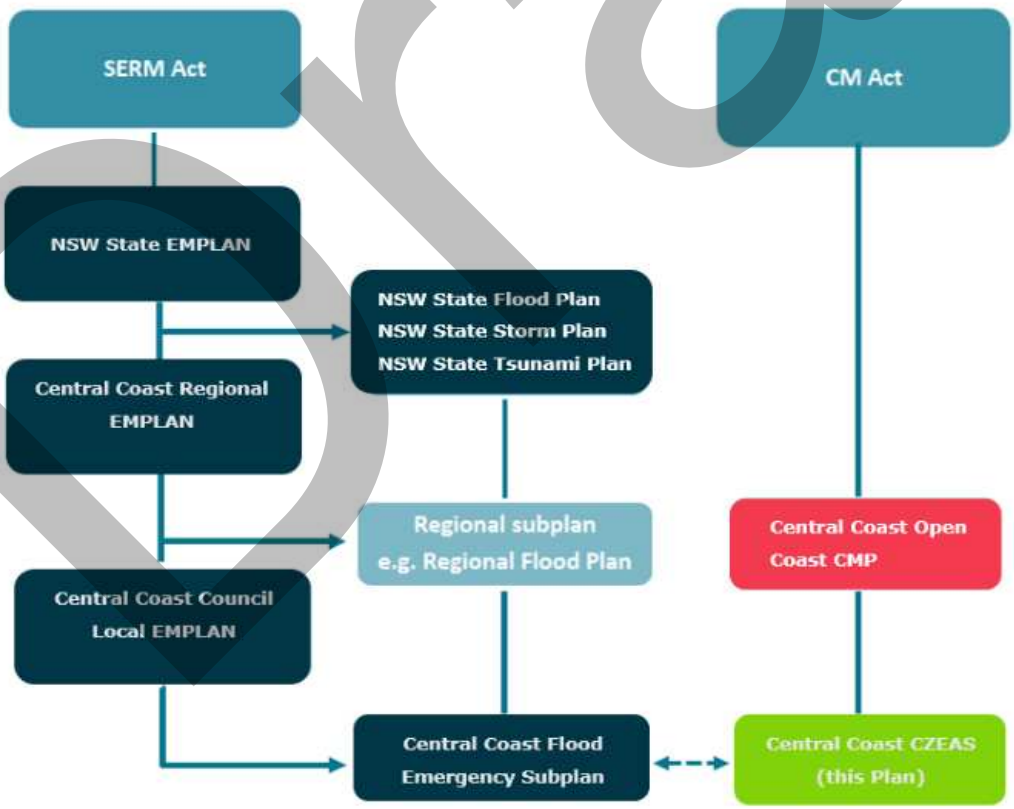

Figure 3-1: Simplified legislative framework for emergency management in NSW and its relationship with coastal management legislation and coastal management programs related to coastal hazards (NSW DPIE, 2019)

Table 3-1 Roles and Responsibilities of Agencies with a role in Emergency Management

Agency	Role
Central Coast Council	• **No protection of private homes or structures is proposed under this CZEAS.** • Develop and implement this CZEAS within coastal vulnerability areas in accordance with the requirements of the CM Act, and provide the NSW SES with a copy of this CZEAS (NSW SES 2023). • Consult with NSW SES in the development of council emergency arrangements including this CZEAS to ensure compatibility with the NSW State Storm Plan (NSW SES 2023). • Assist the NSW SES with community awareness programs to ensure people in locations potentially threatened by coastal inundation understand the threat and its management (NSW SES 2023). • Subject to the availability of council resources, assist the NSW SES with storm damage operations, including reconnaissance, traffic management on council managed roads, provision of plant, equipment, and personnel, including headquarters staff where able and as requested (NSW SES 2023). • Council is the designated coastal authority with responsibility for care of public land within its care, control and management as per the CM Act. The carrying out (or authorising and co-ordinating) of coastal emergency protective works to protect public assets from coastal erosion and inundation is Council's role, if it chooses to undertake such measures. However, works would not be practical or appropriate for the protection of property against coastal hazards within the study area, due to the large number of properties affected. Construction of coastal protection works during a coastal emergency is also unlikely to be effective due to the scale of the area affected, ocean conditions and safety considerations for workers and the public. For these reasons construction of coastal protection works under this CZEAS is not recommended. • Implement emergency actions in this CZEAS relating to Prevention & Preparation, Response and Recover phases.
Emergency Operations Controller (EOCON)	Monitor coastal emergency event operations. Coordinate support to the NSW SES Local Incident Controller, if requested to do so.
Regional Emergency Operations Controller (REOCON)	The REOCON is responsible for the overall control and coordination of emergency response operations at Region level for which the REOCON is the designated controller (NSW State Emergency Management Plan 2023). The REOCON is also the designated controller where there is no designated Combat Agency, or where it is necessary to coordinate two or more local level operations which are controlled by Emergency Operations Controllers, or when directed by the SEOCON. The REOCON is responsible, when requested by a combat agency, to co-ordinate the provision of resources support.
State Emergency Operations Controller (SEOCON)	• Responsible for the control and coordination of emergency response operations at State level, for which the SEOCON is the designated Controller or where there is no designated Combat Agency (NSW State Emergency Management Plan 2023). • Provide advice to the Minister regarding emergencies, including whether or not a declaration of a 'State of Emergency' may be necessary. • Consider requests for State or Commonwealth assistance. • Coordinate the establishment of a Major Evacuation Centre in accordance with Major Evacuation Centre Guidelines if required.
NSW State Emergency Service	NSW State Emergency Service (SES) is responsible for the protection of persons from danger, to their safety and health, and to protect property from destruction or damage arising from storms (SES Act, 1989). Designated Combat Agency for flood, storm and tsunami. Warning and evacuation of residents at risk and coordinating protection of property (e.g., sandbagging to minimise entry of water into buildings and lifting and/or relocating readily moveable household goods and commercial stock and equipment). These activities would

Agency	Role
	be carried out in accordance with the NSW SES Local Flood Sub Plan, NSW Flood Plan and NSW State Storm Plans. NSW SES's legislated role is to assist in the short-term transition to recovery. NSW SES is not authorised to undertake coastal emergency protective works (such as placement of rocks or sand-filled geotextile containers) of any form. The NSW State Storm Plan (2023) outline specific roles for the NSW SES for storm activity likely to result in coastal erosion and/or inundation. During an emergency event the NSW SES will deliver public information warnings in line with Australian Warning System (AWS) Framework.
Department of Climate Change, Energy, the Environment and Water	DCCEEW is the NSW government authority responsible for advising on coastal zone management. The role of DCCEEW is defined in the NSW State Storm Plan (2023) as: • Oversee the delivery of the NSW Coastal legislation including financial support through the CMP and technical advice to Council and state agencies including assistance with the identification of risks in areas which are subject to coastal erosion, the preparation and implementation of management plans and programs and associated mitigation and management actions • Advise the NSW SES about conditions which may lead to coastal erosion. • Provide storm damage response teams to assist the NSW SES and National Parks and Wildlife Service (NPWS). • Provide related advice on coastal hazards to the NSW SES on request. • Support recovery committees as required.
Bureau of Meteorology	The BoM role in relation to storm events including coastal inundation is outlined within the NSW State Storm Plan (2023). This includes: • maintaining, coordinating, and delivering operational 24-hour weather forecast and warning services to the NSW community. • Provide weather, wave, and sea level information directly to the NSW SES, SEMC and other relevant agencies. • Provide the NSW SES with intelligence that conveys the development and progression of storm events. • Formulating, issuing, and publishing official forecasts and warnings and including NSW SES safety messages within warnings. A "Severe Weather Warning for Damaging Surf" is issued if waves in the nearshore zone are forecast to exceed a significant wave height of 5 m (irrespective of wave period) in the next 24 hours. A "Severe Weather Warning for Abnormally High Tides" is issued if storm surge, wave setup or and/or outflow from river flooding are expected to raise ocean water levels significantly above Highest Astronomical Tide.
NSW Police Force	The NSW Police Force is the agency responsible for: • law enforcement and search and rescue • controlling and coordinating the evacuation of victims from the area affected by the emergency in conjunction with the combat agency being the combat agency for terrorist acts. Some members of the NSW Police may also be appointed as Emergency Operations Controllers. The role of the NSW Police in relation to storms including coastal erosion and coastal inundation are outlined within the NSW State Storm Plan and the NSW Flood Plan. Police would typically become involved in a coastal emergency event as follows: • assisting NSW SES where required (for example assisting with warnings and/or evacuations and road and traffic control operations and managing disaster victim registrations/evacuation) The NSW Police Force is not responsible for controlling, coordinating or mitigating any physical mitigation works to protect properties or structures at risk from coastal erosion or inundation, either during or outside the period of storm activity.
NSW Rural Fire Service (RFS)	The role of NSW Rural Fire Service in relation to coastal emergencies is outlined within the State Storm and NSW Flood Plans. They have a Mutual Aid Agreement with the NSW SES

Agency	Role
	and would have a support role assisting the SES during a coastal emergency. In particular, NSW RFS would become involved during a coastal emergency in the following ways: • assist the NSW SES in monitoring / reconnaissance of areas potentially damaged by storms • provide storm damage response teams to assist the NSW SES, including strike teams when requested, to assist the NSW SES • assist with the evacuation of at-risk communities • provide staff to support a spatial information group established by the NSW SES.
National Parks and Wildlife Service (NPWS)	Roles and responsibilities are outlined in NSW State Storm Plan (NSW SES, 2023) and NSW State Flood Plan (NSW SES, 2021) and include: • Assist the NSW SES with identification of road infrastructure in National Parks at risk from storms. • Close and reopen NPWS managed roads when affected by storms and advise the NSW SES of its status. • Facilitate safe reliable access by emergency resources on NPWS managed roads. • Assist the NSW SES with the communication of warnings and information provision to the public through variable message signs and other appropriate means.
Transport for NSW (TfNSW)	TfNSW (Maritime), following the direction of the NSW Police Force will assist in the identification and recovery of vessels.
Reconstruction Authority	The NSW Reconstruction Authority (RA) was established to proactively reduce the impact of future disasters across NSW and to help communities recover from them faster. When disasters occur, RA work closely with emergency services and community leaders to understand what local communities need to recover. Once the immediate threat has eased, we lead recovery efforts in collaboration with community leaders and other recovery partners.
Other agencies	Other agencies with a role in Emergency Management include: • NSW Ambulance • Department of Justice, Office of Emergency Management • Housing NSW • Marine Rescue NSW • NSW Reconstruction Authority • NSW Volunteer Rescue Association • Surf Lifesaving NSW Full details of the role of these Agencies are described in the NSW State Storm Plan (NSW SES 2023) and NSW State Flood Plan (NSW SES, 2021).

4. Coastal Hazards

4.1 Overview

This CZEAS applies to those locations identified as being affected by beach erosion, coastal inundation or cliff and slope instability as noted in the latest Open Coast CMP coastal hazard study (Bluecoast Consulting Engineers, 2024).

It is possible that coastal hazards could affect additional locations not currently identified as being at risk within the open coast of Central Coast LGA. If further locations become at risk, Council should assess these locations and revise this CZEAS to include the new locations.

4.2 Areas Subject to Coastal Hazards

Those private and public assets and infrastructure at risk from beach erosion have been identified using the immediate hazard line mapping from Council's adopted coastal hazard mapping dataset (Bluecoast Consulting Engineers, 2024).

The areas identified at immediate risk of beach erosion are shown in Table 4-14-1.

The CM Act defines critical infrastructure as infrastructure for the following purposes: electricity generation, transmission and distribution, telecommunications, rails, roads, gas, sewerage systems, water supply systems of stormwater management systems, airports, ports shipping and harbours. Particular attention should be given to at risk critical infrastructure.

Table 4-1: Locations where roads and infrastructure are impacted by coastal hazards for the 1% AEP, in the present day

Location	Scenario	Infrastructure and property at risk under Present day	Temporary Road Closures/ Triggers for Action
Killcare SLSC (refer Map C1 Appendix A)	1% AEP	Inundation (wave runup/overtopping) of foreshore reserve in front of SLSC Erosion risk to SLSC building and local beach accessways Slope instability risk at cliffs south of SLSC building	• Close access to SLSC for general public, authorised personnel only allowed • Close beach accessways in immediate erosion zone.
MacMasters Beach (refer Map C2 Appendix A)	1% AEP	Inundation (wave runup/overtopping) of Marine Parade and parking spaces on seaward side of Marine Parade Erosion risk to Marine Parade Erosion risk to SLSC Slope instability risk at cliffs south of SLSC building Erosion risk to seaward side of properties at Tudibaring Parade	• Close access to Marine Parade for general public at Gerda Road, authorised personnel only allowed • Close beach accessways in immediate erosion zone.
Copacabana (refer Map C2 Appendix A)	1% AEP	Erosion Risk to Del Monte Place Slope instability risk to private properties and foreshore reserve at top of cliffs to east of Copacabana Beach, Del Monte Place	• Close access to Del Monte Place for general public between Del Mar Drive and Del Rio Drive; provide local diversion via Del Rio Drive. • Close beach accessways in immediate erosion zone.
Avoca Beach (refer Map C3 Appendix A)	1% AEP	Inundation (wave runup/overtopping) of private lots, public reserve, carpark and SLSC building at Avoca Drive Inundation (wave runup/overtopping) of private lots, carpark and Heazlett Park, Ficus Avenue Inundation (wave runup/overtopping) at Burns Street Isolation of beachfront lots along Avoca Drive and Ficus Avenue Coastal erosion at seaward ends of approximately ten private lots at Avoca Drive	• Avoca Drive, Burns St, Ficus avenue for general public but allow access for emergency services, residents and evacuation. Install local traffic diversions • Close beach accessways in immediate erosion zone.
North Avoca **(refer Map C3 Appendix A)**	1% AEP	Inundation (wave runup/overtopping) of roadway and private lots at Bareena Avenue Inundation (wave runup/overtopping) of roadway and private lots at Lake Street Inundation (wave runup/overtopping) of roadway and private lots at Ocean Street	• Close access to Lake Street and Bareena Avenue at Lake Street landward of Bareena Avenue intersection, but allow access for emergency services, residents and evacuation. • Close access to Ocean Street at Elgata Avenue intersection, but allow access for emergency services, residents and evacuation.

Location	Scenario	Infrastructure and property at risk under Present day	Temporary Road Closures/ Triggers for Action
		Inundation (wave runup/overtopping) of roadway and private lots at North Avoca Parade Inundation (wave runup/overtopping) of roadway and private lots at View Street Inundation (wave runup/overtopping) of roadway and private lots at Elgata Avenue Slope instability risk to private lots and roadway at Scenic Highway Coastal erosion risk at seaward ends of oceanfront lots Coastal erosion risk at approximately six beach accessways	• Close access to View Street at Elgata Avenue intersection, but allow access for emergency services, residents and evacuation. • Close access to North Avoca Parade at Bulbabaring Road, but allow access for emergency services, residents and evacuation. • Assess landslip risk at Scenic Drive and close access to at-risk zone shown in Map C3 if required.
Terrigal **(refer Map C4 in Appendix A)**	1% AEP	Inundation (wave runup/overtopping) of commercial centre at Terrigal Esplanade, Church Street, Campbell Cres. Inundation, wave overtopping and slope instability at the Terrigal Boardwalk Wave overtopping of seawall at Terrigal Haven Slope instability at The Skillion Wave overtopping of seawall at Terrigal Esplanade	• Close pedestrian access to Terrigal Boardwalk at either end with barricades • Close access to Terrigal Esplanade between Campbell Crescent and Kurrawyba Avenue for public access, evacuation and emergency services only • Close access to Church Street between Church Street and Kurrawyba Avenue, for public access, evacuation and emergency services only • Install local traffic diversions as required.
Wamberal **(refer Map C5 in Appendix A)**	1% AEP	Coastal erosion and inundation (wave runup/overtopping) of all private lots seaward of Pacific Street Coastal erosion and inundation (wave runup/overtopping) of all private lots seaward of Ocean View Drive between Pacific Street and Calais Road Coastal erosion and inundation (wave runup/overtopping) of all private lots and SLSC building seaward of Calais Road	• Ocean View Drive will be key evacuation route • Monitor ongoing erosion at 25/25B Ocean View Drive for risk of wave overtopping and breakthrough to Terrigal Lagoon. If erosion escarpment reaches trigger distance of 15 m from edge of road and Preparedness phase of CZEAS triggered, install emergency coastal protection

Location	Scenario	Infrastructure and property at risk under Present day	Temporary Road Closures/ Triggers for Action
			works at this location (refer Map C5 and Section 8 for details)
Forresters Beach **(refer Map C6 in Appendix A)**	1% AEP	Geotechnical hazard affecting land seaward from Kalakau Avenue and North Scenic Road, public land, amenities and private lots	• Close public beach accessways where impacted by slope instability, monitor and repair damaged infrastructure as required
Bateau Bay **(refer Map C7 in Appendix A)**	1% AEP	Geotechnical hazard affecting land seaward from Reserve Drive, public land and beach access in hazard zone	• Close public beach accessways where impacted by slope instability, monitor and repair damaged infrastructure as required
Blue Lagoon **(refer Map C7 in Appendix A)**	1% AEP	Geotechnical hazard affecting land seaward from Bateau Bay Road (landward of Blue Lagoon Beach Resort) Beach accessways at erosion risk	• Close beach accessways where unsafe and impacted by coastal erosion • Monitor and repair damaged infrastructure as required.
Shelly Beach **(refer Map C8 in Appendix A)**	1% AEP	Coastal erosion hazard impacting beach accessways	• Close beach accessways where unsafe and impacted by coastal erosion
Toowoon Bay **(refer Map C9 in Appendix A)**	1% AEP	Coastal inundation (wave runup and overtopping) impacting Toowoon Bay carpark, SLSC building, foreshore reserve Geotechnical instability hazard impacting private lots behind beach Coastal erosion hazard impacting beach accessways	• Monitor and repair damaged infrastructure as required.
Blue Bay **(refer Map C9 in Appendix A)**	1% AEP	Coastal inundation (wave runup and overtopping) impacting seaward end of private lots and beach accessways Geotechnical instability hazard impacting private lots behind beach Coastal erosion hazard impacting seaward end of private lots and beach accessways	• Close beach accessways where unsafe and impacted by coastal erosion
The Entrance **(refer Map C9 in Appendix A)**	1% AEP	Coastal inundation impacting seaward end of lots at Marine Parade Slope instability impacting along parts of Marine Parade	• Monitor and repair damaged infrastructure as required. • Monitor The Entrance foreshore coastal protection works for undermining/potential for collapse and

Location	Scenario	Infrastructure and property at risk under Present day	Temporary Road Closures/ Triggers for Action
			close access to foreshore reserve/shared pathway if required
The Entrance North **(refer Map C10 in Appendix A)**	1% AEP	Coastal inundation at Hutton Road, Hargraves St., Roberts St., Leonard St., Florida St. Manly Pde., Bondi St., Coogee Ave., Mini St., Curtis Parade, Wyuna Avenue, Central Coast Highway Coastal erosion risk at all oceanfront lots on Hutton Road south of Hargraves St. Coastal erosion risk at all oceanfront lots on Curtis Parade	• Temporary road closures possible at Hutton Road, Hargraves St., Roberts St., Leonard St., Florida St. Manly Pde., Bondi St., Coogee Ave., Mini St., Curtis Parade, Wyuna Avenue, Central Coast Highway
Soldiers Beach and Norah Head **(refer Map C11 in Appendix A)**	1% AEP	Coastal inundation Bald St. Norah Head Slope instability at Cabbage Tree Harbour and Jenny Dixon Beach	• Temporary closure of beach accessways at Soldiers Beach
Hargraves Beach and Lakes Beach **(refer Map C12 in Appendix A)**	1% AEP	Slope instability at Cabbage Tree Harbour and Jenny Dixon Beach Coastal inundation and erosion risk at Elizabeth Drive, and oceanfront lots at Budgewoi Road, Hargraves Beach Possible coastal erosion and inundation risk at The Lakes SLSC	• Temporary closure of Elizabeth Drive and/or Budgewoi Road due to wave overtopping/coastal inundation, at locations shown in map.

5. Communication Protocols

As part of the CZEAS, the *Guidelines for Preparing a Coastal Zone Emergency Action Subplan* (NSW DPIE 2019) stipulate that a communication protocol to be used before, during and after a coastal emergency will need to be prepared. The protocol is to outline procedures to:

- engage with landholders in the coastal vulnerability area to raise awareness of coastal emergency events and the dangers these conditions may present
- inform landholders of actions council will take during an emergency, what actions a landholder may need to take and any assistance that may be available to them
- issue safety advice to landowners and the community of the likelihood of an impending emergency that would initiate actions under the CZEAS
- advise Council staff of all emergency management procedures and ensure they have the capacity to respond.

A proposed communications protocol is presented below.

Table 5-1. Communications protocol for this CZEAS

Emergency Phase	Communications
Prevention (sunny-day preparedness)	• Share information with NSW SES for incorporation into coastal inundation planning and intelligence for the study area and for updating the Local Flood Plan. • Make a copy of the CZEAS available through Council's existing Emergency website • Provide practical emergency management information to the community through Council's website and in the form of signage and brochures at local community centres. • Inform the community of Council's intended emergency responses under this CZEAS to improve readiness for emergency events. • Contribute to emergency management-related community engagement activities coordinated by the NSW SES and/or the LEMC. • Through the LEMC, provide routine emergency management briefings to communicate the strategy outlined in this plan including coastal emergency triggers, areas at risk, roles and responsibilities and response action plan.
Preparation (before a storm)	• Seek advice from NSW SES, BoM or coastal experts from DCCEEW-CPHR to assess potential for occurrence of a coastal emergency and, subject to availability of resources, offer assistance that may be requested by NSW SES (in accordance with the arrangements set out within the NSW State Storm Plan). • Contact authorised personnel responsible for emergency plant and equipment to ensure personnel are on stand-by and sufficient sandbags, sand stockpiles, warning signage and road closure barricades/tape are available for use if required.
Response (during a storm)	• If a coastal emergency is as a result of storm/flood/tsunami - NSW SES as the combat agency will coordinate all public information during the response phase. If not, council is responsible for public information. • In consultation with the NSW SES and BoM, provide public information about approaching coastal emergencies where possible through digital means. This would involve updates to Council's emergency website keeping messaging consistent with the national approach outlined in the Australian Warning System Framework (AIDR 2021); i.e. Advice (yellow), Watch and Act (orange), Emergency Warning (red), refer Section 5.1.

Emergency Phase	Communications
	• Coordinate with the NSW SES to ensure residents are aware of urgent hazards during emergency events and provide assistance with door-to-door communication as necessary • Accurately record and report information relevant to Council emergency response activities and any real time coastal inundation information (including road closure information) to the NSW SES Incident Controller. This may be in the form of a combined Emergency Operations Centre (EOC) report, or direct from agencies where an EOC has not been established. • Subject to availability of resources, offer assistance that may be requested by NSW SES.
Recovery (after a storm)	• Document records of decisions made and the reasoning in making those decisions (before, during and after coastal inundation emergencies). • Liaise with property owners as required to ensure any private and/or public structures do not pose a risk to the public.

5.1 Australian Warning System Framework

In accordance with the Communications Protocol outlined in this CZEAS, Council is to consult with the NSW SES and BoM, in order to help provide public information about approaching coastal emergencies.

The design of Council's external messaging during an emergency event should be aligned with the Australian Warning System framework (AIDR, 2021) – which is a national approach to information and warnings during emergencies like bushfire, flood, storm, extreme heat, and severe weather.

There are three warning levels, provided in as per AIDR (2021).

Table 5-2 Warning levels from the Australian Warning System Framework (AIDR 2021)

Alert Level	Description
Advice (Yellow)	An incident has started. There is no immediate danger. Stay up to date in case the situation changes.
Watch and Act (Orange)	There is a heightened level of threat. Conditions are changing and you need to start taking action now to protect you and your family.
Emergency Warning (Red)	An Emergency Warning is the highest level of warning. You may be in danger and need to take action immediately. Any delay now puts your life at risk.

A consistent set of hazard icons has been developed for each warning level. There are icons for cyclone, bushfire, flood, extreme heat, storm, and other. There is a consistent shape and colour scheme, with icons increasing in size as the warning level increases.

For coastal hazards, it is suggested that the most appropriate icon to use is the icon for flood, or "other" as provided below in Figure 5-1.

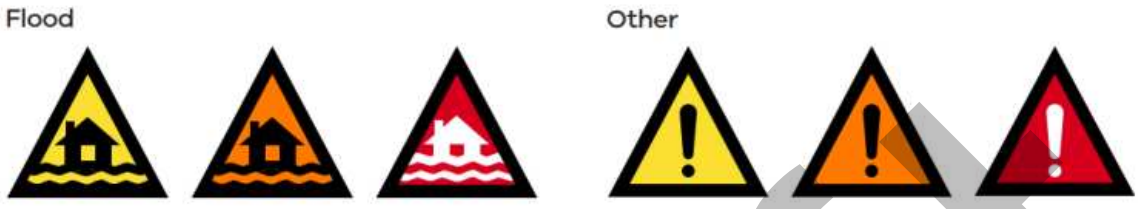

Figure 5-1 National Hazard Icons under the Australian Warning System Framework.

Table 5-3.

Table 5-3 Action statements for coastal inundation under each warning level

Advice	Watch and Act	Emergency Warning
Prepare now **Stay informed** **Monitor conditions** **Stay informed/threat is reduced** **Avoid the area** **Return with caution**	Prepare to leave/evacuate Leave/evacuate now (if you are not prepared) Prepare to take shelter Move/stay indoors Stay near shelter Walk two or more streets back Monitor conditions as they are changing Move to higher ground (away from creeks/rivers/coast) Avoid the area/avoid the flooded area Stay away from damaged buildings and other hazards Prepare for isolation Do not enter flood water Not safe to return Prepare your property (cyclone/storm)	Leave/evacuate (immediately, by am/pm/hazard timing) Seek/take shelter now Shelter indoors now Too late/dangerous to leave

6. Emergency Management Measures

6.1 LGA-wide Actions

The following table provides a list of actions for the CZEAS including:

- triggers for implementation of the CZEAS
- the identification of actions that Council should undertake before, during and after a coastal erosion or inundation emergency.

Note that the CZEAS is independent of the Central Coast Local Emergency Subplan but may be triggered at the same time as this CZEAS. Council will need to fulfil its required responsibilities and undertake action under that plan in conjunction with the actions outlined in this CZEAS.

6.2 Site-Specific Actions

In addition to the LGA-wide actions specified in the table below that would apply generally to all areas impacted by a coastal emergency, site-specific emergency actions that would apply to particular locations are outlined in individual site plans in Appendix A.

Table 6-1: Prevention Phase Actions for CZEAS for Central Coast Open Coast CMP

Action	Trigger/Timing	Responsibility
1.1 Make this CZEAS available to all relevant Stakeholders identified in Section 3 of the CZEAS.	Immediate/Ongoing.	Council
1.2 Share information with NSW SES for incorporation into coastal hazard planning and intelligence for the study area. Specifically, this includes the results of the Central Coast Coastal Hazard Study (Bluecoast Consulting Engineers, 2024)	Immediate.	Council, NSW SES
1.3 Inform the community regarding the risk of coastal hazards in the study area and inform the community of the Council's intended emergency responses under the CZEAS. In some areas, private property is within the immediate coastal hazard area and is at risk from coastal erosion or inundation. For those areas, it is important that local landowners: • Know what to do, where to go and who to contact for assistance in a coastal emergency. • Are educated and empowered to maintain the foreshore under their control as required to reduce the risk to their property. Council can encourage foreshore residents to maintain preparedness for a coastal hazard events, including maintaining and preparing a home FloodSafe Plan through the NSW SES website. Through Council's website, provide advice to the community, landholders and the NSW SES about the potential for a coastal emergency from coastal hazards, and the types of responses that are permitted and not permitted. Contribute to emergency management-related community engagement activities coordinated by the NSW SES through the LEMC.	Ongoing	Council
1.4 Apply development controls to developments in the coastal hazard areas in accordance with Council's LEP and DCP. The CMP includes an action to develop CVA mapping for the study area, which will formally identify land in the study area subject to coastal inundation. Through development of a Planning Proposal to update Council's DCP and LEP to include mapping of the CVA, Council can reduce the risk to new developments by applying development controls on floor levels and stipulating special conditions for building foundations. Council can also apply existing development controls for new developments for areas identified as flood-prone land, which will be relevant to reducing the risk from coastal inundation also.	As per CMP	Council, DCCEEW
1.5 Maintain a plant and equipment resource list for equipment necessary to enact the actions in this Subplan. This would include maintaining details of equipment location, standard operating procedures for its use, authorised personnel responsible and contact details for the proper use of the plant and equipment. Obtain the necessary permits/approvals to allow post-storm recovery actions to be carried out in those areas where public infrastructure is at risk.	Initiate list as soon as possible and update every six months	Council, NSW SES

Action	Trigger/Timing	Responsibility
Liaise with NSW SES to identify sources of materials potentially held by NSW SES Community Action Teams and where they can be stored. This may include sand and sandbags, signage/barricades for road closures.		
1.6 Develop a communications protocol to be used at all stages of a coastal emergency. The communications protocol would formalise operational activities between Council, NSW SES and EOCON for circumstances where an EOC has not been established. If a coastal emergency is as a result of storm/flood/tsunami - NSW SES as the combat agency will coordinate all Public Information during the response phase. If not, council is responsible for public information..	Ongoing	Council, DCCEEW, NSW SES
1.7 Consult with NSW SES and other Local Emergency Management Committee (LEMC) members, and DCCEEW-CPHR, to ensure this CZEAS remains consistent with the relevant local, regional, and state-based emergency management plans. • At LEMC meetings and directly as required • Following update to the relevant local, regional, and state-based emergency management plans	Upon finalisation of CZEAS, and to be reviewed in accordance with the CMP review process.	Council, LEMC
1.8 Review and update this CZEAS in line with any future CVA mapping or CMP implementation.	In conjunction with CMP preparation and review process. Refer to CMP management action EW-E02 relating to the development of a CVA for the estuaries.	Council, DCCEEW
1.9 Establish internal operational protocol and procedures for all coastal erosion and inundation scenarios in the study area for LEMO, Council's coastal officers and works crews and communications staff. This would include up-to-date personal contact details for key council staff involved in coordinating actions under the CZEAS (include responsibilities of staff who prepare for, manage and coordinate recovery from a coastal emergency event) and individuals the council may need advice from, such as DCCEEW staff, or to integrate with personnel from other emergency sectors. The procedure would detail resourcing, internal training, testing and periodic review requirements.	Upon finalisation of CZEAS, and to be reviewed in accordance with the CMP review process.	Council, LEMC
1.10 Monitoring of physical environmental conditions to assess potential for occurrence of coastal emergency and seeking appropriate advice when required. Refer to Figure 2-2 for monitoring requirements and Table 2-1 for data sources and site-specific triggers.	As specified in Figure 2-2 and Table 2-1 to assess potential for emergency event to occur within next 5 days	Council, NSW SES, DCCEEW

Table 6-2: Preparedness Phase Actions for CZEAS for Central Coast Open Coast CMP

Action	Trigger/Timing	Responsibility
2.1 Monitoring of physical environmental conditions to assess potential for occurrence of coastal emergency and seeking appropriate advice where required. Refer to Figure 2-2 for monitoring requirements and Table 2-1 for data sources and site-specific triggers. Use this information to assess threats to life and property arising from a coastal emergency. BoM's Interactive Weather and Wave Forecast Maps: http://www.bom.gov.au/australia/charts/viewer/index.shtml New South Wales Weather and Warnings Summary: (http://www.bom.gov.au/nsw/index.shtml?ref=hdr)	Refer to Figure 2-2 for monitoring requirements and Table 2-1 for data sources and site-specific triggers. Twice-daily after Preparedness Phase Trigger	Council, DCCEEW, NSW SES, BoM
2.2 Ensure signage to close Council-managed roads and public areas, and signage warning of coastal hazard risks are available for use during coastal emergencies. Ensure appropriate plant, equipment and experienced personnel are available for protection of assets at risk. Both internal and external personnel will be required based on specific scope of works. Materials needed may include sandbags, sand stockpiles, warning signage and road closure barricades/tape to close off damaged and potentially dangerous roads or access points. Ensure the stockpiles of equipment will be accessible when water levels rise, or sufficient access to equipment is obtained prior to water levels rising. A list of roads and access points to be considered is provided in Section 4.2 and are mapped in Appendix A. Alert affected land managers about access requirements to enable freedom of movement for personnel, plant and equipment during the emergency.	As soon as practicable after Preparedness Phase triggered.	Council
2.3 Initiate communications protocol described in this CZEAS to advise the community of the likelihood of an impending coastal inundation emergency that would initiate actions under the Subplan. This would include consulting with NSW SES and other relevant agencies such as DCCEEW as required. Note that NSW SES would only be communicating AWS products, should community need to be evacuated. Initiate updates to Council's emergency website that provide essential information to the community at https://emergency.centralcoast.nsw.gov.au/dashboard/overview In support of the NSW SES, advise affected landholders to activate their home FloodSafe Plan if they have this in place.	Within 24 hours after Preparedness Phase triggered	Council, NSW SES, DCCEEW
2.4 Inform Council staff about the emergency responses within this plan and ensure relevant personnel have copies of the plan.	Within 24 hours after Preparedness Phase triggered	Council, NSW DPHI Crown Lands

Table 6-3: Response Phase Actions for CZEAS for Central Coast Open Coast CMP

Action	Trigger/Timing	Responsibility
3.1 Monitoring of physical environmental conditions to assess whether trigger conditions for response actions in this CZEAS are reached. Refer to Figure 2-2 for monitoring requirements and Table 2-1 for data sources and site-specific triggers. Use this information to assess threats to life and property arising from a coastal emergency. BoM's Interactive Weather and Wave Forecast Maps: http://www.bom.gov.au/australia/charts/viewer/index.shtml New South Wales Weather and Warnings Summary: (http://www.bom.gov.au/nsw/index.shtml?ref=hdr)	When response phase of this CZEAS triggered in accordance with Figure 2-2 and Table 2-1. Four-times daily monitoring of forecasts and realtime data once Response phase triggered.	Council, DCCEEW, NSW SES, BoM
3.2 The LEMC (inc. Council LEMO) should consider Council advice regarding consider Warnings and Triggers, and advice provided by the NSW BoM. From here SEOCON, REOCON, LEOCON and NSW SES to are decide on the emergency management process (supported by Council). This may include the establishment of an Emergency Operations Centre (EOC).	Once Response phase triggered	SEOCON REOCON LEOCON NSW SES
3.3 Initiate erection of safety barriers or safety signage across potentially dangerous access points on roads assessed within the CZEAS to be vulnerable to coastal hazards. Refer to the coastal hazard maps in Appendix A and specific locations listed in Section 4.2 of this CZEAS as a guide to assess locations where action such as road closures will be required. Sections of roadway that may be subject to inundation that pose a high public safety risk should be temporarily closed to public access. This can be done through erection of temporary barricades, cyclone fencing and/or signage. Undertake inspection of these areas where it is safe to do so and inform the NSW SES of any intelligence on unforeseen impacts of coastal inundation gathered during the emergency. In a potential emergency event, the foreshore areas listed in Table 4-1 should be inspected daily, particularly at high tide, where resources permit. Work with NSW SES and NSW DCCEEW-CPHR to collect data during and after coastal inundation events (e.g. RTK survey of debris lines, photographs of inundated or eroded areas). Assist the NSW SES to enact closure of access points that the NSW SES Incident Controller has deemed to be unsafe and that may not have been identified as specific locations of coastal erosion or inundation risk within this CZEAS. Council will coordinate the closure and reopening of council managed roads once inspections have been carried out by the relevant authority. Accurately record and report information relevant to Council emergency response activities and any real time coastal	Once Response phase triggered Council may consider minor assets at risk, such as access tracks, viewing platforms or picnic facilities, to be not worthy of protection due to the relatively low cost of the works, which can be reconstructed if damaged following a coastal inundation event. It is not appropriate or practical to attempt to protect minor assets such as dune fencing, bins and signage in any emergency. These could be removed to prevent damage, repaired or replaced as required (where appropriate). **Council staff should not attempt to undertake works if conditions are assessed to be too dangerous** As soon as practicable after Response Phase being triggered, inspections daily during	Council

Action	Trigger/Timing	Responsibility
inundation information (including road closure information) to the NSW SES Incident Controller. This may be in the form of a combined Emergency Operations Centre (EOC) report, or direct from agencies where an EOC has not been established.	Response Phase only if/when safe to do so.	
3.4 Install temporary fencing and/or signage on council managed land (e.g. foreshore reserves) affected by coastal inundation or erosion resulting from major storm activity or an extreme or irregular event, where this has resulted in unsafe conditions. Note: In an emergency response phase, only limited emergency coastal protection works would be possible within the short time frames available. The only possible activities may include assisting with regular sandbagging of low-lying public infrastructure (such as SLSCs) to mitigate some impacts of coastal inundation **only**. All other considerations would be on a case-by-case basis and are unlikely to be feasible.	Once Response phase triggered Once identified from monitoring as being required	Council
3.5 Support the NSW SES to advise landholders, residents, public authorities and other organisations that a coastal emergency is likely or is occurring and that actions in the CZEAS are to be implemented. This includes updating Council's emergency website that provides essential information to the community at https://www.centralcoast.nsw.gov.au/plan-and-prepare-emergency and disaster dashboard https://emergency.centralcoast.nsw.gov.au/dashboard/overview Co-ordinate the release of information to the media through the NSW SES Incident Control Centre in accordance with the arrangements in the Central Coast Local EMPLAN.	Once Response phase triggered In accordance with directions from the NSW SES.	Council
3.6 Provide support to NSW SES in accordance with the provisions in the Central Coast Local EMPLAN as required and where resources allow Provision of assistance to NSW SES (plant, equipment, and personnel where able and requested), and technical advice on the impacts of coastal erosion and inundation.	Once Response phase triggered As requested by NSW SES	Council
3.7 Manage Essential Infrastructure under Council control (water supply and sewerage operations). Liaise with utility providers during coastal inundation events about key council managed infrastructure such as sewerage treatment and water supply that are likely to or may become impacted by coastal hazards.	Once Response phase triggered As required	Council
3.8 Liaise with other agencies (e.g., Transport for NSW, NSW DPHI – Crown Lands, National Parks and Wildlife Service) if debris from coastal erosion or inundation creates a safety hazard in adjoining areas (or liaise with road owners to enable closure).	Once Response phase triggered and realtime conditions indicate coastal inundation/coastal erosion is expected to be occurring, As required	Council

Table 6-4: Recovery Phase Actions for CZEAS for Central Coast Open Coast CMP

Action	Trigger/Timing	Responsibility
4.1 Initiate Recovery phase of CZEAS once waves and water levels have fallen below trigger levels. Continue to monitor waves and water levels throughout the event, and initiate the Recovery Phase of the CZEAS 24 hours after the cancellation of the Severe Weather Warning from the Bureau of Meteorology, AND realtime monitoring indicates that significant wave height at Sydney has fallen below 3 m AND water levels at high tide have fallen to below Mean High Water Springs. Monitor physical environmental conditions to assess whether the trigger conditions to initiate the recovery phase have been reached	Initiate the Recovery Phase of the CZEAS 24 hours after the cancellation of the Severe Weather Warning from the Bureau of Meteorology, AND realtime monitoring indicates that significant wave height at Sydney has fallen below 3 m AND water levels at high tide have fallen to below Mean High Water Springs. Once trigger is reached	Council
4.2 Assess and where practical, remove any threats to public safety, such as debris deposited or exposed in public areas. Where required, supporting agencies will assist with clean-up operations after coastal inundation events, where possible when resources and personnel permit. NSW SES will support the short-term transition to recovery as per the State Recovery Plan and NSW Flood Plan.	As soon as possible once Recovery Phase has been initiated. As required	Council, NSW SES
4.3 Assess and reopen Council-managed roads and access points once inspections have been carried out by the relevant authority and deemed safe to do so. Maintain temporary safety fencing and associated warning signage, as necessary. Liaise with NSW-SES as required.	As soon as possible once Recovery Phase has been initiated. As required.	Council, NSW SES, NSW DCCEEW
4.4 Undertake post-storm reconnaissance of affected areas to gather intelligence including recording of maximum erosion or inundation levels, mapping of inundation extents, surveys of debris marks, post-event damage assessments etc. Use the intelligence gathered to improve future CZEAS operations and share resources/work with the NSW SES and NSW DCCEEW to assist in future decision-making.	As soon as possible once Recovery Phase has been initiated. Initiate within 24 hours after Recovery Phase has been triggered	Council

Action	Trigger/Timing	Responsibility
Collate and maintain photographic and written records of events and decision-making processes.		
4.5 Assess, repair and/or replace any essential Council-owned/managed structures that are damaged as a result of a coastal emergency. Assess the structural integrity of unprotected assets affected by or damaged during the emergency event. Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following an emergency event. Expert advice to be sought as required. Assess and prioritise structures and access for repair based on public safety, and carry out remedial works to restore safe residential access in accordance with the assessed priority. Timely repair and replacement of any essential Council-owned/managed structures that are damaged as a result of a coastal emergency is required.	As soon as possible once Recovery Phase has been initiated. As required.	Council
4.6 Restore safe foreshore access in public spaces. This may require regrading of eroded steep embankments greater than 1 m in vertical height to 1V:4H at designated public access points to restore foreshore amenity**.**	As soon as possible once Recovery Phase has been initiated. Initiate within 1 week after Recovery Phase has been triggered.	Council Supporting Role: NSW DPHI Crown Lands, NPWS
4.7 Replenish any emergency materials and supplies for future emergency events. This refers to items that can be stored at Council premises specifically for emergency events, and items that may have a long lead-time to procure e.g. barricades for road closures.	After Recovery Phase has been initiated. Initiate within 1 week after Recovery Phase has been triggered.	Council, NSW SES, NSW DCCEEW
4.8 Remove any temporary coastal protection works placed during the coastal emergency in accordance with the requirements of the CM Act. Obtain expert coastal engineering advice to assess the safety and condition of any temporary coastal protection works placed during the coastal emergency and remove these if required, or seek the appropriate development approval for these to remain in place, based on expert advice.	After Recovery Phase has been initiated. Initiate within 90 days after Recovery Phase has been triggered.	Council, NSW SES, NSW DCCEEW

Action	Trigger/Timing	Responsibility
4.9 Participate in post-event community engagement e.g. community forums, workshops, or other opportunities to provide communities a chance to provide feedback, address any concerns and provide input into the recovery process. These will typically include other agencies such as the Reconstruction Authority and Welfare Services	After Recovery Phase has been initiated. As required	Council, NSW SES, NSW DCCEEW, BoM
4.10 Undertake After Action critical review of the CZEAS in conjunction with NSW SES, DP&E and LEMC to assess its effectiveness. Update this Subplan as required to improve future emergency management operations. Lessons learnt from the emergency event may be documented and applied back to the prevention and preparedness phases for future coastal emergency events.	After Recovery Phase has been initiated. Initiate when practicable after Recovery Phase triggered	Council, NSW SES, NSW DCCEEW
4.11 Monitor unauthorised erosion or inundation protection works through Council development compliance process. Liaise with property owners to ensure any private and/or public structures do not pose a risk to the public. Issue orders under the *Local Government Act* 1993 and/or the *Environmental Planning and Assessment Act* 1979 when properties are deemed structurally unsafe, or where erosion or inundation protection works have been constructed illegally or result in exposure of contamination/landfill, or where structures otherwise pose a risk to the public. Ensure premises are fit and safe for reoccupation and assess any need for demolition.	After Recovery Phase has been initiated. Ongoing	Council

7. Emergency Coastal Protection Works

Emergency coastal protection works are defined in the RH SEPP as:

'works comprising the placement of sand, or the placing of sandbags for a period of not more than 90 days, on a beach, or a sand dune adjacent to a beach, to mitigate the effects of coastal hazards on land'.

7.1 Approvals Pathway

A public authority may carry out coastal protection works without development consent if the works are:

- identified in the relevant certified CMP
- beach nourishment
- placing sand bags for not more than 90 days
- routine maintenance works or repairs to existing coastal protection works
- Coastal protection works that are identified in a coastal zone emergency action sub plan.

If the works are not in accordance with the above, they would need to be assessed for approval by the relevant Regional or Local Planning Panel.

Emergency protection measures are to be undertaken in consultation with a suitably qualified coastal or geotechnical engineer.

Note that in an emergency response phase, only limited emergency coastal protection works would be possible within the short time frames available. The only possible activities may include assisting with regular sandbagging of low-lying public infrastructure (such as SLSCs) to mitigate some impacts of coastal inundation only. All other considerations would be on a case-by-case basis and are unlikely to be feasible.

Locations where emergency protection works may be carried out, the nature of the works and triggers are identified in this CZEAS in Table 7-1 and shown in the maps in Appendix A.

Table 7-1: Locations where emergency coastal protection works may be carried out, nature of works and triggers.

Location	Type of Works	Trigger
Marine Parade, MacMasters Beach between Gerda Road and MacMasters SLSC (Map C2)	Works comprising the placement of sand, or the placing of sandbags for a period of not more than 90 days, on a beach, or a sand dune adjacent to a beach, to mitigate the effects of coastal hazards on land. Emergency protection measures are to be undertaken in consultation with suitably qualified coastal or geotechnical engineer. Temporary access works may include a range of activities e.g. placing sand filled geotextile bags, erecting temporary barriers, emergency vehicle access. Works may include placement of sand on an opportunistic basis from entrance management activities at Cockrone lagoon, beach scraping, or other works with appropriate approvals in place. The CMP identifies this area as requiring long term adaptive management.	**Preparedness Phase:** Decision made by Council with DCCEEW advice that works are recommended, but will be dependent on availability of materials, resources and potential exposure to coastal hazard **Recovery Phase:** Placement of sand on an opportunistic basis from entrance management activities at Cockrone lagoon Beach scraping to restore safe pedestrian access to beach Long term adaptive management in accordance with CMP to develop design and approval for proposed adaptive management solution.
Wamberal Beach at publicly owned frontage 25A-A and 25 B Ocean View Drive (Map C5)	Works comprising the placement of sand, or the placing of sandbags for a period of not more than 90 days, on a beach, or a sand dune adjacent to a beach, to mitigate the effects of coastal hazards on land. Emergency protection measures are to be undertaken in consultation with suitably qualified coastal or geotechnical engineer. Temporary access works may include a range of activities e.g. placing sand filled geotextile bags, erecting temporary barriers, emergency vehicle access. Works may comprise placement of sand on an opportunistic basis from entrance management activities at Terrigal or Wamberal lagoons, beach scraping, or other works with appropriate approvals in place.	**Preparedness Phase:** Works to be considered as a preventative measure for breakthrough of Terrigal Lagoon if erosion scarp reaches 15 m trigger distance from the seaward edge of Ocean View Drive and CZEAS Preparedness Phase triggered. Placement of sand from entrance management activities at Terrigal or Wamberal lagoons if available. **Recovery Phase:** Beach scraping to encourage onshore sand movement and restore safe beach access. Placement of sand on an opportunistic basis from entrance management activities at Terrigal or Wamberal lagoons.
The Entrance North between Karagi Point Reserve and Hargraves Street (Map C10)	Works comprise opportunistic sand nourishment sourced from entrance management activities at Tuggerah Lakes Entrance, to be placed within the indicated area on Map C10, triggerred by the Preparedness Phase of the CZEAS, and at other times if and when available as per management action in the CMP. Post-storm beach scraping at Council managed beach accessways to be carried out to make accessway safe. Other coastal protection works if approved under relevant approval pathway.	**Preparedness Phase:** if available and with advice from a suitably qualified Coastal Engineer. **Recovery Phase:** Post-storm beach scraping at Council managed beach accessways to be carried out to make accessway safe. **Prevention Phase/Recovery Phase:** If and when sand is available as per management action in the CMP.

8. References

AIDR. (2021). The Australian Warning System – Companion Document to Public Information and Warnings. Australian Institute for Disaster Resilience.

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Bureau of Meteorology (2024) Thunderstorm and Severe Weather Service Level Specification, Community Services Group, Season 2023-2024, February.

CCC/NSW SES. (2021). *Central Coast Council Flood Emergency Sub Plan.*

Department of Planning, Industry and Environment. (2019). *Guideline for Preparing a Coastal Zone Emergency Action Subplan.*

JK Geotechnics. (2023). *Geotechnical Assessment for Central Coast Open Coast and Coastal Lagoons CMP.*

Appendix A. Local Area Emergency Plans

Site-Specific Action Plans and Maps

LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)

N

INSET

Recovery Phase: Action 4.6
Collapse dune escarpment at coastal accessway to 1:4 slope to maintain safe beach access, or barricade accessway if unsafe

Response Phase:
Provide assistance to SLSC with sandbagging to protect against coastal inundation

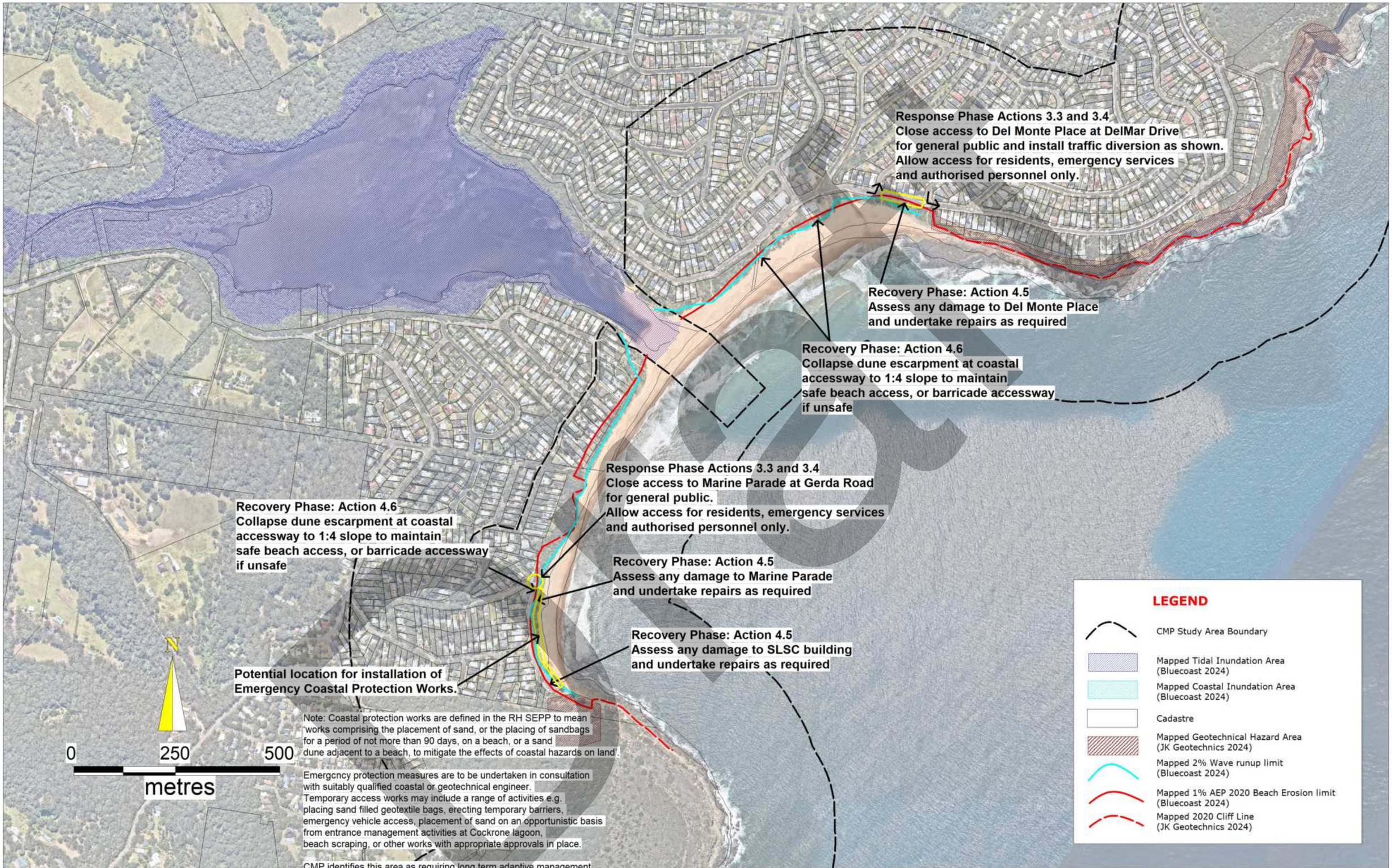
Recovery Phase: Action 4.5
Assess any damage to SLSC building and undertake repairs as required

SEE INSET

0 100 200
metres

0 25 50
metres

DATE 30.05.2025	**COORDINATE SYSTEM** MGA 94 Zone 56	**FIGURE TITLE** Map C1 2020 Coastal Hazard Areas Killcare	Central Coast Council · worley consulting · NSW GOVERNMENT
PROJECT NO. 311015-00572	**PROJECT TITLE** Central Coast Open Coast Coastal Management Program	**CREATED BY** CA	



DATE 23.03.2025

COORDINATE SYSTEM MGA 94 Zone 56

FIGURE TITLE Map C2
2020 Coastal Hazard Areas
MacMasters/Copacabana

PROJECT NO. 311015-00572

PROJECT TITLE Central Coast Open Coast
Coastal Management Program

CREATED BY CA

Central Coast Council

worley consulting

NSW GOVERNMENT

LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Suggested Local Traffic Diversion
- Possible Road Closure point

Response Action 3.3
Monitor slope for signs of movement and close section of Scenic Hwy vulnerable to landslip if deemed unsafe, install local diversions if required.

Response Phase Action 4.4:
Undertake post-storm reconnaissance to assess risk of slope instability

Response Phase Action 3.4:
Provide assistance to SLSC with sandbagging to protect against coastal inundation

Response Phase Actions 3.3 and 3.4
If required close access to Bareena Ave, Lake St., N. Avoca Parade, Ocean St. and Elgata Avenue at locations shown for general public and install traffic diversions as required. Allow access for evacuation, residents, emergency services and authorised personnel only.

Recovery Phase: Action 4.5
Assess any damage to local roads and undertake repairs as required

Recovery Phase: Action 4.6
Collapse dune escarpment at coastal accessway to 1:4 slope to maintain safe beach access, or barricade accessway if unsafe

Recovery Phase: Action 4.5
Assess any damage to Avoca Drive and undertake repairs as required

Response Phase Actions 3.3 and 3.4
Close access to Avoca Drive, Burns St and Ficus Avenue at locations shown for general public and install traffic diversions as required. Allow access for evacuation, residents, emergency services and authorised personnel only.

Recovery Phase: Action 4.5
Assess any damage to SLSC building and undertake repairs as required

Response Phase Action 3.4:
Provide assistance to SLSC with sandbagging to protect against coastal inundation

Elgata Ave
View St
N Avoca Pde
Ocean St
Lake St
Bareena Ave
Ficus Ave
Avoca Dr
Burns St

N

0 250 500
metres

DATE 30.05.2025	**COORDINATE SYSTEM** MGA 94 Zone 56	**FIGURE TITLE**	Map C3 2020 Coastal Hazard Areas Avoca/North Avoca
PROJECT NO. 311015-00572	**PROJECT TITLE** Central Coast Open Coast Coastal Management Program	**CREATED BY**	CA

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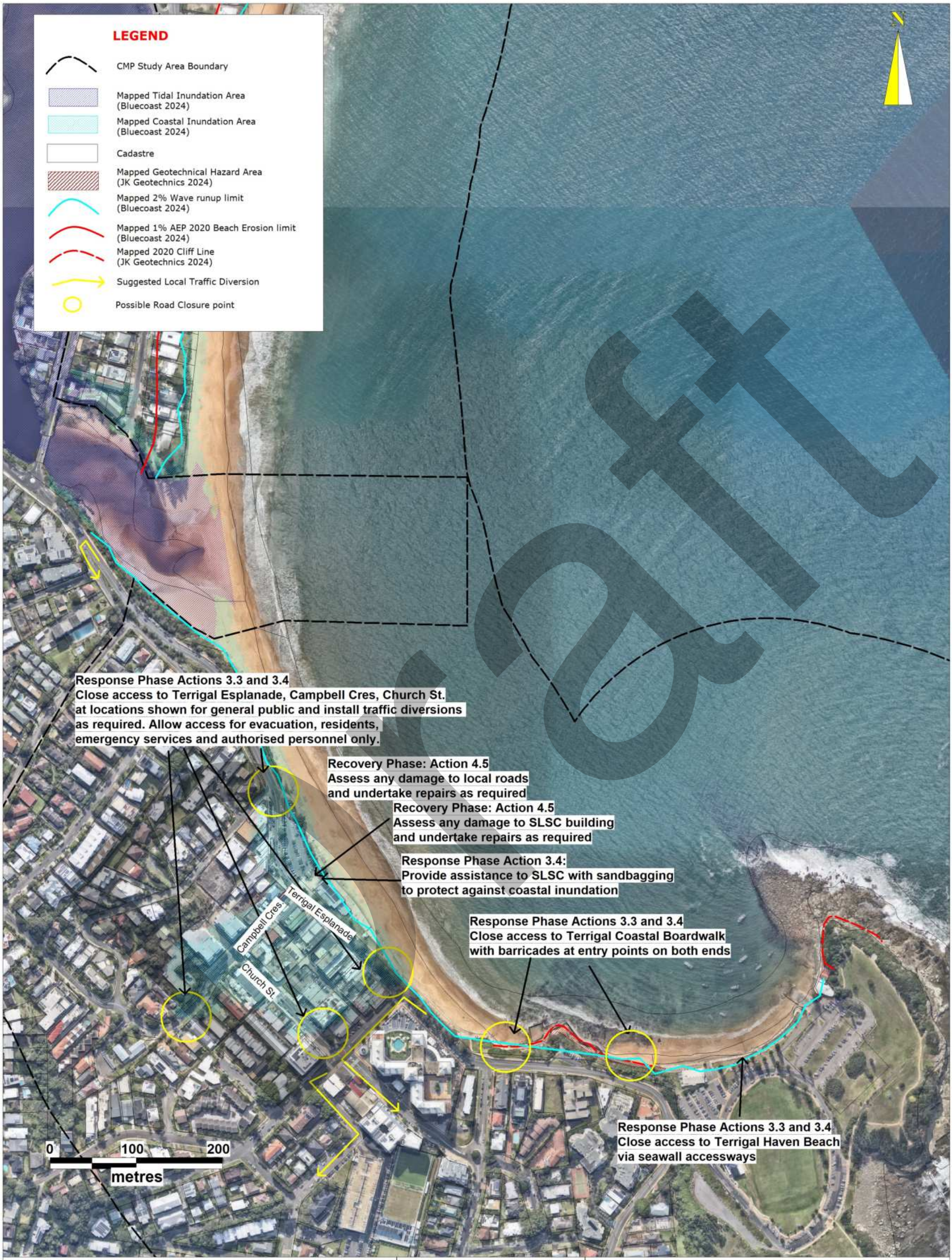

DATE	COORDINATE SYSTEM	FIGURE TITLE
30.05.2025	MGA 94 Zone 56	Map C4 2020 Coastal Hazard Areas Terrigal
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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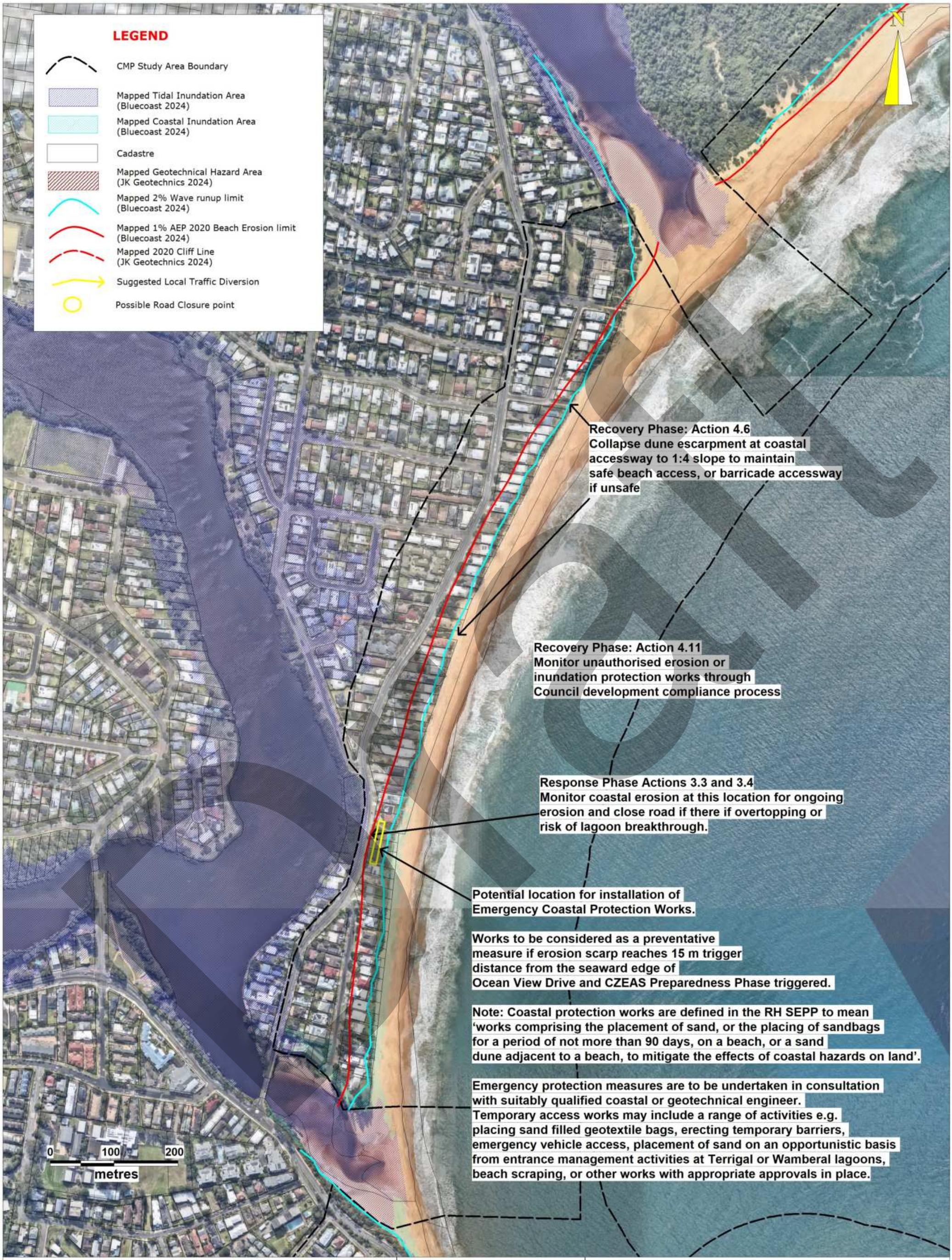

DATE	COORDINATE SYSTEM	FIGURE TITLE
30.05.2025	MGA 94 Zone 56	Map C5 Wamberal 2020 Coastal Hazards
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Suggested Local Traffic Diversion
- Possible Road Closure point

Response Phase Action 4.4:
Undertake post-storm reconnaissance to assess risk of slope instability

Recovery Phase: Action 4.6
Collapse dune escarpment at coastal accessway to 1:4 slope to maintain safe beach access, or barricade accessway if unsafe

Recovery Phase: Action 4.5
Assess any damage to public assets and undertake repairs as required

Response Phase Action 4.4:
Undertake post-storm reconnaissance to assess risk of slope instability

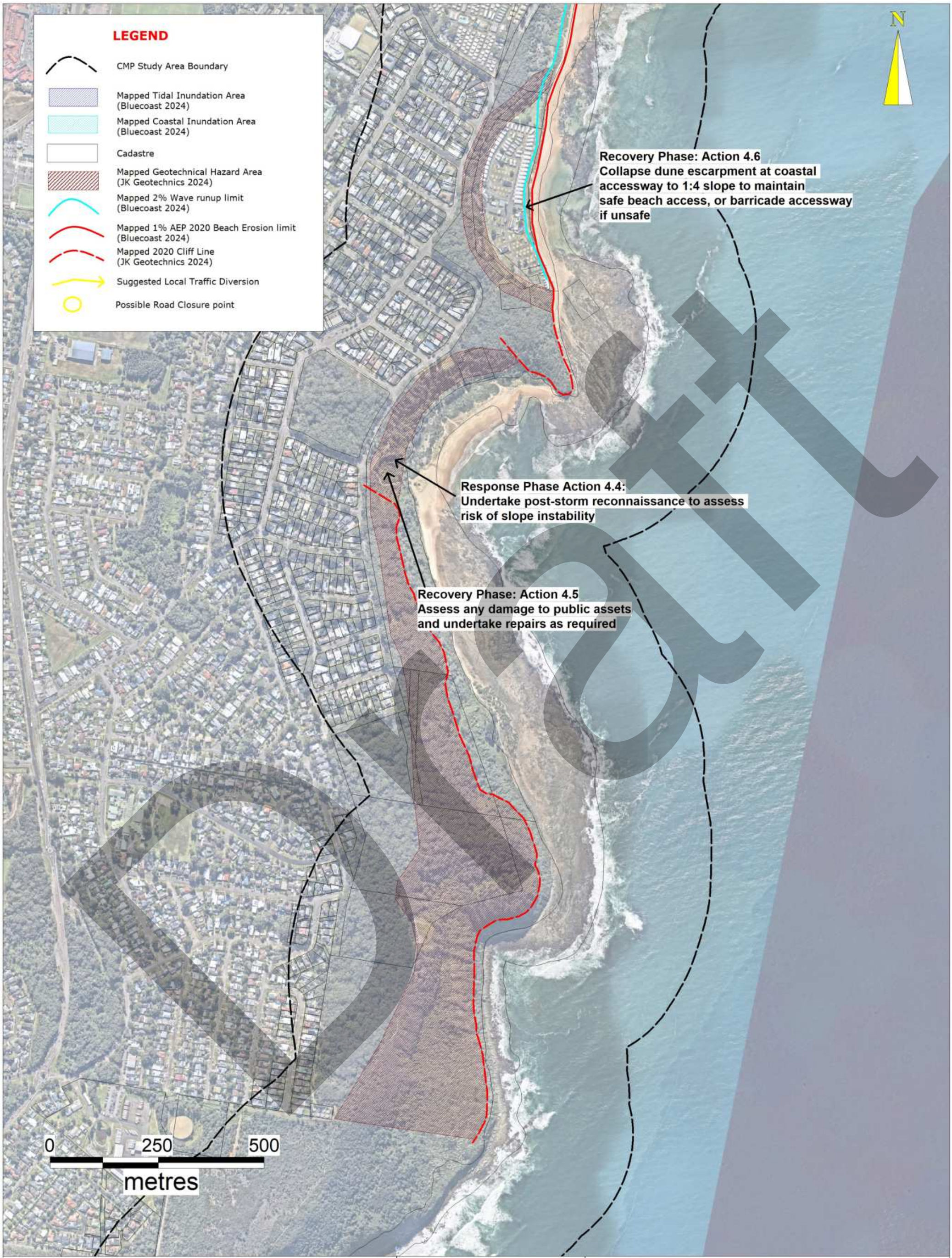
0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
30.05.2025	MGA 94 Zone 56	Map C6 2020 Coastal Hazard Areas Forresters Beach
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

Central Coast Council

worley consulting

NSW GOVERNMENT



DATE	COORDINATE SYSTEM	FIGURE TITLE
23.03.2025	MGA 94 Zone 56	Map C7 2020 Coastal Hazard Areas Bateau Bay
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Suggested Local Traffic Diversion
- Possible Road Closure point

N

Recovery Phase: Action 4.6
Collapse dune escarpment at coastal accessway to 1:4 slope to maintain safe beach access, or barricade accessway if unsafe

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
23.03.2025	MGA 94 Zone 56	Map C8 2020 Coastal Hazard Areas Shelly Beach
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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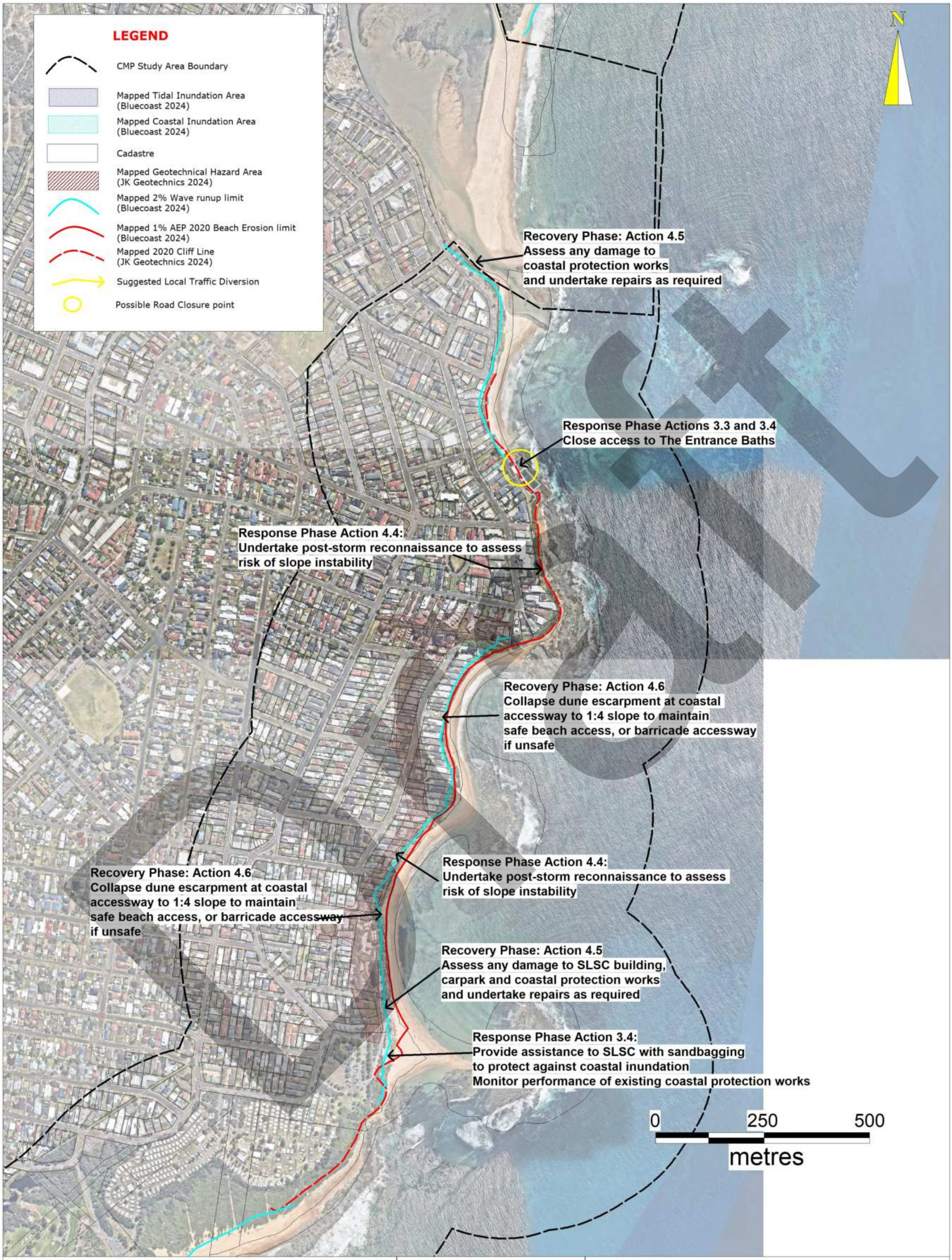

DATE	COORDINATE SYSTEM	FIGURE TITLE
23.03.2025	MGA 94 Zone 56	Map C9 2020 Coastal Hazard Toowoon Bay, Blue Bay The Entrance
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Suggested Local Traffic Diversion
- Possible Road Closure point
- Possible emergency coastal protection works

N

Recovery Phase: Action 4.11
Monitor unauthorised erosion or inundation protection works through Council development compliance process

Terilbah Pl
Central Coast Hwy
Curtis Pde
Wyuna Ave
Mini St
Coogee Ave
Bondi Rd
Manly Pde
Florida St
Stewart St
Leonard St
Roberts St
Hargraves St
Hutton Rd

Recovery Phase: Action 4.6
Collapse dune escarpment at coastal accessway to 1:4 slope to maintain safe beach access, or barricade accessway if unsafe

Response Phase Actions 3.3 and 3.4
Close access to inundated roads at indicated locations for general public and install traffic diversions.
Allow access for residents, emergency services and authorised personnel only.

Recovery Phase: Action 4.6
Collapse dune escarpment at coastal accessway to 1:4 slope to maintain safe beach access, or barricade accessway if unsafe

Recovery Phase: Action 4.11
Monitor unauthorised erosion or inundation protection works through Council development compliance process

Potential area for emergency coastal protection works

Works comprise opportunistic sand nourishment sourced from entrance management activities at Tuggerah Lakes Entrance, to be placed within the indicated area, triggerred by the Preparedness Phase of the CZEAS, and at other times if and when available as per management action in the CMP.

Post-storm beach scraping at Council managed beach accessways to be carried out to make accessway safe.

Other coastal protection works if approved under relevant approval pathway.

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
23.03.2025	MGA 94 Zone 56	Map C10 2020 Coastal Hazard Areas The Entrance North
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

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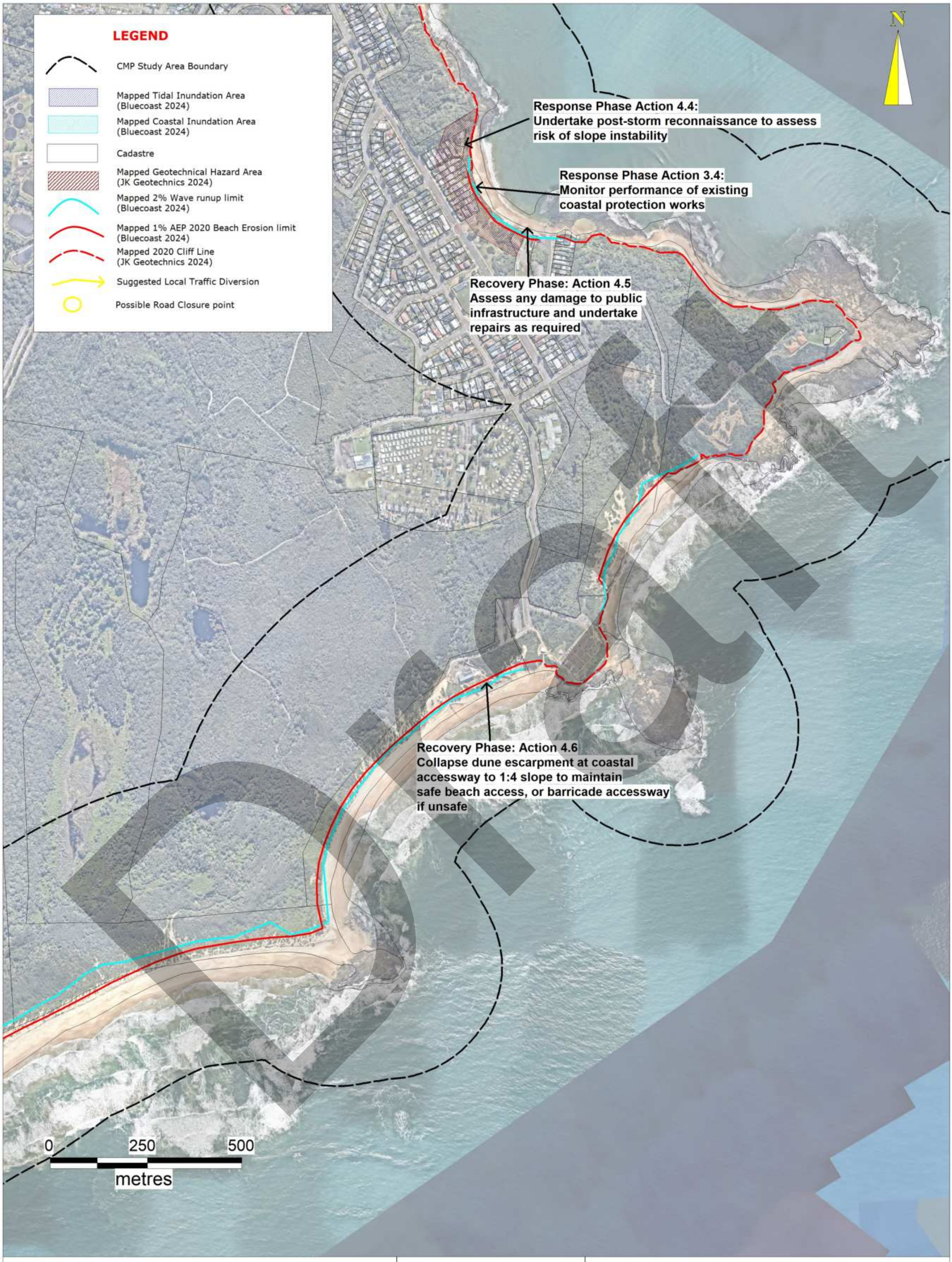

DATE 23.03.2025	**COORDINATE SYSTEM** MGA 94 Zone 56	**FIGURE TITLE** Map C11 Coastal Hazard Areas 2020 Soldiers Beach and Norah Head	Central Coast Council · worley consulting · NSW GOVERNMENT
PROJECT NO. 311015-00572	**PROJECT TITLE** Central Coast Open Coast Coastal Management Program	**CREATED BY** CA	

LEGEND

- CMP Study Area Boundary
- Mapped Tidal Inundation Area (Bluecoast 2024)
- Mapped Coastal Inundation Area (Bluecoast 2024)
- Cadastre
- Mapped Geotechnical Hazard Area (JK Geotechnics 2024)
- Mapped 2% Wave runup limit (Bluecoast 2024)
- Mapped 1% AEP 2020 Beach Erosion limit (Bluecoast 2024)
- Mapped 2020 Cliff Line (JK Geotechnics 2024)
- Suggested Local Traffic Diversion
- Possible Road Closure point

N

Recovery Phase: Action 4.6
Collapse dune escarpment at coastal accessway to 1:4 slope to maintain safe beach access, or barricade accessway if unsafe

Response Phase Action 3.4:
Provide assistance to SLSC with sandbagging to protect against coastal inundation

Recovery Phase: Action 4.5
Assess any damage to SLSC building and undertake repairs as required

Gomul St

Budgewoi Rd

Elizabeth Dr

Recovery Phase: Action 4.6
Collapse dune escarpment at coastal accessway to 1:4 slope to maintain safe beach access, or barricade accessway if unsafe

Response Phase Actions 3.3 and 3.4
Close access to inundated roads at indicated locations for general public and install traffic diversions.
Allow access for residents, emergency services and authorised personnel only.

Response Phase Action 4.4:
Undertake post-storm reconnaissance to assess risk of slope instability
Restore safe access

Recovery Phase: Action 4.5
Assess any damage to public infrastructure and undertake repairs as required

0 250 500
metres

DATE	COORDINATE SYSTEM	FIGURE TITLE
23.03.2025	MGA 94 Zone 56	Map C12 2020 Coastal Hazard Areas Hargraves Beach, Lakes Beach
PROJECT NO.	**PROJECT TITLE**	**CREATED BY**
311015-00572	Central Coast Open Coast Coastal Management Program	CA

Central Coast Council

worley consulting

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Appendix C. Alignment of CMP with Objects of CM Act and RH SEPP

How the CMP addresses the objects of the CM Act 2016 and management objectives of the RH SEPP

A. Objects of the Coastal Management Act 2016 (Section 3 CM Act)	How this is addressed in the CMP
(a) to protect and enhance natural coastal processes and coastal environmental values including natural character, scenic value, biological diversity and ecosystem integrity and resilience	Rigorous assessment of the risks associated with coastal processes and coastal environmental values, as evidenced through the detailed studies undertaken to understand coastal processes and environmental values, the identification of risks associated with these and the identification of management actions to address the risks. Refer to Section 2.55 which details the Risk Assessment.
(b) to support the social and cultural values of the coastal zone and maintain public access, amenity, use and safety	Rigorous assessment of the risks associated with social and cultural values, as evidenced through community engagement and the detailed studies undertaken to identify risks associated with these, together with the identification of management actions to address the risks. Refer to Section 2.55 which details the Risk Assessment.
(c) to acknowledge Aboriginal peoples' spiritual, social, customary and economic use of the coastal zone	Specific management actions have been included to specifically acknowledge and protect Aboriginal peoples' spiritual, social, customary and economic use of the coastal zone. Refer to Management Actions CW-C02 and CW-C05
(d) to recognise the coastal zone as a vital economic zone and to support sustainable coastal economies	The importance of the CMP Study Area for recreation, and economic activities associated with recreational activity in the CMP Study Area has been specifically recognised, with a specific risk category developed for amenity and community and social issues, with development of management actions with a focus on improving recreational amenity in the CMP Study Area. Refer to Management Actions CW-A01, CW-A03, CW-D03 and CW-D04
(e) to facilitate ecologically sustainable development in the coastal zone and promote sustainable land use planning decision-making	The CMP has identified actions to promote sustainable land use planning and decision-making, including actions to identify areas which are subject to coastal hazards, as well as environmentally sensitive areas that would require planning controls to facilitate ecologically sustainable development. Refer to Management Actions CW-S03, CW-S06, CW-S07, CW-A02, CW-H01, CW-H02 and CW-C04
(f) to mitigate current and future risks from coastal hazards, taking into account the effects of climate change	The CMP has identified natural and built assets impacted by current and future risks from coastal hazards, and has devised management actions to address these hazards. Refer to Management Actions CW-S05, CW-S06, CW-S07, CW-A02, CW-H01, MM01, WB01, WB02, CW-D01, CWD02, CW-D03, CW-D05
(g) to recognise that the local and regional scale effects of coastal processes, and the inherently ambulatory and dynamic nature of the shoreline, may result in the loss of coastal land to the sea (including estuaries and other arms of the sea), and to manage coastal use and development accordingly	The CMP has identified areas subject to coastal erosion and slope instability, as well as areas subject to coastal inundation with sea level rise, and has identified actions to address the risks posed by loss of coastal land caused by future climate change, including the development of an overarching coastal planning framework to guide future coastal development in the Central Coast open coast coastal zone. Refer to Coastal Hazard Mapping in Appendix A, and Management Actions CW-S05, CW-S06, CW-S07, CW-A02, CW-H01, MM01, WB01, WB02, CW-D01, CWD02, CW-D03, CW-D05

A. Objects of the Coastal Management Act 2016 (Section 3 CM Act)	How this is addressed in the CMP
(h) to promote integrated and co-ordinated coastal planning, management and reporting	The CMP actions and timeframes have been developed in accordance with the NSW Integrated Management & Reporting Framework, with responsible and partner agencies identified for each management action. Refer to Section 8 for details.
(i) to encourage and promote plans and strategies to improve the resilience of coastal assets to the impacts of an uncertain climate future including impacts of extreme storm events	The CMP has provided actions that include strategies to improve the resilience of coastal natural and built assets to impacts of an uncertain climate future, including recognising the need for long-term adaptation planning for land subject to coastal erosion, slope instability and inundation. Refer to Coastal Hazard Mapping in Appendix A, and Management Actions CW-S05, CW-S06, CW-S07, CW-A02, CW-H01, MM01, WB01, WB02, CW-D01, CWD02, CW-D03, CW-D05, A01
(j) to ensure coordination of the policies and activities of government and public authorities relating to the coastal zone and to facilitate the proper integration of their management activities	CMP actions have been reviewed and discussed with partner Agencies to obtain their support prior to inclusion in the CMP. Refer to Section 3 for details of the process for stakeholder consultation.
(k) to support public participation in coastal management and planning and greater public awareness, education and understanding of coastal processes and management actions	The CMP includes management actions that specifically solicit public participation in coastal management and planning, and improve education, awareness and understanding of coastal processes. The CMP has been developed with input from the public through each stage of the process. Refer to Section 3 for details of the process for stakeholder consultation, and Management Actions CW-C04, CW-C05
(l) to facilitate the identification of land in the coastal zone for acquisition by public or local authorities to promote the protection, enhancement, maintenance and restoration of the environment of the coastal zone	The CMP recognises the need for the protection of sensitive environmental communities in the coastal zone, and has identified management actions to facilitate the preservation of these communities. Refer Management Actions CW-E02, T01, CW-S03, CW-S04
(m) to support the objects of the Marine Estate Management Act 2014	The CMP promotes a biologically diverse, healthy and productive marine estate by specifically including management actions which enhance: • economic opportunities for regional communities (by improving local recreational facilities) • the cultural, social and recreational use of the marine estate (by improving local recreational amenity) • the maintenance of ecosystem integrity (by including actions to enhance ecological integrity) • the use of the marine estate for scientific research and education (by including actions for public education, monitoring and scientific research/collaboration). Refer to Management Action T01

B. Management objectives for the coastal wetlands and littoral rainforests area (Section 6 CM Act)	How this is addressed in the CMP
(a) to protect coastal wetlands and littoral rainforests in their natural state, including their biological diversity and ecosystem integrity	The CMP maps and identifies these locations and has identified issues, threats and opportunities, and management actions specifically for these areas. Refer Appendix A.
(b) to promote the rehabilitation and restoration of degraded coastal wetlands and littoral rainforests	The CMP has included management actions to promote the rehabilitation and restoration of degraded coastal wetlands and littoral rainforests within the CMP Study Area. Refer Action CW-E02 and specific locations mapped in Appendix A.
(c) to improve the resilience of coastal wetlands and littoral rainforests to the impacts of climate change, including opportunities for migration	The CMP has identified and mapped through the Stage 2 Coastal Hazard Studies (Bluecoast Consulting Engineers 2024) the coastal hazard risks to these areas. Opportunities for migrtation of these communities within the Central Coast Open Coast are limited due to coastal squeeze and lack of appropriate land available for migration. Refer Action CW-E02 and specific locations mapped in Appendix A.
(d) to support the social and cultural values of coastal wetlands and littoral rainforests	The CMP has specifically developed management actions to promote cultural awareness and cultural practices in managing these areas. Refer to Management Actions CW-C05, CW-E02.
(e) to promote the objectives of State policies and programs for wetlands or littoral rainforest management	The CMP has developed management actions in conjunction with State Government Agencies that promote the objectives and programs for wetland and littoral rainforest management within the CMP Study Area. Refer Action CW-E02, T01 and specific locations mapped in Appendix A.

C. Management objectives for coastal vulnerability area (Section 7 CM Act)	How this is addressed in the CMP
(a) to ensure public safety and prevent risks to human life	The CMP has developed a Coastal Zone Emergency Action Subplan (CZEAS) which details actions and responsibilities to ensure public safety and prevent risks to human life. Refer Appendix B.
(b) to mitigate current and future risk from coastal hazards by taking into account the effects of coastal processes and climate change	The CMP has mapped areas of current and future risk from coastal hazards taking account of the effects of coastal processes and climate change, and developed management actions to mitigate those risks. Refer Appendix A and management actions CW-S05, CW-S06, CW-S07, CW-A02, CW-H01, MM01, WB01, WB02, CW-D01, CWD02, CW-D03, CW-D05, A01.
(c) to maintain the presence of beaches, dunes and the natural features of foreshores, taking into account the beach system operating at the relevant place	The CMP has mapped areas impacted by foreshore erosion, and developed management actions to assist in maintaining the presence of the natural features of the foreshores within the CMP Study Area. Refer mapping in Appendix A.
(d) to maintain public access, amenity and use of beaches and foreshores	The CMP has developed management actions to assist in maintaining public access, amenity and use of foreshores within the CMP Study Area. Refer mapping in Appendix A.
(e) to encourage land use that reduces exposure to risks from coastal hazards, including through siting, design, construction and operational decisions	The CMP has identified land that is subject to coastal hazards, and has identified the need for planning controls for those lands to reduce exposure to risk from coastal hazards. Refer Management Action CW-H01
(f) to adopt coastal management strategies that reduce exposure to coastal hazards: **i. in the first instance and wherever possible, by restoring or enhancing natural defences including coastal dunes, vegetation and wetlands** **ii. if that is not sufficient, by taking other action to reduce exposure to those coastal hazards** **(g) if taking that other action to reduce exposure to coastal hazards:** **i. to avoid significant degradation of biological diversity and ecosystem integrity** **ii. to avoid significant degradation of or disruption to ecological, biophysical, geological and geomorphological coastal processes** **iii. to avoid significant degradation of or disruption to beach and foreshore amenity and social and cultural values** **iv. to avoid adverse impacts on adjoining land, resources or assets**	The CMP has identified actions to preserve the natural features of the coast. All potential options in Stage 3 were assessed, based on their impact on the coastal environment, public safety, social and recreational amenity. Actions that have progressed to the final stage of the CMP are those which emphasise natural coastline defences, or otherwise have neutral or beneficial impacts on the coastal environment. Refer mapping in Appendix A and management actions CW-S06, CW-S07, CW-H01, CT01, MM01, EB01, WB01, WB02, CW-E02

C. Management objectives for coastal vulnerability area (Section 7 CM Act)	How this is addressed in the CMP
v. to provide for the restoration of a beach, or land adjacent to the beach, if any increased erosion of the beach or adjacent land is caused by actions to reduce exposure to coastal hazards	
(h) to prioritise actions that support the continued functionality of essential infrastructure during and immediately after a coastal hazard emergency **(i) to improve the resilience of coastal development and communities by improving adaptive capacity and reducing reliance on emergency responses**	The CMP has prioritised actions through the CZEAS to support the continued functionality of essential infrastructure during and immediately after a coastal hazard emergency. The CMP has also identified where infrastructure is at risk from coastal hazards and provided management actions to increase the resilience of the infrastructure and reduce the reliance on emergency management. Refer Appendix B and Management Action CW-S06.

D. Management objectives for coastal environment area (Section 8 CM Act)	How this is addressed in the CMP
(a) to protect and enhance the coastal environmental values and natural processes of coastal waters, estuaries, coastal lakes and coastal lagoons, and enhance natural character, scenic value, biological diversity and ecosystem integrity	Rigorous assessment of the risks specifically associated with the coastal environment area and coastal environmental values, as evidenced through the detailed studies undertaken to understand environmental values, the identification of risks associated with these and the identification of management actions to address the risks. Refer management action CW-E02.
(b) to reduce threats to and improve the resilience of coastal waters, estuaries, coastal lakes and coastal lagoons, including in response to climate change	The CMP has identified threats to the resilience of coastal waters, including in response to climate change, and proposed management actions to specifically mitigate these threats. Refer Management Actions CW-E01, CW-S01.
(c) to maintain and improve water quality and estuary health	The CMP has defined management actions specifically aimed at maintaining and improving water quality, by assessing the risks specific to this category and providing mitigation measures. Refer management actions Refer Management Actions CW-E01, CW-S01.
(d) to support the social and cultural values of coastal waters, estuaries, coastal lakes and coastal lagoons	The CMP has defined community and social values as a specific category for risk assessment and has developed management actions aimed at addressing the identified risks. Refer management actions CW-C01 to CW-C05.
(e) to maintain the presence of beaches, dunes and the natural features of foreshores, taking into account the beach system operating at the relevant place	The CMP has mapped areas impacted by coastal hazards, and developed management actions to assist in maintaining the presence of the natural features of the beaches and dunes within the CMP Study Area. Refer management actions CW-S01 to CW-S08, and corresponding area-specific actions in Appendix A.
(f) to maintain and, where practicable, improve public access, amenity and use of beaches, foreshores, headlands and rock platforms	The CMP has developed management actions to assist in maintaining public access, amenity and use of beaches, foreshores, headlands and rock platforms within the CMP Study Area. Refer management action CW-A01 and corresponding area-specific actions in Appendix A.

E. Management objectives for coastal use area (Section 9 CM Act)	How this is addressed in the CMP
(a) to protect and enhance the scenic, social and cultural values of the coast by ensuring that: **i. the type, bulk, scale and size of development is appropriate for the location and natural scenic quality of the coast** **ii. adverse impacts of development on cultural and built environment heritage are avoided or mitigated** **iii. urban design, including water sensitive urban design, is supported and incorporated into development activities** **iv. adequate public open space is provided, including for recreational activities and associated infrastructure** **v. the use of the surf zone is considered**	The CMP has developed management actions, including concepts for upgrading public infrastructure in accordance with contemporary best practice, minimising any impacts of development on cultural or built heritage, and has considered urban design, including water sensitive urban design. There are management actions aimed at improving access and amenity to public areas of the foreshore. Refer management actions CW-A01 and corresponding area-specific actions in Appendix A.
(b) to accommodate both urbanised and natural stretches of coastline	The CMP recognises both the urbanised and natural values of the coast by providing management actions to balance these two values, for example; combining protection of infrastructure and high-use public areas from coastal erosion with enhancement of environmental values and foreshore access. Refer examples including management action CW-E02, CW-D03 and area-specific actions in Appendix A.

Appendix D. Specific Management Actions

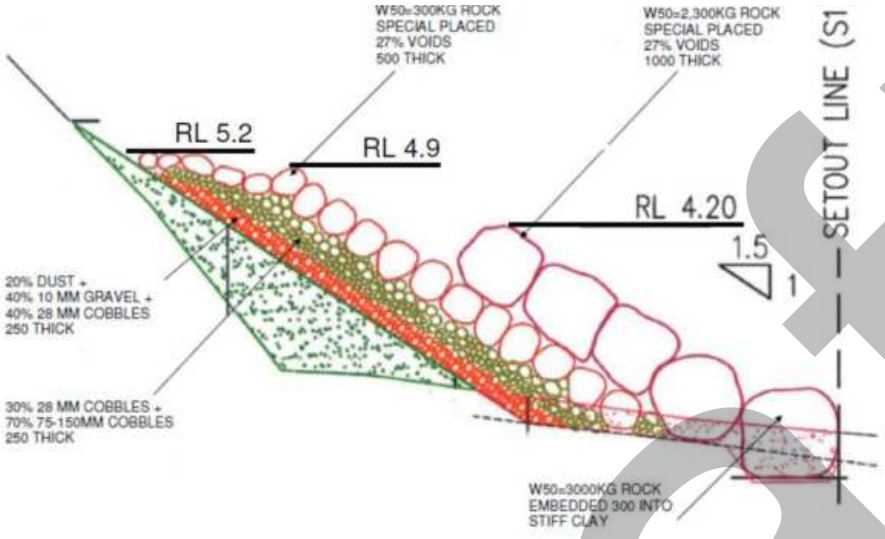
Details and Rationale

Action CT01 – Design and construct Stage 2 of the existing Cabbage Tree Harbour toe drainage structure

Action EN02 – Continue to nourish The Entrance North Beach with sand from The Entrance channel berm management or dredging activities when available to increase beach amenity and resilience.

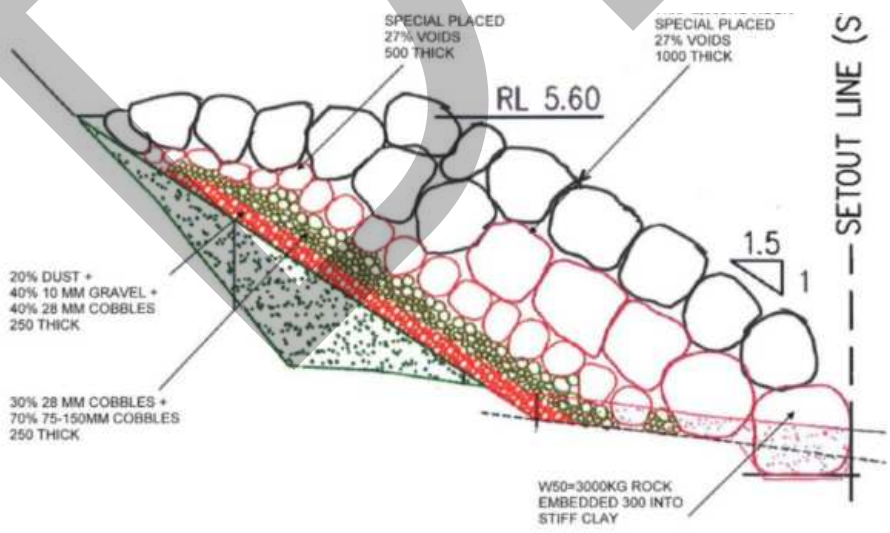
Action CT01 – Design and construct Stage 2 of the existing Cabbage Tree Harbour toe drainage structure

- Stage 1 already constructed, designed for a 0 – 15 year design life, see typical cross section below (WorleyParsons, 2011)

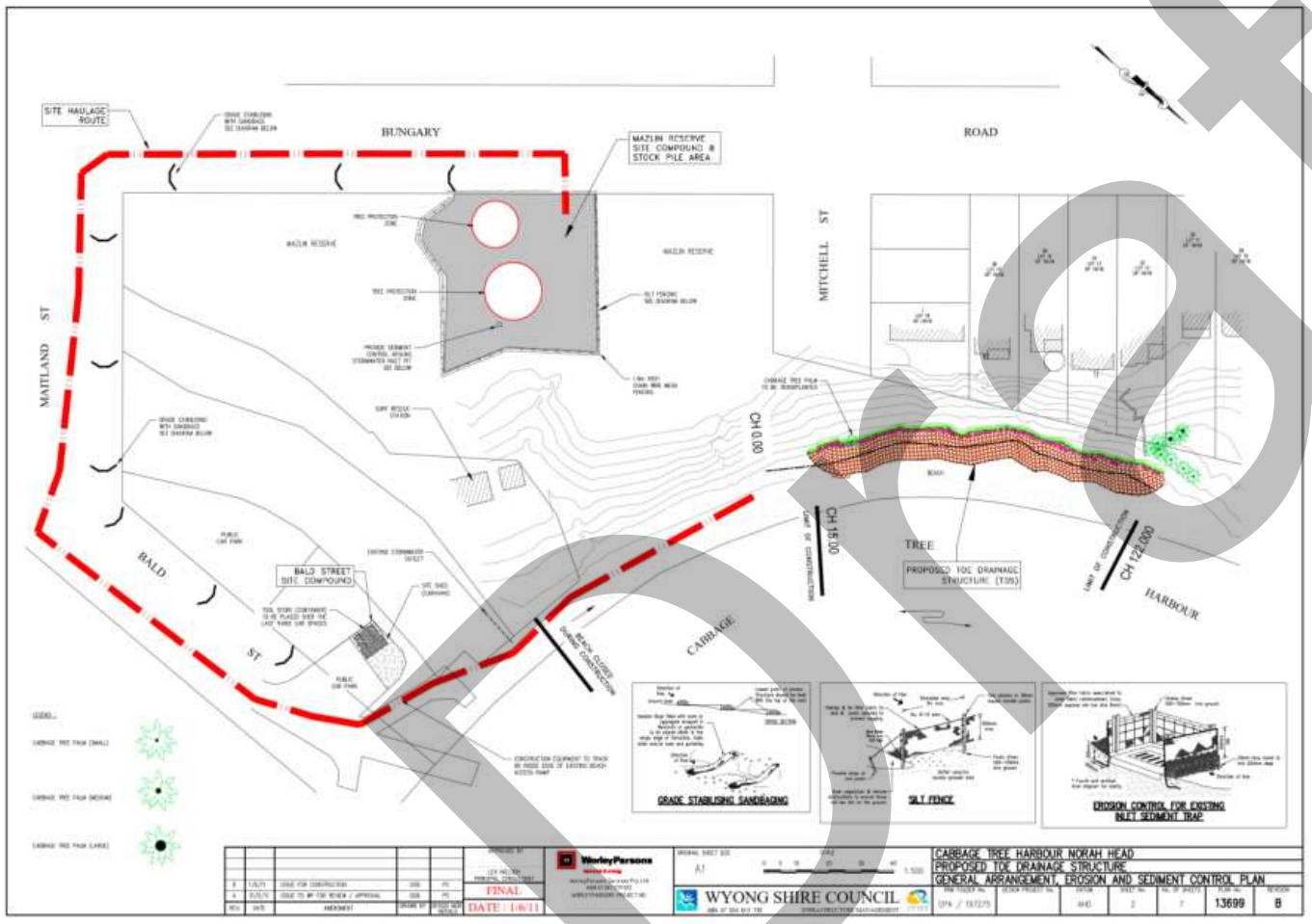


Stage 1: 0–15 year Design Life

- Stage 2 involves topping up the armour with a second layer of armour rock as shown in the typical section below (WorleyParsons 2011)
- The staging recognises that the design criteria will increase with time as projected climate change impacts on sea levels progress and, in extending the design life of the structure, the design storm event becomes more intense for the same level of risk of damage (WorleyParsons 2011).
- Layout Plan for the existing structure is shown below.



Stage 2: 15–50 year Design Life



Cabbage Tree Harbour Toe Drainage Structure – Layout Plan (WorleyParsons 2011)

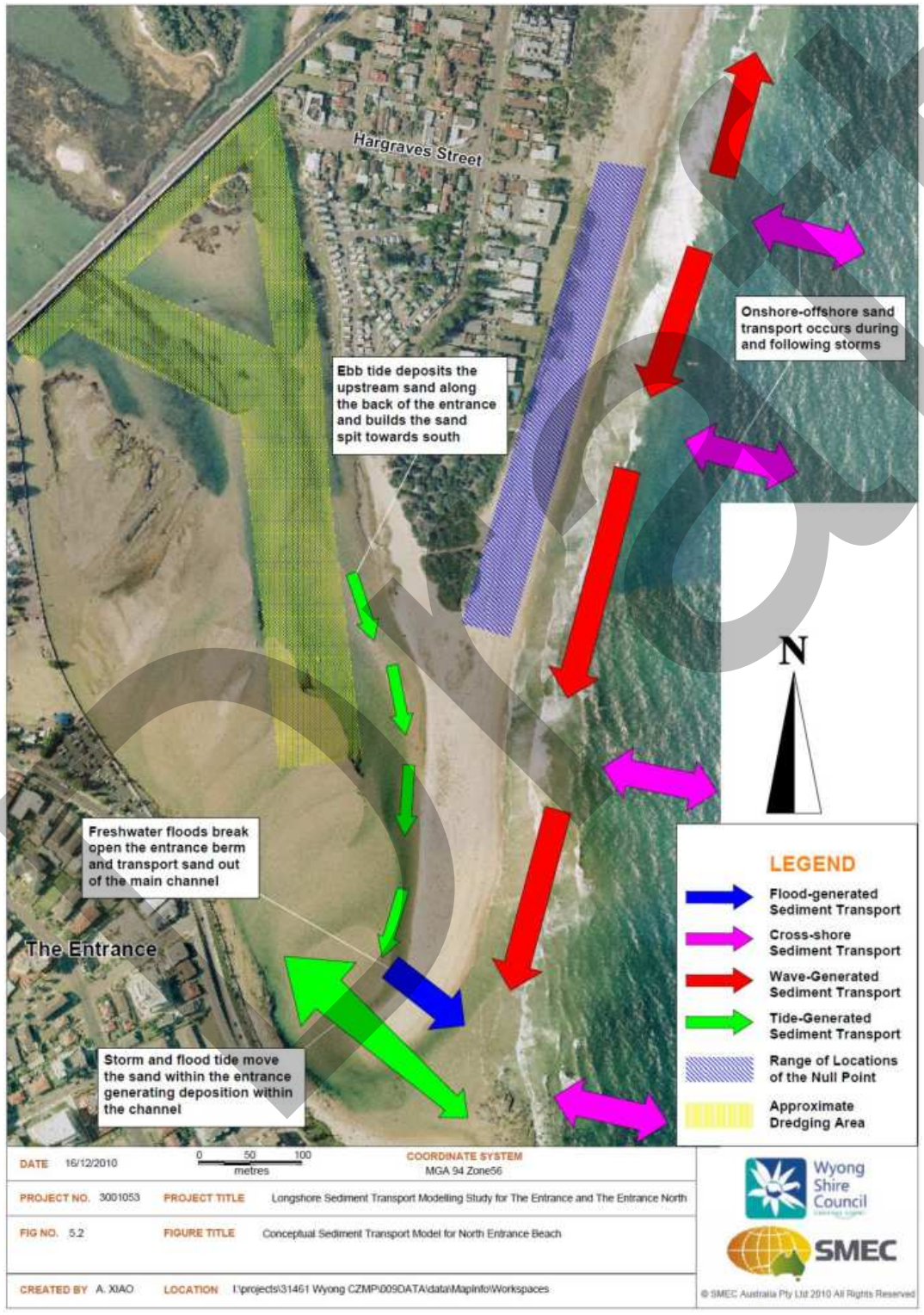
Action EN02 – Continue to nourish The Entrance North Beach with sand from The Entrance channel berm management or dredging activities when available to increase beach amenity and resilience.

This action involves the opportunistic placement of sand dredged from The Entrance during maintenance operations onto North Entrance Beach, which serves to reduce the impact of beach erosion by beneficially reusing the sand. The dredging strategy is shown below (WorleyParsons 2008).

Outlines of dredge areas are schematic only.
Based on notes supplied by Wyong Shire Council.

Along North Entrance Beach, swell generates a northward sediment transport. This northward sand movement potential is reduced closer to the tidal inlet, with southward transport occurring at the entrance and along the entrance spit.

Sand should be placed within the zone of the change in sediment transport direction (shown in the hatched blue area in the conceptual sediment pathway model below (SMEC 2010)). This would allow the sand to provide maximum benefit against beach erosion without it being lost to the littoral system.



Conceptual sediment transport pathways at The Entrance North (SMEC 2010a)