Stage 3 Summary Report

Hawkesbury-Nepean River System Coastal Management Program

HNRS CMP Steering Committee

5 July 2025

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ACKNOWLEDGEMENT OF COUNTRY

The Board and employees of Water Technology acknowledge and respect the Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of Country throughout Australia. We specifically acknowledge the Traditional Custodians of the land on which our offices reside and where we undertake our work.

We respect the knowledge, skills and lived experiences of Aboriginal and Torres Strait Islander Peoples, who we continue to learn from and collaborate with. We also extend our respect to all First Nations Peoples, their cultures and to their Elders, past and present.

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1 INTRODUCTION

1.1 Background

Under the NSW Coastal Management Framework and the *NSW Coastal Management Act 2016* (CM Act), the future management of the Hawkesbury-Nepean River System (HNRS) will be guided by a Coastal Management Program (CMP). The six local councils that border the estuarine reach of the river system have agreed to partner in the development of an integrated, whole-of-estuary, CMP. The six councils, hereafter referred to as the Partner Councils (PCs), comprise:

- Central Coast Council (CCC)
- Hawkesbury City Council (HCC)
- The Hills Shire Council (THSC)
- Hornsby Shire Council (HSC)
- Ku-ring-gai Council (KC)
- Northern Beaches Council (NBC)

The development of the HNRS CMP is supported by funding and technical assistance from the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW).

The purpose of the CMP is to set the long-term strategy for the coordinated management of the HNRS and its contributing catchment. The CMP seeks to achieve the objectives of the CM Act through a program that will identify coastal management issues, pressures, and risks - and the actions required to address these issues in a strategic and integrated way.

The CMP is being prepared through the five-stage process prescribed in the NSW Coastal Management Manual and depicted in Figure 1-1.

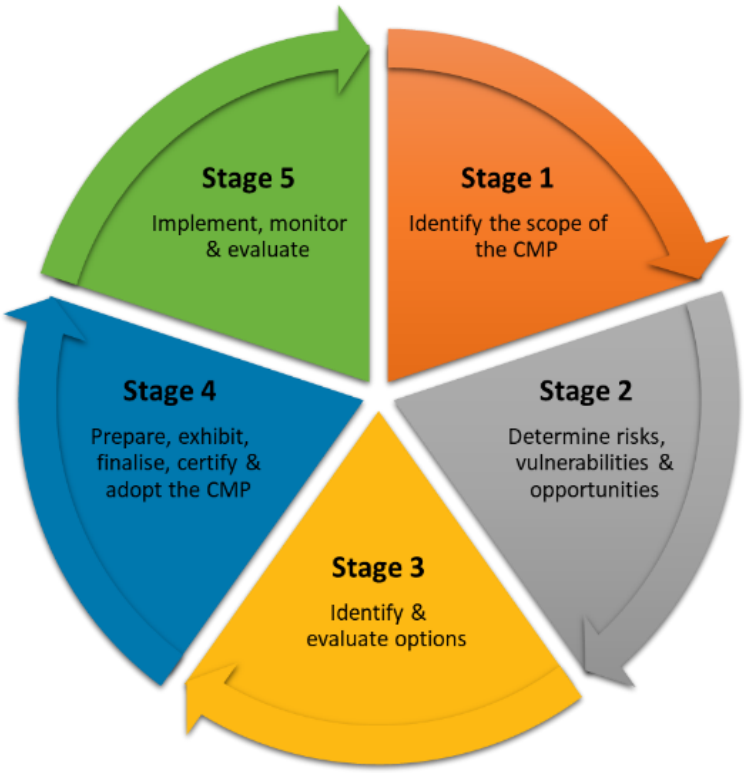

Figure 1-1 The CMP process

Stage 1 of the CMP (Water Technology, 2020) was adopted by the PCs in 2020. It included a review of relevant background information, a first pass risk assessment, a data gap analysis, and a forward program for the CMP.

Stage 2 delivered five technical studies to improve understanding of the threats and risks to the environmental, social, and economic values of the system, and to support informed decision-making in Stage 3. These included:

- The Hawkesbury-Nepean River System Physical and Ecological Processes Abridgement Report (Alluvium, 2022a).
- The Hawkesbury-Nepean River System Estuary Bank Erosion Assessment and Options Report (Alluvium, 2022b)
- The Hawkesbury-Nepean River System Community Values and Uses Report (Alluvium and Mosaic Insights, 2023)
- The Pittwater Beach Erosion and Shoreline Recession Assessment (WRL, 2023)
- The Hawkesbury River Coastal Inundation Study (Rhelm and Baird, 2023)

Subsequently, the purpose of Stage 3 is to identify and assess coastal management options that can address coastal management issues such as threats, risks, and hazards, take advantage of opportunities, and give effect to the objectives of the CM Act.

This report has been prepared to fulfill the requirements of Stage 3 of the CMP process. It has been prepared on behalf of the PCs, and in consultation with relevant State agencies, Upper Catchment councils, First Nations Groups, and local communities of the CMP study area.

1.2 Approach to Stage 3

The recommended approach to Stage 3 is set out in the NSW Coastal Management Manual (OEH, 2018d) and is summarised in Figure 1-2.

The primary objective of Stage 3 is to develop a long list of potential management options to address the risks and opportunities identified in Stage 2. These options are then assessed, ranked, and prioritised using a robust and transparent decision-making framework. The outcome is a short list of preferred management actions to progress to Stage 4 for detailed planning and, ultimately, implementation in Stage 5.

The assessment framework used in this study was designed to enable consistent, objective comparison of options, ensuring that those delivering the greatest overall benefit to the coastal zone and its contributing catchment are identified and advanced.

Stage 3 of the CMP has included a large-scale community and stakeholder engagement program - likely the most extensive Stage 3 engagement undertaken for any CMP in NSW to date. This program was designed to ensure that the values, priorities, and local knowledge of communities and stakeholders across the HNRS were meaningfully captured and considered in the development of management options. The engagement process included a wide range of activities and consultation methods to reach diverse audiences across the catchment. A summary of the engagement program, including its scope, methods, and key findings, is provided in Appendix A.

Figure 1-2 The approach to Stage 3 of the CMP

1.3 The Structure of this Report

The structure of this report has been designed to align with the staged delivery of Stage 3 of the CMP.

- Sections 2 to 5 summarise Steps 1 to 4 of the process (as illustrated in Figure 1-2 above). Given the large number of potential management options assessed throughout these steps, these sections focus on outlining the methodology and presenting key outcomes.
- Section 6 provides a summary of community and stakeholder engagement activities undertaken in Stage 3. As engagement has been integrated throughout each step in Stage 3 (and built on previous engagement from Stages 1 and 2), this section has been positioned early in the report to provide important context.
- Appendices provide supporting detail for each component of Stage 3:
  - Appendix A – Detailed Community and Stakeholder Engagement Report for Stage 3, outlining processes and outcomes.
  - Appendix B – Strategic Direction Summary Report for Stage 3.
  - Appendix C – An Electronic Appendix (contained within a separate Microsoft Excel file) comprising the Options Assessment Spreadsheet. This includes:

- Descriptions of all potential management options considered in Stage 3 (the full options long list).
- The Outcomes of the Acceptability, Feasibility, and Viability Assessments, and the Total Options Ranking for Each Option.

- Appendix D – Outcomes of the Acceptability Assessment
- Appendix E – Outcomes of the Feasibility Assessment
- Appendix F – Outcomes of the Viability Assessment
- Appendix G – Detailed economic cost-benefit analysis for selected options, where (a) risks and impacts are significant, and (b) economic costs and benefits could be reasonably quantified.

1.4 Guiding Documents

This report and its analysis have been undertaken in accordance with, and with a clear understanding of, the key requirements and guidance outlined in the following documents:

- *NSW Coastal Management Manual Part B: Stage 3 – Identify and evaluate options* (OEH, 2018d)
- *NSW Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions* (OEH, 2017).
- *NSW Marine Estate Management Strategy 2018 – 2028* (MEMA, 2018)
- *NSW Coastal Design Guidelines* (DPE, 2023a)
- *Coastal Crown Land Guidelines* (DPE, 2023b)
- *NSW Guide to Cost-Benefit Analysis* (NSW Treasury, 2023)
- *DPE Guidelines for using Cost-Benefit Analysis to Assess Coastal Management Projects* (DPE, 2020)
- *The Engineers Australia National Committee on Coastal and Ocean Engineering - Climate Change Adaptation Guidelines in Coastal Management and Planning* (NCCOE, 2012)
- *Guidelines for responding to the effects of climate change in coastal and ocean engineering* (NCCOE, 2017)
- *ISO 14090:2019 Adaptation to climate change — Principles, requirements and guidelines* (ISO , 2019)

These documents have informed the approach to option identification, assessment, and prioritisation throughout Stage 3 of the CMP.

2 STEP 1: STRATEGIC DIRECTION

2.1 Vision, Purpose, and Objectives

The purpose of the CMP is to create a comprehensive framework for the future management of the HNRS. This framework aims to align with the principles of ecologically sustainable development and promote the well-being of the community in social, cultural, and economic aspects.

During Stage 1 of the CMP (Water Technology, 2020), the Vision, Purpose, and Management Objectives for the project were developed. The Vision and Purpose play a crucial role in the CMP hierarchy, as they provide the framework for defining strategic objectives. These strategic objectives, in turn, enable the establishment of specific objectives. The relationship between the Vision, Purpose, and Specific Objectives is illustrated in Figure 2-1.

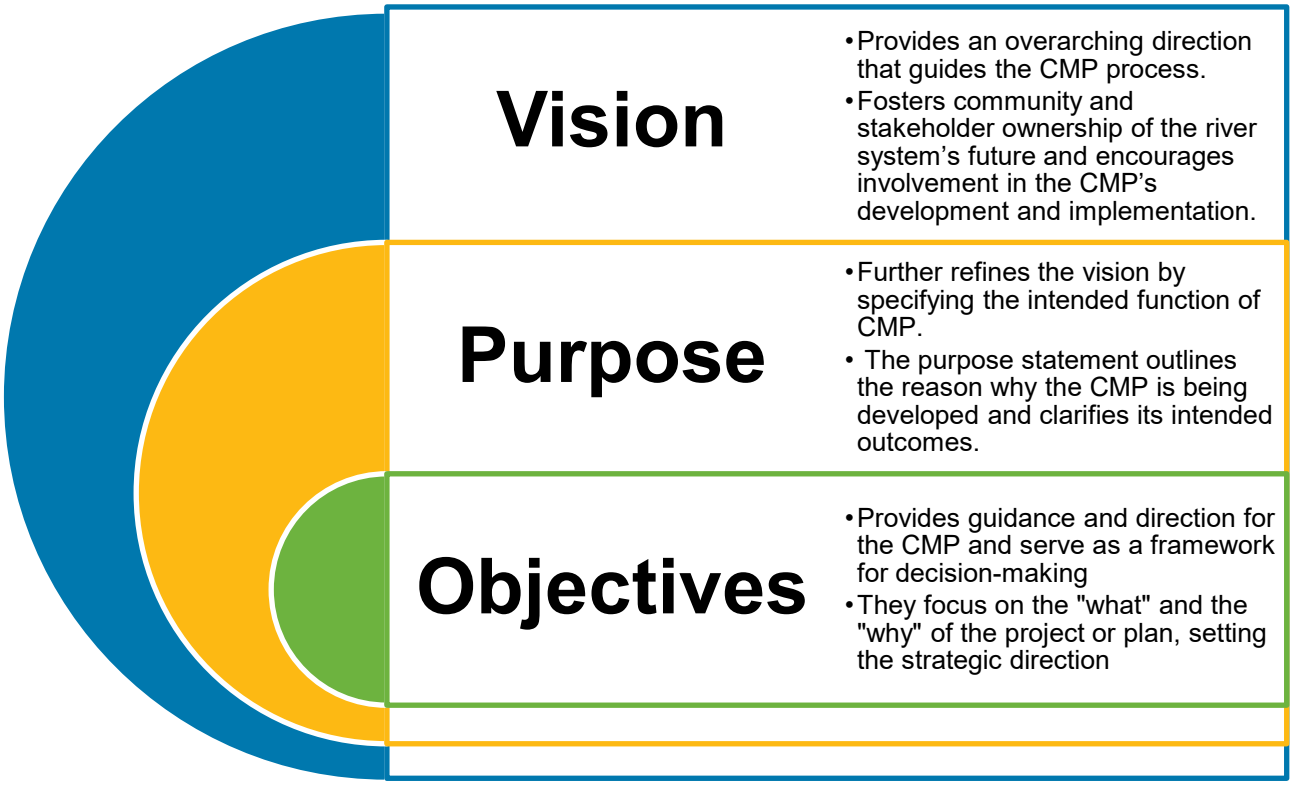

Figure 2-1 The Vision, Purpose, and Objectives of the CMP

2.1.1 Vision

The vision statement derived in Stage 1 of the CMP (Water Technology, 2020) provides an overarching direction that guides the CMP process:

To preserve and enhance the environmental, social and economic values of the Hawkesbury-Nepean River system and its catchment for current and future generations, and ensure its status as one of Australia's premier river systems.

2.1.2 Purpose

The purpose statement further refines the vision by specifying the intended function or role of CMP:

The purpose of the CMP is to set the long-term strategy for the coordinated management of the Hawkesbury-Nepean River system, encompassing the estuaries of Broken Bay, Pittwater, the Hawkesbury River and Brisbane Water. The CMP seeks to achieve the objectives of the CM Act through a program to identify coastal management issues, pressures, risks and opportunities - and the actions required to address these issues in a strategic and integrated way.

The purpose of the CMP is to set the long-term strategy for the coordinated management of the HNRS.

2.1.3 Objectives

The strategic management objectives determined during Stage 1 of the CMP are summarised in Table 2-1

Table 2-1 Strategic objectives of the CMP

Objectives
a) to protect and enhance the integrity and resilience of the environmental values of the Hawkesbury River, Brisbane Water and Pittwater estuaries, including healthy, diverse aquatic ecosystems.
b) to maintain and protect water quality across the system and its impacts on environmental, social and economic values - including ecological condition, recreational amenity and agricultural uses;
c) to maintain and preserve the unique scenic amenity and natural character of the Hawkesbury River, Brisbane Water and Pittwater estuaries;
d) to support the social and cultural values of the system and maintain public access and recreational amenity;
e) to maintain the health, safety and wellbeing of those using the coastal zone (both directly and indirectly) - and to protect the health of human consumers of aquatic foods;
f) to acknowledge Aboriginal peoples' spiritual, social, customary and economic use of the Hawkesbury and to protect local indigenous cultural heritage;

Objectives

g) to recognise the coastal zone as a vital economic zone and to support sustainable coastal economies such as recreational and commercial fishing, aquaculture, and tourism;

h) to facilitate appropriate management of the coastal zone through ecologically sustainable development, and the promotion of sustainable land use planning and decision-making that is consistent with regional and local strategic plans;

i) to mitigate current and future risks from population growth, urbanisation and coastal hazards (erosion and inundation of foreshores caused by tidal waters and the action of waves, including the interaction of those waters with catchment flooding);

j) to ensure co-ordination between relevant government and public authorities relating to the river system - and to facilitate the proper integration of management activities across all levels of government;

k) to maintain meaningful engagement with the community, and to support public participation in coastal management and planning, and to create greater public awareness, education and understanding of coastal processes and management actions;

l) to encourage and facilitate research and monitoring – and to maintain the scientific and educational values of the river system;

m) to support the objects of the *Marine Estate Management Act 2014*; and

n) to align with the NSW Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions.

2.2 Key Challenges and Strategic Direction

2.2.1 Key Challenges for CMP Implementation

A Strategic Direction Workshop was held with the Steering Committee members on 5 December 2023 (see Figure 2-2). The purpose of the workshop was to facilitate decision making in these areas, and to guide development of the CMP. The outcomes of the workshop and key decision points for the CMP are detailed in the Strategic Direction Document (Water Technology, 2023a), which is provided in Appendix B.

Figure 2-2 Strategic Direction Workshop

During the workshop, the Purpose, Vision, and Objectives of the CMP (Section 2.1) were reaffirmed by the Steering Committee. These elements will form the foundation for strategic decision-making throughout the remainder of the CMP process.

The workshop also highlighted the key challenges facing the CMP, including:

- **Addressing Strategic, Large Scale Risks and Opportunities** The CMP must address a range of interconnected issues at a system-wide scale, spanning the catchment, waterways, and foreshores of the HNRS. This includes managing estuary health, water quality, ecological risks, coastal hazards, and development pressures in a coordinated and integrated way.
- **Maintaining Local Focus:** While addressing broad-scale issues, the CMP must also retain sufficient detail and granularity to respond effectively to the many localised risks, challenges, and opportunities across the expansive study area.
- **Collaboration and Efficiency:** The CMP must support a collaborative approach between stakeholders - particularly the PCs - while clearly defining roles, responsibilities, and financial or resourcing commitments to enable efficient implementation.

A key bureaucratic challenge for the CMP is integrating coastal and catchment management objectives within a statutory framework that limits formal recognition of areas outside the coastal zone. While improving estuary health remains a central focus of the CMP, the CM Act does not permit the inclusion of land or actions located outside the legally defined coastal zone in a certified CMP (DPE, 2022).

This limitation stems from Section 13(2) of the CM Act, which states: "*A Coastal Management Program may be made in relation to the whole, or any part of the area included within the coastal zone*."

As a result, any land or management action situated beyond the mapped coastal zone - defined by the application of the relevant Coastal Management Areas under the Resilience and Hazards State Environmental Planning Policy (RH SEPP) - cannot be formally certified under the Act. These areas include:

- Coastal Use Area (CUA) – generally a 250 m buffer around the estuary foreshore.
- Coastal Environment Area (CEA) – estuarine waterways plus a variable 100–500 m buffer landward.
- Coastal Wetlands and Littoral Rainforest Area(s) (CWLR)
- Coastal Vulnerability Area (CVA) – areas directly impacted by coastal hazards. Mapping for the CVA has not been provided from the RH SEPP, and no such CVA map yet exists for the study area. Nonetheless, it is recognised that the HNRS is subject to coastal hazards and that the scope of this CMP also covers managing coastal vulnerability.

Due to this statutory limitation, the certified CMP study area comprises only 2.2% of the total HNRS catchment, presenting a significant constraint to achieving integrated, catchment-wide outcomes through the CMP alone.

2.2.2 CMP Structure and Delivery Mode

To effectively address the diverse challenges facing the CMP, a matrix delivery structure was adopted—enabling targeted action at both strategic and local geographic scales. The structure, illustrated in Figure 2-3, comprises:

- **Overarching Strategies:** A suite of nine (9) strategies aligned with key management themes across the HNRS.
- **Implementation Plans:** That allow for the implementation of actions at multiple scales.
  - River-wide Implementation Plan: Includes actions requiring collaboration between PCs or those extending beyond a single Local Government Area (LGA).

- LGA-based Local Implementation Plans: Contain actions specific to individual LGAs that can be implemented by a single Council.

The CMP will also include a catchment-based companion section which identifies actions or strategies located outside the legally defined coastal zone. While clearly marked as non-certifiable under the CM Act, these actions will be included within the CMP document to maintain integration with coastal zone actions and to support holistic estuary management.

This approach aligns with the NSW Government's guidance on *Coastal Management Programs and Integration with Catchment Management* (DPE, 2022). The guidance notes that actions within the companion section may still be eligible for funding under the Coastal and Estuary Grants Program, provided they meet all three of the following criteria:

- Significantly benefit the coastal zone and is a critical factor in estuary health.
- Give effect to the management objectives for the coastal management areas and the objects of the CM Act.
- Assist in addressing a key coastal management issue affecting the areas to which a certified applies.

This structured and integrated delivery model ensures that the CMP remains both strategically focused and locally responsive - enabling coordinated action across the entire HNRS while meeting statutory requirements and maximising opportunities for implementation funding.

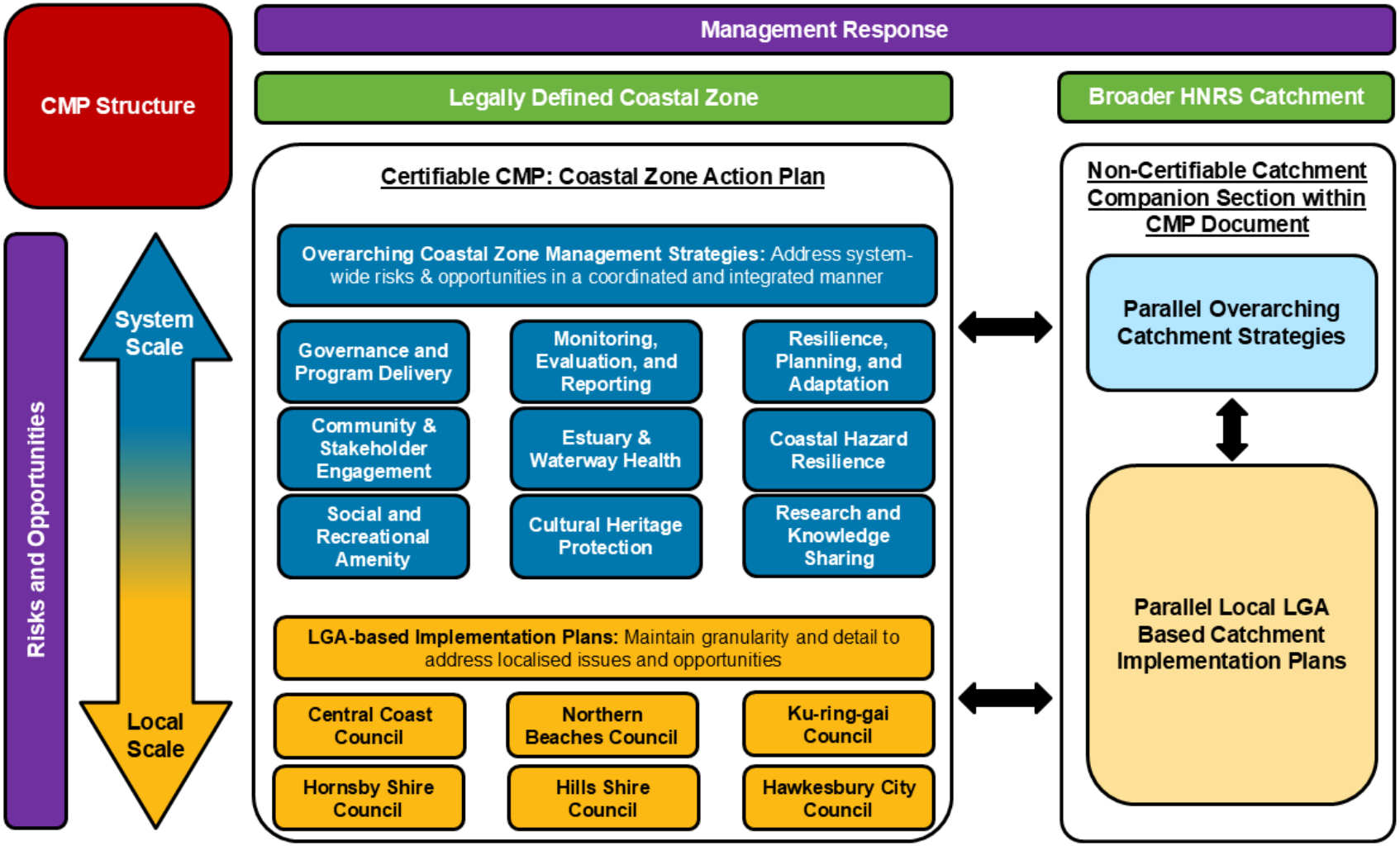

Figure 2-3 The HNRS CMP Program Structure

3 STEP 2: OPTION IDENTIFICATION

3.1 Strategic Approach

Coastal management is generally approached through the lens of five different strategic approaches as described in the NSW Coastal Management Manual (OEH, 2018d) and outlined in Figure 3-1.

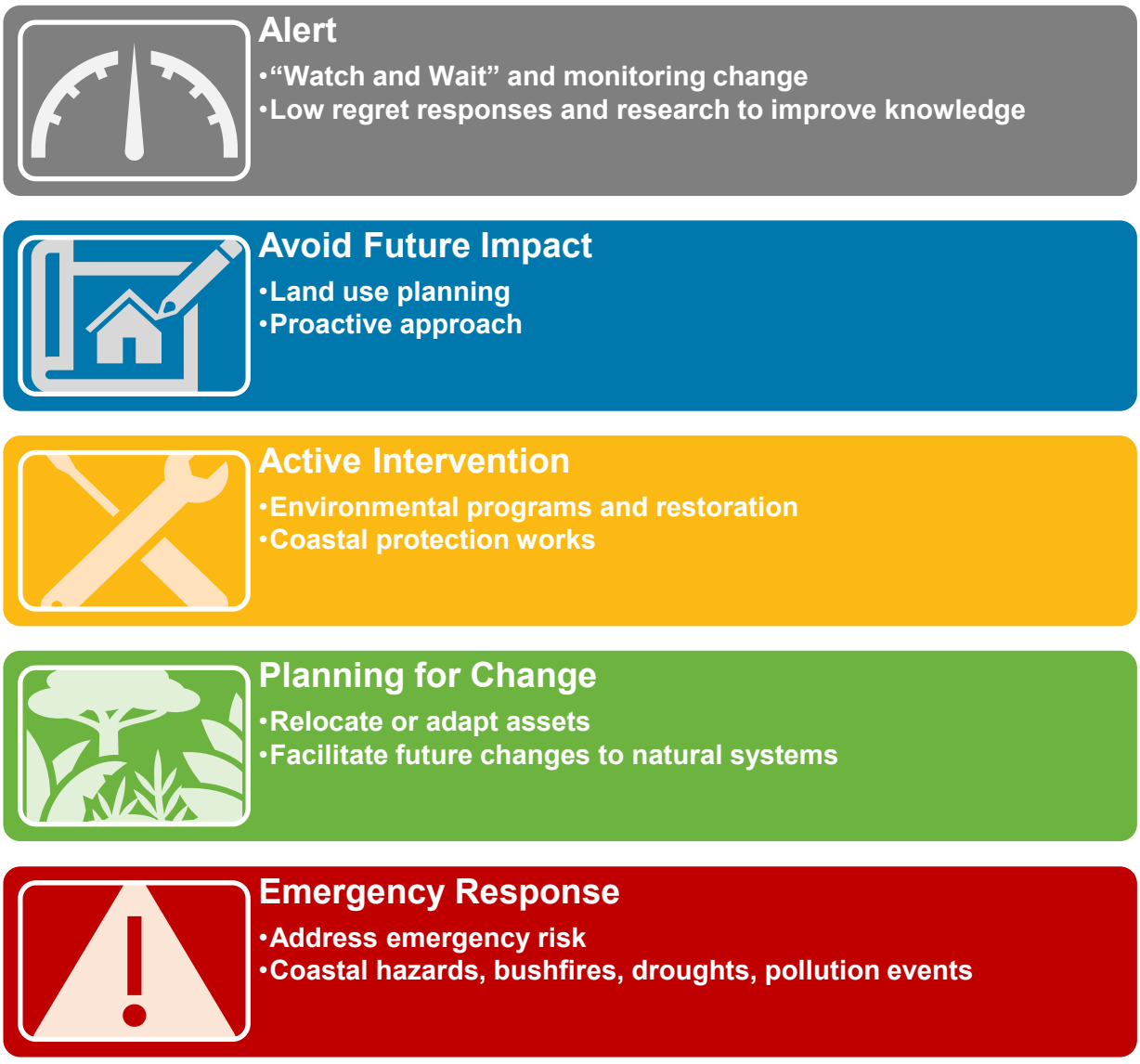

Figure 3-1 The five strategic approaches to coastal management (adapted from the NSW Coastal Management Manual)

Different strategic approaches are relevant to different levels of risk and attitudes to risk. However, they are often combined, or the emphasis may change from one to another over time as circumstances change. Therefore, the derivation of management options for Stage 3 of the CMP has been undertaken with consideration of these five strategic approaches.

1. For coastal environments such as the study area, ***Alert*** responses may be implemented to monitor conditions and ensure communities are aware of emerging changes to the environment. *Low regrets* responses are generally cost-effective, low impact options that yield multiple net benefits now, and

help communities prepare for future changes to risk exposure. Often, low regrets options can be insufficient to manage medium to high risks on their own, but they do allow coastal managers to strengthen coastal resilience and build management capacity.

2. Reducing current and future pressures on ecosystem health may also be achieved through ***Avoid*** approaches, such as recommending appropriate land use planning and infrastructure planning decisions that support appropriate community uses of the coastal environment and avoid future irreversible impacts.

3. If coastal hazard risk is high, or coastal ecosystem health is poor, then management options may seek to improve the safety, resilience, health or function of coastal landforms and ecosystems through a range of ***Active Intervention*** approaches – such as remediation, rehabilitation, and implementation of environmental improvement programs and coastal protection works.

4. ***Planning for change*** and allowing coastal environments to adapt to climate change is often a more cost-effective approach that will lead to higher value environmental outcomes. Fostering strategic adaptation in coastal environments to address climate change is frequently a more economically efficient strategy that yields enhanced environmental benefits. Contemplating habitat migration becomes advisable when vigilant monitoring substantiates the impending or irreparable nature of such changes. This entails establishing a comprehensive set of protocols and tactics to be activated when inescapable transformations (like coastal erosion) render a region unsuitable for human occupancy or utilization.

5. ***Emergency Response*** is a strategic approach incorporating immediate actions designed to be implemented during extreme coastal hazards events, providing a set of actions to be followed during times of emergency.

3.2 Identification of Options

Once the strategic direction was confirmed, the next step of the assessment was to develop a suite of potential options to address the risks identified in Stage 2 and achieve the objectives of the CMP. A “long list” of potential options was developed through the process summarised in Figure 3-2, and outlined in the NSW Coastal Management Manual (OEH, 2018d). This included investigating prior works such as the historical coastal zone management plans (CZMPs) and estuary management plans (EMPs), historical studies, community and stakeholder engagement, and risk-based analysis of key environmental datasets.

The initial database of potential options was based on actions previously identified in legacy CZMPs and EMPs. This was refined through a series of workshops with the PCs. Feedback during these workshops highlighted that historical CZMPs and EMPs often contained lengthy “wish lists” of actions, many of which proved difficult to implement due to budget and resourcing constraints. This approach was considered unsustainable and ultimately contributed to stakeholder frustration over the limited progress on implementation. Accordingly, the Stage 3 process prioritised the development of a more concise, coordinated, and achievable program of actions. A key focus of the workshops was the consolidation of the long list into a more practical and implementable set of options.

A range of technical studies from Stage 2, along with historical studies identified in the Stage 1 Scoping Study, were reviewed to inform the CMP option development. This process helped identify site-specific coastal management issues and incorporate relevant mitigation recommendations into the long list of options.

Further refinement was undertaken through engagement with key stakeholders, including local First Nations Groups, State Government agencies, and Upper Catchment councils. In addition, a large-scale community engagement program - delivered over a 10-week period between September and December 2024 - helped shape the long list. This engagement included drop-in sessions across the river system and an online

engagement portal which provided opportunities for the community to suggest new options and comment on existing proposals. Details of the community and stakeholder engagement process are provided in Appendix A.

The identification of potential management options was also informed by a technical, risk-based analysis that assessed threats to key environmental, social, cultural, and infrastructure values within the coastal zone. This process included a detailed geospatial assessment, supported by a broad range of datasets and technical guidelines. The analysis incorporated (but was not limited to) the following:

- **Environmental Assets and Estuary Health Datasets:**
  - The NSW Estuary Health Risk Dataset (DPIE, 2019b)
  - The NSW Estuary Water Quality Data Compilation: 2007 – 2020 (DCCEEW, 2025)
  - Local water quality monitoring programs and estuary health scorecards prepared by the PCs, including Hornsby Shire and Central Coast councils
  - Coastal Wetland and Littoral Rainforest Mapping provided in the State Environmental Planning Policy (Resilience and Hazards) 2021
- **Coastal and Estuarine Hazard Datasets:**
  - Bank erosion mapping prepared as part of the Stage 2 Bank Erosion Assessment and Options Report (Alluvium, 2022b)
  - Coastal erosion hazard mapping for the beaches of Pittwater (WRL, 2023), and Broken Bay (WorleyParsons, 2014; Worleys, 2025)
  - Coastal inundation mapping for the HNRS prepared as part of the Stage 2 Coastal Inundation Study (Rhelm and Baird, 2023)
  - The NSW Estuary Tidal Inundation Exposure Assessment (OEH, 2018g)
- **Assets, Infrastructure, and Social Values:**
  - Geospatial data (GIS) provided by each PC that provided information regarding:
    - Coastal infrastructure (e.g. boat ramps, wharves, jetties, and seawalls)
    - Community and recreational infrastructure (e.g. beach access paths and public foreshore amenities)
    - Road networks and car parks
    - Public buildings (e.g. community centres, surf lifesaving clubs)
    - Stormwater infrastructure (e.g. outlets, pits, and drainage systems, where available)
    - Council-managed reserves and open spaces

This multi-layered risk assessment allowed the project team to identify spatially explicit vulnerabilities and target areas where management actions would deliver the greatest benefit to the health, function, and resilience of the HNRS coastal zone.

Figure 3-2 Identification of potential management options

4 STEP 3: OPTIONS ASSESSMENT

4.1 Overview

Once the long list of management options was developed in Step 2, the next step was to assess and prioritise these options. Decision making in coastal and estuary management can be complex and multifaceted due to the inherent trade-offs required between social, environmental, economic, and political factors. The identification of appropriate management options therefore requires the consideration of a range of criteria, many of which cannot be easily quantified into common units or monetary values. Traditionally, optioneering undertaken as part of coastal and estuary management plans has applied qualitative methods that aim to simplify this complexity. Whilst practical, this can sometimes lead to over-simplifications whereby important information may be lost, opposing points of view may be discarded, and elements of uncertainty may be ignored.

To ensure the program of management options are appropriate, are able to be implemented and meets the objectives the CM Act, Stage 3 of the CMP has employed a robust multi-criteria decision-making framework. The purpose of this approach is to evaluate and choose among alternatives based on a systematic analysis that uses stakeholder participation to inform economic, social, and environmental criteria. This provides a tool that enables different stakeholders' perspectives and values to be explicitly included in the analysis.

The options assessment has followed a 3-step process, as outlined in the NSW Coastal Management Manual (OEH, 2018d), and summarised in Figure 4-1 below.

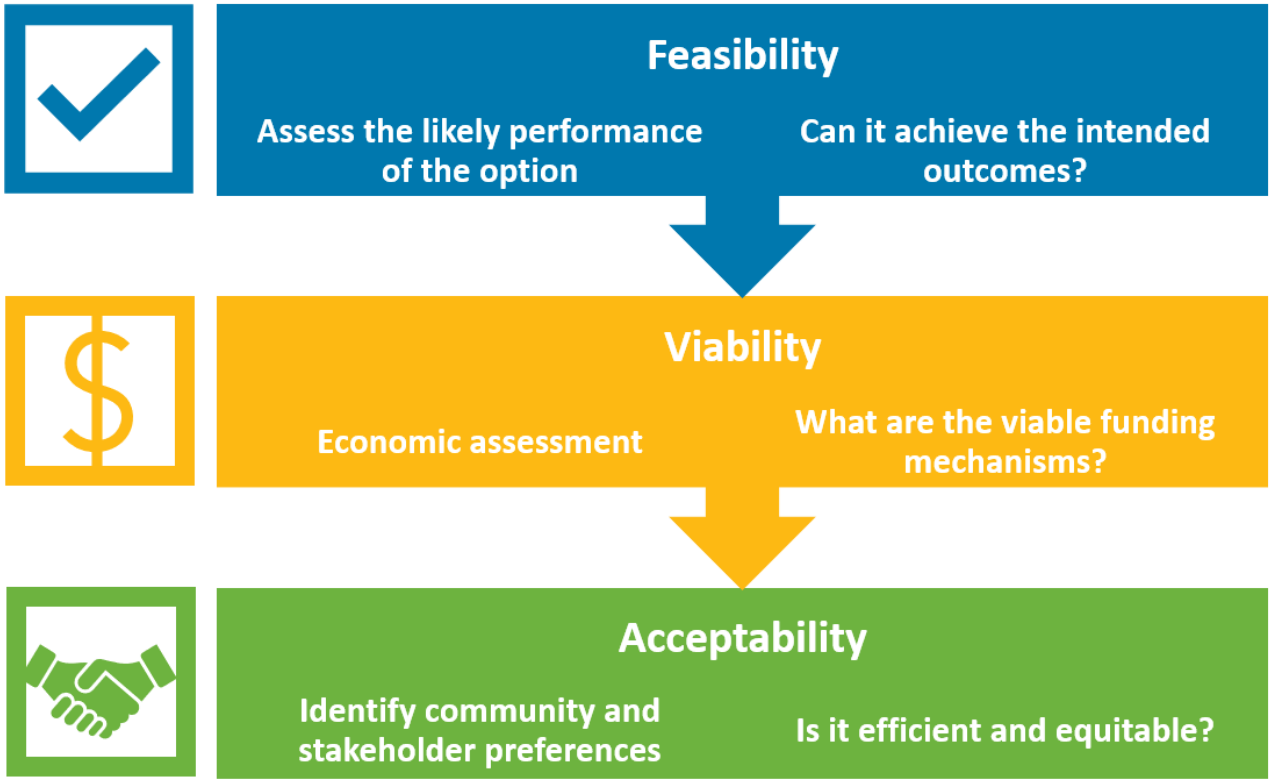

Figure 4-1 The Stage 3 options assessment process (adapted from the NSW Coastal Management Manual)

The overarching approach has been to undertake a discrete (but interrelated) assessment of each of these three components. The output of each assessment was a numerical score –: a *Feasibility Score*, a *Viability Score*, and an *Acceptability Score*. These three scores will be subsequently combined in order to calculate a total *Options Ranking Score* that can be used to rank and compare the various options.

4.2 Preliminary Screening of Options

Prior to undertaken a detailed options assessment, a preliminary screening assessment was undertaken through workshops and detailed engagement with the PCs and relevant stakeholders. As part of the screening process, an audit of historical CZMPs and EMPs was undertaken to remove actions that were either already completed or no longer relevant. Similar or duplicate actions across the study area were consolidated to reduce redundancy and improve clarity. Community suggestions were carefully reviewed, with those found to be inconsistent with local or state government policy or legislation excluded (refer to Appendix A). Additional suggestions that duplicated existing actions or were already captured under broader management strategies were also streamlined. Finally, actions considered to be routine operational tasks or already addressed through other existing plans of management were excluded to ensure the long list remained focused and strategic. This process is summarised in Table 4-1.

Table 4-1 Action Long List Development and Preliminary Screening Process

Action Identification Source	Total Number of Actions
Starting Point - Review of Historical CZMP and EMPs	
Upper Hawkesbury CZMP (BMT WBM, 2014a)	+39
Lower Hawkesbury EMP (BMT WBM, 2008)	+147
Brisbane Water (Cardno, 2012)	+183
Pittwater EMP (BMT WBM, 2010)	+41
Gosford Beaches CZMP (WorleyParsons, 2017)	+111
Pearl Beach Lagoon CZMP (BMT WBM, 2014b)	+9
Additional Actions Identified During Stage 3	
Actions derived from review of Stage 2 studies (and other historical technical studies), PC workshops, stakeholder engagement, and risk-based analysis	+158
Community Engagement – Community Suggestions for Actions	+159
Sub-Total of Preliminary Long List Actions	**847**
Preliminary screening of actions through: ▪ CZMP/EMP audit (removal of completed or outdated actions) ▪ Consolidation of duplicate/similar actions ▪ Identifying community suggestions that are inconsistent with government policy or legislation (see Appendix A) ▪ Identifying community suggestions that are already covered by existing lost-list actions with government policy or legislation (see Appendix A) ▪ Exclusion of actions covered by other plans or considered “business-as-usual” operational activities	-601
Second Pass Screening of Options through Council Engagement and Workshopping	-58
Total Actions on Refined Long list	**188**

This consultative and rigorous screening process was applied to ensure only relevant, implementable, and strategic actions remained, culminating in a refined long list of 188 management options for consideration in the CMP. This refined list reflects a coordinated and considered approach, ensuring the final program of

actions is practical, aligned with community and stakeholder priorities, and supports the long-term objectives of the CMP.

4.3 Options Long List

A full description of all options in the long list is provided in Appendix C and Table 4-3, which includes a comprehensive set of information for each option, as summarised in Table 4-2. The long list includes 188 options, each of which was assessed in detail using the methodology outlined in Figure 4-1 and described in Section 4.3 to 4.6.

Table 4-2 Snapshot of Long List Information

CMP Document Location	Indicates whether the option will be included in the certifiable CMP or the catchment companion document.
CMP Strategy	Identifies the overarching strategy that the option aligns with.
Implementation Plan	Indicates the relevant Implementation Plan under which the option falls.
ID	A unique action ID assigned to each option using the format: [Strategy ID].[Implementation Plan ID].[Numerical Sequence]
RHSEPP Geography	Indicates whether the option is located within the coastal zone or the catchment.
Functional Zone	Specifies the estuary functional zone in which the option is located.
Locality	Describes the specific location of the option.
Action Name	A short name or title for the option (typically fewer than 20 words).
Action Description	A more detailed explanation of the option.
Lead	Identifies the organisation with lead responsibility for implementation.
Support	Lists supporting agencies or stakeholders.
CM Manual Approach	Indicates the relevant strategic approach from the Coastal Management Manual (OEH, 2018d)
Option Source	Notes the original source of the option (e.g., stakeholder suggestion, technical recommendation).

Table 4-3 Long List of CMP Options

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
Certifiable CMP	Strategy 1: Governance and Program Delivery	River-wide Implementation Plan	S1.CMP.01	Estuary-Wide	Implement the CMPs formal governance partnership for the river system	This will involve the implementation of a new partnership for the governance of the Hawkesbury-Nepean River and its catchment. The partnership will be tasked with the implementation of the CMP, and the broader management of the river system. The aim of the partnership will be to: > Ensure collaboration and coordination between local councils, the state government and other stakeholders > Define the roles and responsibilities of all stakeholders > Ensure dedicated resourcing for river management	Partner Councils	N/A	NG	NG	Planning for change	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 1: Governance and Program Delivery	River-wide Implementation Plan	S1.CMP.02	Estuary-Wide	Develop and execute a communications plan for Stage 5 of the CMP	Develop a communications plan for the 10 year implementation phase of the CMP. This will include maintenance of the CMP Website and other associated Partner Council information pages. The purpose of the plan should be to provide the community with the following information: > The purpose of the CMP. > The CMP background, and an overview of the NSW Coastal Management Framework. > Key CMP information, including reports available for public consumption. > The Status of CMP actions, with details of the actions and recent updates/progress. > Information pertaining to upcoming community consultation or education events, and avenues for engagement; and > Links to relevant materials such as The NSW Coastal Management Framework, and the Marine Estate Management Strategy. This may also include the ongoing social media presence, mailing lists and newsletters publishing.	Partner Councils	DCCEEW(BCS)	NG	NG	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	River-wide Implementation Plan	S2.CMP.01	Estuary-Wide	Design and implement an integrated and coordinated water quality monitoring program	Water Quality across the Hawkesbury-Nepean River System is currently monitored by various stakeholders, including Partner Councils, the State Government (Department of Climate Change, Energy, the Environment and Water - DCCEEW), and Sydney Water. While each independent water quality sampling program provides valuable datasets, the lack of coordination leads to inconsistencies in sampling frequency and testing that hampers the ability to comprehensively understand and manage the river system's health. Therefore, it is essential to integrate these individual programs into a single, coordinated water quality monitoring initiative. This action would therefore include: Program Design: >Map the respective sampling locations across the river system and determine if there are any important gaps or duplication > Develop standardized protocols for water quality sampling, including the frequency, locations, and types of tests to be conducted. Data management: > Create a centralized database to store, manage, and share water quality data collected by all stakeholders. > Implement robust data entry, validation, and analysis processes to ensure data accuracy and reliability. Resource sharing: > Identify where resource sharing between Councils can reduce costs and resourcing requirements > Promote capacity building through workshops, seminars, and exchange programs to enhance technical skills and knowledge sharing Reporting: > Develop a public-facing platform to disseminate water quality information, ensuring transparency and fostering community engagement (see Action S2.CMP.03)	Partner Councils	DCCEEW(BCS), Sydney Water, NSW Food Authority,	NG	NG	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	River-wide Implementation Plan	S2.CMP.02	Estuary-Wide	Implement a bank stability and condition monitoring program across the estuary foreshores	Systematically monitor and assess bank stability and geomorphic conditions in the Hawkesbury River Estuary to identify erosion risks and support effective riverbank management. While monitoring is currently conducted by individual Partner Councils, an integrated and coordinated program would enable a more comprehensive estuary-wide assessment, facilitate resource sharing, and improve cost efficiencies. This program will be designed to be cost-effective, replicable, and adaptable over time, ensuring consistent data collection and long-term riverbank health management.	Partner Councils	DCCEEW(BCS), NPWS	NG	NG	Alert	Stage 3 Analysis & Council Engagement
Catchment Companion	Strategy 2: Monitoring, Evaluation, and Reporting	River-wide Implementation Plan	S2.CMP.03	Upper catchments	Implement a bank stability and condition monitoring program across the creeks and waterways of the catchment	The objective of this action would be to systematically monitor and assess bank stability and geomorphic conditions of the catchment waterways Hawkesbury River Estuary to identify erosion and manage riverbank health effectively. Monitoring is currently undertaken by each of the Partner Councils, however an integrated and coordinated program would allow for a more holistic assessment of the estuary and provide the opportunity for resource sharing and harnessing of cost efficiencies.	Partner Councils	DCCEEW(BCS) NPWS	NG	NG	Alert	Stage 3 Analysis & Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	River-wide Implementation Plan	S2.CMP.04	Wisemans Ferry to Richmond	Undertake periodic surveys of the River in between Wisemans Ferry and Richmond	Undertake periodic hydrographic surveys of the upper reaches of the HNRS between Wisemans Ferry and Yarramundi - in order to support maritime safety, and inform environmental management and infrastructure planning. These surveys will provide up-to-date data on riverbed conditions, water depths, and channel movements, helping to identify hazards, maintain navigability, and inform future planning decisions. Accurate and regularly updated river mapping will also assist identifying and assessing erosion hotspots, and ensuring that foreshore development aligns with the evolving river system. The data will support both safe boating and maritime operations through identification of significant navigation hazards including trees, shallowing or other debris that may exist. Surveys would be proactively scheduled on a regular basis (every 10 years), and also triggered by the occurrence of major flood events that can generate significant morphological changes and/or navigational hazards.	The Hills Shire Council, Hawkesbury City Council, TfNSW		NG	NG	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	River-wide Implementation Plan	S3.CMP.01	Estuary-Wide	Review and update Partner Council planning instruments to ensure a consistent best practice approach to managing stormwater and downstream estuarine water quality	The objective of this action is to establish a consistent and best-practice approach to development controls that enhance estuary health, by reviewing and updating the Development Control Plans (DCPs) of the six Partner Councils. This action will also set pollution reduction targets to ensure measurable improvements in estuarine environments. This action would include: > Determination of a consistent set of targets for relating to water quality and quantity that are consistent with the Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning. > Conducting a detailed review of the existing (DCPs) across the six Partner Councils - in relation to how they address stormwater management, sediment and erosion management, and water sensitive urban design (WSUD) applications and requirements. > Identification of gaps, inconsistencies, and areas needing improvement in the current DCPs, particularly those affecting estuary health. > Update of each of the DCPs so that they provide a best practice approach to stormwater management and water quality, and provide consistency across the catchment to the greatest extent practical. This Action should use the Parramatta River Catchment Groups "Standardise the standards" initiative as an example of contemporary good practice.	Partner Councils	DPHI-Planning and Assessment	NG	NG	Planning for change	Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	River-wide Implementation Plan	S3.CMP.02	Estuary-Wide	Review and update coastal hazard risk planning controls every 10 years	The objective of this action is to establish a consistent and best-practice approach to development controls that manage coastal and estuarine hazard risk, by reviewing and updating the Development Control Plans (DCPs) of the six Partner Councils. Each Partner Council should review their relevant planning controls at least every 10 years, in order to ensure that these controls are based on contemporary climate change projections, consider observed coastal hazard impacts, and are consistent with state government policies	Partner Councils	DPHI-Planning and Assessment	NG	NG	Planning for change	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	River-wide Implementation Plan	S3.CMP.03	Estuary-Wide	Encourage eco-friendly features in seawall development applications	Partner Councils are to review and update their DCPs to encourage development applications for private seawalls to include eco-friendly features - such as installing 3D-printed habitat panels, increasing surface texture, and planting estuarine vegetation around the structures. This could also include: > Ensuring that all relevant Conditions of Consent include reference to the Environmentally Friendly Seawall Design > Providing educational material to foreshore residents promoting eco-friendly features and the ecological value they provide. > Providing access to suppliers and contractors to help install ecofriendly features.	Partner Councils	DCCEEW(BCS), DPIRD-Fisheries	NG	NG	Active Intervention	Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	River-wide Implementation Plan	S3.CMP.04	Estuary-Wide	Undertake a Hawkesbury River System Blue Carbon Scoping Study	'The NSW Blue Carbon Strategy 2022–2027 (the Strategy) provides a roadmap to support blue carbon projects in NSW. The Strategy aims to increase participation in the emerging blue carbon market and leverage the many co-benefits of blue carbon projects. Action 2.2 of that Strategy involves the identification of potential new sites for blue carbon restoration projects. In alignment with this action, the proposed Project would involve a Scoping Study for the Hawkesbury–Nepean River System to investigate the feasibility of potential tidal restoration sites for blue carbon outcomes. The feasibility investigation would include the following components: > Desktop site identification and scoping: Including mapping and analysis of hydrological units, land tenures, land uses, land zoning. > Hydrological assessment: To understand the hydrological unit, artificial tidal flow controls and potential impacts of sea level rise scenarios. > Identification of key local stakeholders, including land owners, traditional custodians, and government agencies. > Identification of opportunities and constraints, any planning or other regulatory approvals that are likely to be required to implement tidal restoration. The project can leverage off the NSW Government Blue Carbon datasets (https://www.seed.nsw.gov.au/news-and-resources/news/explore-nsw-blue-carbon-data)	Partner Councils	DCCEEW(BCS), DPIRD-Fisheries	NG	NG	Planning for change	Stage 3 Analysis & Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	River-wide Implementation Plan	S3.CMP.05	Estuary-Wide	Prepare a Hawkesbury River Coastal Wetland Sea Level Rise Adaptation Strategy	Develop a comprehensive strategy to facilitate the landwards (upslope) migration of Coastal Wetlands (CWs) within the Hawkesbury River Estuary, ensuring their sustainability and resilience in the face of climate change and sea-level rise. This would include: > Mapping and Baseline Data: Conduct detailed mapping of current CWs, topography, and land use in the Hawkesbury River Estuary. > Vulnerability Assessment: Assess the vulnerability of existing CWs to sea-level rise and other climate change impacts. > Review of Existing DCPs: Evaluate current DCPs to identify provisions related to CWs and land use regulations that may affect their upslope migration. > Strategy for migration pathways: Explore opportunities for rezoning, land conversion or acquisition in strategic areas to facilitate upslope migration. The study area can exclude Brisbane Water, as this work has already been undertaken as part of the Brisbane Water Wetland Refugia Study.	Partner Councils	DCCEEW(BCS), DPIRD-Fisheries	Multiple	Multiple	Planning for change	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	River-wide Implementation Plan	S3.CMP.06	Estuary-Wide	Develop Foreshore Stabilisation and Rehabilitation Guidelines for the HNRS	Develop comprehensive Foreshore Stabilisation and Rehabilitation Guidelines to provide clear, consistent guidance for landowners and managers on best practices for stabilizing and restoring foreshore areas. These guidelines will help balance environmental sustainability, erosion control, and land use requirements, ensuring that foreshore management aligns with ecological and planning objectives. The guidelines will outline appropriate stabilisation treatments and construction techniques suited to different site conditions, promote nature-based solutions where feasible, and support ecological function while mitigating erosion risks. They will also serve as a supporting document to each Council's Development Control Plan (DCP) for foreshore and waterway development, ensuring consistent advice for development proponents across the Hawkesbury-Nepean River System (HNRS). This approach builds on successful models, such as the Lake Macquarie City Council's foreshore management framework, which can serve as a reference point for guideline development. The guidelines should be consistent with the NSW Coastal Design Guidelines 2023, and the NSW Environmentally Friendly Seawalls guidelines (2009).	Partner Councils	DCCEEW(BCS) , DPIRD-Fisheries, DPHI-Crown Lands	NG	NG	Avoid Future Impact	Stage 3 Analysis & Council Engagement
Catchment Companion	Strategy 3: Resilience, Planning, and Adaptation	River-wide Implementation Plan	S3.CMP.07	Ku-ring-gai Chase National Park	Support the proposal for the development of the Ku-ring-gai GeoRegion	In October 2018, Friends of Ku-ring-gai Environment (FOKE) resolved to initiate a campaign advocating for the UNESCO World Heritage listing of Ku-ring-gai Chase National Park (KCNP). This campaign has since focussed on the development of a designated 'GeoRegion,' which will include the creation of geotrails, signage, and efforts to promote the region's geological significance. The proposal aims to leverage the area's existing recognised values, which include its biodiversity, natural and cultural heritage, as well as its exceptional geological and geomorphological features. These elements have shaped the landscape and created the distinctive traits that make the region globally significant. Once agreed upon by stakeholders, a defined area within the 'Ku-ring-gai GeoRegion' could be put forward for submission as an Aspiring UNESCO Global Geopark. Establishing this GeoRegion and pursuing UNESCO Global Geopark status will provide significant environmental benefits, particularly for downstream estuary health. By preserving and enhancing the region's geological and ecological integrity, the project will support the natural hydrological processes that flow downstream, ensuring better water quality and habitat conditions for estuaries. The protection of this vital landscape will help mitigate erosion, reduce sediment runoff, and preserve natural buffers, all of which contribute to healthier estuarine ecosystems and improve the overall resilience of coastal environments. Relevant stakeholders can offer continued support for the proposal through the provision of technical advice and political support.	Ku-ring-gai Council, Hornsby Shire Council, Northern Beaches Council, NPWS		-33.6224	151.2543	Avoid Future Impact	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 4: Community & Stakeholder Engagement	River-wide Implementation Plan	S4.CMP.01	Estuary-Wide	Design and Implement a Community Engagement and Education Program to support the vision and objectives of the CMP	The action includes the design and implementation of a Community Engagement and Education Program to support the vision and objectives of the CMP. The purpose of the program would be to educate the community regarding the keys threats and risks facing the estuary system, and how they can actively contribute to mitigating these risks and improving the resilience of the coastal zone. It would include the following components, or themes: > Water quality and marine litter > Riparian zone and foreshore management (focusing on foreshore residents) > Ecosystems of the estuary and biodiversity > Aboriginal and European cultural heritage values of the estuary > Coastal hazard risk (focusing on residents impacted by such hazards) > Recreational use impacts (including boating) The program can leverage off the existing community education material developed by the state government (DPIRD-Fisheries, DCCEEW, NPWS, TfNSW) and be implemented across the Hawkesbury River System by the Partner Councils in a strategic and integrated manner.	Partner Councils	DPIRD-Fisheries, NPWS, TfNSW	NG	NG	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 4: Community &	River-wide Implementation Plan	S4.CMP.02	Estuary-Wide	Develop an education package	This Action would be a specalised extension of the broader community and stakeholder education program (S4.CMP.01). The purpose of this action is to enhance environmental awareness and promote responsible boating practices by creating a	Partner Councils, TfNSW	N/A	Multiple	Multiple	Alert	Stage 3 Analysis &

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
	Stakeholder Engagement				for recreational boaters	series of short, estuary-specific educational videos for use across the Hawkesbury. These videos will be used by local boat-hire operators to conduct induction and "toolbox talks" with customers and users before departure. The design of the video would be undertaken by Council's, together with TfNSW and would include information regarding: > Reducing impacts on seagrass : Include best practices for avoiding seagrass beds, and highlighting areas where seagrass is particularly vulnerable and should be avoided. > Speed limits, anti-social behaviour: Clearly state speed limits for different zones within each estuary. Provide guidelines on respectful and safe boating behaviour to minimize conflicts and accidents. > Locations of pumpout facilities impacts: Map the locations of pump-out facilities within each estuary, and explain the environmental impacts of improper waste disposal and the benefits of using pump-out services.						Council Engagement
Certifiable CMP	Strategy 4: Community & Stakeholder Engagement	River-wide Implementation Plan	S4.CMP.03	Estuary-Wide	Community education and outreach program for estuary frontage communities	This Action would be a specalised extension of the broader community and stakeholder education program (S4.CMP.01). The purpose of this action is to undertake targeted engagement with private landowners in the Coastal Zone (particularly those with river frontage), in order to help increase their awareness of estuary management issues riverfront residents would be provided with information on best practice for management of the foreshore within their property boundaries – including recommended riparian species, weed identification and management	Partner Councils	DCCEEW(BCS)	Multiple	Multiple	Alert	Stage 3 Analysis & Council Engagement
Catchment Companion	Strategy 4: Community & Stakeholder Engagement	River-wide Implementation Plan	S4.CMP.04	Estuary-Wide	Develop and implement a Hawkesbury River school environmental education program focused on water quality, estuary health, and coastal hazards	This Action would be a specalised extension of the broader community and stakeholder education program (S4.CMP.01). It would involve the development and implementation of a coordinated school education program across the HNRS catchment that educates the local school students regarding the unique values of the river system and current and emerging stressors and risks. The program would focus on water quality, estuary health, and coastal hazards. The program may include a curriculum-based program, and/or excursion based learning modules - and could make of the existing environmental education centres that are active across the HNRS catchment.	NSW Department of Education	Partner Councils, First Nations Groups	NG	NG	Alert	Engagement with NSW Department of Education
Certifiable CMP	Strategy 4: Community & Stakeholder Engagement	River-wide Implementation Plan	S4.CMP.05	Upper Estuary	'Implementing a community-based carp fishing initiative	European Carp pose a serious threat to local ecosystems, degrading water quality and displacing native species. This Action involves implementing a community-based carp fishing initiative - an effective and engaging way to control invasive carp populations in the freshwater sections of the Hawkesbury River System. Such activities not only contribute to the management of this invasive species but also raise public awareness and foster ongoing community involvement in environmental conservation. This could be similar to the "Catch a Carp Day" programs in other estuaries, or even could be modelled on the "Carp to Croc" program implemented by Central Coast Council.	Hawkesbury City Council, The Hills Shire Council, Hornsby Shire Council	DPIRD-Fisheries, OzFish	Multiple	Multiple	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 4: Community & Stakeholder Engagement	River-wide Implementation Plan	S4.CMP.05	Estuary-Wide	Hawkesbury River Marine Compliance & Education Campaign	A targeted compliance and education campaign will be conducted across the Hawkesbury River to promote best practices within the marine industry and improve estuary health outcomes. This initiative will focus on raising awareness of environmental regulations, sustainable operational practices, and the impacts of pollution, sediment runoff, and habitat disturbance. The campaign will combine proactive education with compliance monitoring, engaging key industry stakeholders such as commercial fishers, boat operators, marina managers, and waterfront businesses. Outreach efforts will include workshops, on-site visits, digital resources, and enforcement where necessary to ensure adherence to environmental guidelines. By fostering industry-wide accountability and knowledge-sharing, the campaign aims to reduce harmful impacts on water quality, aquatic habitats, and biodiversity within the estuary	Northern Beaches Council, Central Coast Council, Hornsby Shire Council	TfNSW NSW EPA	NG	NG	Avoid Future Impact	Stage 3 Analysis & Council Engagement
Catchment Companion	Strategy 5: Estuary & Waterway Health	River-wide Implementation Plan	S5.CMP.01	Estuary-Wide	Prepare a Litter Prevention Strategy for the Hawkesbury River System	The purpose of the Hawkesbury River Litter Prevention Strategy would be to provides strategic direction and a detailed action plan for the Partner Councils to tackle litter prevention across the river system (in partnership with other stakeholders in the catchment). The objectives of the strategy would be to reduce marine litter in the river system and to contribute to the state government target of a 60 per cent reduction in litter by 2030. The strategy would link with existing strategies in place across the Partner Council LGAs and the Greater Sydney Area.	Partner Councils	NSW EPA	NG	NG	Avoid Future Impact	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	River-wide Implementation Plan	S5.CMP.02	Estuary-Wide	Identify opportunities to retrofit existing public seawalls with eco-friendly features	This action would include the Partner Council's undertaking a strategic investigation into improving the quality and complexity of their existing public seawalls in order to improve biodiversity. The investigation would include an audit of existing seawall structures, and a review of their suitability to be retrofit with ecofriendly features such as: > Application of 3D printed habitat panels that feature complex surface designs that mimic the natural environment.	Partner Councils	DPIRD-Fisheries	Multiple	Multiple	Active Intervention	Agency and Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						> Increasing roughness and texture through creating holes and cavities > Planting estuarine vegetation seawards and/or landwards of the structure						
Certifiable CMP	Strategy 5: Estuary & Waterway Health	River-wide Implementation Plan	S5.CMP.03	Estuary-Wide	Investigate opportunities to increase uptake of environmentally friendly moorings (EFM) across the lower estuary	This would involve Partner Councils, TfNSW, and DPIRD-Fisheries designing a cost effective program to incentivise uptake of environmentally friendly moorings (EFM) across the lower estuary. This could include: > Public Recognition: Highlight certified moorings in local publications, on the council's website, and through community events to encourage others to follow suit > Support: Offer assistance with the installation and maintenance of these moorings, possibly through partnerships with local marine service providers. > Education: Host workshops or seminars to demonstrate the advantages and installation processes of environmentally friendly mooring systems. Inform contractors of appropriate maintenance techniques to assist with uptake and delivery.	TfNSW	Hornsby Shire Council, Central Coast Council, Northern Beaches Council	Multiple	Multiple	Active Intervention	Agency and Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	River-wide Implementation Plan	S5.CMP.05	Estuary-Wide	Undertake a coordinated riparian rehabilitation works program across the River System	This action includes the implementation of a targeted riparian rehabilitation works program – with the aim of managing both the spread and introduction of weeds and improve the condition of riparian vegetation across the coastal zone. The works program would undertake wetland restoration and weed control in high value riparian areas - particularly those that overlay the presence of weeds with Threatened Ecological Communities (TEC's) using the most relevant Plant Community Type (PCT) mapping available at the time. This will require a "targeting multi-species" approach, along with both follow up control and planting of native vegetation suited to that PCT. As part of the final CMP a series of maps will depict the areas of foreshore where works may be undertaken over the CMPs 10 year implementation period.	Partner Councils NPWS	DCCEEW(BCS), DPIRD-Fisheries	NG	NG	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	River-wide Implementation Plan	S5.CMP.06	Estuary-Wide	Continue to support Floating Landcare (and other relevant Landcare networks) across the river system	Floating Landcare is coordinated in partnership by Hornsby Council, Northern Beaches Council, Central Coast Council and the National Parks and Wildlife Service. The activities range from litter collection and weed removal through to native planting and surveys of local wildlife. Support for this program from the participating Partner Council's would in the form of: > Financial and logistical support for Floating Landcare Activities - including the allocation of agreed-upon funding pipelines > Technical support and identification of priority sites and activities > Promotion of Floating Landcare through Council communications channels > Utilising Council networks with existing businesses and chambers of commerce to actively promote Floating Landcare corporate volunteering events and donations This kind of support should be extended to other landcare networks active across the CMP Study Area, including Clean4Shore.	Partner Councils NPWS	NPWS, LLS	NG	NG	Active Intervention	Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	River-wide Implementation Plan	S5.CMP.07	Estuary-Wide	Develop a strategy for managing vessel pumpouts across the Hawkesbury River System	The purpose of the strategy would be to enhance water quality, protect marine ecosystems, and support sustainable boating practices through a strategic plan for pumpout facilities across the study area. Strategy components include: Identify Locations for New/Additional Public Pumpouts: >Conduct a survey to identify high-traffic boating areas and regions lacking pumpout facilities. >Collaborate with local stakeholders to determine suitable locations. >Develop a phased implementation plan, prioritizing areas with the greatest need. Provide Incentives for Marinas to Install Oil Absorbent Devices: >Launch an educational campaign about the benefits of oil absorbent devices in bilge water tanks. >Provide financial incentives, technical support, and recognition to marinas that install these devices. Provide Incentives for Routine Pumpout Services to Riverside Settlements: >Offer grants and subsidies to establish routine pumpout services in riverside communities. >Partner with local businesses and organizations to promote these services. >Educate residents on the importance of regular pumpouts for water quality. Review of Emergency Spill Management Action Plans: > Conduct comprehensive annual reviews of Emergency Spill Management Action Plans (ESMAPs). These reviews should assess the effectiveness, adequacy, and current relevance of each plan. > Utilise findings from the annual reviews to improve and update the ESMAPs. Incorporate lessons learned from past incidents, advancements in spill response technology, and evolving environmental regulations.	TfNSW, Hornsby Shire Council, Central Coast Council, Northern Beaches Council	NSW EPA	NG	NG	Planning for change	Agency and Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	River-wide Implementation Plan	S5.CMP.08	Estuary-Wide	Engage with government and the community to reduce the impacts of	The purpose of this action is to reduce the environmental impacts of liveaboards on the waterways by providing onshore facilities, while minimizing the risk of encouraging non-compliant behaviour. >Partner Councils to collaborate with Transport for NSW (TfNSW) to plan and develop onshore facilities for liveaboards.	TfNSW	Hornsby Shire Council, Central Coast Council, Northern Beaches Council	NG	NG	Active Intervention	Agency and Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
					liveaboards (and associated discharges) on the waterways	>Identify key locations for the installation of onshore waste management facilities, including sanitary services. > Engage with the community to inform liveaboards about the availability and importance of using onshore facilities. > Implement a monitoring system to track the usage of onshore facilities and detect any non-compliant behaviour.						
Certifiable CMP	Strategy 5: Estuary & Waterway Health	River-wide Implementation Plan	S5.CMP.09	Estuary-Wide	Support the NSW Government's breeding and release program for the endangered White's Seahorse	The NSW Government is currently undertaking a research program to breed the endangered White's Seahorses and release them at suitable locations. The breeding is done at three facilities: Port Stephens Fisheries Centre, Sydney Aquarium, and SIMS. There is currently a need for suitable release sites, preferably in areas where the seahorses occur naturally. The CMP should support this program by liaising with DPIRD-Fisheries to identify suitable release locations using tidal baths in Pittwater, Brisbane Water, and the Lower Hawkesbury. There is also an opportunity for Councils to contribute through the implementation of "Seahorse Hotels" - which are purpose-designed artificial habitat units that are made out of biodegradable materials – under publics wharfs and other infrastructure (as part of public wharf rebuilds).	DPIRD Fisheries	Hornsby Shire Council, Central Coast Council, Northern Beaches Council	NG	NG	Active Intervention	Agency and Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	River-wide Implementation Plan	S5.CMP.10	Estuary-Wide	Coordination and resource sharing for inspection of OSMS at key river settlements	This action would involve coordination and resource sharing between Partner Councils across the lower to middle estuary reaches in order to facilitate and program of inspection for On-site sewage management systems (OSMS) at key river settlements. Inspections are currently undertaken by each Councils, with their programs prioritized based on risk factors such as proximity to waterways and type of system. However, there is an opportunity to collaborate to share resources and harness cost effectiveness through a coordinated program.	Hornsby Shire Council, Central Coast Council, Northern Beaches Council	NSW Food Authority	Multiple	Multiple	Alert	Agency and Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	River-wide Implementation Plan	S5.CMP.11	Estuary-Wide	Fencing of riparian foreshores on high risk agricultural lands	Conduct a comprehensive audit of high-risk agricultural locations to identify areas where livestock access to estuaries is prevalent. Develop and implement a targeted program to install fencing in these critical riparian zones. It would include: > Identify High-Risk Areas: Conduct field surveys and use geographic information systems (GIS) to map high-risk agricultural areas where livestock frequently access riparian zones. > Evaluate Impact: Assess the extent of damage caused by livestock and prioritize sites based on the severity of impact and potential for recovery. > Engage Landowners: Work collaboratively with landowners and stakeholders to secure permissions and support for the fencing installations. > Install Fencing: Carry out the installation of fences in the identified high-risk areas, ensuring minimal disruption to the environment.	LLS	Partner Councils	NG	NG	Active Intervention	Stage 3 Analysis & Council Engagement
Catchment Companion	Strategy 5: Estuary & Waterway Health	River-wide Implementation Plan	S5.CMP.12	Estuary-Wide	Undertake a coordinated creek rehabilitation works program across the Partner Council's upper catchment waterways	This action includes the implementation of a targeted creek rehabilitation works program – with the aim of managing both the spread and introduction of weeds across the foreshore of the four estuaries, and improve the condition of riparian vegetation across the coastal zone. The works program would use this mapping and prioritise weed control in high value riparian areas - prioritising high value riparian areas, particularly those that overlay the presence of weeds with Threatened Ecological Communities (TEC's) using the most relevant Plant Community Type (PCT) mapping available at the time. This will require a "targeting multi-species" approach, along with both follow up control and planting of native vegetation suited to that PCT. As part of the final CMP a series of maps will depict the areas of foreshore where works may be undertaken over the CMPs 10 year implementation period.	Partner Councils	N/A	NG	NG	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	River-wide Implementation Plan	S6.CMP.01	Broken Bay Pittwater	Activate the "Coastal Hazard Emergency Action Sub-Plans" (CZEAS) for each beach as required after storm events	Undertake planning, engagement and emergency works, if appropriate, to manage beach erosion before, during and after storm events in accordance with the Coastal Zone Emergency Action Subplans for the Broken Bay Beaches and Pittwater Beaches respectively.	Central Coast Council Northern Beaches Council	DCCEEW(BCS) NSW SES	Multiple	Multiple	Emergency Response	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	River-wide Implementation Plan	S6.CMP.02	Estuary-Wide	Riverine bank erosion recovery works after erosion events	In the event of future combined coastal and catchment flooding events that generate foreshore/bank erosion, the Partner Councils may respond with the provision of bank stabilisation works. These works may include the following bank stabilisation approaches: > Native vegetation establishment > Bank reprofiling > Armouring of banks with logs/wood installations, coir log protection, piled rock / rubble, rock bags, and/or geotextile sandbags These works would be classified as riparian corridor and bank management works (including erosion control and bank stabilisation), and there would be considered development permitted without consent under Division 25 of the Transport and Infrastructure State Environmental Planning Policy. This action covers design investigations, project management and capital works.	Partner Councils	NSW RA	NG	NG	Emergency Response	Agency and Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	River-wide Implementation Plan	S6.CMP.03	Estuary-Wide	Develop a Tide Alert Calendar Tool for the low lying communities of the river system to encourage citizen science in monitoring tidal inundation	There are numerous areas across the river system that are exposed to a high level of tidal inundation risk (sunny day flooding), with increasing vulnerability to this risk over time due to future sea level rise. As the tides can be predicted many years in advance, this action involves development of a "Tide Alert" Calendar, and a public engagement program. It specifically includes: A) The creation of a Tide Alert Calendar: This would be a simple and practical tool that clearly communicates dates of higher-than-normal high tides to indicate when low-lying land is particularly vulnerable to tidal inundation and coastal flooding. Red-alert tide calendars are highly visual and easily interpreted, and do not require technical expertise or interpretation of large amounts of data or text. B) Public awareness and citizen science: This initiative would focus on public engagement and awareness around the highest red-alert days each year, encouraging citizens to "snap the coast" at the designated time of the high tide and upload the photograph to Councils social media channels or a Council web repository. This kind of public engagement initiative allows both Council and the local community to utilize these red-alert tide days and visualize the impacts rising sea levels may have on their communities in the future.	Partner Councils	DCCEEW(BCS)	Multiple	Multiple	Alert	Stage 3 Analysis
Certifiable CMP	Strategy 7: Social and Recreational Amenity	River-wide Implementation Plan	S7.CMP.01	Estuary-Wide	Develop a Hawkesbury-Nepean River Maritime Infrastructure Strategy	This action would involve development of a Hawkesbury-Nepean River Maritime Infrastructure Strategy which considers foreshore, commercial and recreational for maritime infrastructure of wharves, boat ramps, pumpouts, moorings and jetties, rather than stand alone; they are interconnected. This would determine demand based resource allocation and consider onshore needs. The development of this strategy would include: > An audit of existing waterway access points across the river system that are used for recreational and commercial purposes - including wharves and jetties, boat ramps, foreshore parks, swimming locations, and pedestrian paths. > A user needs analysis that identifies the current needs of estuary users, and likely future needs over future decades as the population grows > An action plan that identifies what works are required to meet user needs, including maintenance/repair of existing facilities, and creation of additional access points The outcomes of the strategy would improve and expanded access to the Hawkesbury River System for a variety of recreational activities. Note that is action would also link with Action S5.CMP.07	TfNSW	Partner Councils, DCCEEW(BCS), NPWS, DPHI-Crown Lands	NG	NG	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	River-wide Implementation Plan	S7.CMP.02	Estuary-Wide	Undertake a trial of webcams at high usage boat ramps	This would include undertaking a trial of operating Webcams at high usage boat ramps. The purpose of this would be to: > Provide users with near real time images to give an indication of how busy the ramp and carpark may be (images are displayed at a resolution not to reveal boat ramp user identities). > This would also allow Council and TfNSW to gain a clear quantified understand of the usage levels of the various boat ramps around the Hawkesbury - in order to help inform maintenance works, upgrades, and to allocating funding accordingly. This project would be undertaken ensuing that the system complies with all relevant privacy laws and regulations.	Partner Councils, TfNSW	N/A	Multiple	Multiple	Alert	Agency and Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	River-wide Implementation Plan	S7.CMP.03	Estuary-Wide	Undertake a feasibility investigation for the Great Hawkesbury Walk - connecting Penrith to Brooklyn via Wisemans Ferry	Undertake an investigation into the feasibility of increasing river connectivity through creation of Great Hawkesbury Walk - a walking track that spans the river from Yarramundi to Brooklyn. This would essentially create a walking path that connects the Great River Walk at Penrith to the Great Northern Walk at Brooklyn.	Hornsby Shire Council The Hill Shire Council Hawkesbury City Council Penrith City Council NPWS	N/A	Multiple	Multiple	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	River-wide Implementation Plan	S7.CMP.03	Wisemans Ferry to Windsor	Update and Extend the Upper Hawkesbury River Dredging Investigations	The Hawkesbury River is navigable from Windsor to the ocean and supports numerous recreational and commercial boating activities. The tidal stretch of the river from "The Breakaway" (upstream of the Windsor Bridge) to the Sackville Ferry river crossing plays an important role hosting recreational boat users and providing a thoroughfare for vessels travelling to and from destinations further upstream. Concerns from users of the river have been raised over a number of years in relation to the navigability of the upper estuary. Subsequently, a Dredging Feasibility Investigation was undertaken in 2012 by Hawkesbury City Council that covered the reach of the river from Windsor to Sackville. The study found that dredging is not required at any of the investigated locations for navigation purposes. The 2012 Dredging Investigations Study should be updated and extended for the following parameters: > Updated: The study should be updated based on contemporary bathymetric information. It is noted that since the 2012 investigation, the HNRS has experienced 4 major flood events which have potential to generate significant morphological changes in the river. > Extended: The study area should be extended downstream to Wisemans Ferry to	The Hills Shire Council, Hawkesbury City Council	TfNSW	-33.5994	150.8305	Alert	Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						consider the high levels of recreational usage in between Sackville and Wisemans Ferry. This Action would be contingent on Action S2.CMP.04 being undertaken - so that a contemporary survey is available.						
Certifiable CMP	Strategy 8: Cultural Heritage Protection	River-wide Implementation Plan	S8.CMP.01	Estuary-Wide	Engage First Nations teams where appropriate to undertake bush regeneration works including weeding and revegetation	To enhance the involvement of First Nations peoples in the stewardship and management of the estuary system and its catchment by building strong, collaborative partnerships with First Nations Ranger Groups and Bush Regeneration Teams. This approach aims to integrate traditional knowledge and contemporary conservation practices for sustainable environmental management. This would include: > Identify key First Nations Ranger Groups and Bush Regeneration Teams that are active in the region. Initiate dialogues to understand their perspectives, goals, and areas of expertise. > Engage teams where appropriate to undertake bush regeneration works including weeding and revegetation > Provide training and capacity-building opportunities to First Nations Rangers and community members. This can include workshops on estuary management, ecological monitoring, and restoration techniques.	Partner Councils First Nations Groups	LLS NPWS	NG	NG	Active Intervention	Engagement with First Nations Groups
Certifiable CMP	Strategy 8: Cultural Heritage Protection	River-wide Implementation Plan	S8.CMP.02	Estuary-Wide	Further develop and implement community education programs for awareness and appreciation of Indigenous cultural heritage	Develop and implement a program of Indigenous cultural education activities along the HNRS. The objective is to increase community awareness and appreciation of the Indigenous cultural heritage values of the estuary and Indigenous management practices along the Hawkesbury River. This Action would be a specalised extension of the broader community and stakeholder education program (S4.CMP.01).	Partner Councils First Nations Groups	LLS NPWS	NG	NG	Alert	Engagement with First Nations Groups
Certifiable CMP	Strategy 8: Cultural Heritage Protection	River-wide Implementation Plan	S8.CMP.03	Estuary-Wide	Support cultural education and awareness of estuary health issues for First Nations Groups	Provide funding and technical support for the development of a coordinated program of cultural education activities that are designed to enable local First Nations groups to further their understanding and awareness of key estuary health issues and associated management approaches. The objective of these activates are to increase First Nations participation in catchment and estuary management.	Partner Councils First Nations Groups	LLS NPWS	NG	NG	Alert	Engagement with First Nations Groups
Certifiable CMP	Strategy 8: Cultural Heritage Protection	River-wide Implementation Plan	S8.CMP.04	Estuary-Wide	Prepare a heritage tourism strategy and plan for the Hawkesbury River System	Engage with Destination NSW and Heritage NSW to prepare and implement a heritage tourism strategy and plan across the Hawkesbury River System. This would include: > Stakeholder Engagement: Meetings, workshops with Destination NSW, Heritage NSW, councils, and communities > Review of Existing Programs: Desktop review, site visits, analysis of current tourism and heritage activities > Market & Opportunity Assessment: Identification of new tourism opportunities, market demand, regional gaps > Strategy & Plan Development: Drafting the strategy, incorporating feedback, producing final deliverables	Partner Councils (Heritage Officers)	Destination NSW Heritage NSW First Nations Groups	NG	NG	Alert	Engagement with First Nations Groups
Certifiable CMP	Strategy 8: Cultural Heritage Protection	River-wide Implementation Plan	S8.CMP.05	Estuary-Wide	Develop a Hawkesbury heritage central display	Develop a means for the display and public exhibition of artefacts, models etc that can educate the community and tourists regarding the maritime heritage of the river.	Central Coast Council	Heritage NSW First Nations Groups	NG	NG	Alert	Engagement with First Nations Groups, and other Stakeholders across CCC LGA
Certifiable CMP	Strategy 8: Cultural Heritage Protection	River-wide Implementation Plan	S8.CMP.06	Estuary-Wide	Identify opportunities for, and undertake cultural land management practices, including cultural burning	The Partner Council's should engage with local First Nations groups to identify opportunities for, and undertake cultural practices (including cultural burning) across the river catchment. This would involve the Partner Councils working closely with NPWS and local First Nations Groups to develop and implement appropriately.	Partner Councils	NPWS RFS LLS First Nations Stakeholders	NG	NG	Active Intervention	Engagement with First Nations Groups
Certifiable CMP	Strategy 8: Cultural Heritage Protection	River-wide Implementation Plan	S8.CMP.07	Estuary-Wide	Engage with local First Nations Groups to protect and preserve cultural heritage items across the coastal zone	This action involves engaging with the relevant First Nations Groups to protect and preserve Aboriginal Cultural Heritage (ACH) items across the Hawkesbury River System. It is anticipated that there would be four main tasks for this action: > Consultation with the relevant First Nations Groups. > A literature review of existing ACH databases (such as AHIMS) and existing cultural heritage plans > An Aboriginal cultural heritage survey of the legally defined coastal zone, which should include field work, and recording of cultural heritage sites (such as middens sites) and detailed documentation of findings.	Partner Councils First Nations Groups	NPWS	NG	NG	Active Intervention	Engagement with First Nations Groups

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						> The development and prioritisation of local, site specific management plans for protection and preservation of sites exposed to coastal hazard risk.						
Certifiable CMP	Strategy 9: Innovation, Research & Knowledge Sharing	River-wide Implementation Plan	S9.CMP.01	Estuary-Wide	Collaborate with local universities and research institutions to establish a list of research priorities for the Hawkesbury-Nepean River System	This Action would include the Partner Councils collaborating to determine a list of priorities for research project across the Hawkesbury-Nepean River System - and establishing formal connections with local universities and research institutions in order to facilitate research projects.	Partner Councils	N/A	NG	NG	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 9: Innovation, Research & Knowledge Sharing	River-wide Implementation Plan	S9.CMP.02	Estuary-Wide	Establish information sharing and reporting protocols for the identification of pest species	The purpose of this action is to enhance collaboration and information sharing among Partner Councils and DPIRD-Fisheries by establishing a standardised reporting protocol for the identification of pest species within the river system. This would include: > Compilation a list of priority pest species that are of concern within the river system. > Development of a comprehensive reporting protocol for flora and fauna pest species, including the use of a simple online data sharing mechanism > Information sharing - require detailed information in reports, such as the location, number of specimens, and potential impacts of the identified pest species. This action could potentially link with the RedMap program, and include installation of RedMap signage at key boat ramps.	DPIRD-Fisheries	Partner Councils	NG	NG	Alert	Agency and Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: The Hills Shire Council	S3.THC.01	Sackville North	Coastal Wetland Mapping Update	A planning proposal will be prepared in accordance with the Environmental Planning and Assessment Act 1979 to update the coastal wetland mapping for Lambs Creek Lagoon under the Resilience and Hazards State Environmental Planning Policy (RHSEPP). This process will ensure that the mapped extent of the wetland reflects current ecological conditions, hydrological processes, and environmental values. Key steps in the planning proposal process will include: > Reviewing existing mapping, ecological assessments, and hydrological data to determine necessary updates. > Undertake mapping update, using a combination of desktop analysis and fieldwork ground-truthing > Engaging with relevant stakeholders, including environmental agencies, landowners, and the local community, to ensure transparency and informed decision-making. > Preparing justification for the proposed changes, demonstrating consistency with state planning policies, environmental legislation, and coastal management objectives. > Submitting the planning proposal to the NSW DPHI for gateway determination. > Coordinating public exhibition and responding to submissions as part of the statutory assessment process. Updating the mapping will strengthen the protection of Lambs Creek Lagoon as a coastal wetland, ensuring that land-use planning decisions appropriately consider its environmental significance.	The Hills Shire Council	DPHI-Planning and Assessment	-33.4935	150.9103	Active Intervention	Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: The Hills Shire Council	S6.THC.01	Lower Portland	Implement the outcomes of the Blundells Swamp Inundation Mitigation Study	River Road frequently experiences inundation at Blundells Swamp due to the combined effects of coastal and catchment flooding. This persistent issue poses challenges for infrastructure resilience, access, and safety. To address these concerns, a comprehensive investigation will be undertaken to assess potential options for reducing inundation risk. THSC has recently completed an options assessment to identify an optimised solution to mitigate inundation risk while preserving the sensitive environmental values of the lagoon. This Action therefore includes: (a)Undertaking a detailed environmental assessment technical study. Blundells Swamp is mapped as a coastal wetland under the Resilience and Hazards State Environmental Planning Policy (RHSEPP) and serves as a locally significant wildlife refuge. The lagoon system provides important habitat for native flora and fauna, including species reliant on wetland ecosystems. Changes to hydrology, drainage, or land use would be thoroughly evaluated to prevent unintended ecological impacts. A robust environmental assessment is essential to safeguarding the long-term health of the wetland ecosystem while developing solutions that enhance the resilience of River Road. (b) Implementation of the Capital Works associated with the road resilience project.	The Hills Shire Council	DCCEEW(BCS)	-33.4308	150.8990	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: The Hills Shire Council	S6.THC.02	Lower Portland	Inundation and Drainage Study at Michael Duggan Reserve	River Road frequently experiences inundation at Michael Duggan Reserve (875 River Rd Lower Portland) due to the combined effects of coastal and catchment flooding. This persistent issue poses challenges for infrastructure resilience, access, and safety. To address these concerns, a comprehensive investigation will be undertaken to assess potential options for reducing inundation risk and improving drainage of the creek. Crucially, any proposed mitigation measures must carefully balance flood risk reduction with the protection of the area's significant environmental values. Changes to hydrology, drainage, or land use must be thoroughly evaluated to prevent unintended ecological	The Hills Shire Council	DCCEEW(BCS)	-33.4355	150.9031	Alert	Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						impacts. This assessment will ensure that flood mitigation strategies are sustainable, environmentally responsible, and aligned with regulatory requirements for coastal wetlands. A robust environmental assessment is essential to safeguarding the long-term health of the wetland ecosystem while developing solutions that enhance the resilience of River Road.						
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: The Hills Shire Council	S6.THC.03	Sackville North	Lambs Creek Inundation and Drainage Study	Mud Island Road frequently experiences inundation at Lamb Creek due to the combined effects of coastal and catchment flooding. This persistent issue poses challenges for infrastructure resilience, access, and safety. To address these concerns, a comprehensive investigation will be undertaken to assess potential options for reducing inundation risk and improving drainage of the creek. Crucially, any proposed mitigation measures must carefully balance flood risk reduction with the protection of the area's significant environmental values. Changes to hydrology, drainage, or land use must be thoroughly evaluated to prevent unintended ecological impacts. This assessment will ensure that flood mitigation strategies are sustainable, environmentally responsible, and aligned with regulatory requirements for coastal wetlands. A robust environmental assessment is essential to safeguarding the long-term health of the wetland ecosystem while developing solutions that enhance the resilience of Mud Island Road.	The Hills Shire Council	DCCEEW(BCS)	-33.4828	150.8941	Alert	Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: The Hills Shire Council	S6.THC.04	Wisemans Ferry	Erosion remediation at Wisemans Ferry	In Stage 2 of the CMP, the bank erosion at Wisemans Ferry was investigated (referred to as Site HSC45b). The site is approximately 50 m in length and is located on the right bank on the inside of a tight meander. The erosion is within 18 m of public assets including a car park and recreational infrastructure (picnic benches). It is anticipated that over time the natural replenishment observed at the downstream extent will continue upstream , however the following works should be implemented as an interim measure in order to reduce public safety risk: > Monitoring of deposition extent on site > Installation of sand-filled geobags at the upstream extent to approximately 0.5 m above high tide level > Reprofiling of steeper upper bank (backfill to geobag toe to a gentle slope i.e. min 1V:3H) > Formalised access installation such as a rollout composite boardwalk > Establishment of riparian vegetation along the reprofiled bank and overbank zone (≈ 5 m).	The Hills Shire Council	DCCEEW(BCS) DPIRD-Fisheries	-33.3789	150.9869	Active Intervention	Stage 2 Study and Stage 3 analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: The Hills Shire Council	S6.THC.05	Wisemans Ferry	Erosion Remediation at Webbs Creek Ferry Foreshore	Severe bank erosion is occurring over a 100 m stretch of foreshore immediately south of the Webbs Creek Ferry. Erosion is impacting an amenities block, which has now been closed and demolished in order to reduce public safety risk. The erosion is within 5 m of River Road in some locations. A bank remediation design should be developed and implemented. The remediation design should incorporate sustainable and resilient solutions to stabilize the foreshore while considering environmental impacts, hydrodynamic conditions, and long-term maintenance requirements. The proposed works include: > Bank reprofiling to a slope of 1V:3H to aid in vegetation establishment and improve slope stability to reduce risk of mass failure > Establishment of riparian vegetation along the reprofiled bank and overbank zone (≈ 5 m) > Large wood installation to provide structural toe protection	The Hills Shire Council	DCCEEW(BCS) DPIRD-Fisheries	-33.3882	150.9821	Active Intervention	Stage 3 Analysis and Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: The Hills Shire Council	S6.THC.05	Leets Vale	Erosion investigation and design at River Road, Leets Vale	In Stage 2 of the CMP, the bank erosion at Leets Vale was investigated (referred to as Site HSC41 and HSC 42). The foreshore at these two sites comprise a mix of exposed bedrock, rock rubble and rock revetment at water level that are protecting road infrastructure. Some sections are new and engineered, others older and in need of maintenance. Sections of old rock revetment in variable condition that may require structural assessment and redesigns or infill/top up of existing material. There is insufficient information to develop and assess discrete options that account for the variability in conditions across the sites. It is recommended more detailed investigations are undertaken including geotechnical design/condition assessment, and survey including bathymetry to develop and assess appropriate management options at the site. While the erosion rate appears to be low, ongoing monitoring is recommended given the proximity to road infrastructure. Ultimately management options are likely going to be limited to hard engineering approaches such as rock revetment due to the limited set back and proximity to road assets.	The Hills Shire Council	DCCEEW(BCS) DPIRD-Fisheries	-33.4208	150.9543	Active Intervention	Stage 2 Bank Erosion Report, and updated Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal	Local Implementation	S6.THC.06	Lower Portland	Erosion remediation at	In Stage 2 of the CMP, the bank erosion at Lower Portland was investigated (referred to as Site HSC34). The site is approximately 20 m in length and is located on the right bank on an outside meander of the Hawkesbury River. River Road is between 5 – 10 m	The Hills Shire Council	DCCEEW(BCS) DPIRD-Fisheries	-33.4366	150.9006	Active Intervention	Stage 2 Bank Erosion Report, and updated

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
	Hazard Resilience	Plan: The Hills Shire Council			River Road, Lower Portland	from the top of the bank. Erosion remediation at this site would include: > Bank reprofiling to a slope of 1V:3H to aid in vegetation establishment and improve slope stability to reduce the risk of mass failure > Establishment of riparian vegetation along the reprofiled bank and overbank zone (≈ 5 m). This will increase the root network at the top of the bank providing a greater degree of reinforcement and decreasing the level of bank saturation by intercepting precipitation and by transpiration. > Ongoing monitoring and evaluation of the site should be undertaken every ~2 years.						Stage 3 Analysis
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	Local Implementation Plan: Northern Beaches Council	S2.NBC.01	Pittwater	Install a CoastSnap Camera Cradles at strategic locations across the LGA foreshore	Install CoastSnap Camera Cradles at strategic locations across the foreshores of Pittwater. CoastSnap is a global citizen science project to capture our changing coastlines. It allows citizens to capture and upload photos of their beaches in order to improve our scientific understanding of erosion and coastal shoreline change. These camera cradles are a low cost resource that enables citizen science to monitor the movement of the shoreline over time, and to identify when erosion at the reserve may represent an increased risk to land and infrastructure. Locations within Pittwater that may be suitable include: > Station Beach > Sandy Beach > Currawong Beach > Great Mackerel Council can liaise with CoastSnap to identify opportunities to install camera cradles at additional locations as funding and resourcing allow.	Northern Beaches Council	DCCEEW(BCS)	Multiple	Multiple	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	Local Implementation Plan: Northern Beaches Council	S2.NBC.02	Pittwater	Implement a Pittwater Beach Monitoring Program	Implement a foreshore monitoring program for the swell exposed beaches of Pittwater. These sites could include beach surveys of: > Great Mackerel Beach > Currawong Beach > Station Beach > Snapperman Beach > Sandy Beach > Paradise Beach > Additional beaches maybe be included in the monitoring over time as necessary These beach surveys are essential for improving our understanding of coastal erosion and shoreline changes. A critical aspect of this monitoring program is the calculation of the Beach Volume Index (BVI). The BVI is a key metric that quantifies the amount of sand and sediment on the beach.	Northern Beaches Council	DCCEEW(BCS)	Multiple	Multiple	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	Local Implementation Plan: Northern Beaches Council	S2.NBC.03	Pittwater, Cottage Point	Install permanent tide gauges at strategic locations around the waterway	Whilst there are a number of tide gauges located throughout the river system, there are still some locations where there is an absence of local tide recorded tide data that can assist to understanding localised impacts of tidal inundation, and the impacts of combined coastal and catchment flooding. This information will be particular important over future time frames as the impacts of Sea Level Rise become more severe. This action therefore involves the installation of a new tide gauges at strategic locations across the waterway, including: > The southern area of Pittwater > Cottage Point This list is not exhaustive, and additional gauges may be installed as deemed necessary by Council and the State Government.	Northern Beaches Council	DCCEEW(BCS)	Multiple	Multiple	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	Local Implementation Plan: Northern Beaches Council	S2.NBC.04	Pittwater-wide	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	This action involves the development and implementation of a monitoring program designed to assess and track the condition of various public coastal assets and infrastructure, including: > Public coastal protection structures (revetments, seawalls, training walls) > Recreational assets including viewing platforms & coastal access tracks > Stormwater outlets. > Sewer and water infrastructure The program should be integrated into Councils broader asset management program	Northern Beaches Council	DPHI-Crown Lands	Multiple	Multiple	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Northern Beaches Council	S3.NBC.02	Pittwater-wide	Develop and update coastal hazard information	Develop and update coastal hazard information including coastal erosion and coastal inundation considering climate change and sea level rise	Northern Beaches Council	N/A	Multiple	Multiple	Alert	Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Northern Beaches Council	S3.NBC.03	Pittwater-wide	Update planning certificates with coastal hazard information	Update coastal hazard information on 10.7 Planning Certificates including coastal erosion and estuarine inundation	Northern Beaches Council	N/A	Multiple	Multiple	Planning for change	Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Northern Beaches Council	S3.NBC.04	Pittwater-wide	Develop planning controls to ensure buildings are sited and designed to	Undertake regular reviews and updates of existing planning controls in LEP, DCP and Policy's / Guidelines to ensure the controls are consistent with current best practice and consider contemporary information regarding climate change and sea level rise, and reflect best practice hazard and environmental management	Northern Beaches Council	N/A	Multiple	Multiple	Planning for change	Stage 3 Analysis & Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
					consider coastal hazard information including coastal erosion and estuarine inundation.							
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Northern Beaches Council	S3.NBC.04	Pittwater-wide	Long Term Adaptation Plan for Coastal Assets and Infrastructure	A comprehensive audit of coastal assets and infrastructure will be undertaken to assess their current condition, vulnerability to coastal hazards, and future adaptation needs. This audit will inform a structured approach to managing coastal infrastructure over the next 50–100 years, ensuring resilience to sea level rise, erosion, and extreme weather events. key components of this action include: > Auditing Coastal Assets: Conducting a detailed assessment of key coastal infrastructure, including seawalls, stormwater outlets, walkways, and public amenities. This will document asset condition, maintenance requirements, and exposure to coastal hazards. > Determining Adaptation Triggers: Identifying environmental and structural thresholds (e.g., erosion rates, inundation levels, structural degradation) that will signal when adaptation or intervention is required. These triggers will be based on climate change projections, historical trends, and asset vulnerability. > Developing a Long-Term Response Framework: Establishing a strategic framework for asset adaptation, including short-, medium-, and long-term management options such as maintenance, reinforcement, managed retreat, or realignment. > Prioritising Works: Developing a prioritised list of coastal asset management and adaptation works based on risk, urgency, and cost-effectiveness. These works will be incorporated into future Coastal Management Programs (CMPs) to ensure funding and implementation align with broader coastal planning objectives.	Northern Beaches Council	N/A	Multiple	Multiple	Planning for change	Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Northern Beaches Council	S5.NBC.01	Careel Bay	Investigate the feasibility of naturalisation of Careel Creek	Undertake a feasibility study for the naturalisation project for the Concrete Drain section of Careel Creek. The naturalisation project would involve: > Replacing the concrete banks with native wetland vegetation - thereby increasing the number and diversity of native plants and vegetation > Expanding the salt marsh around the creek and creating intertidal rock pools within the channel where possible. The project would improve waterway health through the creation of a wetland to naturally treat and remove pollutants from the water before it enters the creek and nearby Pittwater	Northern Beaches Council	DPIRD-Fisheries	-33.6323	151.3325	Active Intervention	Council and Agency Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Northern Beaches Council	S5.NBC.02	Careel Bay	Upgrade the Careel Bay litter trap	Upgrade the Careel Creek baramy trap to a more modern design that incorporates advanced technology for improved waste capture and environmental sustainability. This will involve adoption of a modern litter trap/boom design, ensuring minimal impact on local ecosystems, and implementing ongoing maintenance to keep the system operating efficiently.	Northern Beaches Council	N/A	-33.6336	151.3318	Active Intervention	Council Engagement
Catchment Companion	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Northern Beaches Council	S5.NBC.03	Careel Bay	Investigate WSUD solutions within the Careel Creek Drainage catchment.	Undertake a planning investigation to identify opportunities to implement Water Sensitive Urban Design (WSUD) approaches within the Careel Creek drainage catchment. Identified WSUD opportunities can be used to help manage the quantity and quality of runoff, improve water quality in Pittwater, and enhance local ecological health around the waterway. This investigation will include site assessments, analysis of current drainage infrastructure, and the identification of opportunities for implementing WSUD solutions.	Northern Beaches Council	DCCEEW(BCS)	-33.6239	151.3324	Active Intervention	Roll over from existing EMP / CZMP
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Northern Beaches Council	S6.NBC.01	Station Beach	Foreshore naturalisation and restoration works at Station Beach	Undertake foreshore restoration and naturalisation works across Station Beach in order to improve erosion resilience and ecological values. The works would include: > Planting appropriate native foredune species along the foredune to promote natural foreshore building and recovery. > Formalisation of beach access points to protect dune vegetation The initial priority for the works would be the area of foreshore directly in front of the Car Park - but works could also extent to other areas across the Station Beach foreshore as needed.	Northern Beaches Council	DCCEEW(BCS)	-33.5903	151.3220	Active Intervention	Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Northern Beaches Council	S6.NBC.02	Sand Point Beach	Beach scraping and sand redistribution works at the western end of Sand Point Beach	Undertake a program of beach scraping at the north-western end of Sand Point Beach. The objective of the works are to provide additional sand to the upper beach profile, and subsequently enhance the local dune system, offset the ongoing erosion / recession. The requirements and beach profile design for this work were assessed as part of a 2019 study (WRL, 2019). It is recommended that these works are undertaken as part of a monitored trial.	Northern Beaches Council	DCCEEW(BCS)	-33.6027	151.3172	Active Intervention	Stage 2 Bank Erosion Study WRL (2019)
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Northern Beaches Council	S6.NBC.03	Sand Point Beach	Foreshore naturalisation and restoration works along Sand Point Beach	Undertake foreshore restoration and naturalisation works across Station Beach (south of the boat ramp)in order to improve erosion resilience and ecological values. The works would include: > Planting appropriate native foredune species along the foredune to promote natural foreshore building and recovery. > Formalisation of beach access points to protect dune vegetation	Northern Beaches Council	DCCEEW(BCS)	-33.6041	151.3194	Active Intervention	Stage 3 Analysis & Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Northern Beaches Council	S6.NBC.04	Great Mackerel Beach	Great Mackerel Beach Foreshore Master Plan	The Foreshore Masterplan for Great Mackerel Beach aims to provide a strategic framework for the sustainable management, enhancement, and protection of the foreshore area. The masterplan will address environmental, social, and recreational values while considering the unique constraints and opportunities of the site. The Plan would include the following components: > Beach Nourishment and Foredune Building: Targeted sand replenishment will strengthen the upper beach and improve coastal resilience. This will involve small-scale beach scraping combined with beach nourishment using sand sourced from the flood tide delta at the northern end of the beach. Similar works carried out in 1989 and 1990 remained stable until the June 2016 storm event. The project will also include constructing a low foredune crest and swale to mitigate overland flow, which is contributing to ongoing erosion. > Foreshore Naturalisation: Strengthening the natural dune system by planting native foredune species to promote dune formation and stability. Protective fencing will be installed to support vegetation colonization and long-term dune recovery. > Formalisation of pedestrian access and connectivity: Establishing designated beach access points at regular intervals to reduce dune trampling and erosion. A shared pathway behind the dune crest will enhance connectivity while protecting sensitive coastal areas. > Dinghy Storage: Installing structured dinghy racks to eliminate on-ground storage, which currently contributes to localized erosion. This will provide a designated, organized solution that preserves the foreshore while maintaining access for boat users. Community engagement will be a key part of the process, ensuring local input shapes the plan and that proposed actions align with community values and priorities.	Northern Beaches Council	DCCEEW(BCS)	-33.5902	151.3008	Active Intervention	Stage 2 Bank Erosion Study WRL (2020)
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Northern Beaches Council	S6.NBC.05	Currawong Beach	Foreshore naturalisation and restoration works at Currawong Beach	Undertake foreshore restoration and naturalisation works along Currawong Beach in order to enhance erosion resilience and ecological values. The works would include: > Planting appropriate native foredune species along the foredune to promote nature dune building and recovery > Construction of a small swale running behind the foreshore to prevent overland flow exacerbating the current erosion issues	Northern Beaches Council	DCCEEW(BCS)	-33.5957	151.2998	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Northern Beaches Council	S6.NBC.06	Clareville Beach	Foreshore naturalisation and restoration works at Clareville Beach Reserve	Undertake foreshore restoration and naturalisation works along the foreshore south of Delecta Ave, in order to enhance erosion resilience and ecological values. The works would include: > Planting appropriate native foredune species along the foredune to promote natural foreshore building and recovery. > Formalisation of beach access points to protect dune vegetation	Northern Beaches Council	DCCEEW(BCS)	-33.6346	151.3114	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Northern Beaches Council	S6.NBC.07	Bayview	Foreshore naturalisation and restoration works at Bayview Park foreshore	Undertake foreshore restoration and naturalisation works across the eastern side of the Bayview Dog Park foreshore, in order to enhance erosion resilience and ecological values. The works would include: > Planting appropriate native foredune species along the foredune to promote natural foreshore building and recovery. > Implementation of formalised access points to the beach from the park	Northern Beaches Council	DCCEEW(BCS)	-33.6610	151.3042	Active Intervention	Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Northern Beaches Council	S6.NBC.08	Pittwater	Coastal hazard resilience for both built and natural asset owners	Inform public asset owners of future risks associated with coastal erosion hazards. Consider a number of different management options through a cost benefit analysis and consideration of social and environmental impacts. These options include: > Nature based solutions, including enhancing foreshore resilience in front of the assets through dune management and maintenance > Coastal protection works > Asset relocation to areas further inland less exposed to coastal hazard risk	Northern Beaches Council	NPWS	Multiple	Multiple	Active Intervention	Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Northern Beaches Council	S6.NBC.12	Pittwater	Pittwater dredging and beach nourishment feasibility investigation and implementation	This would include a detailed study investigating the feasibility of dredging and beach nourishment as a long term strategy for managing coastal hazard risk at key high risk beaches across the estuary. It would include: > A sand source investigation - identifying quantity and quality of suitable sources of sand within the estuary > Technical feasibility: An assessment of potential dredging methods (and equipment) and beach nourishment methods, volumes, and placement designs > Environmental impacts: An assessment of potential environmental impacts and associated environmental planning and approvals requirements > Economic feasibility: An economic assessment of potential costs associated with an ongoing program > Implement dredging and beach nourishment program	Northern Beaches Council	DCCEW(BCS)	-33.5888	151.3097	Active Intervention	Stage 2 Bank Erosion Study
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Northern Beaches Council	S6.NBC.13	Careel Bay	'Investigate the feasibility of channel maintenance works within Careel Bay and Careel Creek	Investigate the feasibility of channel maintenance works within Careel Creek and Careel Bay to maintain effective drainage and reduce the risk of flooding in the surrounding areas. The investigation will assess the potential for removal of accumulated sediment, debris, and vegetation that may obstruct water flow and contribute to inundation during combined coastal and catchment flooding events. The study would consider environmental constraints and the requirements of relevant permits and approvals. If feasible, this action would also include the delivery of the works.	Northern Beaches Council	N/A	-33.6272	151.3335	Active Intervention	Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Northern Beaches Council	S7.NBC.01	Pittwater	Upgrade and repair of waterway access points	Undertake maintenance, repairs and upgrade works at public wharfs across Pittwater Estuary. Relevant wharfs and ramps may include: > Great Mackerel Beach > Currawong > Coasters Retreat (Bonnie Doon) > Lovett Bay > Church Point > Scotland Island (4 x wharfs) > Careel Bay Additional wharfs may be included as required.	Northern Beaches Council	N/A	Multiple	Multiple	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Northern Beaches Council	S7.NBC.06	Sand Point	Boat Ramp Upgrade	The existing boat ramp at Sandy Point Lane is in need of significant upgrades due to ongoing structural deterioration. The ramp surface has developed visible cracking, which may be indicative of underlying structural weaknesses. Additionally, scour and undermining at the base of the ramp are compromising its stability, potentially creating safety hazards for users and increasing maintenance requirements. Upgrade work will consist of ramp resurfacing with the inclusion of appropriate engineering works for the ramp foundation.	Northern Beaches Council	TfNSW	-33.6031	151.3176	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 9: Innovation, Research & Knowledge Sharing	Local Implementation Plan: Northern Beaches Council	S9.NBC.01	Northern Estuary	Pittwater Wave Climate Study	A coastal engineering investigation should be undertaken to investigate the propagation of offshore swell energy into the Pittwater Estuary. The Stage 2 Coastal Hazard Study for Pittwater identified that there is currently very little information available to properly quantify this process with little recorded wave data and the most recent modelling studies very 20 years old. This currently represents an major data gap and has flow-on effects in terms of being able to prepare for coastal storm events, to adequately design coastal infrastructure to resist swell energy, and to understand sediment transport processes inside the estuary. The Stage 2 hazard study recommended that a comprehensive wave climate study be undertaken for the Pittwater Estuary. It would include the following elements: > Data Collection: Collection of wave data through the installation of field instrumentation (pressure transducers, ADCP, wave buoys) at various points within and outside the estuary to measure wave height, period, and direction. > Numerical modelling: Development wave models to simulate wave propagation into the estuary, using the wave buoy data to calibrate and validate the modelling. > Analysis and Reporting: Determination of design & operational wave conditions around the estuary, including an improved understanding of the penetration of swell wave energy into the estuary.	Northern Beaches Council	DCCEEW(BCS)	-33.5856	151.3157	Alert	Stage 2 Coastal Hazard Study
Catchment Companion	Strategy 4: Community & Stakeholder Engagement	Local Implementation Plan: Ku-ring-gai Council	S4.KRG.01	LGA Wide	Support Community Engagement undertaken as part of the Ku-ring-gai Council – Water Sensitive City Strategy	Action 2.2 of the Ku-ring-gai Council – Water Sensitive City Strategy (WSCS) includes the extension of community engagement programs to educate the community regarding how they participate in environmental protection, advocacy, clean up and celebration, and act on climate change, extreme events, resilient and water sensitive neighbourhoods.	Ku-ring-gai Council	N/A	Multiple	Multiple	Avoid Future Impact	Stage 3 Analysis & Council Engagement
Catchment Companion	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Ku-ring-gai Council	S5.KRG.01	Cowan Creek	Prepare and implement a catchment study and management plan for the Cowan Creek catchment	Catchment runoff from urban areas is a key issue for estuarine water quality across Cowan Creek. Therefore, this option involves undertaking a review of the Council's stormwater assets that discharge into the estuary, in order to identify and prioritise upgrading and maintenance of stormwater assets and infrastructure to improve estuarine health. The plan should analyse the local stormwater network, and identify strategic locations to minimise stormwater pollution using Water Sensitive Urban Design (WSUD) principles. The plan may also include the installation of stormwater infrastructure such as gross pollutant traps (GPTs) and detention basins. This plan should aim to reduce the impacts of urban stormwater runoff on water quality, marine litter, and siltation on the downstream coastal zone waters within Cowan Creek.	Ku-ring-gai Council	N/A	-33.6635	151.1657	Avoid Future Impact	Stage 3 Analysis & Council Engagement
Catchment Companion	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Ku-ring-gai Council	S5.KRG.02	Cowan Creek	Update the catchment studies for Ku-ring-gai Creek and Lovers Jump Creek	This would involve Council undertaking a review and update of the catchment studies for Ku-ring-gai Creek and Lovers Jump Creek . The purpose of these updates will be to incorporate current information regarding catchment land usage, water quality, and the Ku-ring-gai Council – Water Sensitive City Strategy. The updated studies should identify management actions to reduce the impacts of urban stormwater runoff on water quality, marine litter, and siltation on the downstream coastal zone waters.	Ku-ring-gai Council	N/A	-33.7021	151.1728	Avoid Future Impact	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	Local Implementation Plan: Hornsby Shire Council	S2.HSC.01	Berowra Waters	Install a permanent tide gauge at Berowra Waters	There is currently no permanent tide gauge located within Berowra Creek. As a result there is an absence of recorded tide data that can assist in understanding localised impacts of coastal and catchment flooding on the numerous foreshore communities across Berowra Creek. This information will be particular important over future time frames as the impacts of Sea Level Rise become more severe. This action therefore involves the installation of a permanent water level gauge at Berowra Waters. The exact position of the gauge should be determined in consultation	Hornsby Shire Council	DCCEEW(BCS)	-33.5990	151.1203	Alert	Stage 3 Analysis

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						with the State Government, based on an assessment of a strategic location that can achieve the objectives outlined above, whilst maintaining a practical location for installation and maintenance. Furthermore, water level data can be transmitted and published through the MHL web page, and this will help to manage and mitigate estuarine flood risk by providing publicly available water levels in real time.						
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	Local Implementation Plan: Hornsby Shire Council	S2.HSC.02	Hawkesbury River	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	This action involves the development and implementation of a monitoring program designed to assess and track the condition of various coastal assets and infrastructure, including: > Coastal protection structures (revetments, seawalls, training walls) > Recreational assets including viewing platforms & coastal access tracks > Stormwater outlets. > Sewer and water infrastructure The program should be integrated into Councils broader asset management program	Hornsby Shire Council	N/A	Multiple	Multiple	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Hornsby Shire Council	S5.HSC.01	Parsley Bay	Installation of Stormwater Quality Improvement Devices at Parsley Bay	The project involves the installation of a vortex-style gross pollutant trap and a biofilter to treat the runoff from a 10-hectare catchment area flowing into the bay. The biofilter, which is subject to design, could consist of a series of stepped salt marsh areas leading into Parsley Bay from the stormwater outlet. This innovative approach aims to remove up to 1.5 tonnes of pollution annually from entering Parsley Bay, significantly improving the water quality and overall health of the bay's ecosystem	Hornsby Shire Council	DCCEEW(BCS)	-33.5482	151.2302	Active Intervention	Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Hornsby Shire Council	S5.HSC.02	Brooklyn	Installation of Stormwater Quality Improvement Devices at The Gateway	The project involves the installation of a vortex-style gross pollutant trap on Dangar Road, situated between the Brooklyn Leisure Centre and the bay. This system will treat runoff from a 13-hectare catchment area. By implementing this solution, the project aims to remove 1.2 tonnes of pollution annually from entering the Brooklyn Wharf area, thereby enhancing the water quality and overall environmental health of the region.	Hornsby Shire Council	DCCEEW(BCS)	-33.5472	151.2256	Active Intervention	Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Hornsby Shire Council	S5.HSC.03	Brooklyn	Installation and upgrade of Stormwater Quality Improvement Devices at Brooklyn Park	The project involves the installation of an appropriate gross pollutant trap and the upgrading of the existing wetland at Brooklyn Park. This initiative aims to mitigate the impact of the urban catchment on the estuary at this location. By implementing these measures, the project is expected to remove 5 tonnes of gross pollution and nutrient pollution annually, thereby significantly improving the water quality and ecological health of the estuary.	Hornsby Shire Council	DCCEEW(BCS)	-33.5477	151.2145	Active Intervention	Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hornsby Shire Council	S6.HSC.01	Parsley Bay	Repair and Renewal of the Parsley Bay Breakwater	Asset condition inspections by Hornsby Shire Council have indicated that the Parsley Bay rock-armoured breakwater structure is in a relatively poor structural condition. The breakwater provides an important function to the safe operability of the Parsley Bay boat ramp by providing protection from south-easterly waves. A repair and renewal project will be undertaken to maintain the function of the structure, extend the functional life, and adapt it for future sea level rise impacts. The objective of this repair would be to return the structure to a “make safe” condition, and extend the life of the structure by another 50+ years. Repair and renewal works would likely comprise the placement of additional rock armour units and repacking of units to increase interlocking and hydraulic stability. It would also include raising the crest level to mitigate future SLR impacts – however this would be subject to a detailed design process. Specific works for this project would therefore include: > Structure Survey and coastal engineering condition inspection: To survey the structure and identify the exact nature of the required repair and renewal works - including the required quantity of rock armour material. > Breakwater repair and renewal design: To prepare a specific repair design detailing the sizing and quantity of the required rock armour, and specifying the required grades and levels. > Repair and renewal works: Implementation of the repair design, including a safety in design assessment, construction of the works and development of As-Constructed certification from an suitably qualified engineer for Council records. The repair design should also include provision of safe waterway access ramp for non-powered craft (kayaks, sailing boats) at the south-eastern trunk of the breakwater.	Hornsby Shire Council	DCCEEW(BCS)	-33.5485	151.2313	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hornsby Shire Council	S6.HSC.02	Parsley Bay	Repair and renewal of seawall protecting loading dock access road	This work will focus on reinforcing the seawall's structural stability to prevent erosion and maintain the integrity of the access road. The works will comprise the repair of the structure of a make-safe / functional condition - through the placement of additional rock armour units on the structure in locations where it has experienced significant armour unit loss, core exposure, and loss of crest height and width. The objective would be to extend the life of the structure by another 50+ years. The renewal will ensure long-term protection against coastal hazards and improve the overall safety and resilience of the infrastructure.	Hornsby Shire Council	DCCEEW(BCS)	-33.5474	151.2313	Active Intervention	Council Engagement

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Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hornsby Shire Council	S6.HSC.03	Brooklyn	Sea Level Rise adaptation for Brooklyn Road	Inspection of topographic road survey and future sea level rise projections has indicated that up to 200 m of Brooklyn Road will be impacted by sunny day tidal inundation under a +0.5 m sea level rise (SLR) scenario, with up to 1 km impacted under a +1.0 m SLR scenario. Therefore, road raising will be required in order to maintain safe all-tide vehicle access in the future. > Desktop Vulnerability Assessment: Conduct a Geographic Information System (GIS) analysis to map the location and extent of roads vulnerable to tidal inundation under +0.5 m and +1.0 m SLR scenarios. Use high-resolution elevation data, LiDAR, and hydrodynamic modelling outputs to refine impact assessments. Identify priority road segments based on frequency of projected inundation, existing flood risk, and criticality for community access. > Road Raising Strategy: Road raising in high risk areas may subsequently be undertaken in one of two approaches: > Trigger Based: Works may be implemented once future sea levels reach a trigger threshold (+0.5 m SLR) > Opportunistic: Opportunistic raising of the roads may be undertaken as part of future routine road upgrade works - or as funding becomes available.	Hornsby Shire Council	N/A	-33.5479	151.2124	Planning for change	Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hornsby Shire Council	S6.HSC.04	Brooklyn	Wharf Street Foreshore Improvement Works	Foreshore improvement works at the end of Wharf Street will focus on renewal of the existing seawall (which is in poor structural condition) and providing safe recreational access to the waterway for passive recreation. It will include the following components: > Renewal of the existing seawall to provide long-term protection for Wharf Street and associated public infrastructure against coastal hazards. The renewal works will include replacement of the existing structure with a stepped sandstone blockwork seawall. > Incorporation of waterway access for non-powered vessels into the renewal design > Stormwater management at the end of Wharf Street to prevent overland flows damaging the structure from behind	Hornsby Shire Council	DCCEEW(BCS)	-33.5483	151.2054	Active Intervention	Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hornsby Shire Council	S6.HSC.05	Bar Island	Repair and renewal of seawall at the base of the Bar Island jetty	This work will focus on reinforcing the seawall's structural stability to prevent erosion and maintain the integrity of the access jetty. The works will comprise the repair of the structure of a make-safe / functional condition - through the placement of additional rock armour units on the structure in locations where it has experienced significant armour unit loss, core exposure, and loss of crest height and width. The objective would be to extend the life of the structure by another 50+ years. The renewal will ensure long-term protection against coastal hazards and improve the overall safety and resilience of the infrastructure.	Hornsby Shire Council	DCCEEW(BCS)	-33.5254	151.1533	Active Intervention	Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hornsby Shire Council	S6.HSC.06	Dangar Island	Bradleys Beach Foreshore Restoration works	Foreshore Restoration Works at Bradelys Beach would address beach erosion issues and enhance the natural resilience of the foreshore to coastal hazards. Works would cover a 300 m long stretch of the beach and would involve: > Beach scraping works to increase the volume of sand on the upper beach profile. Sand would be scraped from the intertidal zone to an approximate depth of 0.2 metres to win a total volume of around 700m3 of sand. >Sand redistribution works on the upper beach profile as part of a small foredune building process > Planting appropriate native foredune species along the foredune to promote natural dune building and recovery > Construction of a small swale running behind the foreshore to prevent overland flow exacerbating the current erosion issues Works would be undertaken as part of an ongoing program of beach grooming and sand distribution, with works triggered based on observed erosion risk along the foreshore.	Hornsby Shire Council	DCCEEW(BCS)	-33.5398	151.2405	Active Intervention	Stage 2 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hornsby Shire Council	S6.HSC.07	Dangar Island	Repair and renewal of seawall from Brooklyn to Parsley Bay	This work will focus on reinforcing the seawall's structural stability to prevent erosion and maintain the integrity of the access road. The works will comprise the repair of the structure of a make-safe / functional condition - through the placement of additional rock armour units on the structure in locations where it has experienced significant armour unit loss, core exposure, and loss of crest height and width. The objective would be to extend the life of the structure by another 50+ years. The renewal will ensure long-term protection against coastal hazards and improve the overall safety and resilience of the infrastructure.	Hornsby Shire Council	DCCEEW(BCS)	-33.5469	151.2325	Active Intervention	Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hornsby Shire Council	S7.HSC.01	Brooklyn	Develop Infrastructure strategy for the Lower Hawkesbury	The Lower Hawkesbury has been identified by local and state government as a critical regional asset for community recreation, commercial boating and fishing, and access to remote riverside settlements. To address infrastructure pressures and enhance usability, Hornsby Shire Council, in coordination with the State Government, will develop an Infrastructure Strategy for the Lower Hawkesbury. This strategy will identify and implement key infrastructure improvements, considering recreational needs, foreshore protection, and long-term sustainability. The strategy will take into account the transition between land and waterway, parking challenges, and the competing demands of tourism operators and the public, recognizing the complexity of managing limited spaces and access points. It will be informed by the HSC Natural Areas Recreation Strategy (currently on exhibition) and will align with the Brooklyn Place Plan, which is scheduled for exhibition in April/May	Hornsby Shire Council	DCCEEW(BCS)	-33.5482	151.2025	Planning for change	Stage 3 Analysis & Council Engagement

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						2025. Additionally, the strategy will integrate with the NSW Maritime Infrastructure Plan to ensure a coordinated approach to infrastructure development and foreshore management.						
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hornsby Shire Council	S7.HSC.02	Parsley Bay	Parsley Bay Loading Dock Upgrade	The Parsley Bay loading dock, which is currently in moderate to poor condition, is a vital infrastructure component for servicing the remote river settlements of the Lower Hawkesbury. This project involves undertaking comprehensive repairs and upgrades to ensure the dock's safety, functionality, and longevity, thereby supporting the communities that rely on it for transport and logistics.	Hornsby Shire Council	N/A	-33.5477	151.2326	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hornsby Shire Council	S7.HSC.03	Parsley Bay	Parsley Bay Dredging Feasibility Study	The Parsley Bay boat ramp and harbour area does not currently provide all tide access for vessels due to long term siltation occurring within the boat harbour. This represents an access issue for both recreational users of the estuary and for the various remote river communities that rely on the harbour for safe and reliable access to Brooklyn. It would include: > Navigational Requirements: Analysis of bathymetric survey data and identification of navigational requirements > Technical feasibility: An assessment of potential dredging methods (and equipment) and beach nourishment methods, volumes, and placement designs > Environmental impacts: An assessment of potential environmental impacts and associated environmental planning and approvals requirements > Economic feasibility: An economic assessment of potential costs associated with an ongoing program The purpose of the study would be to investigate the logistical, environmental, and economic feasibility of dredging operations to reinstate all-tide access inside Parsley Bay.	Hornsby Shire Council	DCCEEW(BCS) DPHI-Crown Lands DPIRD-Fisheries	-33.5479	151.2309	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hornsby Shire Council	S7.HSC.04	Brooklyn	Upgrade of Kangaroo Point Pumpout Pontoon	The project will include the upgrade of the Kangaroo Point Pumpout Pontoon and its associated landside pumpout facilities. The enhancements will focus on improving the functionality, durability, and user experience of both the pontoon and the pumpout systems, ensuring they meet current environmental standards and can effectively support the needs of the boating community	Hornsby Shire Council	N/A	-33.5423	151.2002	Active Intervention	Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hornsby Shire Council	S7.HSC.05	Brooklyn	Upgrade of McKell Park Tidal Pool	The project will involve the repair and upgrade of the McKell Park Tidal Pool. The scope of work will be determined by a thorough condition assessment to identify necessary improvements. The upgrade plan will be developed based on available funding and resources, ensuring that the pool meets safety standards and enhances the overall user experience.	Hornsby Shire Council	N/A	-33.5461	151.2314	Active Intervention	Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hornsby Shire Council	S7.HSC.06	Parsley Bay	Upgrade of public pontoons at Parsley Bay	The two public pontoons at Parsley Bay, situated on the eastern and western sides, require upgrades to enhance safety, accessibility, and durability. The planned improvements will address structural wear and ensure the pontoons can better accommodate community use, supporting boating activities and providing safer access for all users.	Hornsby Shire Council	N/A	-33.5482	151.2304	Active Intervention	Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hornsby Shire Council	S7.HSC.07	Dangar Island	Dangar Island Loading Dock Upgrade	The project will involve upgrading the Dangar Island loading dock. This upgrade will enhance the dock's structural integrity, safety, and accessibility, ensuring it can maintain a continued level of service for the community.	Hornsby Shire Council	N/A	-33.5367	151.2412	Active Intervention	Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hornsby Shire Council	S7.HSC.08	Wisemans Ferry	Upgrade of the Wisemans Ferry old public wharf	The public wharf at Wisemans Ferry will require upgrades to enhance safety, accessibility, and durability. The planned improvements will address structural wear and ensure the pontoons can better accommodate community use, supporting boating activities and providing safer access for all users.	Hornsby Shire Council	N/A	-33.3819	150.9893	Active Intervention	Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hornsby Shire Council	S7.HSC.09	Sandbrook Inlet	Sandbrook Inlet Dredging Feasibility Study	Navigational access to Sandbrook Inlet is currently impacted by siltation in key navigation channels. This represents an access issue for both recreational users of the estuary and for the various remote river communities that rely on the harbour for safe and reliable access to Brooklyn. It would include: > Navigational Requirements: Analysis of bathymetric survey data and identification of navigational requirements > Technical feasibility: An assessment of potential dredging methods (and equipment) and beach nourishment methods, volumes, and placement designs > Environmental impacts: An assessment of potential environmental impacts and associated environmental planning and approvals requirements > Economic feasibility: An economic assessment of potential costs associated with an ongoing program The purpose of the study would be to investigate the logistical, environmental, and economic feasibility of dredging operations to reinstate all-tide access inside Sandbrook Inlet.	Hornsby Shire Council	DCCEEW(BCS) DPHI-Crown Lands DPIRD-Fisheries	-33.5440	151.2012	Active Intervention	Community Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hornsby Shire Council	S7.HSC.10	Brooklyn	Bayden Powell Avenue Dinghy and Foreshore Access improvement	This action involves enhancing dinghy storage and improving foreshore access at the end of Bayden Powell Avenue to support safe and sustainable waterway use. The project will focus on providing designated and orderly dinghy storage to reduce clutter, minimize environmental impact, and improve accessibility for boat users. Additionally, improvements to foreshore access will ensure safer and more convenient launching and retrieval of small watercraft, benefiting both recreational and commercial	Hornsby Shire Council	N/A	-33.5463	151.2172	Active Intervention	Community Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						users. Works may include installing secure storage racks, upgrading pathways, stabilising the shoreline to prevent erosion, and enhancing accessibility features. These upgrades will help protect the surrounding environment, improve user experience, and support responsible waterway management.						
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hornsby Shire Council	S7.HSC.11	Brooklyn	Design and install boardwalk from Brooklyn Public Wharf to Lower McKell Park	The project involves the construction of a boardwalk/path from Brooklyn Public Wharf to Lower McKell Park. This initiative has been identified by the community and staff as the 'missing link' needed to complete the foreshore walk around to Parsley Bay from the Brooklyn Public Ferry Wharf. The boardwalk/path will provide a continuous and scenic route for pedestrians, enhancing the accessibility and enjoyment of the foreshore area. Some sections of the boardwalk/path will be accommodated on land, while others will need to be constructed over water to ensure a seamless connection. This project aims to improve the overall experience for residents and visitors, promoting outdoor activities and fostering a stronger connection with the natural environment	Hornsby Shire Council	DCCEEW(BCS)	-33.5465	151.2288	Active Intervention	Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Hawkesbury City Council	S3.HCC.01	LGA Wide	Write a specific WSUD chapter in Hawkesbury City Council DCP	Water Sensitive Urban Design (WSUD) is an approach to urban planning that integrates land and water planning and management into urban design. WSUD is based on the premise that urban development and redevelopment must address the sustainability of water. WSUD s one of the key management measures that can control pollutants, such as nutrients, sediments, pathogens and gross pollutants, being exported into the estuary from urban lands. It is recommended that Council specifies and applies pollution reduction targets within their Development Control Plan. Council should accompany this with a WSUD policy, which advocates WSUD as a means to help achieve proposed pollution reduction and improve the quality of inflows entering the Hawkesbury River and the broader Estuary (especially nitrogen, phosphorus and suspended sediments).	Hawkesbury City Council	N/A	NG	NG	Avoid Future Impact	Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Hawkesbury City Council	S3.HCC.02	LGA Wide	Undertake a review and update of the Council OSSM policy.	Undertake a review and update of the Council Policy regarding On-site Sewage Management Systems (OSSMs) (policy number 8217275). Hawkesbury Council estimates that there are over 9,000 OSSMs with the Hawkesbury LGA. The purpose of the review would be to ensure the effective regulation of OSSMs in order to preserve the waterways, community health and the environment.	Hawkesbury City Council	N/A	NG	NG	Planning for change	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Hawkesbury City Council	S3.HCC.03	LGA Wide	Environmental Conservation zoning for coastal wetland areas	Analysis undertaken in the CMP has identified a number of locations around the Upper Estuary foreshore and waterways where land containing important coastal wetlands mapped under the NSW Hazards and Resilience State Environmental Planning Policy (RH SEPP) is currently not zoned as a "'conservation zones" in the Local Environment Plan. This action would therefore involve Council investigating land use planning options for improved coastal and environmental management – including potential rezoning of RHSEPP Mapped coast wetland areas from to a C2 (Environmental Conservation). The purpose of a LEP zoning amendment would be to protect and preserve its environmental values of these wetlands for future generations, and to help enhance the resilience of these wetlands to future sea level rise by allowing for upslope migration pathways.	Hawkesbury City Council	DPHI-Planning and Assessment	Multiple	Multiple	Avoid Future Impact	Stage 3 Analysis
Certifiable CMP	Strategy 4: Community & Stakeholder Engagement	Local Implementation Plan: Hawkesbury City Council	S4.HCC.01	LGA Wide	Establish an environmental program for the Turf Farmers across the Hawkesbury LGA	The Action would involve developing an environmental program for Turf Growers across the LGA through targeted extension, technical assistance and grants to improve on-farm management practices, and in doing so, reduce the impacts of horticulture on downstream estuary health. This would include providing education regarding: > The importance of native and healthy riparian vegetation in stabilising riverbanks and providing key fish habitat > On-site management drainage and water quality The program can utilise existing education materials from GS LLS and the DPIRD Fisheries "fish-friendly farms" initiative. The program can also provide technical assistance for operators by providing information regarding available State Government grants and other funding mechanisms to help implement adopt enhanced land management practices – with a focus on improving downstream estuary health outcomes.	Hawkesbury City Council	WSU GS LLS Sydney Water	Multiple	Multiple	Active Intervention	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 4: Community & Stakeholder Engagement	Local Implementation Plan: Hawkesbury City Council	S5.HCC.01	LGA Wide	Incentivising private landowners to undertake best practice management of their riparian zones	Incentivizing private landowners to undertake best practice management of their riparian zones involves implementing strategies that encourage and support sustainable and environmentally friendly practices along waterways on private lands. This would include providing education regarding the importance of native and healthy riparian vegetation in stabilising riverbanks and providing key fish habitat. It would also provide assistance private land owners by providing information regarding available State Government grants and other funding mechanisms to help implement adopt enhanced land management practices such as: > revegetation of riverbanks > fencing of riverbanks for stock exclusion > weed control It could also provide access to Councils nursery to promote planting of native riparian vegetation.	Hawkesbury City Council	GS LLS	Multiple	Multiple	Active Intervention	Stage 3 Analysis & Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
Certifiable CMP	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Hawkesbury City Council	S5.HCC.02	LGA Wide	Continue Council's Yabby Trap Round-Up Program	Opera House yabby traps are illegal in NSW and no longer permitted to be used as they have been implicated in the drowning of air breathing fauna such as platypus, turtles, and water rats. This program involves using the CMP to fund the continued implementation of Councils Yabby Trap Round-Up program. The program allows community members to drop off their Opera House yabby traps at designed locations so that they can be recycled into useful products for fishers, with the proceeds funding habitat restoration.	Hawkesbury City Council	N/A	Multiple	Multiple	Active Intervention	Stage 3 Analysis & Council Engagement
Catchment Companion	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Hawkesbury City Council	S5.HCC.03	Richmond	Implement the recommendations of the Hawkesbury Floodplain Drainage Review	In 2023, a review was undertaken into the drainage network across the Hawkesbury River floodplains, within the Hawkesbury LGA boundary from Yarramundi bridge in the west down to Pitt Town in the east. The purpose of the study was to identify locations where drainage was inhibited and provide recommendations on site specific solutions for each drainage channel. The broader conclusion is that the condition of the drainage channels has deteriorated over time, resulting in poor drainage and giving rise to further damage to the area in flood events. The deterioration is partly due to failure by landowners or Council to maintain flood mitigation and drainage infrastructure, and partly due to farm works or practices which have changed the topography of the area. The review identified a number of specific Actions for Council to improve drainage across the floodplain. These Actions include: > Action 6: Investigate whether drainage improvements can be made upstream of Pughs Lagoon. > Action 7: Keep pipes clear of debris at Pughs Lagoon > Action 10: Repair or replace floodgates at Cooley Creek > Action 14: Investigate whether drainage improvements can be made at Cooleys Creek and Bakers Lagoon > Action 21: Replace floodgate and repair and stabilise levee at South Creek Implementation of these actions will help restore the functionality of the drainage network, improving water flow efficiency and reducing prolonged inundation following flood events. By addressing blockages, maintaining flood mitigation infrastructure, and ensuring effective drainage, the risk of water stagnation and back-flooding will be minimized. Enhancing drainage across the floodplain will also provide significant benefits to downstream estuary health. Improved water movement will help reduce sediment accumulation, nutrient buildup, and the risk of hypoxic conditions that can lead to fish kills and other ecological imbalances	Hawkesbury City Council	N/A	-33.5887	150.8036	Active Intervention	Molino Stewart (2024)
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hawkesbury City Council	S6.HCC.01	Webbs Creek	Sea Level Rise adaptation for the local road network along the Colo River, Webbs Creek, and The Macdonald River	Inspection of topographic road survey and future sea level rise projections has indicated that important stretches of public road along Colo River, Webbs Creek, and The Macdonald River will be impacted by sunny day tidal inundation under a +0.5 m sea level rise (SLR) scenario (up to 500m), with a significantly higher impact for a +1.0 SLR scenario (up to 3.5km). These roads provide crucial transportation and access for the rural settlements further upstream. A proactive approach will be undertaken to plan for the long-term resilience of public roads along these foreshores. The study will include: > Desktop Vulnerability Assessment: Conduct a Geographic Information System (GIS) analysis to map the location and extent of roads vulnerable to tidal inundation under +0.5 m and +1.0 m SLR scenarios. Use high-resolution elevation data, LiDAR, and hydrodynamic modelling outputs to refine impact assessments. Identify priority road segments based on frequency of projected inundation, existing flood risk, and criticality for community access. > Road Raising Strategy: Road raising in high risk areas may subsequently be undertaken in one of two approaches: -Trigger Based: Works may be implemented once future sea levels reach a specific trigger threshold (i.e., +0.5 m or +1.0 m SLR) - Opportunistic: Opportunistic raising of the roads may be undertaken as part of future routine road upgrade works - or as funding becomes available. > Engage with relevant stakeholders, including local councils, Transport for NSW, and impacted communities, to ensure alignment with broader flood resilience and transport planning strategies. Integrate findings into future infrastructure planning documents and funding applications to ensure long-term viability.	Hawkesbury City Council	N/A	-33.3867	150.9743	Planning for change	Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hawkesbury City Council	S6.HCC.02	Cumberland Reach	Bank Erosion Remediation at Holmes Drive Reserve	In Stage 2 of the CMP, the bank erosion at Holmes Drive Reserve was investigated (referred to as Site HCC27). Based on the outcomes of the MCA, the recommended stabilisation option for management is "Bank reprofiling, large wood installation and revegetation". The proposed works include: > Bank reprofiling to a slope of 1V:3H to aid in vegetation establishment and improve slope stability to reduce the risk of mass failure > Establishment of riparian vegetation along the reprofiled bank and overbank zone (≈ 5 m). This will increase the root network at the top of the bank providing a greater degree of reinforcement and decreasing the level of bank saturation by intercepting precipitation and by transpiration >Large wood installed at the toe of the bank will provide structural protection to	Hawkesbury City Council	DCCEEW(BCS) DPIRD-Fisheries	-33.4726	150.8905	Active Intervention	Stage 2 Bank Erosion Report, and updated Stage 3 Analysis

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						dissipate the wave energy and protect the bank from wave action and fluvial scour. Each log will be secured by a timber pile at each end lashed together with stainless steel cable > Stormwater outflow upgrade to include scour protection (e.g. piped outlet with rock protection) > Fish habitat features such as concrete habitat reefs could also be incorporated below low tide level on the subtidal bench (Optional) >Formalised access such as aluminium stairs should be installed to provide safe public access to the beach area.						
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hawkesbury City Council	S6.HCC.03	Sackville	Erosion remediation at Churchills Wharf Reserve	In Stage 2 of the CMP, the bank erosion at Churchills Wharf Reserve was investigated (referred to as Site HCC26). The site is approximately 25 m in length and is located on the left bank (looking downstream) of the Hawkesbury River at the beginning of the outside of a tight meander, encompassing the Churchills Wharf Reserve (Sackville Ferry). There has been significant bank retreat of up to 5 m between 2010 and April 2022, and without management intervention ongoing erosion and bank retreat are likely placing the car park and amenities block at risk. Based on the setback constraints, the works will involve reprofiling of the steep upper bank to a more stable gradient - and the construction of a rock toe with revegetation of the upper bank.	Hawkesbury City Council	DCCEEW(BCS) DPIRD-Fisheries	-33.5017	150.8757	Active Intervention	Stage 2 Bank Erosion Report, and updated Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hawkesbury City Council	S6.HCC.04	Ebenezer	Relocation of Utilities Infrastructure at Argyle Bailey Memorial Reserve	In Stage 2 of the CMP, the bank erosion at Argyle Bailey Memorial Reserve was investigated (referred to as Site HCC25b). The site is approximately 160 m in length and is located on the left bank on a meander of the Hawkesbury River adjacent to Argyle Baily Reserve at Ebenezer. The erosion is currently placing at risk a number of utilities assets, including 3 power poles and associated transmission lines owned by Endeavor Energy. The poles are located on Council Managed Crown Land (Lot No: 556/-/DP704504). The most cost effective approach to protection of these assets will be to relocate these assets in question. This Action would therefore involve Council assisting to mitigate the public safety risk across the Council reserve by engaging with Endeavor Energy to relocate the at risk infrastructure.	Hawkesbury City Council	Endeavour Energy DPHI-Crown Lands	-33.5415	150.8876	Active Intervention	Stage 2 Bank Erosion Report, and updated Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hawkesbury City Council	S6.HCC.05	Windsor	Bank Erosion Remediation Design: The Terrace, Windsor	In Stage 2 of the CMP, the bank erosion at The Terrace (Windsor) was investigated (referred to as Site HCC24). The site is approximately 340 m in length and is located on the right bank of the Hawkesbury River immediately adjacent to The Terrace at Windsor. The 2022 flood events had a significant impact on the site. Across the extent of the site, there has been stripping of understory vegetation (primarily weeds) which has left the bank surface exposed. Major erosion has occurred at two locations resulting in significant damage to the public pedestrian path and loss of the upper bank gabion wall in both locations. The Stage 2 Study noted that more detailed investigations are required to determine the extent of works required across the site more broadly. Given the height and steepness of the bank, limited or no setback available at the top of the bank, and lack of intertidal bench the management options will likely largely be limited to a 'hard' engineering approach. For example, this may require the construction of a retaining wall structure at the toe of the bank to enable infill of the upper bank with some combination of rock and suitable compacted soil, followed by revegetation. However, significant geotechnical investigation and design will be required to determine the appropriate extent of works, slope stability, type of works, and construction methodology.	Hawkesbury City Council	DCCEEW(BCS) DPIRD-Fisheries	-33.6042	150.8207	Active Intervention	Stage 2 Bank Erosion Report, and updated Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Hawkesbury City Council	S6.HCC.06	Windsor	Bank Erosion Remediation Works at Governor Phillip Park	The foreshore at Governor Phillip Park experienced a bank erosion and landslip event following flooding in 2022. This erosion has impacted the public walkway, and the erosion scarp is within a 10 m proximity to the Upper Hawkesbury Power Boat Club building. Erosion mitigation works should include: > Flattening the slope of the landslip area to a more stable slope (1V:3H) > Planting of native riparian vegetation across the foreshore of Governor Phillip Park in order to increase erosion resilience > Realignment of the public walkway > Frequent monitoring of the foreshore	Hawkesbury City Council	DCCEEW(BCS) DPIRD-Fisheries	-33.6005	150.8303	Active Intervention	Community Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Hawkesbury City Council	S7.HCC.01	Pitt Town	Upgrade the Punt Road Public Boat Ramp	The boat ramp at Punt Road Pitt Town (and the access road leading to it) are in relatively poor condition. This Action would therefore include resurfacing of the leading access road and the boat ramp in order to provide safer access for both powered and non-powered vessels to the waterway. The upgrade would be undertaken in accordance with the TfNSW Boat Ramp Facility Guidelines. This action may be eligible for funding through programs administered by TfNSW for boating infrastructure.	Hawkesbury City Council	TfNSW	-33.5676	150.8592	Active Intervention	Stage 3 Analysis
Certifiable CMP	Strategy 2: Monitoring,	Local Implementation	S2.CCC.01	Broken Bay Beaches	Coastal dynamics monitoring program	Develop and implement a coastal dynamics monitoring program to provide information on coastal processes to inform management practices. The program will be consistent with, and integrate with the monitoring program implemented for the Open Coast	Central Coast Council	DCCEEW(BCS)	Multiple	Multiple	Alert	Stage 3 Analysis &

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
	Evaluation, and Reporting	Plan: Central Coast Council				Beaches CMP, and would include: - Monitoring surveys (both ongoing and post storm events) program using drones - to better assess erosion rates, impacts of individual storm events and ongoing erosion and inundation risk. - Targeted ecological surveys to monitor long term trends e.g. changes in dune vegetation and fauna communities - Entrance monitoring of the coastal creeks (e.g. Beach Stat, Inlet Tracker, Coast Snap), foreshore vegetation, seagrass monitoring, shorebird habitat and ongoing monitoring of at risk assets. - Survey campaigns on coastal protection infrastructure pre and post storm event to determine performance. Monitoring would culminate in development of a "Beach Health Report" for each beach to cover total beach volumes and susceptibility of the beach to erosion/coastal hazards (similar that that produced by Gold Coast City Council for their beaches). This monitoring program should be integrated into the wider Central Coast Council Coastal Monitoring Program.						Council Engagement
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	Local Implementation Plan: Central Coast Council	S2.CCC.02	Broken Bay Brisbane Water	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	This action involves the development and implementation of a monitoring program designed to assess and track the condition of various coastal assets and infrastructure, including: > Coastal protection structures (revetments, seawalls, training walls) > Recreational assets including viewing platforms & coastal access tracks > Stormwater outlets. > Sewer and water infrastructure The program should be integrated into Councils broader asset management program - and should be consistent with the asset monitoring undertaken as part of the Open Coast Beaches CMP.	Central Coast Council	N/A	Multiple	Multiple	Alert	Stage 3 Analysis & Council Engagement
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	Local Implementation Plan: Central Coast Council	S2.CCC.03	Green Point Creek Ettalong Creek Pearl Beach Lagoon	Install permanent water level gauges at key locations within Brisbane Water and Broken Bay	There is currently no permanent water level gauge at a number of key locations within Brisbane Water and Broken Bay. This has resulted in an absence of recorded water level data that can assist in understanding localised impacts of coastal and catchment flooding on the numerous foreshore communities across the waterways and their catchment. This information will be particular important over future time frames as the impacts of Sea Level Rise become more severe. This action therefore involves the installation of a permanent water level gauges at the following locations: > Green Point Creek > Ettalong Creek > Pearl Beach Lagoon The exact positions of the gauges should be determined in consultation with the State Government, based on an assessment of strategic locations that can achieve the objectives outlined above, whilst maintaining a practical location for installation and maintenance. Furthermore, water level data can be transmitted and published through the MHL web page, and this will help to manage and mitigate estuarine flood risk by providing publicly available water levels in real time.	Central Coast Council	DCCEEW(BCS)	-33.5337	151.3094	Alert	Stage 3 Analysis
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Central Coast Council	S3.CCC.01	Brisbane Water	Environmental Conservation zoning for coastal wetland areas	Analysis undertaken in the CMP has identified a number of locations around the Brisbane Water foreshore and waterways where land containing important coastal wetlands mapped under the NSW Hazards and Resilience State Environmental Planning Policy (RH SEPP) is currently not zoned as a "'conservation zones" in the Local Environment Plan. This action would therefore involve Council investigating land use planning options for improved coastal and environmental management – including potential rezoning of RHSEPP Mapped coast wetland areas to a C2 (Environmental Conservation). The purpose of a LEP zoning amendment would be to protect and preserve the environmental values of these wetlands for future generations, and to help enhance the resilience of these wetlands to future sea level rise by allowing for upslope migration pathways. The scope of this undertaking should consider the findings of the Central Coast Council Wetland Refugia Study (WRL, 2023)	Central Coast Council	DPHI-Planning and Assessment	Multiple	Multiple	Avoid Future Impact	Stage 3 Analysis
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Central Coast Council	S3.CCC.02	Hardys Bay	Implement the Hardys Bay Foreshore Master Plan	Implement the Foreshore Master Plan (FMP) for Hardys Bay. The FMP would include the following elements: > Provision of recreational amenity and foreshore access > Drainage upgrades > Landscaping and green space design > Habitat restoration and vegetation plans > Protection of Indigenous cultural heritage > Addressing siltation issues at the at the boat ramp, and the potential relocation of the Pretty Beach pool such that it will be suitable for swimming under all tidal conditions and is not subject to sediment build-up.	Central Coast Council	N/A	-33.5261	151.3495	Active Intervention	Council Engagement & CZMP Review

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						Note that erosion control and shoreline stabilization measures for Hardy Bay and Pretty Beach foreshore areas are described by, and covered in CMP Actions S6.CCC.03, S6.CCC.06, and S6.CCC.24 - and those actions will integrate with this Master Plan.						
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Central Coast Council	S3.CCC.03	Phegans Bay	Implement the Phegans Bay Waterfront Foreshore Master Plan	Council was approached by the Phegans Bay community with concerns that the condition of the foreshore was deteriorating and that if not addressed infrastructure, including Phegans Bay Road, would be compromised. The site was subsequently assessed as a high priority for investigation and a commitment was made to work with the community to develop a masterplan outlining upgrades required to improve the amenity, access, safety and environmental integrity of the site. The FMP would include the following elements: > Provision of recreational amenity and foreshore access > Landscaping and green space design > Habitat restoration and vegetation plans > Protection of Indigenous cultural heritage Council is currently preparing the draft masterplan, and it will be place it on public exhibition for further feedback before finalising it for Council adoption. Note that erosion control and shoreline stabilization measures for Phegans Bay are described by, and covered in CMP Actions S6.CCC.30 - and that action will integrate with this Master Plan.	Central Coast Council	N/A	-33.4876	151.3101	Active Intervention	Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Central Coast Council	S3.CCC.04	Brisbane Water	Update RH SEPP Coastal Wetlands and Littoral Rainforest Mapping for the LGA	Undertake a planning proposal to update the Coastal Wetland Mapping for Brisbane Water in the NSW Resilience and Hazards State Environmental Planning Policy (RH SEPP).	Central Coast Council	DPHI-Planning and Assessment	Multiple	Multiple	Alert	Council Engagement
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Central Coast Council	S3.CCC.05	LGA Wide	Review and update Council's Development Control Plan	Review and update Councils DCP to maintain consistency with the goals and objectives of the CMP. This would include review and update of: > Chapter 2.12 Waterfront Structures > Chapter 2.17 Character and Scenic Quality > 3.1 Floodplain Management and Water Cycle Management > 3.2 Coastal Hazard Management > 3.3 On-Site Sewage Management > 3.4 Water Catchment Areas > 3.5 Tree and Vegetation Management > 3.6 Heritage Conservation > 3.7 Geotechnical Requirements	Central Coast Council	DPHI-Planning and Assessment	NG	NG	Planning for change	Council Engagement & CZMP Review
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Central Coast Council	S3.CCC.06	LGA Wide	Compliance auditing of private development encroachment onto public land	Initiate a thorough compliance auditing process to address the issue of private development encroachment onto public land along the Brisbane Water, Lower Hawkesbury River and Broken Bay foreshores. This auditing will encompass a range of activities, including detailed desktop assessments utilizing aerial imagery to identify instances of encroachment. The aim is to ensure that all private developments adhere to established regulations and do not unlawfully extend onto public land. This process will involve cross-referencing current property boundaries with historical records and conducting on-site inspections where necessary. By undertaking this comprehensive audit, we aim to safeguard public spaces, protect natural resources, and uphold the integrity of our coastal environments for the benefit of the community.	Central Coast Council	N/A	NG	NG	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 3: Resilience, Planning, and Adaptation	Local Implementation Plan: Central Coast Council	S3.CCC.07	LGA Wide	Investigate opportunities to purchase saltmarsh areas for incorporation into Council's reserve system.	The purpose of this action is investigate opportunities for acquiring saltmarsh areas to integrate into Council's reserve system - thereby enhancing environmental protection, biodiversity conservation, and providing a future adaptation pathway for these wetland ecosystems to mitigate sea level rise impacts. This would be in alignment with Councils Wetland Management Policy, specifically > Policy 5.1 Council will investigate options for protecting or acquiring wetlands on private land. > Policy 5.2 Where possible Council will acquire wetlands in accordance with a priority program. Acquisition of wetlands would be in accordance with Council Policy A5.02 Land and Property Transactions.	Central Coast Council	DPIRD-Fisheries	NG	NG	Planning for change	Council Engagement & CZMP Review
Certifiable CMP	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Central Coast Council	S5.CCC.01	Brisbane Water	Water Quality Improvement Plan for Brisbane Water	The Water Quality Improvement Plan (WQIP) for Brisbane Water aims to enhance and protect the water quality of the Brisbane Water estuary and its catchment areas. The plan will outline the actions, responsibilities, and timelines for achieving sustainable water quality improvements. The WQIP will include: > Collation and review of existing water quality data, details on current point source loads to the estuaries, catchment land use data and existing environmental values/water quality objectives > Identify opportunities to collaborate with key stakeholders including the oyster industry and commercial & tourism operators > Catchment Audits: Undertake detailed audits of each sub-catchment across Brisbane Water > Water Quality Assessment and Modelling: Comparisons to be made between actual	Central Coast Council	DCCEEW(BCS)	Multiple	Multiple	Active Intervention	Council Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						water quality across Brisbane Water and the identified waterway objectives by way of an effects-based assessment. Where modelling tools are available, these tools will be applied at this stage to enhance the rigour of the assessments. > Management Options: Development of a suite of potential management responses, and evaluate the options based on cost effectiveness and risk treatment. This includes investigation of the use of constructed wetlands, sediment, and detention basins and other WSUD options to minimise the effect of freshwater and sediment inflows, with particular reference to areas of high biodiversity value around entrances to creeks. Consideration should be given to both current and future meteorological conditions. > Action Plan: Define the roles and responsibilities, costs, and timeframes for implementation of the action plan.						
Certifiable CMP	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Central Coast Council	S5.CCC.04	Brisbane Water	Undertake a sedimentation study for major creek outlets	This project involves conducting a detailed geomorphological study to assess both historical and current sedimentation rates at the estuarine outlet areas of Narara Creek, Erina Creek, Kincumber Creek, and Woy Woy Creek. The aim is to understand sediment dynamics, identify trends and patterns, and inform sustainable management practices for these critical estuarine environments. It would include: > Historical Analysis: Review of past studies, aerial imagery, and hydrographic surveys. > Field Investigations and Sediment Testing: Sediment sampling and testing for grain size distribution, organic content, and sediment composition. > Numerical Modelling: Simulation of sediment transport under different conditions (base flow and high flow) > Data Analysis & Interpretation: Sedimentation Rate Estimation, Sediment Transport Patterns, Erosion vs. Deposition Trends > Recommendations for Management	Central Coast Council	N/A	Multiple	Multiple	Active Intervention	Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Central Coast Council	S5.CCC.05	Woy Woy	Investigate the feasibility of Naturalisation of the Austin Butler Drainage Channel	Undertake a feasibility study into the naturalisation the Concrete Drain section of Austin Butler Drainage Channel. The naturalisation project would involve: > Replacing the concrete banks with native wetland vegetation - thereby increasing the number and diversity of native plants and vegetation > Expanding the salt marsh around the creek and creating intertidal rock pools within the channel where possible. The project would improve waterway health through the creation of a wetland to naturally treat and remove pollutants from the water before it enters Brisbane Water The feasibility study would consider: > Impacts of naturalisation on local flood levels. > Impacts of naturalisation on serviceability of drainage infrastructure > Costs/benefits of naturalisation The feasibility study should also investigate other options to improve water quality outcomes from the Austin Butler drain network. This could include installing, biofiltration/sediment/gross pollutant infrastructure where appropriate.	Central Coast Council	DCCEEW(BCS) DPIRD-Fisheries	-33.4862	151.3278	Active Intervention	Community Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Central Coast Council	S5.CCC.06	Estuary-Wide	Implement a wetland monitoring, management and restoration program	This would include the development of an LGA wide wetland management strategy for Central Coast Council. Upon completion of the strategy, this action would include implementation of wetland restoration works in priority locations across the CMP study area. This initiative aims to enhance ecosystem health, improve biodiversity, and bolster the resilience of the region's wetlands in the face of climate change and urbanisation. An important component of the wetland management strategy is monitoring. The monitoring program would utilise both physical on-ground monitoring techniques such as floristic surveys as well as remote sensing techniques looking at changes in the wetlands over time in response to climate change. Note the linkages to CMP Action S5.CMP.05	Central Coast Council	DCCEEW(BCS)	Multiple	Multiple	Active Intervention	Council Engagement
Certifiable CMP	Strategy 5: Estuary & Waterway Health	Local Implementation Plan: Central Coast Council	S5.CCC.07	Davistown	Green and Golden Bell Frog Key Population Management Plan	The objective of this action is to protect and enhance the Green and Golden Bell Frog (GGBF) populations within the coastal management zones of the Hawkesbury CMP (Davistown), ensuring their long-term viability in the face of estuarine dynamics, human activities, and climate change impacts such as sea level rise. The plan will: > Assess current population health, habitat condition, and key threats. > Identify priority areas for habitat protection, restoration, and connectivity. > Develop adaptive management strategies to mitigate the impacts of estuarine change and sea level rise. > Provide recommendations for water quality management, habitat enhancement, and invasive species control. > Establish monitoring protocols to track population trends and habitat changes over time. > Engage with relevant stakeholders, including local councils, research institutions, environmental groups, and government agencies, to coordinate conservation efforts.	Central Coast Council	DCCEEW(BCS)	-33.4812	151.3576	Active Intervention	Community Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.01	Green Point	Implement foreshore restoration and stabilisation works at Bayside Drive Reserve	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. In this location, the tool recommends stabilisation using low height native vegetation and ecofeatures to create a 'living foreshore' across key area of the Bayside Drive Reserve Foreshore. This living shoreline would include a step-type rock bench structure that incorporates a bench of estuarine vegetation such as salt marsh or mangroves. This may be similar to what has been recently constructed at Davistown Rd, Yattalunga. A map and concept outline of the works will be provided in Stage 4 CMP document.	Central Coast Council	DCCEEW(BCS)	-33.4500	151.3583	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.02	Green Point	Implement foreshore restoration and stabilisation works at Edgewater Avenue Reserve	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. In this location, the tool recommends stabilisation using rip-rap and geotextile sand containers. A map and concept outline of the works will be provided in Stage 4 CMP document.	Central Coast Council	DCCEEW(BCS)	-33.4533	151.3571	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.03	Pretty Beach	Implement foreshore restoration and stabilisation works at Pretty Beach Road	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. In this location, the tool recommends stabilisation through the implementation of a "living shoreline" across the 620-metre stretch of foreshore along Pretty Beach Road. This living shoreline would include a step-type rock bench structure that incorporates a bench of estuarine vegetation such as salt marsh or mangroves. This may be similar to what has been recently constructed at Davistown Rd, Yattalunga. A map and concept outline of the works will be provided in Stage 4 CMP document. This area is covered by the Hardys Bay Foreshore Masterplan and the objectives of that plan should also be considered in the restoration if this foreshore.	Central Coast Council	DCCEEW(BCS)	-33.5272	151.3477	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.04	Koolewong	Implement foreshore restoration and stabilisation works at Lara Street	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. In this location, the tool recommends stabilisation through repair and renewal of the existing rock armoured seawall and inclusion of "living shoreline" elements which could include inter-tidal/sub-tidal oyster reefs and planting of mangroves where appropriate. A map and concept outline of the works will be provided in Stage 4 CMP document.	Central Coast Council	DCCEEW(BCS)	-33.4770	151.3220	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.05	Woy Woy	Implement foreshore restoration and stabilisation works at the Woy Woy waterfront	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. In this location, the tool recommends stabilisation through repair and renewal of the existing 870 m long rock armoured seawall structure. The works will comprise the repair of the structure of a make-safe / functional condition - through the placement of additional rock armour units on the structure in locations where it has experienced significant armour unit loss, core exposure, and loss of crest height and width. The objective would be to extend the life of the structure by another 50+ years. The renewal will ensure long-term protection against coastal hazards and improve the overall safety and resilience of the infrastructure. A map and concept outline of the works will be provided in Stage 4 CMP document. This area is covered by the Woy Woy Waterfront Masterplan and the objectives of that plan should also be considered in the restoration of this foreshore.	Central Coast Council	DCCEEW(BCS)	-33.4901	151.3337	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.06	Hardys Bay	Implement foreshore restoration and stabilisation works at Araluen Drive Reserve	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. In this location, the tool recommends the implementation of a "living shoreline" across the 360 m stretch of foreshore located west of the Hardys Bay public wharf. This living shoreline would include a step-type rock bench structure that incorporates a bench of estuarine vegetation such as salt marsh or mangroves. This may be similar to what has been recently constructed at Davistown Rd, Yattalunga. A map and concept outline of the works will be provided in Stage 4 CMP document. This area is covered by the Hardys Bay Foreshore Masterplan and the objectives of that plan should also be considered in the restoration if this foreshore (see Action S3.CC.02).	Central Coast Council	DCCEEW(BCS)	-33.5229	151.3624	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.07	Daleys Point	Implement foreshore restoration and stabilisation works	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. In this location, the tool recommends stabilisation using a geotextile	Central Coast Council	DCCEEW(BCS)	-33.4998	151.3538	Active Intervention	Council Engagement & CZMP Review

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
					at Palermo Reserve	sand container structure. A map and concept outline of the works will be provided in Stage 4 CMP document.						
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.08	Davistown	Implement foreshore restoration and stabilisation works at Illoura Reserve	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. In this location (from Lintern Street to Pyang Avenue), the tool recommends stabilisation using a geotextile sand container structure. A map and concept outline of the works will be provided in Stage 4 CMP document.	Central Coast Council	DCCEEW(BCS)	-33.4838	151.3530	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.09	Point Clare	Implement foreshore restoration and stabilisation works at the Point Clare waterfront	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. In this location, the tool recommends stabilisation using low height native vegetation and ecofeatures to create a 'living foreshore' comprising dese estuarine vegetation planting. A map and concept outline of the works will be provided in Stage 4 CMP document.	Central Coast Council	DCCEEW(BCS)	-33.4342	151.3207	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.10	Ettalong	Repair and renewal of the Lance Webb Reserve Seawall	Asset condition inspections by Central Coast Council have indicated that the Lance Webb Reserve Seawall is in a relatively poor structural condition. A repair and renewal project will be undertaken to maintain the function of the structure, extend the functional life, and adapt it for future sea level rise impacts. The objective of this repair would be to return the structure to a “make safe” condition, and extend the life of the structure by another 50+ years. Repair and renewal works would likely comprise the placement of additional rock armour units and repacking of units to increase interlocking and hydraulic stability. It would also include raising the crest level to mitigate future SLR impacts – however this would be subject to a detailed design process. Specific works for this project would therefore include: > Structure Survey and coastal engineering condition inspection: To survey the structure and identify the exact nature of the required repair and renewal works - including the required quantity of rock armour material. > Repair and renewal design: To prepare a specific repair design detailing the sizing and quantity of the required rock armour, and specifying the required grades and levels. > Repair and renewal works: Implementation of the repair design, including a safety in design assessment, construction of the works and development of As-Constructed certification from a suitably qualified engineer for Council records.	Central Coast Council	DCCEEW(BCS)	-33.5152	151.3391	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.11	Booker Bay	Implement construction of the foreshore stabilisation works near Rip Road Reserve.	Rip Road Reserve was identified as a high priority site for foreshore stabilisation due to significant active erosion and the presence of important Aboriginal cultural heritage items. Detailed designs of the foreshore stabilisation works have been prepared and this action would involve implementing the construction of the works as designed. A map and concept outline of the works will be provided in Stage 4 CMP document.	Central Coast Council	DCCEEW(BCS)	-33.5075	151.3448	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.12	Brisbane Water	Tidal inundation stormwater audit and adaptation investigation	This would include an audit of stormwater outlets around the foreshores of low lying areas in Brisbane Water (including Woy-Woy, Empire Bay, Davistown, and Saratoga), and assessment of the need for upgrades to help mitigate tidal inundation. Upgrades may include retrofitting stormwater outlets with one-way valves (tidal flaps) to prevent tidal backflows causing king-tide inundation of the surrounding land and road network.	Central Coast Council	N/A	Multiple	Multiple	Active Intervention	Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.13	Upper Estuary	Sea Level Rise adaptation for Wisemans Ferry Road	Inspection of topographic road survey and future sea level rise projections has indicated that up to 5 km of Wisemans Ferry will be impacted by sunny day tidal inundation under a 1.0 m sea level rise (SLR) scenario. The impacted areas include Roses Creek, Gunderman, Cohens Creek, Spencer, Lower Mangrove, Therefore, road raising will be required in order to maintain safe all-tide vehicle access in the future. > Desktop Vulnerability Assessment: Conduct a Geographic Information System (GIS) analysis to map the location and extent of roads vulnerable to tidal inundation under +0.5 m and +1.0 m SLR scenarios. Use high-resolution elevation data, LiDAR, and hydrodynamic modelling outputs to refine impact assessments. Identify priority road segments based on frequency of projected inundation, existing flood risk, and criticality for community access. > Road Raising Strategy: Road raising in high risk areas may subsequently be undertaken in one of two approaches: > Trigger Based: Works may be implemented once future sea levels reach a trigger threshold (+1.0 m SLR) > Opportunistic: Opportunistic raising of the roads may be undertaken as part of future routine road upgrade works - or as funding becomes available.	Central Coast Council	N/A	Multiple	Multiple	Planning for change	Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.14	Broken Bay Beaches	Develop and Implement a Beach Maintenance Program.	This Action would integrate with the Beach Maintenance Program identified in the Open Coast Beaches CMP. This action would include: > List LGA wide beach accessways (location, material, condition) and prioritise upgrades in line with the Stage Two Social Recreation Assessment and Councils Council's Disability Access Inclusion Plan. > Guidance for Council Works Teams to reduce impacts while working on or near Aboriginal and environmentally sensitive sites. > Outline ongoing and post storm event beach scraping following storm events at beach	Central Coast Council	DCCEEW(BCS)	Multiple	Multiple	Active Intervention	Stage 3 Analysis

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						accessways to allow reopen after a storm. Prioritise locations such as surf clubs and heavy plant vehicle access ways. > Guidance on appropriate signage, including safety, environmental, cultural awareness, education and compliance for consistency. > Specify temporary and permanent fencing guidance including appropriate materials to be used in the coastal zone. > Develop LGA wide beach scraping Part 5 Assessment to streamline works. > Develop controls for commercial beach access permits e.g. guidelines for management of commercial beach access and controls around vehicle access during Little Tern breeding season > Undertake an audit on beach maintenance operations, personal and resources to maximise efficiencies inhouse. Provide plant equipment to undertake ongoing and post storm event scaping						
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.15	Broken Bay Beaches	Develop and implement a coastal vegetation and dune management strategy	This Action would integrate with the Coastal Vegetation and Dune Management Strategy identified in the Open Coast Beaches CMP. It would involve an ongoing (continuous) program of foreshore dune restoration works across the beaches of Broken Bay in order to improve the erosion resilience and ecological integrity of the dunes. The works would include: > Develop native plant species list for coastal dune planting - including species along the foredune to promote natural foreshore building and recovery. > Specify suitable shade and street trees. > Outline follow up maintenance guidance. > Management of priority weed species. > Guidance on appropriate dune fencing materials and stabilisation controls. > Guidance on tree restoration due to coastal erosion. > Succession planning for replacement trees. > Outline steps to remediation following illegal clearing	Central Coast Council	DCCEEW(BCS)	Multiple	Multiple	Active Intervention	Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.16	Umina Beach	Implement the Umina-Ocean Beach Erosion Management Strategy	The Umina-Ocean Beach Erosion Management Strategy, finalized in 2019, provides a detailed framework for managing coastal erosion at Umina-Ocean Beach over the long term. This strategy was developed based on extensive technical studies of the complex coastal dynamics of Broken Bay and involved collaboration with State Government Agencies. It includes a monitoring system and a trigger-based approach for implementing coastal protection works (CPWs) along the 1300-meter foreshore between Ocean Beach SLSC and Kourung Street Boat Ramp, to be constructed at a point in the future if coastal erosion reaches a trigger point where it threatens critical infrastructure along the Esplanade. The trigger to undertake the CPWs should also include any major upgrades of The Esplanade and associated foreshore amenities. The strategy outlines a concept design for coastal protection, which features a rock-armoured revetment stretching from Kourung Street Boat Ramp to Ocean Beach SLSC and a stepped concrete seawall in front of the Ocean Beach SLSC. This action therefore includes the ongoing implementation of this strategy, which includes developing detailed designs for the coastal protection works – so that the works can be implemented if/when erosion triggers are reached at some point in the future. Additionally, there will be community engagement to ensure public input and feedback are incorporated into the final design, promoting transparency and local support for the project.	Central Coast Council	DCCEEW(BCS)	-33.5242	151.3236	Active Intervention	Agency and Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.17	Umina Beach	'Prepare and Implement a Broken Bay Beach Nourishment Framework	Coastal erosion poses a persistent risk to infrastructure, public access, and recreational amenity along key beaches within the region. While natural sand movement plays a significant role in shaping these beaches, targeted sand nourishment can be a valuable management tool to help maintain beach volume and reduce erosion risk. At the same time, the NSW Government periodically undertakes dredging works in nearby waterways — such as navigation channels and estuarine inlets — generating sand that can be reused for beach nourishment. However, in the absence of a clear local framework, decisions about where to place dredged sand are often made without full consideration of local erosion risks, beach conditions, or community priorities. This action aims to develop a Beach Nourishment Framework that enables Council to proactively plan, prioritise, and coordinate sand placement across Pearl, Ocean, Umina, and Ettalong Beaches. It would guide local decision-making, support more effective collaboration with State Government agencies, and help maximise the community and environmental benefits of available sand resources	Central Coast Council	DCCEEW(BCS) TfNSW	Multiple	Multiple	Active Intervention	Agency and Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.18	Umina Beach	Management of stormwater outlets on beaches	Collaborate with internal business units to undertake an inspection of all stormwater outlets within the coastal use area and highlight assets at risk of coastal erosion and inundation mapped in the Coastal Hazard Definition Study. Identify assets without scour protection or which are causing a significant impact on coastal processes and provide recommendations for future scour protection or redirection of stormwater to minimise the potential for erosion and erosion scarps. Identify stormwater assets within the Beach and Public Infrastructure Monitoring Program (Ref LGA Wide action) which can be retrofitted with energy dissipation	Central Coast Council	N/A	Multiple	Multiple	Active Intervention	Stage 3 Analysis & CZMP Review

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						structures. Establish engineering guidance document for internal business units and consultants which considers coastal processes in stormwater system design. Undertake regular monitoring of stormwater assets including post storm events, to assess performance and impacts.						
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.19	Patonga	Patonga Sand Management Plan	Investigate and design a sand management plan for Patonga Beach and Patonga Creek. The action would contain the following key elements: > A detailed investigation of the local sediment transport processes. A key outcome of this model would be an enhanced understanding of the local sediment dynamics - including a quantified sediment budget that includes sediment exchange between the creek and beach. This would include investigation erosive process currently occurring in the creek such as along Larkins Flat. > Development of a sand redistribution program to improve the coastal hazard resilience of key foreshore assets and infrastructure. This would involve an ongoing program of the redistribution of sand sourced from western beach and creek entrance shoals to be placed in front of Patonga Drive to provide a buffer against storm erosion. > This should also investigate opportunities for periodic maintenance dredging of sand from the creek entrance providing a viable source of sand.	Central Coast Council	DCCEEW(BCS)	-33.5525	151.2711	Active Intervention	Council Engagement & CZMP Review
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.20	Patonga	Patonga Levee Feasibility Investigation and Design	Sea Level Rise (SLR) inundation mapping indicates that under a +0.5 m SLR scenario, some areas of Patonga will be exposed to sunny day king tide inundation. Under a future +1.0 m SLR scenario the potentially impacted areas increases significantly. Subsequently, Council should undertake a feasibility investigation of implementing a vegetated earthen levee along the western foreshore of Patonga, adjacent to Patonga Creek. The levee would be located on public reserve and would extend from approximately from Meroo Avenue to Jacaranda Avenue. The feasibility study would include: > Problem Definition and Objectives > Site Assessment (survey geotechnical assessment, hydrology, land ownership, and utilities) > Concept Design Options and Associated Cost Estimates > Environmental and Planning Constraints > Social and Community Considerations > Recommendations	Central Coast Council	DCCEEW(BCS)	-33.5510	151.2689	Active Intervention	Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.21	Pearl Beach	Implement recommendations from Gosford Lagoons & Creek Entrance Management Review (Salients 2017) for Green Point Creek, Pearl Beach Lagoon and Ettalong Creek.	This action would include updating the Opening of Coastal Lagoons policy to include recommendations of the Gosford Lagoon and Creek Entrance Management Review (Salients 2017). These recommendations relate to Green Point Creek, Pearl Beach Lagoon and Ettalong Creek, and include the identification of triggers for intervention to mitigate flood impacts in low lying areas.	Central Coast Council	DCCEEW(BCS)	Multiple	Multiple	Planning for change	Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.22	Patonga	Repair and renewal of Patonga Seawall	Undertake the repair and renewal of the Patonga Seawall at the Boat Ramp Reserve - to ensure it effectively protects the coastline, surrounding infrastructure, and community from coastal erosion, storm surges, and rising sea levels. This initiative will address current structural deficiencies and future-proof the seawall to meet the challenges of a changing climate. Specific works for this project would therefore include: > Structure Survey and coastal engineering condition inspection: To survey the structure and identify the exact nature of the required repair and renewal works - including the required quantity of rock armour material. > Repair and renewal design: To prepare a specific repair design detailing the sizing and quantity of the required armour units, and specifying the required grades and levels. > Repair and renewal works: Implementation of the repair design, including a safety in design assessment, construction of the works and development of As-Constructed certification from a suitably qualified engineer for Council records. Repair and renewal works would likely comprise repacking and re-placing the existing sandstone blockwork units with a more robust filter layer and drainage accommodation. However this would be subject to a detailed design process.	Central Coast Council	DCCEEW(BCS)	-33.5507	151.2771	Active Intervention	Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.23	Hardys Bay	Include RSL Creek and Mudflat Creek in the Central Coast Council Priority Creek Program	As part of the Central Coast Council's Priority Creek Program, high-priority creeks across the LGA are actively managed to help maintain adopted flood planning levels and reduce the risk of flooding to nearby developments. This work includes creek stabilisation, repair projects, and the ongoing management of sediment, debris, and vegetation build-up. This action proposes adding RSL Creek and Mudflat Creek in Hardys Bay to the	Central Coast Council	DPIRD-Fisheries	-33.5207	151.3627	Active Intervention	Community Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						program, ensuring these waterways receive the necessary maintenance to support flood resilience and environmental health.						
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.24	Hardys Bay	Implement foreshore restoration and stabilisation works at the Hardys Bay extension wharf	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. Erosion along the foreshore near the Hardys Bay extension wharf (at 25-19 Hardys Bay Pde) is putting key infrastructure at risk, including Hardys Bay Parade, which in some areas is less than one metre from the eroded scarp. In this location, the tool recommends stabilisation through repair and renewal of the existing rip rap seawall that runs along a 600-metre stretch of foreshore along Hardys Bay Road (focussing on the stretch approximately 50 metres on either side of the wharf). Repairs work will comprise the placement of additional rock armour units, and the repacking of existing rock armour units to improve interlocking and stability, and to stabilise existing areas of core/backfill exposure. This area is covered by the Hardys Bay Foreshore Masterplan and the objectives of that plan should also be considered in the restoration if this foreshore (see Action S3.CC.02).	Central Coast Council	DCCEEW(BCS) DPIRD-Fisheries	-33.5186	151.3602	Active Intervention	Community Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.25	Patonga	Repair and renewal of the Patonga Creek Training Wall	The Patonga Creek rock-armoured training wall is aging and in a relatively poor structural condition. The training wall provides an important flood-risk management function by maintaining an open estuary entrance for Patonga Creek. It is recommended that a repair and renewal project is undertaken to maintain the function of the structure, extend the functional life, and adapt it for future sea level rise impacts. Repair and renewal works would likely comprise the placement of additional rock armour units and repacking of units to increase interlocking and hydraulic stability. It may also include redesign of the breakwater roundhead feature (the area that is most damage-prone), and raising the crest level of the structure to mitigate future SLR impacts – however this would be subject to a design process. Specific works for this project would therefore include: > Structure Survey and coastal engineering condition inspection: To survey the structure and identify the nature of the required repair and renewal works > Training wall repair and renewal design: To prepare a specific repair design detailing the sizing and quantity of the required rock armour, and specifying the required grades and levels. > Repair and renewal works: Implementation of the repair design, including a safety in design assessment, construction of the works and development of As-Constructed certification from a suitably qualified engineer for Council records.	Central Coast Council	DCCEEW(BCS) DPIRD-Fisheries DPHI-Crown Lands	-33.5560	151.2680	Active Intervention	Community Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.26	Patonga	Repair and renewal of the Patonga Creek foreshore protection works	The Patonga Creek foreshore protection works, which are constructed of stepped sandstone blocks, is in need of repair. It is recommended that a repair and renewal project is undertaken to maintain the function of the structure, extend the functional life, and adapt it for future sea level rise impacts. Repair and renewal works would likely comprise the re-packing of displaced or unstable sandstone block units, and the placement of additional sandstone block units to increase interlocking and hydraulic stability. It may also include incorporation of improved access arrangements for small watercraft – however this would be subject to a design process. Specific works for this project would therefore include: > Structure Survey and coastal engineering condition inspection: To survey the structure and identify the nature of the required repair and renewal works > Repair and renewal design: To prepare a specific repair design detailing the sizing and quantity of the required sandstone block armour, and specifying the required grades and levels. > Repair and renewal works: Implementation of the repair design, including a safety in design assessment, construction of the works and development of As-Constructed certification from a suitably qualified engineer for Council records.	Central Coast Council	DCCEEW(BCS) DPIRD-Fisheries DPHI-Crown Lands	-33.5548	151.2671	Active Intervention	Community Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.27	Wagstaffe	Implement foreshore restoration and stabilisation works at Wagstaffe Wharf	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. In this location (at the end of Mulhall Street), the tool recommends stabilisation works to protect the wastewater pump station south of the wharf - using a geotextile sand container structure.	Central Coast Council	DCCEEW(BCS) DPIRD-Fisheries	-33.5231	151.3432	Active Intervention	Community Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.28A	Pearl Beach	Pearl Beach Foreshore Resilience: Option A - Beach Scraping and Dune Building	Councils coastal hazard mapping has indicated that Pearl Parade is likely to be vulnerable to severe storm erosion over the coming decades - and two options have been considered and assessed as part of the Stage 3 Analysis. Option B involves the restoration and revegetation of 200 m of foreshore from Emerald Ave to Tourmaline Ave. The works would include: > An ongoing program of beach scraping / beach nourishment to surcharge the upper beach profile and the foredune with additional sand > Revegetation and restoration works to extend the vegetated foredune areas	Central Coast Council	DCCEEW(BCS)	-33.5442	151.3072	Active Intervention	Stage 3 Analysis

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						landwards by around 10 m. These works would be intended to increase the natural resilience of the foreshore to coastal erosion and inundation.						
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.28B	Pearl Beach	Pearl Beach Foreshore Resilience: Option B - Coastal Protection Works	Councils coastal hazard mapping has indicated that Pearl Parade is likely to be vulnerable to severe storm erosion over the coming decades - and two options have been considered and assessed as part of the Stage 3 Analysis. Option A involves providing long term protection for Pearl Parade in the form of buried rock-armoured coastal protection works - which would be implemented once the observed erosion on Pearl Beach reached a set trigger distance from the road and associated infrastructure. The coastal protection works would extend around 200 m from Emerald Ave to Tourmaline Ave and would provide protection to the public road, important water supply mains and other utilities that run under the road, the amenities block and the playground. This Action would therefore involve: > Development of concept and detailed design for the structure that consider coastal protection requirements as well as the maintenance of beach access and recreational amenity. > Development of a specific erosion-based trigger for implementation, based on councils beach monitoring program	Central Coast Council	DCCEEW(BCS)	-33.5442	151.3072	Active Intervention	Stage 3 Analysis
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.29	Pearl Beach	Pearl Beach Lagoon Erosion Management Investigation	The downstream reaches of Pearl Beach Lagoon are currently experiencing erosion - with notable erosion hotspots located both immediately upstream and downstream of the Coral Crescent Culvert. This erosion has the potential to impact upon Coral Crescent, the safe functioning of the lagoon entrance (and Coral Cres culverts), and safe access to Pearl Beach. The Action therefore includes undertaking an investigation of potential erosion mitigation solutions than can protect Council assets, maintain safe beach access, and maintain the functioning of the lagoon entrance dynamics. The works should consider the outcomes of the 2020 technical investigations into the Pearl beach Lagoon weir and sediment dynamics - and the associated package of community engagement (Salients, 2020).	Central Coast Council	DCCEEW(BCS)	-33.5411	151.3074	Active Intervention	Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.29	Ettalong	Ettalong Beach Foreshore Stabilisation Investigation	Ettalong Beach has experienced chronic erosion since the 1940s, with ongoing shoreline recession affecting both recreational use and coastal infrastructure. The foreshore is currently protected by the Lance Webb Reserve seawall, which is in poor structural condition (see Action S6.CCC.10), and is periodically nourished through the entrance dredging program. However, the highly dynamic coastal processes at Ettalong Beach have resulted in rapid loss of nourished sand, often leaving the beach in an eroded state. This not only reduces recreational amenity for locals and visitors but also increases the risk of undermining the seawall foundations. This study will investigate long-term stabilisation strategies to maintain a sandy beach state at Ettalong Beach, including: >Assessment of Local Coastal Processes – Development of a morphological conceptual model. > Numerical Modelling of Existing Conditions – Establishing a base case scenario. > Modelling of Potential Stabilisation Options – Testing nourishment volumes and potential groyne field configurations to improve sand retention (including consideration of the existing groynes along Ettalong Beach). > Identification of potential adverse impacts on coastal processes and ecology > Recommendations for Long-Term Foreshore Management – Providing strategic guidance for inclusion in future CMP revisions.	Central Coast Council	DCCEEW(BCS)	-33.5150	151.3381	Active Intervention	Council Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	Local Implementation Plan: Central Coast Council	S6.CCC.30	Phegans Bay	Implement foreshore restoration and stabilisation works at Phegans Bay Road	The Brisbane Water Foreshore Prioritisation Tool helps plan and prioritize restoration and stabilisation work along the foreshore. It is regularly updated as conditions and priorities change. In this location, the tool recommends the implementation of a "living shoreline" across the 380 m stretch of foreshore located west of the Phegans Bay Road. This living shoreline would include a step-type rock bench structure that incorporates a bench of estuarine vegetation such as salt marsh or mangroves. This may be similar to what has been recently constructed at Davistown Rd, Yattalunga. A map and concept outline of the works will be provided in Stage 4 CMP document. This area is covered by the Phegans Bay Foreshore Masterplan and the objectives of that plan should also be considered in the restoration if this foreshore (see Action S3.CC.03).	Central Coast Council	DCCEEW(BCS)	-33.4876	151.3102	Active Intervention	Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.01	Ocean Beach	Construction of an all-abilities beach access point at	The project involves the construction of a dedicated all-abilities beach access point at Ocean Beach Surf Life Saving Club (SLSC). This initiative aims to enhance beach accessibility, ensuring that all members of the community, regardless of their physical abilities, can enjoy the beach and its amenities.	Central Coast Council	N/A	-33.5245	151.3210	Active Intervention	Council Engagement & CZMP Review

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
					Ocean Beach SLSC	This action is consistent with Council's Disability Inclusion Action Plan (Central Coast Council 2021) which has four focus areas, one of which is "2: Making the Central Coast more accessible, inclusive and liveable", and one of the objectives is "We will make it easier to access the places we love on the Central Coast – the beaches, waterways and bushland". It is also consistent with the Central Coast Recreational Use Study Stage 1: Open Coast and Coastal Lagoons - Improving and increasing disabled access with states that "Council should work with SLS clubs to ensure that they all have either beach access wheelchairs or beach mats".						
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.02	Gosford	Support the Gosford Foreshore Masterplan	This action would seek to identify and support components of the Gosford Foreshore Masterplan that relate to estuary management. The intention of this action would be to embed the consideration of water quality outcomes and improvement to estuarine habitat as part of any future detailed design processes. This would also include embedding coastal hazard resilience into the development design (especially coastal inundation).	Central Coast Council	DCCEEW(BCS), Hunter Central Coast Development Corporation (HCCDC)	-33.4316	151.3387	Active Intervention	Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.03	Patonga	Develop and implement a foreshore masterplan for Patonga Creek	This master planning process would provide an holistic vision for the Patonga Creek foreshore. Key elements of the plan would include: > Parking and amenities > Safe and equitable foreshore access > Riparian vegetation management > Dingy/water craft storage > Road drainage and management of overland flow The master plan will be developed through stakeholder engagement, site analysis, and alignment with relevant coastal management policies. The outcome will be a clear, actionable strategy to ensure the long-term sustainability and enjoyment of the Patonga Creek foreshore.	Central Coast Council	DPHI-Crown Lands	-33.5507	151.2691	Active Intervention	Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.04	Broken Bay Beaches	Strategic assessment of SLSC patrol towers	Perform an audit of the SLSC patrol towers and related structures to assess their condition, effectiveness, and vulnerability to coastal hazards. Prioritize necessary improvements and ensure that adequate equipment, amenities, and parking are available for lifeguards to effectively carry out their duties.	Central Coast Council	N/A	Multiple	Multiple	Active Intervention	Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.05	Broken Bay Beaches	Review of coastal zone waste facilities and collection	Collaborate with internal business units and undertake a review of waste collection assets and servicing in the coastal zone and determine if: > Infrastructure and servicing is adequate > Meets population and season demand > Caters for recycling > Is the colour of the bins appropriate in the coastal zone (similar to flags/international misinterpretation as a warning sign)	Central Coast Council	N/A	NG	NG	Active Intervention	Council Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.06	Hardys Bay	Increase foreshore connectivity between Hardys Bay and Fishermans Point	Create a new footpath and cycleway to connect Hardys Bay Parade to Daley Avenue at Fishermans Point, making it safer and easier for pedestrians and cyclists to move through the area. Given the coastal setting, a section of the path would be designed as a boardwalk above the high tide mark to ensure all tide accessibility while protecting the natural foreshore. This connection would improve access for residents and visitors, encouraging more walking and cycling in the area. This area is covered by the Hardys Bay Foreshore Masterplan and the objectives of that plan should also be considered in the restoration if this foreshore (see Action S3.CC.02).	Central Coast Council NPWS	N/A	-33.5125	151.3597	Active Intervention	Community Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.07	LGA Wide	Prepare Central Coast Council Dinghy Management Plan	Dinghies and other small watercraft are a popular way to access the public foreshores across Council's waterways. However, better management is needed to balance accessibility with environmental protection and community use of foreshore reserves. A Strategic Dinghy Management Plan would guide the responsible storage and use of dinghies on public land, ensuring they are kept in designated areas and do not obstruct shared spaces. The goal of the plan would be to: > Establish and maintain designated dinghy storage facilities to support authorised vessels while aligning with Council's open space objectives. > Maintain high-quality foreshore reserves for the enjoyment of the whole community. > Minimise environmental impacts, safety hazards, and obstructions caused by unattended watercraft. > Provide a framework for the removal of unclaimed or improperly stored dinghies from public land. The development of the plan should consider alignment with the Central Coast Watercraft Storage on Public Land Policy (CCC086)	Central Coast Council	N/A	NG	NG	Active Intervention	Community Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.08	Pearl Beach	Feasibility Investigation: Ambulant Access at Pearl Beach Rock Pool Access	This feasibility investigation will assess options for a low-impact handrail to assist ambulant access from the sand at Pearl Beach to the rock pool platform. The study will consider the environmental, structural, and accessibility requirements for a minimal-intervention solution that enhances safety while preserving the natural character of the area. Key elements of the investigation will include site assessments, design feasibility, regulatory considerations, and potential impacts on coastal processes.	Central Coast Council	N/A	-33.5459	151.3090	Active Intervention	Community Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						Community consultation will form an essential part of the study, ensuring that a range of viewpoints are considered in selecting the most suitable option. This will involve engaging local stakeholders to explore preferences for materials, positioning, and design. The investigation will result in a summary report outlining feasible design options, estimated costs, and implementation considerations for Council's review.						
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.09	Pearl Beach	Develop and implement a foreshore masterplan for Pearl Beach	This master planning process would provide an holistic vision for the Pearl Beach foreshore. Key elements of the plan would include: > Parking and amenities > Safe and equitable beach access > Dune vegetation management > Road drainage and management of overland flow The master plan will be developed through stakeholder engagement, site analysis, and alignment with relevant coastal management policies. The outcome will be a clear, actionable strategy to ensure the long-term sustainability and enjoyment of the Pearl Beach foreshore.	Central Coast Council	DPHI-Crown Lands	-33.5443	151.3071	Planning for change	Community Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.10	Phegans Bay	Feasibility Investigation: Increase foreshore connectivity between Phegans Bay and Woy Woy	This feasibility investigation will investigate the potential to create a new footpath and cycleway to connect Phegans Bay to Woy Woy, making it safer and easier for pedestrians and cyclists to move through the area. Given the coastal setting, a section of the path would be designed as a boardwalk above the high tide mark to ensure all tide accessibility while protecting the natural foreshore. This connection would improve access for residents and visitors, encouraging more walking and cycling in the area.	Central Coast Council NPWS	N/A	-33.4879	151.3098	Active Intervention	Community Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.12	Spencer	Develop and implement a foreshore masterplan for Spencer	This master planning process would provide a strategic and holistic vision for the Spencer foreshore - extending from the boat ramp in the south to the public swimming enclosure in the north. Key elements of the plan would include: > Parking and amenities > Safe vessel access to the waterway > Pedestrian access and safety > Renewal of the Spencer swimming enclosure > Riparian vegetation management > Road drainage and management of overland flow. The master plan will be developed through stakeholder engagement, site analysis, and alignment with relevant coastal management policies. The outcome will be a clear, actionable strategy to ensure the long-term sustainability and enjoyment of the Spencer foreshore.	Central Coast Council	DPHI-Crown Lands	-33.4584	151.1475	Planning for change	Community Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.13	Pearl Beach	Feasibility Investigation: Reinstating Umina Point foreshore connection	This feasibility investigation will assess the potential to reinstate the coastal foreshore walk in between Pearl Beach and Umina Beach around Umina Point. The study will evaluate environmental, engineering, and accessibility considerations to determine the viability of restoring the walking connection while ensuring safety and sustainability.	Central Coast Council	N/A	-33.5354	151.3144	Active Intervention	Community Engagement
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.14	Estuary-Wide	Undertake strategic upgrades of Council owned boat ramps in Brisbane Water	This would include implementing boat ramp upgrades identified by Councils boat ramp action plan.	Central Coast Council	TfNSW	Multiple	Multiple	Active Intervention	Stage 3 Analysis
Certifiable CMP	Strategy 7: Social and Recreational Amenity	Local Implementation Plan: Central Coast Council	S7.CCC.15	Estuary-Wide	Implement the St Huberts Island Canals maintenance program	The purpose of the St Huberts Island Canals maintenance program is to enable residents and Council to conduct maintenance and improvement activities within the St Huberts Island Drainage Reserves (canals) in an informed and consistent manner. The Guideline provides advice and direction for the undertaking of activities to protect and restore foreshores, seawalls and canal depths in a manner that minimises impacts on the hydraulic, sedimentary or ecological processes occurring within the canals, foreshores and surrounding water body (Brisbane Water). Whilst the program predominantly includes provision of guidelines for waterfront residents, there are a number of actions for Council, including the following: > Undertaking hydrographic surveying of the canals every 10 years > In conjunction with the surveying and monitoring of sedimentation program, a program of visual monitoring for foreshore management should be undertaken. Similarly, this should be undertaken every three to five years > Preparation of a dredging and disposal feasibility assessment & strategy. The strategy should be developed following consideration of the required dredging volume. This also includes a review available funds to determine whether dredging works are economically feasible	Central Coast Council		-33.4973	151.3464	Active Intervention	CZMP
Certifiable CMP	Strategy 8: Cultural Heritage Protection	Local Implementation Plan: Central Coast Council	S8.CCC.01	Entrance channel	Identify the location and condition of ship wrecks near the old bar via a maritime	The project involves conducting a comprehensive maritime archaeological survey to identify the likely location and assess the condition of shipwrecks near the Old Bar. This initiative aims to uncover historical maritime artifacts, preserve cultural heritage, and contribute to the understanding of the region's maritime history.	Central Coast Council	Heritage NSW	-33.5266	151.3396	Alert	Council Engagement & CZMP Review

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
					archaeological survey.							
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	NPWS Implementation Plan	S6.SGA.01A	Station Beach	Station Beach Coastal Adaptation Option A: GSC Coastal Protection Works	Stage 2 coastal hazard mapping has indicated that key NPWS Assets at Station Beach are likely to be vulnerable to severe storm erosion over the coming decades - and 3 options have been considered and assessed as part of the Stage 3 Analysis. Option A involves providing long term protection for the assets in the form of geotextile sand container (GSC) coastal protection works, which would extent around 100m across the foreshore in front of the assets. A preliminary engineering assessment has identified that 1.2m 3 GSC units would be required (Elcorock ER120V or equivalent), with a crest level matching the surrounding terrain level (+2mAHD) and a foundation level to resist storm erosion of around -1 m AHD.	NPWS		-33.5820	151.3261	Active Intervention	Agency Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	NPWS Implementation Plan	S6.SGA.01B	Station Beach	Station Beach Coastal Adaptation Option B: Sand Redistribution and Dune Building	Stage 2 coastal hazard mapping has indicated that key NPWS Assets at Station Beach are likely to be vulnerable to severe storm erosion over the coming decades - and 3 options have been considered and assessed as part of the Stage 3 Analysis. Option B involves the restoration and revegetation of 80m across the foreshore in front of the assets. The works would include: • An ongoing program of sand back-passing, beach nourishment and dune building. As the longshore sediment transport at the sites moves from North to South (as identified in the Stage 2 Hazard Study), this action would include a beach scraping process to "back-pass" sand from farther south along Station Beach - returning it northwards to build the beach and an increased dune buffer in front of the at risk assets. • The dune building and buffer in front of the assets has been designed to provide buffer from a 100 years ARI storm event, providing an additional 18m3/m of sand in front of the assets. • Sand could be won from a 250 m long stretch of foreshore located to the south of the assets. This would involve a shallow scraping of ~0.2 m of surface sand from the intertidal zone across the borrow area. • Revegetation and restoration works could be undertaken to help build the local dune and trap the nourished sand in place. • This would require an ongoing program of works, likely required around every 5 years given the relatively low rate of longshore drift.	NPWS		-33.5820	151.3261	Active Intervention	Agency Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	NPWS Implementation Plan	S6.SGA.01C	Station Beach	Station Beach Coastal Adaptation Option C: Relocation of Assets	Stage 2 coastal hazard mapping has indicated that key NPWS Assets at Station Beach are likely to be vulnerable to severe storm erosion over the coming decades - and 3 options have been considered and assessed as part of the Stage 3 Analysis. Option B involves the relocation of the assets farther landwards to be outside of the coastal hazard zone.	NPWS		-33.5820	151.3261	Active Intervention	Agency Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	NPWS Implementation Plan	S6.SGA.02A	The Basin	West Basin Coastal Adaptation Option A: GSC Coastal Protection Works	Erosion along the western foreshore of The Basin is impacting safe recreational access and is placing a number of large trees at risk of collapse. Option A involves providing long term protection for the foreshore in the form of geotextile sand container (GSC) coastal protection works, which would extent around 180m across the foreshore in front of the assets. A preliminary engineering assessment has identified that 1.2m 3 GSC units would be required (Elcorock ER120V or equivalent), with a crest level matching the surrounding terrain level (+1.4mAHD) and a foundation level to resist storm erosion of around -0.5 m AHD.	NPWS		-33.6044	151.2915	Active Intervention	Agency Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	NPWS Implementation Plan	S6.SGA.02B	The Basin	West Basin Foreshore Coastal Protection Option B: Sand Redistribution Program	Erosion along the western foreshore of The Basin is impacting safe recreational access and is placing a number of large trees at risk of collapse. Option A involves undertaking periodic sand redistribution program - transferring sand from the Basin sand delta to the upper beach profile to stabilise the foreshore. This could include the formation of a dune and swale in order to mitigate impacts of overland flow on foreshore erosion. The works would include: • An ongoing program of sand redistribution - required a total volume of around 1,800m3 of and to be sourced from the adjacent sand delta, and placed along the 180 m of foreshore to create an additional sand buffer of around 10m3/m along the foreshore to provide safe access and protection of trees. This would provide a 5 m width of dry beach sand at the current erosion scarp at high tide. Sand would be placed to match the existing foreshore slope for stability. • It is estimated that these works would need to be undertaken every 2-5 years. • Revegetation and restoration works could be undertaken to help build the local dune and trap the nourished sand in place.	NPWS		-33.6044	151.2915	Active Intervention	Agency Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	NPWS Implementation Plan	S6.SGA.03	The Basin	Eastern Foreshore Beach Nourishment	This action involves the National Parks and Wildlife Service (NPWS) continuing their ongoing foreshore nourishment program along the eastern foreshore of the Basin. The program aims to mitigate coastal erosion by replenishing sand on the shoreline, helping to maintain beach stability and protect coastal ecosystems. This is achieved by transferring sand from the Basin sand delta to the foreshore, redistributing sand to: (a) Areas immediately adjacent the seawall to - ameliorate end effect erosion, and (b) areas directly in front of the seawall - in order to improve recreational amenity values. The nourishment process helps to restore natural coastal dynamics, enhance	NPWS		-33.6021	151.2944	Active Intervention	Agency Engagement

CMP Document	CMP Strategy	Implementation Plan	ID	Locality	Action Name	Full Action Description for CMP	Lead	Support	Lat	Lon	Category	Source
						recreational beach areas, and reduce the risk of accelerated infrastructure deterioration. Regular monitoring and adaptive management ensure the program remains effective in addressing erosion challenges over time.						
Certifiable CMP	Strategy 2: Monitoring, Evaluation, and Reporting	NPWS Implementation Plan	S6.SGA.04	The Basin	Seawall Monitoring	Regular monitoring of the seawall is essential to assess its structural integrity and identify any areas requiring maintenance. The northern half, a recently constructed geotextile sand container (GSC) seawall, is in good condition and should be inspected periodically to ensure stability, check for fabric wear, and confirm that the structure is functioning as designed. The southern half, an older rock seawall, is in a deteriorated state and requires closer observation for signs of slumping, rock displacement, or void formation that could compromise its effectiveness. Routine inspections will be conducted annually, with additional assessments following major storm events to detect any sudden damage or erosion. Triggers for maintenance include significant movement or displacement of rocks, exposed or damaged GSC units, undermining of the wall's foundation, and evidence of increased wave overtopping. If monitoring identifies structural weaknesses or failure risks, targeted repairs or reinforcement works will be scheduled to maintain the seawall's protective function.	NPWS		-33.6033	151.2939	Alert	Agency Engagement
Certifiable CMP	Strategy 6: Coastal Hazard Resilience	NPWS Implementation Plan	S6.SGA.05	Bobbin Head	Sea Level Rise Adaptation of Bobbin Head Foreshore	Several low-lying areas around the Bobbin Head foreshore, including Orchard Park, Gibberagong Park, and the Wharf Area, are currently exposed to tidal inundation ("sunny day flooding"). This issue was recognised in the Bobbin Head Masterplan (NPWS, 2006), which highlighted the negative impact of saltwater inundation on the park's aesthetic and environmental characteristics. Additionally, the NSW Tidal Inundation Exposure assessment (OEH, 2018) has projected that the frequency and severity of tidal inundation will increase in the coming decades due to sea level rise (SLR). Subsequently, this action will involve undertaking a SLR adaptation project for key NPWS assets at Bobbin Head. This will include: Western Side: > Raising of parkland and recreational assets at Orchard Park and Gibberagong Park. T > Raising the existing sandstone blockwork seawall (which is around 530 metres long) by recapping it with additional sandstone capping units. > Raising of Bobbin Head Road at Orchard Park and the Wharf Area and associated parking facilities Eastern Side > Raising of the access road and seawall structure at the Wharf Area. This would include raising the vehicle access and parking facilities and associated pedestrian footpath. This will also include raising the existing sandstone blockwork seawall by recapping it with additional sandstone capping units. It should be noted that the actions detailed above are consistent with Actions previously planned for the area in the Bobbin Head Masterplan (NPWS, 2006).	NPWS		-33.6594	151.1599	Active Intervention	Agency Engagement

4.4 Feasibility Assessment

4.4.1 Overview

As per the NSW Coastal Management Manual (OEH, 2018d), feasible coastal management options are those which are:

- Consistent with the objects of the relevant legislation (including the *Coastal Management Act 2016*, the *Marine Estate Management Act 2014*).
- Consistent with statutory and policy requirements at local, state and Commonwealth levels.
- Environmentally acceptable and consistent with Ecologically Sustainable Development (ESD) principles.
- Feasible in engineering / management terms, i.e., can the option(s) be realistically implemented, given the local social and environmental context.
- Able to address the identified issues, mitigating risks or enhancing opportunities, based on previous experience.
- Adaptive and can transition to alternative approaches when circumstances change.
- Broadly able to be implemented, in terms of available capacity and capability.
- Able to contribute new knowledge about effective management; for instance, a response that is structured as a carefully controlled trial of new technology.

The development of the long list of options was thereby undertaken with regards to the above. The feasibility assessment investigated how each option met the above requirements, and the ability for each option to address the various risks and opportunities across the study area.

4.4.2 Multi Criteria Analysis Methodology

The feasibility assessment was designed to provide an indicative measure of each potential management option's ability to address the identified risks and capitalise on opportunities across the study area (as outlined in Stage 2 of the CMP). This included both direct and indirect contributions to risk reduction and broader management objectives. To ensure a consistent, transparent, and easily understood approach for comparing diverse options, a high-level, semi-quantitative multi-criteria analysis (MCA) framework was applied.

Under this framework, each option was assessed against a defined set of criteria and assigned a numerical score, allowing for a semi-quantified comparison across all options. The outcome of this process was the calculation of a Total Feasibility Score (TFS), which enabled a ranking of options based on their overall merit and feasibility for implementation.

A summary of this methodology is provided in Figure 4-2. Each option was evaluated against the following key criteria:

- *The Degree of Risk Mitigation*: This criterion assessed how effectively each option reduces risks identified in Stages 1 and 2 of the CMP. It considered:
  - The level of risk being addressed – for example, does the option mitigate an extreme risk to public safety or a moderate risk to estuary health?
  - The effectiveness of the option – assessing whether the option provides a long-term or short-term solution, and the degree to which it mitigates the target risk.
- *Potential Impacts on Environmental, Social, and Cultural Values:* This considered the broader implications of each option, recognising that effective coastal management must balance risk reduction with the protection and enhancement of key community values. Options were scored based on potential positive

or negative impacts in the following areas (which were adopted to broadly align with the "Key Estuary Threats" identified in the Stage 1 Scoping Study (Water Technology, 2020) and Stage 2 Abridgement Report (Alluvium, 2022a):

- Water Quality – including stormwater runoff, estuarine water quality, and potential for pollution reduction.
- Biodiversity – including habitat protection and enhancement for native species and ecological communities.
- Physical coastal & estuary processes – including impacts on sediment transport, erosion, and natural geomorphic function
- Social & recreational amenity – including accessibility, usability, and enhancement of public open space and foreshore areas.
- Public safety – including reduction in exposure to coastal hazards such as erosion, inundation, or shoreline instability.
- Cultural heritage values – considering both tangible heritage (e.g. sites or artefacts) and intangible cultural connections, including those identified through consultation with First Nations Groups stakeholders.

Each criterion was scored on a scale from **+4 (strongly positive)** to **0 (neutral or no impact)** to **-4 (strongly negative)**. A strongly negative score (e.g. -3 or lower) in any criterion may render an option unfeasible for inclusion due to significant adverse impacts.

Using the formula provided in Figure 4-2 below, a *Feasibility Score* was calculated for each option. To further refine the assessment, a geographic scale factor - ranging from 1 to 3 - was applied to each option to reflect the spatial extent of its potential benefits and impacts. This approach acknowledges that options with broader application across the study area may deliver more widespread value and efficiency. The scale factor was applied to the Feasibility Score to determine the *Total Feasibility Score.*

The Feasibility Assessment scores for each option are provided in Appendix E.

Table 4-4 Scale factor criteria

Option range of application	Scale Factor
Option generates benefit/impacts to a localised area	1
Option generates benefit/impacts an entire estuary functional zone, multiple zones, or an LGA	2
Benefit/impacts realised across the entire Hawkesbury-Nepean River System study area	3

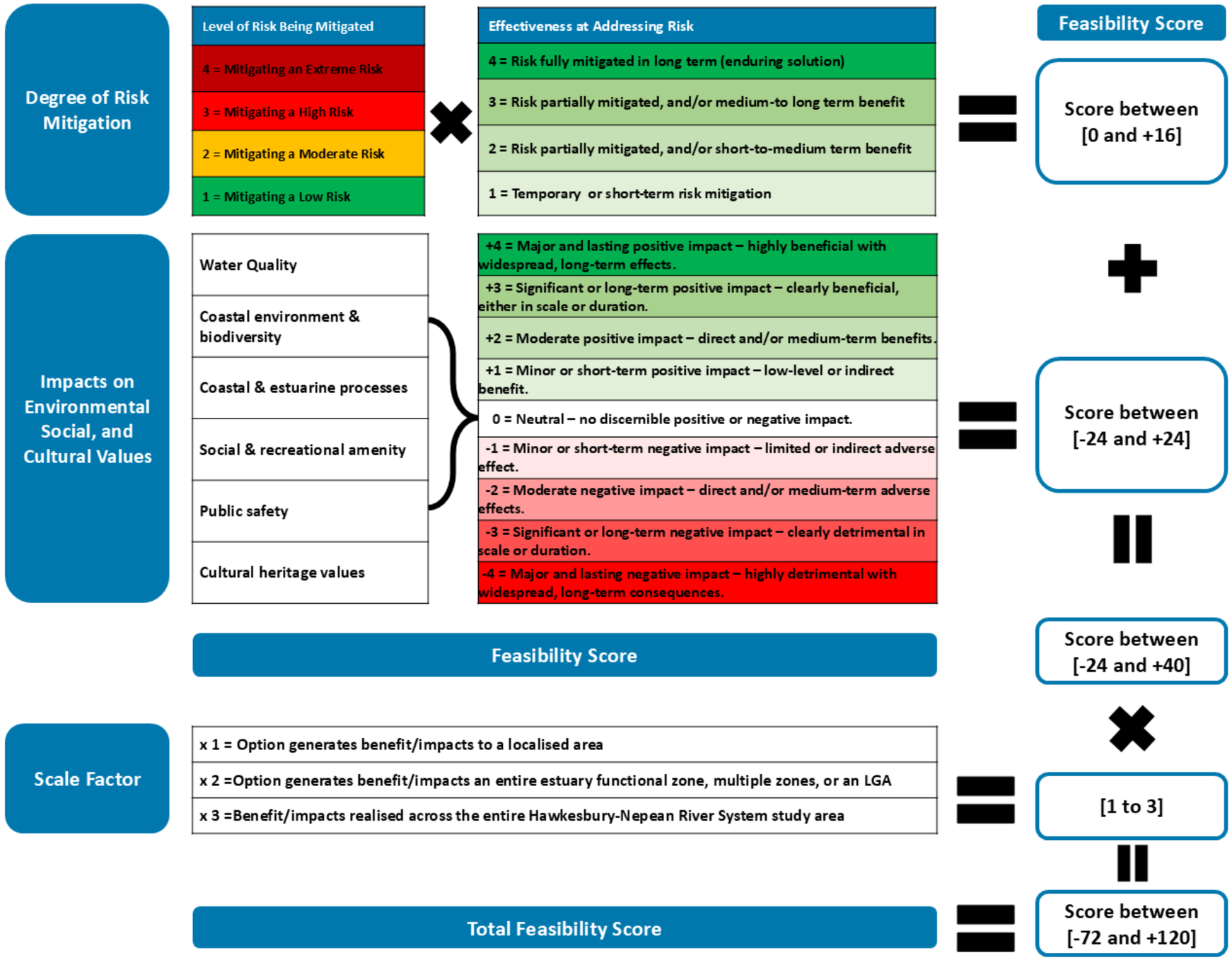

Figure 4-2 Calculation of feasibility score

4.5 Acceptability Assessment

A key factor in the evaluation of options involved determining the acceptability of those options to three distinct stakeholder groups:

- Local communities across the HNRS
- Local First Nations stakeholders, including those identified in the Community & Stakeholder Engagement Plan
- Relevant public authorities, including State Government agencies

To inform this assessment, a robust community and stakeholder engagement process was carried out during Stage 3. The engagement methods and outcomes are detailed in Appendix A. This process provided an opportunity for stakeholders to offer feedback on the potential management options and propose additional actions for consideration.

Feedback from this engagement was used to calculate an Acceptability Score for each option, using the method outlined in Table 4-5. Equal weighting was applied across the three stakeholder groups to generate a normalised score between 0 and 1 for each option.

For new options identified after the engagement period, a default score of 1 was assigned, with a note that further engagement would occur in Stage 4 (including through the public exhibition phase). Similarly, where no indication of non-support or partial support was provided, a default score of 1 was applied.

The Acceptability Assessment scores for each option are provided in Appendix D.

Table 4-5 Calculation of acceptability score

Component	Description	Acceptability Score
Community Support	Based on the percentage of community support recorded through the Stage 3 engagement portal. Support was converted into a decimal value (e.g. 75% = 0.75).	0 - 1
Indigenous Stakeholder Support	Support from local Indigenous interest groups was obtained through both face to face and online engagement methods. Stakeholder support was provided as a number between 0 and 1: ▪ If an Indigenous interest group indicated that it did not support a particular option, then a score of 0 was given. ▪ If partial or conditional support was offered from any group, then a score of 0.5 was applied and conditions of support were noted to modify the option accordingly. ▪ If all groups indicated support of the option, then a score of 1 was applied. *At this point in the project, the default value for most actions is 1 – as these actions have been developed in consultation with First Nations during S3. However, the next round of engagement with these groups will confirm this.*	0 - 1

Component	Description	Acceptability Score
Stakeholder Support	Based on feedback from State Government agencies. Scored identically to the approach for First Nations stakeholders. *At this point in the project, the default value for most actions is 1 – as these actions have been developed in consultation with State Agencies during S3. However, the next round of engagement will confirm this.* A score of 0 received from any State Agency automatically excludes the option.	0 - 1
Total Acceptability Score	**Calculated as the product of the three component scores**	**0 - 1**

4.6 Viability Assessment

4.6.1 Overview

The primary purpose of the viability assessment was to determine, for each potential management option:

- The estimated cost of implementation
- The distribution of costs and benefits among stakeholders
- Proposed cost-sharing arrangements and funding mechanisms
- Whether the option is considered affordable and, therefore, viable for progression to Stage 4 of the CMP.

As part of Stage 3, an economic assessment was undertaken for each option on the long list. The intent of economic assessment is to help decision-makers understand the socioeconomic implications of different management strategies and support the selection of options that deliver net community benefits (OEH, 2018d).

However, the scope and depth of an economic assessment should be proportionate to the:

- Nature and scale of the option – including its cost, complexity, and the number of affected stakeholders
- Risk level and significance of the issue being addressed

Accordingly, the required level of assessment may vary between options. This is illustrated in Figure 4-3, which presents guidance from the NSW Coastal Management Manual on matching the level of economic assessment to project risk and complexity. As shown, conducting a detailed cost-benefit analysis (CBA) for options with minor costs and limited stakeholder impacts is generally not an effective use of resources. Instead, economic assessments should be scaled to match the nature and impact of the proposed action.

		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 investment (see Treasury Guideline 2017)	**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 4-3 Matrix of risk and complexity for selecting the level of economic assessment (source: OEH, 2018d)

In line with this guidance, Stage 3 of the CMP applied two levels of economic assessment:

- **Intermediate Level Economic Assessment**: Applied to options identified in Figure 4-3 as requiring either a Simple or Intermediate assessment. This level was used for the majority of options in the long list). The methodology for this assessment is outlined in Section 4.6.3.
- **Detailed Economic Cost-Benefit Analysis**: Used for high-risk and high-impact options where both costs and benefits could be reasonably estimated, and probabilistic coastal hazard mapping was available to inform such an assessment. This assessment included the calculation of a Benefit-Cost Ratio (BCR) for each applicable option (4 possible management options out of 188). The full methodology is provided in Appendix D, with a summary in Section 4.6.4.

Using these methods of assessment, each option was then given a Viability Score that was related to the forward 10-year lifecycle cost of the option. This process is described in Figure 4-4.

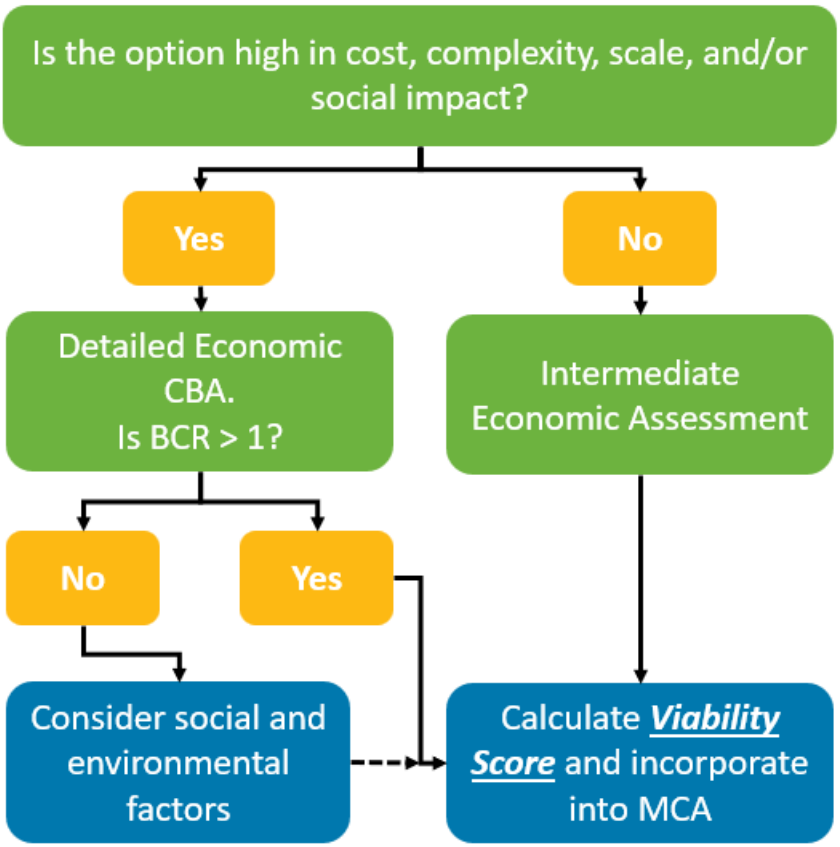

Figure 4-4 The viability assessment process

4.6.2 Calculation of Forward Lifecycle Costings

A key component of the economic assessment process was the calculation of the forward lifecycle costs of each potential option. Both levels of economic assessment evaluated the net present value (NPV) of costs and benefits. NPV is a standard method used in economic analysis to compare options that have time-variable costs and benefits. It allows future streams of costs or benefits to be discounted to reflect their value in today's dollars.

This approach reflects the time value of money - the principle that a dollar today is worth more than a dollar in the future, as it can be invested to yield a return. Accordingly, future expenses are, in effect, less costly than those incurred immediately. By adjusting all costs and benefits to present-day values, NPV enables a direct financial comparison between options. From this perspective, options with a lower NPV cost are considered more favourable from a financial standpoint.

The choice of discount rate is a critical factor in NPV-based economic assessments. The most contemporary NSW Government Guide to Cost-Benefit Analysis (NSW Treasury, 2023) at the time of this assessment recommends that economic appraisals should adopt a discount rate of 5% p.a., with sensitivity testing to be undertaken using a lower bound of 3% p.a., and an upper bound of 7% p.a. These values have been adopted for the economic assessment described herein.

It should be noted that the NSW Government *Guidelines for using cost-benefit analysis to assess coastal management options* (DPE, 2020), makes reference to now superseded treasury advice which previously recommended the use of a 7% p.a. discount rate, with sensitivity testing undertaken using a lower bound of 4% p.a., and an upper bound of 10% p.a. However, this assessment has been undertaken in accordance with

the most up-to-date guidance available from NSW Treasury (2023), to ensure consistency with current best practice.

4.6.3 Preliminary Economic Assessment

As part of the economic assessment, forward estimates have been prepared for the full capital, operational, and ongoing maintenance costs associated with each potential management option. These estimates were developed based on the following sources:

- Engagement with relevant stakeholders.
- Historical costs of capital works and environmental management programs, as recorded by each of the PCs.
- Industry standard guidelines, such as the *Rawlinsons Australian Construction Handbook 2024* (Rawlinsons, 2024), and the *Transport for NSW Economic Parameter Values* (Transport for NSW , 2020).
- Coastal engineering and coastal management experience of the project team.

For many options, cost estimates were derived using standard unit rates for various works, including earthworks, beach scraping, foreshore restoration, or infrastructure works such as construction of coastal protection works, and drainage infrastructure.

Forward costs have been projected over a 10-year planning period, which aligns with the intended implementation timeframe of the CMP. These costs were discounted to present-day (2025) dollars using a net present value (NPV) approach and a 5% per annum discount rate, as outlined in the NSW Treasury guidelines (NSW Treasury, 2023).

4.6.4 Detailed Cost-Benefit Analysis

CBA is a form of economic appraisal that can be used as a decision-support tool for coastal management to assess whether a particular management option will provide net benefits to the local community compared to other alternative developments or options which will achieve the same objectives. However, whilst the CBA is an important decision support tool, it is also important to understand that CBA alone is not intended as a definitive statement of option ranking, and all options have been considered in the broader options assessment context of feasibility and acceptability.

Options which will operate over relatively long timeframes, including engineering works with long design lives, are likely to generate potentially large costs and benefits. Subsequently, a detailed assessment of the costs and benefits of such large scale or long-lasting projects can provide a valuable contribution to CMP decision-making. The options for which a detailed CBA was undertaken are listed in Table 4-6. Note that for Option S6.CCC.16 – a detailed cost benefit analysis has previously been undertaken for that Ocean Beach Terminal Protection Structure.

A detailed description of the CBA for these options is provided in Appendix G, including the methodology, assumptions, and outcomes.

Table 4-6 Options for which a detailed CBA was carried out

ID	Location	Option Name
S6.SGA.01A	Station Beach	Station Beach Coastal Adaptation Option A: GSC Coastal Protection Works
S6.SGA.01B	Station Beach	Station Beach Coastal Adaptation Option B: Sand Redistribution and Dune Building
S6.SGA.01C	Station Beach	Station Beach Coastal Adaptation Option C: Relocation of Assets

ID	Location	Option Name
S6.CCC.28A	Pearl Beach	Pearl Beach Foreshore Resilience: Option A - Beach Scraping and Dune Building
S6.CCC.28B	Pearl Beach	Pearl Beach Foreshore Resilience: Option B - Coastal Protection Works

4.6.5 Viability Score

Following the estimation of each option's 10-year NPV cost, a Viability Score was calculated using the method detailed in Section 4.5. This score was based on the base-10 logarithm of the NPV cost, allowing for an order-of-magnitude cost weighting to be applied in the overall MCA. An example of how these scores is applied is presented in Table 4-7.

It should be noted that for some options, the primary cost incurred is associated with in kind staff time resourcing of the PCs, which was assigned a designation of "IKST" in the analysis summary in Appendix C. For such options, a Viability Score of 3 was applied.

The Viability Assessment scores for each option are provided in Appendix F.

Table 4-7 Viability score weighting for options

10-Year NPV cost of options	Viability Score
< $1,000 (or In-Kind resourcing)	3
$1,000 < $10,000	4
$10,000 < $100,000	5
$100,000 < $1,000,000	6
$1,000,000 < $10,000,000	7
> $10,000,000	8

4.7 Total Ranking Score

The output of the three-phase assessment described was the calculation of an *Options Ranking Score,* which was the arithmetic combination of the *Feasibility Score*, the *Viability Score*, and the *Acceptability Score*, as demonstrated in Figure 4-5.

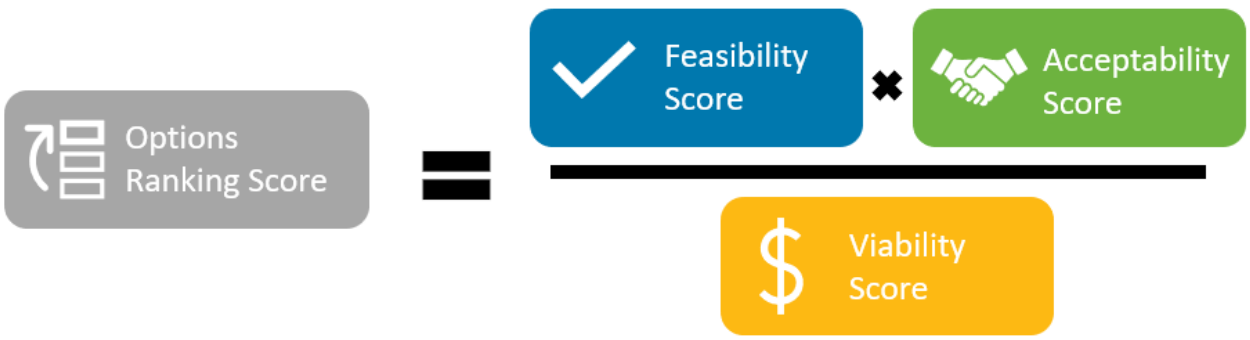

Figure 4-5 Calculation of the options ranking score

Each component of the Options Ranking Score provided a distinct perspective on the performance of an option:

- The **Total Feasibility Score** assessed the extent to which an option addressed the various risks across the study area - either directly or indirectly - and considered its social and environmental impacts.
- The **Acceptability Score** reflected the level of support for each option among local community members and key project stakeholders.
- The **Viability Score** captured the full life-cycle cost of each option and provided an indication of economic viability and value for money.

It is, however, acknowledged that the Options Ranking Score incorporates inherent subjectivity and uncertainty. As such, it should not be interpreted as a definitive or conclusive metric for determining which options proceed to the next stage. Some options may deliver additional qualitative or strategic benefits not easily captured through this assessment framework and may involve organisational, political, or social considerations that affect their overall favourability.

4.8 Options Assessment Outcomes

The summary of the outcomes of the assessment are provided in Table 4-8 and Table 4-9.

Ultimately, the number and nature of options progressing to Stage 4 will also be influenced by the budgetary and resource constraints of the PCs. Accordingly, the Options Ranking Score was considered a starting point for discussion with PCs - with the results to be interpreted alongside local knowledge and contextual understanding of environmental, economic, and social priorities.

Subsequently, a preliminary assessment of which options will progress through to the CMP has been undertaken through engagement with the PCs. Following targeted engagement with PCs, a preliminary status has been assigned to each option in Table 4-9:

- Yes Stage 4 – for options that will progress through to Stage 4 of the CMP
- Continued Engagement – for option that require ongoing discussion to determine where or not they will progress through to Stage 4.
- No - Drop Out – for options that will not progress through to the CMP.

In general, the options that dropped out were those with the lowest Options Ranking Scores within a given Implementation Plan. However, in some cases, options were not progressed because they:

- Were considered “business as usual” activities already covered by Council operations;
- Fell within the remit of other frameworks, such as the NSW Floodplain Risk Management Framework; or
- Aligned more closely with alternative strategies, such as Council open space strategies or asset management plans.

This staged, collaborative approach ensures that the final suite of CMP actions is both strategically targeted and realistically deliverable.

Of the 188 long-listed options, 147 have been assessed as progressing to Stage 4, while 25 will not proceed further. An additional 16 options have been flagged for further discussion through continued engagement following the delivery of the First Draft Stage 3 Report.

Table 4-8 Summary of Options Progressing to Stage 4

CMP Sub-Plan	Total Number of Actions	Yes - Stage 4	No - Drop Out	Continued Engagement
River-wide Implementation Plan	46	34	1	11
Local Implementation Plan: Central Coast Council	62	46	14	2
Local Implementation Plan: Northern Beaches Council	24	24	0	0
Local Implementation Plan: Ku-ring-gai Council	3	3	0	0
Local Implementation Plan: Hornsby Shire Council	23	17	3	3
Local Implementation Plan: The Hills Shire Council	8	5	3	0
Local Implementation Plan: Hawkesbury City Council	14	13	1	0
NPWS Implementation Plan	8	5	3	0
Total	***188***	***147***	***25***	***16***

Table 4-9 Options Assessment Outcomes

ID	Action Name	Accept. Score	Feasibility Score	Viability Score	Option Ranking Score	Proceed to Stage 4 of CMP?
S1.CMP.01	Implement the CMPs formal governance partnership for the river system	0.95	90	6.1	14.1	Yes - Stage 4
S1.CMP.02	Develop and execute a communications plan for Stage 5 of the CMP	1.00	18	2.0	9.0	Yes - Stage 4
S2.CMP.01	Design and implement an integrated and coordinated water quality monitoring program	0.98	78	5.3	14.4	Yes - Stage 4
S2.CMP.02	Implement a bank stability and condition monitoring program across the estuary foreshores	0.95	63	5.4	11.2	Yes - Stage 4
S2.CMP.03	Implement a bank stability and condition monitoring program across the creeks and waterways of the catchment	1.00	54	5.4	10.0	Yes - Stage 4
S2.CMP.04	Undertake periodic surveys of the River in between Wisemans Ferry and Richmond	1.00	12	5.0	2.4	Continued Engagement
S3.CMP.01	Review and update Partner Council planning instruments to ensure a consistent best practice approach to managing stormwater and downstream estuarine water quality	0.92	96	4.8	18.5	Yes - Stage 4
S3.CMP.02	Review and update coastal hazard risk planning controls every 10 years	0.83	84	2.0	34.8	Yes - Stage 4
S3.CMP.03	Encourage eco-friendly features in seawall development applications	0.82	30	2.0	12.3	Yes - Stage 4
S3.CMP.04	Undertake a Hawkesbury River System Blue Carbon Scoping Study	0.82	39	4.9	6.5	Continued Engagement
S3.CMP.05	Prepare a Hawkesbury River Coastal Wetland Sea Level Rise Adaptation Strategy	0.95	66	4.8	13.0	Continued Engagement
S3.CMP.06	Develop Foreshore Stabilisation and Rehabilitation Guidelines for the HNRS	1.00	66	4.5	14.7	Yes - Stage 4
S3.CMP.07	Support the proposal for the development of the Ku-ring-gai GeoRegion	1.00	24	2.0	12.0	Yes - Stage 4
S4.CMP.01	Design and Implement a Community Engagement and Education Program to support the vision and objectives of the CMP	0.95	54	5.6	9.2	Yes - Stage 4

ID	Action Name	Accept. Score	Feasibility Score	Viability Score	Option Ranking Score	Proceed to Stage 4 of CMP?
S4.CMP.02	Develop an education package for recreational boaters	1.00	27	4.4	6.1	Continued Engagement
S4.CMP.03	Community education and outreach program for estuary frontage communities	0.94	36	5.3	6.4	Yes - Stage 4
S4.CMP.04	Develop and implement a Hawkesbury River school environmental education program focused on water quality, estuary health, and coastal hazards	0.95	42	2.0	19.9	Yes - Stage 4
S4.CMP.05	Implementing a community-based carp fishing initiative	1.00	24	5.2	4.6	Yes - Stage 4
S4.CMP.05	Hawkesbury River Marine Compliance & Education Campaign	1.00	45	5.2	8.6	Yes - Stage 4
S5.CMP.01	Prepare a Litter Prevention Strategy for the Hawkesbury River System	0.93	15	5.0	2.8	No - Drop Out
S5.CMP.02	Identify opportunities to retrofit existing public seawalls with eco-friendly features	1.00	18	2.0	9.0	Yes - Stage 4
S5.CMP.03	Investigate opportunities to increase uptake of environmentally friendly moorings (EFM) across the lower estuary	0.91	21	2.0	9.6	Continued Engagement
S5.CMP.05	Undertake a coordinated riparian rehabilitation works program across the River System	0.94	48	6.2	7.2	Yes - Stage 4
S5.CMP.06	Continue to support Floating Landcare (and other relevant Landcare networks) across the river system	0.98	48	5.4	8.7	Yes - Stage 4
S5.CMP.07	Develop a strategy for managing vessel pumpouts across the Hawkesbury River System	0.98	93	5.3	17.1	Yes - Stage 4
S5.CMP.08	Engage with government and the community to reduce the impacts of liveaboards (and associated discharges) on the waterways	0.89	39	5.3	6.6	Continued Engagement
S5.CMP.09	Support the NSW Government's breeding and release program for the endangered White's Seahorse	0.98	40	2.0	19.5	Continued Engagement
S5.CMP.10	Coordination and resource sharing for inspection of OSMS at key river settlements	0.95	46	2.0	21.8	Yes - Stage 4
S5.CMP.11	Fencing of riparian foreshores on high risk agricultural lands	0.95	45	5.9	7.2	Yes - Stage 4
S5.CMP.12	Undertake a coordinated creek rehabilitation works program across the Partner Council's upper catchment waterways	1.00	57	5.9	9.6	Yes - Stage 4
S6.CMP.01	Activate the "Coastal Hazard Emergency Action Sub-Plans" (CZEAS) for each beach as required after storm events	1.00	52	5.9	8.8	Yes - Stage 4
S6.CMP.02	Riverine bank erosion recovery works after erosion events	0.94	78	6.2	11.8	Yes - Stage 4
S6.CMP.03	Develop a Tide Alert Calendar Tool for the low lying communities of the river system to encourage citizen science in monitoring tidal inundation	1.00	45	5.4	8.4	Yes - Stage 4
S7.CMP.01	Develop a Hawkesbury-Nepean River Maritime Infrastructure Strategy	0.95	69	4.9	13.4	Yes - Stage 4
S7.CMP.02	Undertake a trial of webcams at high usage boat ramps	0.97	27	5.1	5.2	Yes - Stage 4
S7.CMP.03	Undertake a feasibility investigation for the Great Hawkesbury Walk -	0.85	10	4.5	1.9	Continued Engagement

ID	Action Name	Accept. Score	Feasibility Score	Viability Score	Option Ranking Score	Proceed to Stage 4 of CMP?
	connecting Penrith to Brooklyn via Wisemans Ferry					
S7.CMP.03	Update and Extend the Upper Hawkesbury River Dredging Investigations	1.00	18	4.9	3.7	Continued Engagement
S8.CMP.01	Engage First Nations teams where appropriate to undertake bush regeneration works including weeding and revegetation	0.86	36	5.6	5.6	Yes - Stage 4
S8.CMP.02	Further develop and implement community education programs for awareness and appreciation of Indigenous cultural heritage	0.85	30	5.6	4.5	Yes - Stage 4
S8.CMP.03	Support cultural education and awareness of estuary health issues for First Nations Groups	0.78	30	5.2	4.5	Yes - Stage 4
S8.CMP.04	Prepare a heritage tourism strategy and plan for the Hawkesbury River System	0.80	18	4.8	3.0	Continued Engagement
S8.CMP.05	Develop a Hawkesbury heritage central display	0.87	8	4.2	1.7	Continued Engagement
S8.CMP.06	Identify opportunities for, and undertake cultural land management practices, including cultural burning	0.87	36	5.6	5.6	Yes - Stage 4
S8.CMP.07	Engage with local First Nations Groups to protect and preserve cultural heritage items across the coastal zone	0.88	48	5.2	8.1	Yes - Stage 4
S9.CMP.01	Collaborate with local universities and research institutions to establish a list of research priorities for the Hawkesbury-Nepean River System	0.92	54	2.0	24.9	Yes - Stage 4
S9.CMP.02	Establish information sharing and reporting protocols for the identification of pest species	0.97	24	2.0	11.7	Yes - Stage 4
S3.THC.01	Coastal Wetland Mapping Update	1.00	8	4.5	1.8	No - Drop Out
S6.THC.01	Implement the outcomes of the Blundells Swamp Inundation Mitigation Study	1.00	21	4.7	4.4	Yes - Stage 4
S6.THC.02	Inundation and Drainage Study at Michael Duggan Reserve	1.00	9	4.7	1.9	No - Drop Out
S6.THC.03	Lambs Creek Inundation and Drainage Study	1.00	13	4.7	2.7	No - Drop Out
S6.THC.04	Erosion remediation at Wisemans Ferry	1.00	11	5.4	2.1	Yes - Stage 4
S6.THC.05	Erosion Remediation at Webbs Creek Ferry Foreshore	1.00	24	5.2	4.6	Yes - Stage 4
S6.THC.05	Erosion investigation and design at River Road, Leets Vale	1.00	16	4.7	3.4	Yes - Stage 4
S6.THC.06	Erosion remediation at River Road, Lower Portland	1.00	20	4.8	4.1	Yes - Stage 4
S2.NBC.01	Install a CoastSnap Camera Cradles at strategic locations across the LGA foreshore	1.00	20	4.9	4.1	Yes - Stage 4
S2.NBC.02	Implement a Pittwater Beach Monitoring Program	0.98	24	5.2	4.5	Yes - Stage 4
S2.NBC.03	Install permanent tide gauges at strategic locations around the waterway	1.00	16	4.6	3.5	Yes - Stage 4
S2.NBC.04	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	1.00	40	2.0	20.0	Yes - Stage 4

ID	Action Name	Accept. Score	Feasibility Score	Viability Score	Option Ranking Score	Proceed to Stage 4 of CMP?
S3.NBC.02	Develop and update coastal hazard information	1.00	32	4.7	6.8	Yes - Stage 4
S3.NBC.03	Update planning certificates with coastal hazard information	1.00	32	2.0	16.0	Yes - Stage 4
S3.NBC.04	Develop planning controls to ensure buildings are sited and designed to consider coastal hazard information including coastal erosion and estuarine inundation.	1.00	32	2.0	16.0	Yes - Stage 4
S3.NBC.04	Long Term Adaptation Plan for Coastal Assets and Infrastructure	1.00	44	5.2	8.5	Yes - Stage 4
S5.NBC.01	Investigate the feasibility of naturalisation of Careel Creek	1.00	13	4.8	2.7	Yes - Stage 4
S5.NBC.02	Upgrade the Careel Bay litter trap	1.00	24	5.2	4.6	Yes - Stage 4
S5.NBC.03	Investigate WSUD solutions within the Careel Creek Drainage catchment.	1.00	21	4.7	4.5	Yes - Stage 4
S6.NBC.01	Foreshore naturalisation and restoration works at Station Beach	1.00	16	5.2	3.1	Yes - Stage 4
S6.NBC.02	Beach scraping and sand redistribution works at the western end of Sand Point Beach	1.00	16	5.1	3.1	Yes - Stage 4
S6.NBC.03	Foreshore naturalisation and restoration works along Sand Point Beach	0.75	17	4.9	2.6	Yes - Stage 4
S6.NBC.04	Great Mackerel Beach Foreshore Master Plan	1.00	27	5.5	4.9	Yes - Stage 4
S6.NBC.05	Foreshore naturalisation and restoration works at Currawong Beach	1.00	19	5.0	3.8	Yes - Stage 4
S6.NBC.06	Foreshore naturalisation and restoration works at Clareville Beach Reserve	1.00	11	4.8	2.3	Yes - Stage 4
S6.NBC.07	Foreshore naturalisation and restoration works at Bayview Park foreshore	1.00	14	4.5	3.1	Yes - Stage 4
S6.NBC.08	Coastal hazard resilience for both built and natural asset owners	1.00	16	2.0	8.0	Yes - Stage 4
S6.NBC.12	Pittwater dredging and beach nourishment feasibility investigation and implementation	0.94	24	4.9	4.6	Yes - Stage 4
S6.NBC.13	Investigate the feasibility of channel maintenance works within Careel Bay and Careel Creek	1.00	16	5.2	3.1	Yes - Stage 4
S7.NBC.01	Upgrade and repair of waterway access points	0.95	40	5.9	6.4	Yes - Stage 4
S7.NBC.06	Boat Ramp Upgrade	1.00	18	5.0	3.6	Yes - Stage 4
S9.NBC.01	Pittwater Wave Climate Study	1.00	32	4.9	6.5	Yes - Stage 4
S4.KRG.01	Support Community Engagement undertaken as part of the Ku-ring-gai Council – Water Sensitive City Strategy	1.00	16	5.2	3.1	Yes - Stage 4
S5.KRG.01	Prepare and implement a catchment study and management plan for the Cowan Creek catchment	1.00	12	4.8	2.5	Yes - Stage 4
S5.KRG.02	Update the catchment studies for Ku-ring-gai Creek and Lovers Jump Creek	1.00	12	4.7	2.6	Yes - Stage 4
S2.HSC.01	Install a permanent tide gauge at Berowra Waters	0.80	5	4.3	0.9	No - Drop Out
S2.HSC.02	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	1.00	40	2.0	20.0	No - Drop Out

ID	Action Name	Accept. Score	Feasibility Score	Viability Score	Option Ranking Score	Proceed to Stage 4 of CMP?
S5.HSC.01	Installation of Stormwater Quality Improvement Devices at Parsley Bay	1.00	19	5.5	3.5	Yes - Stage 4
S5.HSC.02	Installation of Stormwater Quality Improvement Devices at The Gateway	1.00	19	5.5	3.5	Yes - Stage 4
S5.HSC.03	Installation and upgrade of Stormwater Quality Improvement Devices at Brooklyn Park	1.00	19	5.5	3.5	Yes - Stage 4
S6.HSC.01	Repair and Renewal of the Parsley Bay Breakwater	1.00	19	6.2	3.1	Yes - Stage 4
S6.HSC.02	Repair and renewal of seawall protecting loading dock access road	1.00	21	5.9	3.6	Yes - Stage 4
S6.HSC.03	Sea Level Rise adaptation for Brooklyn Road	1.00	10	6.5	1.5	Yes - Stage 4
S6.HSC.04	Wharf Street Foreshore Improvement Works	1.00	16	5.3	3.0	Yes - Stage 4
S6.HSC.05	Repair and renewal of seawall at the base of the Bar Island jetty	1.00	13	5.1	2.6	Yes - Stage 4
S6.HSC.06	Bradleys Beach Foreshore Restoration works	1.00	11	4.8	2.3	Yes - Stage 4
S6.HSC.07	Repair and renewal of seawall from Brooklyn to Parsley Bay	1.00	12	5.9	2.0	Yes - Stage 4
S7.HSC.01	Develop Infrastructure strategy for the Lower Hawkesbury	1.00	44	4.8	9.1	No - Drop Out
S7.HSC.02	Parsley Bay Loading Dock Upgrade	1.00	22	5.4	4.1	Yes - Stage 4
S7.HSC.03	Parsley Bay Dredging Feasibility Study	1.00	9	4.7	1.9	Continued Engagement
S7.HSC.04	Upgrade of Kangaroo Point Pumpout Pontoon	1.00	9	5.3	1.7	Continued Engagement
S7.HSC.05	Upgrade of McKell Park Tidal Pool	1.00	11	5.4	2.0	Yes - Stage 4
S7.HSC.06	Upgrade of public pontoons at Parsley Bay	1.00	15	5.2	2.9	Yes - Stage 4
S7.HSC.07	Dangar Island Loading Dock Upgrade	1.00	22	5.5	4.0	Yes - Stage 4
S7.HSC.08	Upgrade of the Wisemans Ferry old public wharf	1.00	19	5.2	3.7	Yes - Stage 4
S7.HSC.09	Sandbrook Inlet Dredging Feasibility Study	1.00	15	4.8	3.1	Continued Engagement
S7.HSC.10	Bayden Powell Avenue Dinghy and Foreshore Access improvement	1.00	12	4.9	2.4	Yes - Stage 4
S7.HSC.11	Design and install boardwalk from Brooklyn Public Wharf to Lower McKell Park	1.00	11	5.5	2.0	Yes - Stage 4
S3.HCC.01	Write a specific WSUD chapter in Hawkesbury City Council DCP	1.00	46	2.0	23.0	Yes - Stage 4
S3.HCC.02	Undertake a review and update of the Council OSSM policy.	1.00	46	2.0	23.0	Yes - Stage 4
S3.HCC.03	Environmental Conservation zoning for coastal wetland areas	1.00	44	2.0	22.0	Yes - Stage 4
S4.HCC.01	Establish an environmental program for the Turf Farmers across the Hawkesbury LGA	1.00	52	5.3	9.8	Yes - Stage 4
S5.HCC.01	Incentivising private landowners to undertake best practice management of their riparian zones	1.00	44	2.0	22.0	Yes - Stage 4
S5.HCC.02	Continue Council's Yabby Trap Round-Up Program	1.00	14	5.2	2.7	Yes - Stage 4
S5.HCC.03	Implement the recommendations of the Hawkesbury Floodplain Drainage Review	1.00	38	5.6	6.8	Yes - Stage 4
S6.HCC.01	Sea Level Rise adaptation for the local road network along the Colo River, Webbs Creek, and The Macdonald River	1.00	16	6.8	2.3	No - Drop Out

ID	Action Name	Accept. Score	Feasibility Score	Viability Score	Option Ranking Score	Proceed to Stage 4 of CMP?
S6.HCC.02	Bank Erosion Remediation at Holmes Drive Reserve	1.00	20	5.5	3.7	Yes - Stage 4
S6.HCC.03	Erosion remediation at Churchills Wharf Reserve	1.00	25	5.5	4.6	Yes - Stage 4
S6.HCC.04	Relocation of Utilities Infrastructure at Argyle Bailey Memorial Reserve	1.00	20	2.0	10.0	Yes - Stage 4
S6.HCC.05	Bank Erosion Remediation Design: The Terrace, Windsor	1.00	24	5.2	4.6	Yes - Stage 4
S6.HCC.06	Bank Erosion Remediation Works at Governor Phillip Park	1.00	25	4.9	5.1	Yes - Stage 4
S7.HCC.01	Upgrade the Punt Road Public Boat Ramp	1.00	16	5.2	3.1	Yes - Stage 4
S2.CCC.01	Coastal dynamics monitoring program	1.00	48	5.3	9.0	Yes - Stage 4
S2.CCC.02	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	1.00	40	2.0	20.0	Yes - Stage 4
S2.CCC.03	Install permanent water level gauges at key locations within Brisbane Water and Broken Bay	1.00	38	4.8	8.0	Yes - Stage 4
S3.CCC.01	Environmental Conservation zoning for coastal wetland areas	1.00	40	2.0	20.0	Yes - Stage 4
S3.CCC.02	Implement the Hardys Bay Foreshore Master Plan	1.00	25	5.7	4.4	Yes - Stage 4
S3.CCC.03	Implement the Phegans Bay Waterfront Foreshore Master Plan	1.00	27	5.7	4.7	Yes - Stage 4
S3.CCC.04	Update RH SEPP Coastal Wetlands and Littoral Rainforest Mapping for the LGA	1.00	44	2.0	22.0	Yes - Stage 4
S3.CCC.05	Review and update Council's Development Control Plan	1.00	72	2.0	36.0	Yes - Stage 4
S3.CCC.06	Compliance auditing of private development encroachment onto public land	1.00	24	2.0	12.0	Yes - Stage 4
S3.CCC.07	Investigate opportunities to purchase saltmarsh areas for incorporation into Council's reserve system.	1.00	26	2.0	13.0	Yes - Stage 4
S5.CCC.01	Water Quality Improvement Plan for Brisbane Water	1.00	62	5.4	11.5	Yes - Stage 4
S5.CCC.04	Undertake a sedimentation study for major creek outlets	1.00	16	4.9	3.3	No - Drop Out
S5.CCC.05	Investigate the feasibility of Naturalisation of the Austin Butler Drainage Channel	1.00	6	4.6	1.3	No - Drop Out
S5.CCC.06	Implement a wetland monitoring, management and restoration program	1.00	52	4.5	11.4	Yes - Stage 4
S5.CCC.07	Green and Golden Bell Frog Key Population Management Plan	1.00	32	4.4	7.3	Yes - Stage 4
S6.CCC.01	Implement foreshore restoration and stabilisation works at Bayside Drive Reserve	1.00	20	6.2	3.2	Yes - Stage 4
S6.CCC.02	Implement foreshore restoration and stabilisation works at Edgewater Avenue Reserve	1.00	20	6.4	3.1	Yes - Stage 4
S6.CCC.03	Implement foreshore restoration and stabilisation works at Pretty Beach Road	1.00	21	6.3	3.3	Yes - Stage 4
S6.CCC.04	Implement foreshore restoration and stabilisation works at Lara Street	1.00	19	6.4	3.0	Yes - Stage 4
S6.CCC.05	Implement foreshore restoration and stabilisation works at the Woy Woy waterfront	1.00	18	6.5	2.8	No - Drop Out

ID	Action Name	Accept. Score	Feasibility Score	Viability Score	Option Ranking Score	Proceed to Stage 4 of CMP?
S6.CCC.06	Implement foreshore restoration and stabilisation works at Araluen Drive Reserve	1.00	26	6.1	4.3	Yes - Stage 4
S6.CCC.07	Implement foreshore restoration and stabilisation works at Palermo Reserve	1.00	9	5.7	1.6	No - Drop Out
S6.CCC.08	Implement foreshore restoration and stabilisation works at Illoura Reserve	1.00	11	5.9	1.8	Yes - Stage 4
S6.CCC.09	Implement foreshore restoration and stabilisation works at the Point Clare waterfront	1.00	10	5.4	1.9	No - Drop Out
S6.CCC.10	Repair and renewal of the Lance Webb Reserve Seawall	0.92	23	6.5	3.2	Yes - Stage 4
S6.CCC.11	Implement construction of the foreshore stabilisation works near Rip Road Reserve.	1.00	22	5.8	3.8	Yes - Stage 4
S6.CCC.12	Tidal inundation stormwater audit and adaptation investigation	1.00	15	4.8	3.1	No - Drop Out
S6.CCC.13	Sea Level Rise adaptation for Wisemans Ferry Road	1.00	11	7.2	1.5	No - Drop Out
S6.CCC.14	Develop and Implement a Beach Maintenance Program.	0.97	66	5.7	11.3	Yes - Stage 4
S6.CCC.15	Develop and implement a coastal vegetation and dune management strategy	1.00	50	5.5	9.2	Yes - Stage 4
S6.CCC.16	Implement the Umina-Ocean Beach Erosion Management Strategy	0.97	21	7.3	2.8	Yes - Stage 4
S6.CCC.17	Prepare and Implement a Broken Bay Beach Nourishment Framework	1.00	48	5.2	9.2	Yes - Stage 4
S6.CCC.18	Management of stormwater outlets on beaches	1.00	26	2.0	13.0	Yes - Stage 4
S6.CCC.19	Patonga Sand Management Plan	1.00	20	4.9	4.1	Yes - Stage 4
S6.CCC.20	Patonga Levee Feasibility Investigation and Design	1.00	18	4.8	3.7	Yes - Stage 4
S6.CCC.21	Implement recommendations from Gosford Lagoons & Creek Entrance Management Review (Salients 2017) for Green Point Creek, Pearl Beach Lagoon and Ettalong Creek.	1.00	20	2.0	10.0	Yes - Stage 4
S6.CCC.22	Repair and renewal of Patonga Seawall	1.00	20	5.7	3.5	Yes - Stage 4
S6.CCC.23	Investigate the potential inclusion of RSL Creek and Mudflat Creek in the Central Coast Council Priority Creek Program	1.00	10	2.0	5.0	Yes - Stage 4
S6.CCC.24	Implement foreshore restoration and stabilisation works at the Hardys Bay extension wharf	1.00	20	5.6	3.6	Yes - Stage 4
S6.CCC.25	Repair and renewal of the Patonga Creek Training Wall	1.00	14	5.9	2.4	No - Drop Out
S6.CCC.26	Repair and renewal of the Patonga Creek foreshore protection works	1.00	14	5.5	2.6	Yes - Stage 4
S6.CCC.27	Implement foreshore restoration and stabilisation works at Wagstaffe Wharf	1.00	20	5.2	3.9	Yes - Stage 4
S6.CCC.28A	Pearl Beach Foreshore Resilience: Option A - Beach Scraping and Dune Building	1.00	20	4.7	4.3	Yes - Stage 4
S6.CCC.28B	Pearl Beach Foreshore Resilience: Option B - Coastal Protection Works	1.00	18	6.5	2.8	No - Drop Out
S6.CCC.29	Pearl Beach Lagoon Erosion Management Investigation	1.00	13	4.3	3.0	No - Drop Out
S6.CCC.29	Ettalong Beach Foreshore Stabilisation Investigation	1.00	12	4.8	2.5	Yes - Stage 4

ID	Action Name	Accept. Score	Feasibility Score	Viability Score	Option Ranking Score	Proceed to Stage 4 of CMP?
S6.CCC.30	Implement foreshore restoration and stabilisation works at Phegans Bay Road	1.00	24	6.1	3.9	Yes - Stage 4
S7.CCC.01	Construction of an all-abilities beach access point at Ocean Beach SLSC	1.00	14	4.3	3.3	Yes - Stage 4
S7.CCC.02	Support the Gosford Foreshore Masterplan	1.00	12	2.0	6.0	Yes - Stage 4
S7.CCC.03	Develop and implement a foreshore masterplan for Patonga Creek	1.00	19	5.4	3.5	Yes - Stage 4
S7.CCC.04	Strategic assessment of SLSC patrol towers	1.00	24	2.0	12.0	Yes - Stage 4
S7.CCC.05	Review of coastal zone waste facilities and collection	1.00	22	2.0	11.0	Yes - Stage 4
S7.CCC.06	Increase foreshore connectivity between Hardys Bay and Fishermans Point	1.00	5	6.4	0.8	No - Drop Out
S7.CCC.07	Prepare Central Coast Council Dinghy Management Plan	1.00	9	2.0	4.5	Yes - Stage 4
S7.CCC.08	Feasibility Investigation: Ambulant Access at Pearl Beach Rock Pool Access	1.00	16	2.0	8.0	Yes - Stage 4
S7.CCC.09	Develop and implement a foreshore masterplan for Pearl Beach	1.00	11	5.2	2.1	No - Drop Out
S7.CCC.10	Feasibility Investigation: Increase foreshore connectivity between Phegans Bay and Woy Woy	1.00	10	4.4	2.3	No - Drop Out
S7.CCC.12	Develop and implement a foreshore masterplan for Spencer	1.00	16	5.6	2.9	Continued Engagement
S7.CCC.13	Feasibility Investigation: Reinstating Umina Point foreshore connection	1.00	5	4.4	1.1	No - Drop Out
S7.CCC.14	Undertake strategic upgrades of Council owned boat ramps in Brisbane Water	1.00	34	5.8	5.9	Yes - Stage 4
S7.CCC.15	Implement the St Huberts Island Canals maintenance program	1.00	12	4.7	2.6	Yes - Stage 4
S8.CCC.01	Identify the location and condition of ship wrecks near the old bar via a maritime archaeological survey.	1.00	8	4.7	1.7	Continued Engagement
S6.SGA.01A	Station Beach Coastal Adaptation Option A: GSC Coastal Protection Works	1.00	5	5.7	0.9	No - Drop Out
S6.SGA.01B	Station Beach Coastal Adaptation Option B: Sand Redistribution and Dune Building	1.00	14	4.6	3.0	Yes - Stage 4
S6.SGA.01C	Station Beach Coastal Adaptation Option C: Relocation of Assets	1.00	5	5.3	0.9	No - Drop Out
S6.SGA.02A	West Basin Coastal Adaptation Option A: GSC Coastal Protection Works	1.00	5	6.0	0.8	No - Drop Out
S6.SGA.02B	West Basin Foreshore Coastal Protection Option B: Sand Redistribution Program	1.00	13	4.9	2.7	Yes - Stage 4
S6.SGA.03	Eastern Foreshore Beach Nourishment	1.00	16	4.4	3.6	Yes - Stage 4
S6.SGA.04	Seawall Monitoring	1.00	12	2.0	6.0	Yes - Stage 4
S6.SGA.05	Investigate Sea Level Rise Adaptation of Bobbin Head Foreshore	1.00	24	4.8	5.0	Yes - Stage 4

5 STEP 4: BUSINESS PLAN

5.1 The Benefits of Implementing the CMP

The HNRS is one of the Greater Sydney and Central Coast's most significant environmental, social, and economic assets. The river system supports high environmental values and plays a vital role in the social and cultural wellbeing of surrounding communities.

The Stage 1 Scoping Study (Water Technology, 2020) identified the river system as a major contributor to the regional economy through various channels, including:

- An estimated $1 billion per annum in ecosystem services (high-level estimate)
- Approximately $270 million in the replacement value of fixed foreshore assets
- Around $45 million per annum in tourism and domestic day trips
- Approximately $5 million per annum in direct value from commercial fishing and aquaculture
- An estimated $500 million per annum in agriculture value within the PC LGAs.

However, a range of threats and stressors identified in this CMP pose risks to the river system's environmental, social, and economic values. These pressures are expected to intensify over coming decades due to climate change, population growth, and urban development.

The core objective of this CMP is to identify, address, and mitigate these threats - both now and into the future - through a long-term, coordinated strategy for the management of the river system and its broader coastal zone. The CMP encompasses a diverse suite of actions, including physical works, monitoring programs, technical studies, and education and engagement initiatives.

Investment in the CMP presents an opportunity to strengthen and protect the region's natural hazard resilience, water quality, environmental habitats, cultural values, and recreational amenity, delivering broad public benefits.

This business plan focuses on mitigating coastal risks in the public interest, recognising the diverse settings, pressures, and priorities across the HNRS. As such, the plan does not allocate costs to private beneficiaries, but rather focuses on public good outcomes across the catchment.

5.2 Costs of CMP Implementation

The cost breakdown structure of the CMP is provided in Table 5-1 to Table 5-3, and provides a detailed overview of how funding is distributed across councils, implementation plans, and strategic focus areas. These tables outline the estimated delivery costs for all proposed CMP Actions. Of the total, approximately $67.5 million (NPV) has been allocated to actions progressing to Stage 4 of the CMP. This investment is planned over a 10-year period, equating to an indicative average of $1 million per council per year. Considering the two-thirds funding eligibility under the Coast and Estuary Grant Program, the average net contribution from each council could be closer to $330,000 per year. While these figures assume an even distribution of funding across partner councils for illustrative purposes, potential cost-sharing models are discussed in Section 5.4.

Approximately $35.5 million worth of actions have been identified as not progressing at this stage, with an additional $1.4 million flagged for continued engagement before final determination. The costed Stage 4 actions are further broken down by CMP status (Certifiable CMP vs. Catchment Companion) and by CMP Strategy—such as coastal hazard resilience, estuary and waterway health, monitoring and evaluation, and social and recreational amenity. This strategic breakdown supports partner councils and state agencies in aligning funding with priority outcomes and investment planning.

Table 5-1 Total 10 Year NPV cost of CMP actions – broken down by Implementation Plan and Status

CMP Sub-Plan	Total Number of Actions	Yes - Stage 4	No - Drop Out	To be discussed
River-wide Implementation Plan	$11,747,325	$10,999,629	$90,000	$657,696
Local Implementation Plan: Central Coast Council	$68,828,915	$41,486,364	$26,892,551	$450,000
Local Implementation Plan: Northern Beaches Council	$2,870,633	$2,870,633	$0	$0
Local Implementation Plan: Ku-ring-gai Council	$272,156	$272,156	$0	$0
Local Implementation Plan: Hornsby Shire Council	$9,766,313	$9,371,313	$85,000	$310,000
Local Implementation Plan: The Hills Shire Council	$697,770	$552,770	$145,000	$0
Local Implementation Plan: Hawkesbury City Council	$8,340,194	$1,740,194	$6,600,000	$0
NPWS Implementation Plan	$1,930,909	$201,048	$1,729,861	$0
Total	***$ 104,454,214***	***$ 67,494,107***	***$ 35,542,412***	***$ 1,417,696***

Table 5-2 Total 10 Year NPV cost of CMP actions – broken down by Implementation Plan and CMP Status (for Actions flagged as progressing to Stage 4)

CMP Sub-Plan	Certifiable CMP	Catchment Companion
River-wide Implementation Plan	$9,945,612	$1,054,017
Local Implementation Plan: Central Coast Council	$41,486,364	$0
Local Implementation Plan: Northern Beaches Council	$2,825,633	$45,000
Local Implementation Plan: Ku-ring-gai Council	$0	$272,156
Local Implementation Plan: Hornsby Shire Council	$9,371,313	$0
Local Implementation Plan: The Hills Shire Council	$552,770	$0
Local Implementation Plan: Hawkesbury City Council	$1,334,803	$405,391
NPWS Implementation Plan	$201,048	$0
Total	***$65,717,543***	***$1,776,564***

Table 5-3 Total 10 Year NPV cost of CMP actions – broken down by Implementation Plan and Strategy (for Actions flagged as progressing to Stage 4)

CMP Sub-Plan	Strategy 1: Governance and Program Delivery	Strategy 2: Monitoring, Evaluation, and Reporting	Strategy 3: Resilience, Planning, and Adaptation	Strategy 4: Community & Stakeholder Engagement	Strategy 5: Estuary & Waterway Health	Strategy 6: Coastal Hazard Resilience	Strategy 7: Social and Recreational Amenity	Strategy 8: Cultural Heritage Protection	Strategy 9: Innovation, Research & Knowledge Sharing
River-wide Implementation Plan	$1,216,173	$678,626	$90,000	$932,399	$3,693,520	$2,674,503	$201,078	$1,513,330	$0
Local Implementation Plan: Central Coast Council	$0	$262,696	$1,000,000	$0	$310,000	$38,976,841	$936,828	$0	$0
Local Implementation Plan: Northern Beaches Council	$0	$283,235	$200,000	$0	$271,078	$1,125,538	$910,782	$0	$80,000
Local Implementation Plan: Ku-ring-gai Council	$0	$0	$0	$162,156	$110,000	$0	$0	$0	$0
Local Implementation Plan: Hornsby Shire Council	$0	$0	$0	$0	$960,000	$6,861,313	$1,550,000	$0	$0
Local Implementation Plan: The Hills Shire Council	$0	$0	$0	$0	$0	$552,770	$0	$0	$0
Local Implementation Plan: Hawkesbury City Council	$0	$0	$0	$202,696	$567,548	$819,951	$150,000	$0	$0
NPWS Implementation Plan	$0	$0	$0	$0	$0	$201,048	$0	$0	$0
Total	**$1,216,173**	**$1,224,556**	**$1,290,000**	**$1,297,251**	**$5,912,145**	**$51,211,963**	**$3,748,688**	**$1,513,330**	**$80,000**

5.3 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.

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 the PC's operational budgets, competitive State Government grant programs, and local third parties.

5.3.1 Council Funding

Funding for the PCs is allocated based on their respective Resource Strategies and Long Term Financial Plan, which supports the Delivery Program (4-yearly) and the Operational Plan (yearly) under the NSW Integrated Planning and Reporting (IP&R) Framework.

Key funding sources for the PCs 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. The estimated annual revenue from ordinary rates and annual charges is provided in Table 5-4– based on information provided from the PCs publicly reported financial statements.

Table 5-4 Estimated annual revenue for the Partner Councils from rates and annual charges

Partner Council	Estimated Annual Revenue from Rates ($ million)	Source
Hawkesbury City Council	$ 77.2	HCC Financial Statement – FY 23/24
The Hills Shire Council	$128.7	THSC Financial Statement – FY 23/24
Hornsby Shire Council	$116.6	HSC Financial Statement – FY 23/24
Ku-ring-gai Council	$98.3	KC Financial Statement – FY 23/24
Northern Beaches Council	$246.4	NBC Financial Statement – FY 23/24
Central Coast Council	$421.5	CCC Financial Statement – FY 23/24
Total	**$1.1 billion**	

Together, the PCs generate over $1 billion annually in rates and charges, providing a substantial and stable revenue base to support their ongoing service delivery and infrastructure investment. While this funding is already allocated across a wide range of essential Council services, it also presents an opportunity to strategically align existing financial resources with the implementation of priority actions outlined in this CMP. Moving forward, effective integration of CMP initiatives into each Council's IP&R framework will be critical to ensuring that funding commitments are both realistic and sustainable over the long term.

5.3.2 External Sources of Funding

It will not be possible for the PCs 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, the PCs can take advantage of various state grant programs, as listed in Table 5-5. The value of this

funding cannot be accurately quantified until such time as it is awarded. 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.

The viability assessment summarised in Appendix C has identified the potential funding sources for each option.

Table 5-5 Summary of potential funding sources of the CMP

Funding Source	Details / Description
State Government	
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 5 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 a Council. Certification of 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, and prioritised to Council applications with certified CMPs and subject to State Government funding priorities and allocations.
NSW Estuary Asset Protection Program	As part of a two-year, National Emergency Management Authority approved $64 million Riparian Stabilisation Package, co-funded by the Australian and NSW Governments under Disaster Recovery Funding Arrangements, the NSW Estuary Asset Protection program will support the repair, restoration and regeneration of priority riparian and estuarine areas significantly affected by the February 2022 flooding. The aims of the NSW Estuary Asset Protection program are to: ▪ Assess the severity of flood impacts on estuarine and floodplain assets ▪ Identify priority areas for asset protection and increased resilience ▪ Implement actions that will provide increased resilience for estuarine and floodplain assets from flooding events.
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, 2023).

Funding Source	Details / Description
	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 ▪ 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.
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.
Federal Government	
Disaster Ready Fund	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, 2013). 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.
Urban Rivers and Catchments Program	The $200 million Urban Rivers and Catchments Program was established by the Federal Government to assist in restoring the health of urban waterways for native plants, animals, and local communities. The program is funding projects including, but not limited to (Australian Government, 2025): ▪ Creation of wildlife habitats and ecological corridors to support native species ▪ Replacement of concrete channels and drains with restored, vegetated stream environments

Funding Source	Details / Description
	▪ Development of wetlands and interconnected ponds to slow and filter stormwater, enhance aquatic habitats, and improve water quality for native wildlife ▪ Removal of in-stream barriers (e.g., weirs) to facilitate fish passage ▪ Installation of litter and pollutant traps to prevent stormwater-borne plastics from entering aquatic and marine ecosystems.
Other funding opportunities	
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, 2023).
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, 2023).

Agencies responsible for 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.

5.4 Partner Council Funding Models

Approximately $11 million in Actions are proposed under the River-wide Implementation Plan, to be delivered over a 10-year period. While most of these Actions are expected to be eligible for two-thirds funding under the NSW Coast and Estuary Grant Program, the remaining one-third will need to be co-funded by the PCs. This co-contribution is likely to be based on a proportionate cost-sharing arrangement, which will be refined through consultation with the PCs and potentially other partners, such as catchment councils and state agencies, during Stage 4 of the CMP.

A range of cost-sharing models were explored in the Stage 1 Scoping Study (Water Technology, 2020), taking into account equity, ratepayer distribution, foreshore and waterway area across the six partner LGAs, and the spread of key risks and issues. While one model was adopted for the transition from Stage 3 to 4, a revised approach may be necessary for the implementation phase in Stage 5.

To provide context, several nominal funding options are outlined in Table 5-6, including:

- *Equal Funding* – Divides costs evenly among the six PCs, equating to ~5.6% each after applying grant funding.
- *LGA Population* - Allocates costs based on rate-payer base within each LGA, as approximated by the LGA population. However, this option does not account for the fact that some LGAs (such as Central Coast) contain a significant population within the LGA that does not reside within the contributing catchment. Hence, this option is limited from an equity perspective. A more robust approach may be to assess the relative population of each LGA that resides within the contributing catchment of the study area, based on ABS census data (Statistical Area Level 1 and 2 data).
- *Contributing Catchment Size* - Proportions contributions by catchment area within each LGA. However, from an equity perspective this may not fully consider the land use and/or population density within each LGAs contributing catchment. For instance, under such a method there would be a significant contribution

from Hawkesbury City Council relative to the other five councils owing to its larger contributing catchment size.

- *Coastal Environment Area Size* - Bases contributions on the mapped area of the Coastal Environment Area, offering a proxy for foreshore responsibilities but omitting upstream catchment impacts.

None of these methods is likely to be perfectly equitable on its own. A hybrid approach that blends several indicators may provide a more balanced outcome. Importantly, the figures in Table 5-6are indicative only and are not intended as recommended funding commitments, but rather as illustrative scenarios to support ongoing discussion.

Table 5-6 Potential Cost Sharing Arrangements

Potential Option	Central Coast	Northern Beaches	Ku-ring-Gai	Hornsby Shire	The Hills Shire	Hawkes-bury City	State* (DCCEEW)
Equal Funding	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	66.7%
LGA Population	10.2%	7.9%	3.7%	4.5%	5.0%	2.0%	66.7%
Contributing Catchment Size	7.0%	1.1%	0.2%	3.4%	2.5%	19.1%	66.7%
Coastal Environment Area Size	19.9%	2.9%	0.1%	6.1%	1.1%	3.2%	66.7%

5.5 Cost-Benefit Distribution

As per the CM Manual (OEH, 2018d), an analysis of the distribution of costs and benefits to the PCs, public authorities, stakeholders and the environment is recommended when preparing a CMP. None of the actions aim to benefit private interests, although they may do so indirectly as a consequence of improved environmental health and natural hazards resilience (e.g., to commercial businesses in the nearby area including tourism operators and hospitality). There are no actions within the CMP that aim to directly benefit private interests. Therefore, no public-private cost sharing arrangements are required.

5.6 Progression through to the Stage 4 CMP Business Plan

The Business Plan developed herein has been undertaken to assist in the evaluation of options. The Stage 4 CMP document will include a detailed Implementation Program and Business Plan that will include 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 will be discretised into the forthcoming Delivery Program (DP) periods of the PC's IP&R framework. Costs will be discretised into their respective capital, operational, and ongoing maintenance costs.
- Potential funding mechanisms.

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 the PC's respective functions via the Operational and Delivery Plans.

6 THE WAY FORWARD

The next stage of the CMP process, Stage 4, involves the preparation, public exhibition (and updating if required), and submission of a draft CMP to the Minister for certification (OEH, 2018e). The draft CMP should include the various components laid out in the NSW Coastal Management Manual (OEH, 2018e), including:

- Snapshot of issues (coastal processes, coastal hazards, threats to biodiversity, resilience and integrity of coastal ecosystems and ecological values etc)
- Actions to be implemented by Council and other public authorities.
- A business plan identifying the full capital, operational and maintenance costs, and timings of management actions.
- Mapping of coastal management areas (including any proposed changes to current coastal management areas, or mapping of new coastal vulnerability areas).

The Draft CMP document should, in essence, provide a clear and succinct *statement of proposed coastal management actions* undertaken to meet State, Regional and Local coastal management objectives. It will outline how actions will be implemented through each PC's Integrated Planning and Reporting (IP&R) framework and the land-use planning systems. Following the completion of a draft CMP, DPE will review the draft CMP prior to public exhibition to ensure it meets all mandatory requirements for ministerial certification.

The PCs will then place the CMP on *public exhibition* to seek feedback from all stakeholders in the form of written submissions. It is a mandatory requirement of the NSW Coastal Management Manual that the draft CMP be exhibited for a period of not less than 28 calendar days (OEH, 2018e).

All submissions will be reviewed, considered, and if applicable, incorporated into the finalised version of the CMP, along with a *Submissions Report* documenting all outcomes.

7 REFERENCES

Alluvium. (2022a). *Hawkesbury Nepean River System Physical and Ecological Processes Abridgement Report.*

Alluvium. (2022b). *The Hawkesbury-Nepean River System Estuary Bank Erosion Assessment and Options Report.*

Alluvium and Mosaic Insights. (2023). *Hawkesbury Nepean River System Community Values and Uses Report.*

Australian Government. (2025). *Urban Rivers and Catchments Program*. Retrieved from https://www.dcceew.gov.au/environment/biodiversity/conservation/urban-rivers-catchments-program

Beadle, C., Smith, S., & Colleter, G. (2022). Probabilistic Cost-Benefit Analysis to Inform Coastal Management: A Mollymook Case Study. *Australasian Coasts & Ports 2021 Conference.* Christchurch.

BMT WBM. (2008). *Lower Hawkesbury Estuary Management Plan. .* Prepared for Hornsby Shire Council.

BMT WBM. (2010). *Pittwater Estuary Management Plan.*

BMT WBM. (2014a). *Upper Hawkesbury Estuary Coastal Zone Management Plan. October 2014.* Prepared for Hawkesbury City Council.

BMT WBM. (2014b). *Pearl Beach Lagoon Coastal Zone Management Plan.* Prepared for Gosford City Council.

Cardno. (2012). *Coastal Zone Management Plan for Brisbane Water. .* Prepared for Gosford City Council and Department of Environment & Climate Change. LJ2717/R22683. July 2012.

DCCEEW. (2025). *NSW Estuary Water Quality Data Compilation: 2007 - 2020.* State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 2025.

DPE. (2020). *Guidelines for using cost-benefit analysis to assess coastal management options.* Department of Planning, Industry and Environment.

DPE. (2022). *Coastal Management Programs and integration with catchment management.* Environment and Heritage Group, Department of Planning and Environment.

DPE. (2023a). *NSW Coastal Design Guidelines.*

DPE. (2023b). *The Coastal Crown Land Guidelines.*

DPIE. (2019b). *NSW Estuary Health Risk Dataset: A first-pass risk assessment to help with the prioritisation of catchment management actions.*

ISO . (2019). *Adaptation to climate change — Principles, requirements and guidelines.*

Landcare Australia. (2023). *Grants*. Retrieved from https://landcareaustralia.org.au/grants/

MEMA. (2018). *New South Wales Marine Estate Management Strategy. .*

NCCOE. (2012). *Climate Change adaptation guidelines in coastal management and planning.* Engineers Australia National Committee on Coastal and Ocean Engineering.

NCCOE. (2017). *Guidelines for Responding to the Effects of Climate Change in Coastal and Ocean Engineering.* National Committee on Coastal and Ocean Engineering (NCCOE).

NEMA. (2013). *Disaster Ready Fund*. Retrieved from https://nema.gov.au/disaster-ready-fund

NSW Government. (2020). *Guidelines for using cost-benefit analysis to assess coastal management options.* Department of Planning, Industry and Environment.

NSW Government. (2023). *Disaster Risk Reduction Fund - State Risk Reduction Stream*. Retrieved from https://www.nsw.gov.au/emergency/nsw-reconstruction-authority/disaster-risk-reduction-fund-state-risk-reduction-stream

NSW Treasury. (2023). *NSW Government Guide to Cost-Benefit Analysis. February 2023. (TPG23-08).*

OEH. (2017). *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions. .*

OEH. (2018). *NSW Coastal Management Manual Part A: Introduction and mandatory requirements for a coastal management program.* Sydney: Office of Environment and Heritage.

OEH. (2018d). *NSW Coastal Management Manual Part B: Stage 3 – Identify and evaluate options.*

OEH. (2018d). *NSW Coastal Management Manual Part B: Stage 3 – Identify and evaluate options.*

OEH. (2018e). *NSW Coastal Management Manual Part B: Stage 4 – Prepare, exhibit, finalise, certify and adopt a coastal management program.*

OEH. (2018g). *NSW Estuary Tidal Inundation Exposure Assessment.* doi:ISBN 978-1-76039-958-0. OEH 2017/0635. July 2018

Rawlinsons. (2024). *Rawlinsons Australian construction handbook 2024.* Rawlinsons: Rawlhouse Publishing.

Rhelm and Baird. (2023). *Hawkesbury River Coastal Inundation Study.*

Transport for NSW . (2020). *Transport for NSW Economic Parameter Values.*
Water Technology. (2020). *Hawkebury-Nepean River System Coastal Management Program: Stage 1 Scoping Study.*
Water Technology. (2023a). *HNRS CMP: Strategic Direction Summary Document.*
Water Technology. (2023b). *HNRS CMP: Community & Stakeholder Engagement Plan.*
WorleyParsons. (2014). *Open Coast and Broken Bay Beaches Coastal Processes and Hazard Definition Study.*
WorleyParsons. (2017). *The Gosford Beaches Coastal Zone Management Plan. .* Prepared for Gosford City Council.
Worleys. (2025). *Central Coast Council CMP Stage 2: Coastal Hazard Study Update (draft).*
WRL. (2023). *Pittwater Beach Erosion and Shoreline Recession Assessment .*

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APPENDIX A
COMMUNITY AND STAKEHOLDER ENGAGEMENT SUMMARY REPORT

A-1 Introduction

A-1-1 Background

The purpose of this Summary Report is to provide an overview of the community and stakeholder engagement activities carried out during Stage 3 of the Hawkesbury-Nepean River System Coastal Management Program (HNRS CMP). This stage focused on identifying and evaluating potential management actions to address the key issues and risks affecting the river system.

The report outlines the methods used to engage with communities and key stakeholders, including the types of activities delivered, the locations and timing of engagement events, and the level of participation received. It also presents a summary of the feedback collected through these activities, highlights key themes and concerns raised by participants, and identifies how this input will be used to inform the next stages of the CMP process.

By documenting the engagement process and outcomes, this report helps demonstrate how community and stakeholder perspectives have been considered in the development of the CMP, supporting a transparent, collaborative, and locally informed approach to coastal management planning.

A-1-2 HNRS Community and Stakeholder Engagement Plan

A key deliverable at the outset of Stage 3 was to evolve the Community and Stakeholder Engagement Strategy developed in Stage 1 (Water Technology, 2020) into a detailed Engagement Plan for implementation during Stages 3 and 4 of the CMP (Water Technology, 2023b). The plan was developed in accordance with NSW CMP Engagement Guidelines (OEH, 2018), and the International Association for Public Participation (IAP2) guidelines.

The objectives of this Engagement Plan were to:

- Reaffirm the overarching approach to engagement for Stages 3 and 4.
- Provide a detailed action plan outlining engagement methods, timing, and responsibilities.

The Engagement Plan is a live document that is continually updated as the project progresses, ensuring it remains responsive to emerging needs, stakeholder feedback, and project developments.

In November 2023, coastal technical experts and communications/community engagement staff from each Partner Council (PC) were interviewed to inform the development of the Engagement Plan. These discussions helped identify effective local engagement methods, key stakeholder groups, and existing networks within each LGA.

The Engagement Plan includes:

- An overview of the statutory and mandatory requirement for engagement set out in the CM Act and the Coastal Management Manual.
- A detailed stakeholder analysis, identifying over 100 local community stakeholder groups, 15 relevant State Government agencies, as well as First Nations representative groups and upper catchment stakeholders.
- A comprehensive engagement implementation action plan covering the preparation, delivery, and close-out of each engagement activity.

A-1-3 Objectives of Stage 3 Engagement

During Stage 3, the engagement process was designed to support meaningful stakeholder and community involvement in the identification and evaluation of potential management options. Guided by the IAP2 Spectrum of Public Participation, the following levels of engagement were applied (see also Figure A-1):

- **Inform:** Provide stakeholders and the community with clear, accessible information about the project, identified coastal hazards, and the range of potential management options.
- **Consult:** Seek feedback on the Stage 3 "long list" of potential management options, including levels of community and stakeholder support.
- **Involve:** Ensure that community values, concerns, and aspirations - identified through Stages 1 and 2 of the CMP engagement - are reflected in the development and evaluation of management options.
- **Collaborate:** Invite stakeholders and community members to contribute suggestions for additional management options, to be considered as part of the Stage 3 assessment process.

Increasing impact on the decision →					
Public participation goal (what are we trying to achieve)	**Inform**	**Consult**	**Involve**	**Collaborate**	**Empower**
	To provide the public with balanced and objective information to help them understand the problem, alternatives and/or solutions	To obtain public feedback on alternatives and/or decisions	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered	To partner with the public in each aspect of the decision including the development of alternatives and identification of the preferred solution	To place the final decision-making in the hands of the public
Promise to the public	We will keep you informed	We will keep you informed, listen to and acknowledge concerns and provide feedback on how public input influenced the decision	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision	We will work with you to formulate solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible	We will implement what you decide

Figure A-1 The IAP2 spectrum of engagement (source: IAP2)

A-1-4 Engagement Overview

A detailed stakeholder analysis was conducted in the Stage 1 Scoping Study (Water Technology, 2020). Subsequently, the community and stakeholder engagement strategy for the CMP identified and categorised key groups of internal and external stakeholders, which are summarised in Table A-1.

Building on this foundation, Stage 3 of the CMP involved the implementation of a multi-modal community and stakeholder engagement process. This approach combined both digital and in-person methods to ensure broad and inclusive participation. Engagement activities included the use of an online engagement portal, facilitated workshops, targeted one-on-one meetings with key stakeholders, and community drop-in sessions held at accessible local venues. This diverse suite of engagement methods was designed to accommodate varying levels of interest, availability, and preferred modes of communication within the community and stakeholder groups.

Table A-1 Stakeholder Groups for the CMP

Internal Stakeholders	
	CMP Steering Committee
	Broader Partner Council stakeholders (including councillors and council staff)
External Stakeholders	
	Local Community
	Public Authorities (State Government Agencies and Upper Catchment Councils)
	First Nations Groups

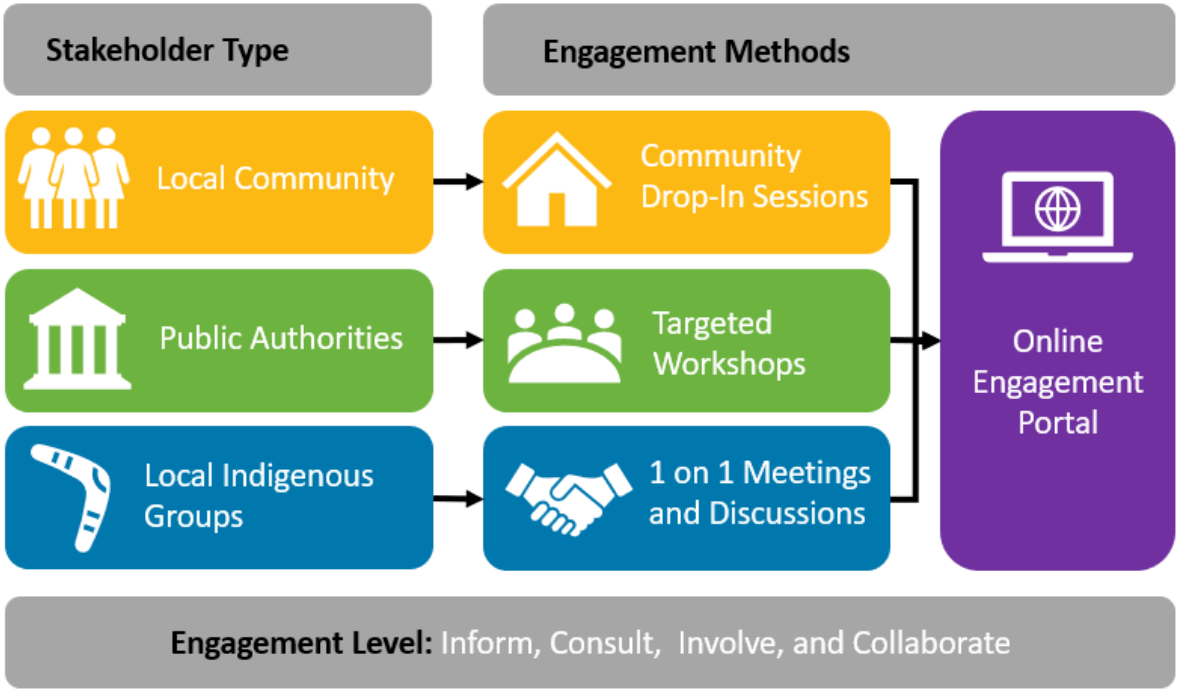

Figure A-2 The approach to Community and Stakeholder Engagement in Stage 3

A-2 Stakeholder Engagement

A-2-1 Overview

Table A-2 below provides a summary of the stakeholder engagement activities conducted throughout the Stage 3 program (as of 31 May 2025), categorised by stakeholder group. It details the mode of engagement, number of sessions, and estimated total hours of interaction.

Table A-2 Stage 3 Stakeholder Engagement Tasks

Category	Stakeholders	Mode	Quantity	Total Hours
Internal Partner Council Engagement	Northern Beaches Council	Workshops	5	11
	Ku-ring-gai Council	Workshops	1	2
	Hornsby Shire Council	Workshops	6	12
	Hills Shire Council	Workshops	2	4
	Hawkesbury City Council	Workshops	3	7
	Central Coast Council	Workshops	5	14
	Collaborative PC Workshops (including DCCEEW-BCS)	Workshops	4	10
State Government Agencies	DCCEEW - MCEF	Workshops	1	2
	Dept of Education	Meeting	1	1
	DPHI - Crown Lands	Workshops	1	2
	DPHI - Planning & Assessment	Workshops	1	2
	DPIRD - Biosecurity & Food Safety	Workshops	1	1
	DPIRD - Fisheries	Workshops	1	2
	Greater Sydney Local Land Services	Workshops	1	2
	NSW National Parks and Wildlife Service	Workshops	2	4
	NSW Reconstruction Authority / Infrastructure NSW	Workshops	1	1
	NSW SES	Workshops	1	1
	Sydney Water	Workshops	1	2
	TfNSW - MIDO	Workshops	2	5
	Water NSW	Workshops	2	1
Upper Catchment Councils	Upper Catchment Council Group	Briefing	1	1
	Blue Mountains City Council, Blacktown City Council, Camden Council, Liverpool Council, Penrith City Council, Wollondilly Council, Wollongong Council	Workshops	1	2

Category	Stakeholders	Mode	Quantity	Total Hours
First Nations Representatives	Muru MIttigar	Meeting	4	4
	CCC Heritage Committee	Meeting	1	1
	Merana Aboriginal Community Association for the Hawkesbury	Meeting	2	4
	Darug Custodians Aboriginal Corporation	Meeting	2	4
	Hornsby Council Aboriginal & Torres Strait Islander Advisory Committee (HATSIC)	Meeting	1	1
	Central Coast First Nations Groups including Wannangini	Meeting	4	6
	Northern Beaches First Nations Group	Meeting	1	1
	Darkinjung LALC	Meeting	1	1
	Deerubbin LALC	Meeting	2	2
		Total	**62**	**113**

A-2-2 Internal (Partner Council) Engagement

Internal stakeholders are those who are part of the decision-making team, and as such the project steering committee (the PCs) are considered internal stakeholders including internal staff with the various divisions/units of the PC organisations. During Stage 3, a series of workshops were held with PC representatives in

- Environmental management.
- Planning and development.
- Roads & drainage.
- Utilities, such as water & wastewater and Sections.
- Open space & recreation.
- Communications/engagement.

Workshops were facilitated through a series of in-person and virtual workshop for the purposes of:

- Option Identification
- Option Refinement
- Option Assessment and Identification

Engaging internal stakeholders across a broad range of disciplines provided critical insight into local conditions, operational constraints, and community priorities. Involving council staff from environmental management, planning, infrastructure, open space, and communications teams ensured that the management options developed were not only technically sound but also aligned with local policy frameworks, existing strategies and plans, service delivery capabilities, and community expectations. The structured workshops during Stage

3 created a space for collaboration, knowledge sharing, and joint problem-solving, which improved the quality and practicality of the proposed management strategies.

A summary of the PC workshops is provided in Table A-2.

A-2-3 Public Authority Engagement

A summary of the engagement undertaken with State Government Agencies and Upper Catchment Councils workshops is provided in Table A-2.

A targeted and coordinated engagement program was undertaken with a range of NSW Government departments, agencies, and entities to ensure the Coastal Management Program (CMP) is strongly aligned with relevant legislation, policy frameworks, and current state-led initiatives. Key agencies were engaged through a series of structured workshops and meetings, involving representatives from DCCEEW, Department of Planning, Housing and Infrastructure (Crown Lands and Planning & Assessment), Department of Primary Industries (Biosecurity and Fisheries), Greater Sydney Local Land Services, NSW State Emergency Service (NSW SES), Transport for NSW (MIDO), Water NSW, and others.

These engagements provided a platform for two-way dialogue - enabling the project team to present emerging findings and management options while gaining valuable insights into agency priorities, statutory roles, and technical requirements. This collaborative approach helped to ensure the CMP is not only informed by the latest state policy directions but also responsive to operational realities and interagency dependencies. This engagement also ensures the CMP is both strategically aligned with state and regional planning instruments and practically integrated with existing and future agency-led projects.

The workshops served as a key touch point for discussion with the agencies regarding potential management options for the CMP. The aims of the workshops were to:

- Provide project background - including a summary of project progress to date, and a summary of the key risks and opportunities identified in Stage 2.
- Commence initial discussions of potential management options where inter-agency coordination and/or agreement could be required.
- Undertake a ‘whiteboarding’ session to identify stakeholder ideas for potential management options, and linkages to existing state agency initiatives and actions

Engagement with Upper Catchment Councils included an initial briefing to the Upper Catchment Council Group (comprising the entire HNRS catchment council collective), as well as a follow up workshop with the Greater Sydney Area councils to help identify and refine management actions for the CMP.

Engagement with these public authorities directly led to the development of a number of CMP Actions – as specified in Section 3 and Appendix C.

A-2-4 First Nations Groups

A summary of the engagement undertaken with local representatives is provided in Table A-2.

Engagement with First Nations representatives was a key component of the CMP process, recognising the deep cultural connections and traditional knowledge Aboriginal communities hold in relation to land and water management across the catchment. Meetings were held with a range of groups and representatives, including Muru Mittigar, the Merana Aboriginal Community Association for the Hawkesbury, Darug Custodians Aboriginal Corporation, Darkinjung Local Aboriginal Land Council (LALC), Deerubbin LALC, Wannagini and other Central Coast First Nations peoples, First Nations peoples from Northern Beaches LGA, and advisory or heritage committees from Hornsby and Central Coast Councils.

These engagements provided valuable opportunities to listen to Country-based perspectives, cultural values, and site-specific knowledge that might otherwise be overlooked in conventional planning processes. This input informed the development of management options and ensured that cultural heritage considerations were

embedded throughout the CMP. By building respectful relationships and providing space for genuine dialogue, the CMP is better placed to reflect shared stewardship principles, acknowledge cultural heritage, and support alignment with the NSW Government's commitments to working in partnership with Aboriginal communities.

Engagement with these stakeholders directly led to the development of a number of CMP Actions – as specified in Section 3 and Appendix C.

A-3 Community Engagement

A-3-1 Community Engagement Period

The community engagement period ran for 10 weeks, from Monday 16 September to Sunday 24 November 2024 (inclusive). This extended timeframe was deliberately chosen to accommodate the large and diverse geographic area covered by the project, and to provide ample opportunity for communities across the HNRS to engage meaningfully with the CMP process.

A longer engagement window also enabled a more sustainable and manageable delivery of over 20 drop-in sessions, ensuring that PC resources could be allocated effectively across multiple locations and dates. Spreading the sessions over several weeks allowed project staff to maintain a consistent and high-quality presence at each event, support meaningful interactions with community members, and respond to local needs and interests as they emerged throughout the engagement period.

A-3-2 Project Website

The primary online platform for Stage 3 community engagement was the project website: https://hawkesburynepeancmp.org. Serving as a centralised and accessible hub throughout Stage 3, the website played a vital role in informing the community and stakeholders about the CMP. Key features of the website included:

- Background: A comprehensive overview of the CMP, including its purpose, who is involved, and how it is being developed under the NSW Coastal Management Framework.
- Explainer Videos: A video library provides the community with short, clear video packages explaining the project, and Stage 3 engagement.
- A document library: A central repository of project materials, including brochures, bulletins, the Stage 1 Scoping Study, selected Stage 2 Technical Studies, and fact sheets on major issues and coastal risks being addressed.
- Progress Updates: Regular updates on the progress of each stage of the CMP, including announcements and advertisements for community engagement opportunities.

Importantly, during Stage 3, the website was also a key engagement tool, hosting dedicated content and functionality to support public participation. This included:

- Promotion of Engagement Events: Advertisements and details for community engagement sessions.
- Stage 3 Community Engagement Portal: A purpose-built digital portal to facilitate online participation and feedback.
- Engagement Portal Instructions: Including an instructional video and downloadable pdf instruction booklet.

A-3-3 Community Drop-In Sessions

To support those who preferred face-to-face engagement, a series of community drop-in sessions were held to gather input for the Stage 3 options identification and assessment process.

Each session was open for 2 to 4 hours, allowing community members to attend at a time convenient for them. This flexible format helped reduce overcrowding and enabled more relaxed, personalised conversations between attendees and project staff.

Community members were encouraged to drop in at any time during the session window. The sessions were designed to:

- Provide clear and accessible information about the project.
- Explain the proposed stage 3 Management Options
- Direct community members to the online engagement portal.

Participants could provide both verbal and written feedback on the proposed management options, as well as the project more broadly. They were also invited to suggest additional options, informed by their local knowledge, values, and aspirations for the coastal zone.

Engagement was robust and constructive, with many in-depth discussions between community members and representatives from the PCs and Water Technology.

In total, 23 drop-in sessions were held across the community engagement period, spanning 18 separate locations throughout the HNRS study area. Table A-3 provides session details, including estimated attendance. Across all sessions, approximately 600 community members were engaged. A selection of photographs from the sessions is presented in Figures A-3 to A-5.

Most sessions were strategically located at estuary foreshore areas—such as parks and boat ramps—to engage directly with estuary users and others with a vested interest in the system's health. In addition, several sessions were delivered as pop-up stalls at existing community events, helping to broaden awareness and participation. These included the Hornsby Organic Food Market, Hornsby Second-Hand Markets, Woytopia (Woy Woy), Sustainable Futures Day (Turramurra), Umina Beachside Markets, Brisbane Water Oyster Festival (Woy Woy), and the Central Coast Lakes Festival 2024 (Gosford).

This approach enabled access to a broad and diverse cross-section of the community, providing an inclusive opportunity to share project information and invite feedback.

Table A-3 Community Drop-In Session Schedule

Date	Time	Address	Suburb	Host Council	Approx. Attendance
Saturday, 21 September 2024	10am - 1pm	58 Araluen Dr, Hardys Bay	Hardys Bay	Central Coast	55
Thursday, 26 September 2024	8am - 4pm	Hornsby Organic Food Market, Hornsby Mall	Hornsby	Hornsby	15
Friday, 27 September 2024	2pm - 4pm	Church Point Square, 2105 Pittwater Rd, Church Point	Church Point	Northern Beaches	20
Sunday, 29 September 2024	9am - 1pm	Second-Hand Hornsby Market, Jersey Lane, Hornsby	Hornsby	Hornsby	15

Date	Time	Address	Suburb	Host Council	Approx. Attendance
Thursday, 3 October 2024	9am - 2pm	Wisemans Ferry Boat Ramp, Old Northern Road, Wisemans Ferry	Wisemans Ferry	Central Coast, Hornsby, Hawkesbury, Hills	20
Friday, 4 October 2024	9am - 1pm	Parsley Bay Boat Ramp, 25 Karoola St, Brooklyn	Brooklyn	Hornsby	40
Friday, 4 October 2024	2pm - 5pm	The Cottage, 10 Dangar Rd, Brooklyn	Brooklyn	Hornsby	15
Saturday, 5 October 2024	9am - 11am	Bayview Dog Park, 1670 Pittwater Rd, Bayview	Bayview	Northern Beaches	30
Wednesday, 9 October 2024	12pm - 5pm	Berowra Waters Marina, 199 Bay Rd, Berowra Waters	Berowra Waters	Hornsby	10
Friday, 11 October 2024	3pm - 6pm	Dunkirk Hotel, 4666 Wisemans Ferry Rd, Spencer	Spencer	Central Coast	20
Sunday, 13 October 2024	9am - 4pm	Woytopia @ Woy Woy South School, 14 Waterloo Ave, Woy Woy	Woy Woy	Central Coast	50
Saturday, 19 October 2024	10am-3pm	Sustainable Futures Day, Cameron Park, 5 Eastern Rd, Turramurra	Turramurra	Ku-ring-gai	35
Saturday, 19 October 2024	9am - 11am	Palm Beach Wharf, 1149 Barrenjoey Rd, Palm Beach	Palm Beach	Northern Beaches	10
Sunday, 20 October 2024	9am - 2pm	Umina Beachside Markets, Sydney Ave, Umina	Umina	Central Coast	40
Thursday, 24 October 2024	10am – 12pm	Cromer Admin Building, 55 Middleton Rd, Cromer	Cromer	Northern Beaches	25
Thursday, 24 October 2024	9am - 9pm	Erina Fair, outside Shaver Shop, 620 Terrigal Dr, Erina	Erina	Central Coast	30
Saturday, 26 October 2024	9am – 12pm	The Bays RFS Brigade, 17 Wattle Cres, Phegans Bay	Phegans Bay	Central Coast	30
Saturday, 2 November 2024	9am - 12pm	Patonga Wharf (Blues across the Bay), 12 Patonga Drive, Patonga	Patonga	Central Coast	40
Sunday, 10 November 2024	10am - 4pm	Brisbane Water Oyster Festival, Lions Park, 2 N Burge Rd, Woy Woy	Woy Woy	Central Coast	50
Tuesday, 12 November 2024	9am - 1pm	Lakes Festival Cleanaway Pop-up, Kibble Park, 118 Donnison St, Gosford	Gosford	Central Coast	20

Date	Time	Address	Suburb	Host Council	Approx. Attendance
Saturday, 16 November 2024	4 pm - 10pm	Lakes Festival Gather & Groove, Lions Park, 2 N Burge Rd, Woy Woy	Woy Woy	Central Coast	30
Sunday, 24 November 2024	9am – 12pm	Lions Park, 10 Masons Parade, Gosford	Gosford	Central Coast	40
				Total	**640**

Figure A-3 **Left: Drop in Session at the Woytopia Event on Sunday, 13 October 2024. Right: At the Brisbane Water Oyster Festival on Sunday, 10 November 2024.**

Figure A-4 **Left: Drop in Session at Parsley Bay on Friday, 4 October 2024. Right: At Berowra Waters on Wednesday, 9 October 2024.**

Figure A-5 Drop in Sessin at the Wisemans Ferry Boat Ramp on Thursday, 3 October 2024

A-3-4 Online Engagement Portal

Portal Functionality

To support and enhance Stage 3 community engagement, a dedicated *Online Engagement Portal* was developed and made available via the project website. The web-based mapping portal included two key interactive tools designed to collect feedback and ideas from the community and stakeholders.

- **A Feedback Portal:** This web-based mapping tool enabled users to review and comment on the Stage 3 long list of proposed local area options. Each option was represented by a geolocated pin on the map. By clicking a pin, users could view a brief description of the option and provide feedback in two ways:
  - An indication of support from a drop-down list, with choices of: '**Support**', 'or '**Do Not Support**'.
  - A free text response where more detailed comments and feedback could be provided.
- **A Suggestion Portal:** This complementary tool allowed users to propose additional local area management options. Suggestions were submitted by placing a pin on the relevant area of the map and entering a short description or comment to explain the idea.

A snapshot of the Online Engagement Portal is provided in Figure A-6 and A-7.

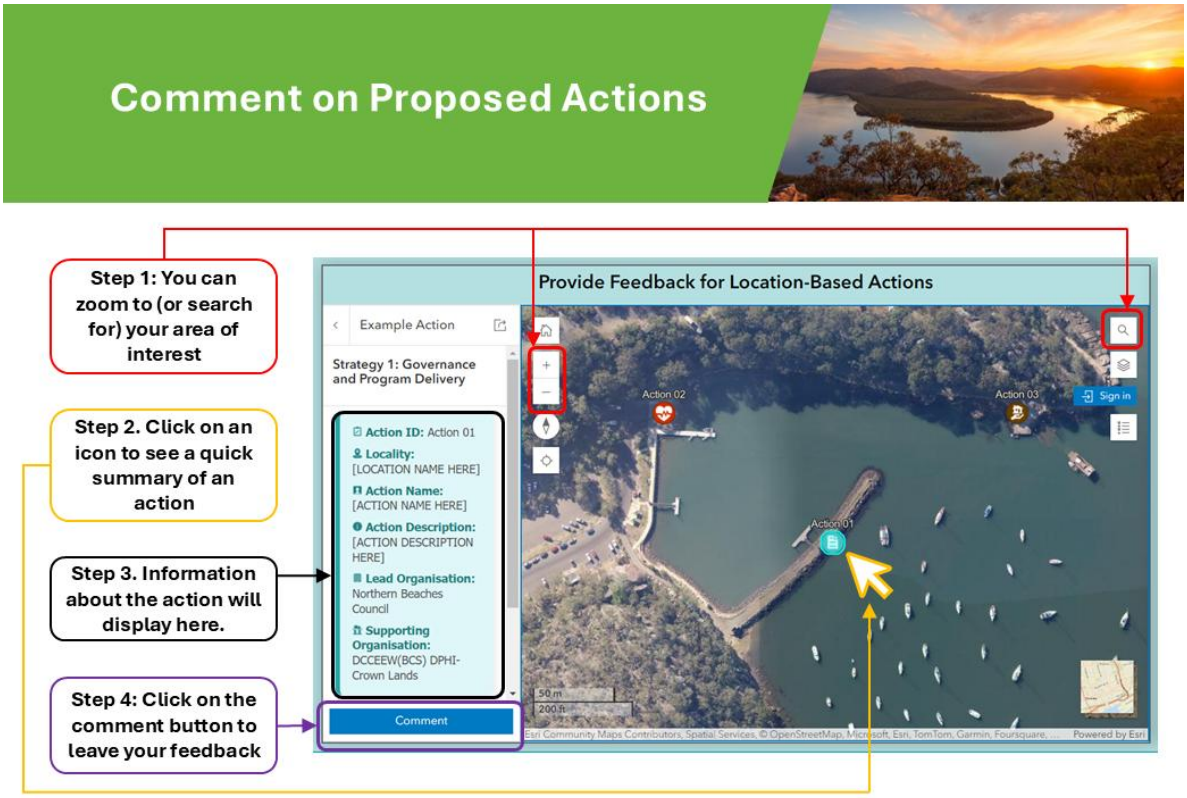

Figure A-6 Example Screenshot from the Feedback Portal

Figure A-7 Example Screenshot from the Suggestion Portal

Feedback Portal Outcomes

The online engagement portal received a strong response from local communities, demonstrating active interest and participation in the CMP process – as summarised in Table A-4. The Feedback Portal received strong community engagement, with a total of 4,029 Action Votes cast across the Stage 3 long list of proposed actions. On average, each action received 32 responses (median: 16), with individual actions receiving as many as 211 votes and as few as 2. Community sentiment was overwhelmingly positive, with an average support rate of 97% and a median of 100%. Even the least supported action still received 75% support, highlighting a high level of overall endorsement for the proposed local options.

Importantly, this community input informed the subsequent assessment of potential management options, in line with the approach set out in the NSW Coastal Management Manual. Feedback was used to generate quantitative indicators of community and stakeholder support, helping to identify which actions were broadly acceptable and where concerns or opposition might exist. These insights were considered alongside other key assessment criteria, including technical feasibility and economic viability.

Table A-4 Online Feedback Portal Engagement Metrics

Feedback Portal Metrics	Value
Total Action Responses on Proposed Actions	4,029
Average (and median) number of responses received on each option	32 (16)
Highest Total Responses Received on an Action	211
Fewest Total Responses Received on an Action	2
Average (and median) % Support for each Action	97% (100%)
Highest % Support for an Action	100%
Lowest % Support for an Action	75%

Suggestion Portal Outcomes

The Suggestion Portal allowed community members to provide their own comments and suggestions using "pinpoints" that they could place on the Suggestion Portal map. In total, 162 comments were recorded in the mapping. All responses were thoroughly reviewed and were placed into one of three categories:

- **Incorporated into in Stage 3 Long List:** Where suggestions were:
  - A new idea/suggestion that could be included in the long list of potential options for the CMP.
  - An idea/ suggestion that was already covered by existing option or was a comment on existing option.
- **Considered, but not progressed to Stage 3:** Where suggestions fell into one of the following categories:
  - They were outside the scope of a CMP – but could potentially be considered as part of a different Council plan or strategy.
  - They were located outside of the CMP study area boundary – could therefore be dealt with by another CMP.
  - The suggestion was either inconsistent or incompatible with Council and/or State Government policy.
  - The suggestion was considered unfeasible or impractical
  - The suggestion was already covered by an existing (alternate) plan or policy
- **General comment:** Where a general comment was provided that was not specifically related to an individual option. These general viewpoints were still considered in the CMP development.

Table A-5 provides high level overview of the suggestions received. A summary of all suggestions received is provided in Table A-6, along with official response of the project team and the status of how the suggestion was considered in the CMP.

Table A-5 Online Suggestion Portal Engagement Metrics

Suggestion Portal Metrics	Value
Total Community Suggestions for new Actions	159
Suggestion Received per LGA	
Northern Beaches Council	27 (17%)
Central Coast Council	91 (57%)
Kur-ring-gai Council	0 (0%)
Hornsby Shire Council	30 (19%)
The Hills Shire Council	3 (2%)
Hawkesbury City Council	7 (4%)
River Wide	1 (1%)
Suggestion Outcome Status	
Incorporated into in Stage 3 Long List - An idea/ suggestion that was already covered by existing option, or was a comment on existing option	72 (45%)
Incorporated into in Stage 3 Long List - A new idea/suggestion that contributed to the inclusion of new option(s) in the long list of for the CMP	36 (23%)
Considered, but not progressed to Stage 3 - Outside the scope of a CMP	17 (11%)
Considered, but not progressed to Stage 3 - Outside of the CMP study area boundary	1 (1%)
Considered, but not progressed to Stage 3 - Not aligned with legislation and/or policy	0 (0%)
Considered, but not progressed to Stage 3 - Considered unfeasible or impractical	2 (1%)
Considered, but not progressed to Stage 3 - Already covered by alternate plan or policy	23 (14%)
General Comment	8 (5%)

Table A-6 CMP Suggestion Portal Responses

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
Central Coast Council	Daleys Point	Conservation and interpretation of The Murray Farm (c.1836) ruins and associated historical elements	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	This action can be covered by CCC Heritage Plans. Passed onto Heritage Group for consideration.
Central Coast Council	Daleys Point	Footpath / cycle way connecting Hardys Bay Pde to Daley Avenue at Fishermans Point. Would need a boardwalk area above high tide mark.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.CCC.06
Central Coast Council	East Gosford	S3.CCC.01 - Local, State and Federal governments need to be serious and work together in addressing the effects of Sea Level Rise (SLR) on both land development for the people and the marine ecosystem of Brisbane Water. Regarding land development and supporting infrastructure eg roads and drainage; authorities need to plan and rezone land and vary supporting infrastructure adjoining waterways that will become inundated by either tidal inundation, catchment flooding, riverine flooding or storm surge. Developed residential and commercial areas around Brisbane Water eg Davistown, Empire Bay and Woy Woy CBD; already suffer from tidal inundation across the foreshore access roads and adjoining residential properties. In time these areas will either need to be raised/protected to address the safety and damage to residents and properties from this long-term flooding inundation, however this will be to the detriment of the Brisbane Water estuary in that there will be nowhere for the mangroves etc to migrate to with SLR. Areas of land should be set aside for our current fringe wetlands to migrate to with the affects of SLR, otherwise our marine ecosystems in and around Brisbane Water will be lost. This is a very big problem that should be planned for sooner rather than later under Floodplain Risk; Coast and Estuary; and also Land Planning management studies and plans.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by multiple existing options - including S6.CCC.12
Central Coast Council	Ettalong	Build the beach back here. It has eroded to the extent of being inaccessible.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Covered by Option S6.CCC.17, and existing TfNSW Dredging Program that is external to (but linked to, the CMP)
Central Coast Council	Ettalong Channel	Execute dredging program for Ettalong Channel. Ferry service disruptions and risk to deeper draft vessels are not acceptable. Sth end Lobster Beach and north of Half Tide Rocks are worst areas, also adjacent Ettalong Wharf.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	As above

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
Central Coast Council	Ettalong Channel	Dredge this area to keep the ferry running	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	As above
Central Coast Council	sd	Dredge here	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	As above
Central Coast Council	Ettalong Channel	Dredge here	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	As above
Central Coast Council	Ettalong Channel	Follow through on dredging program and beach nourishment for Ettalong. Make ferry access easier and beautify foreshore between Ettalong Wharf and Box.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	As above
Central Coast Council	Hardys Bay	Natural stepping stones to waters edge from parkland sea wall in a couple of spots would be good. Also commented on the master plan feedback page	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Covered by Option S3.CCC.02
Central Coast Council	Hardys Bay	asdfwsdf	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Covered by Option S3.CCC.02
Central Coast Council	Hardys Bay	Hardys Bay creek - management of drainage and coastal wetlands - perhaps a candidate for channel naturalization	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.CCC.23
Central Coast Council	sda	Clear debris from RSL Creek outfall to permit clean tidal flushing. This area stinks. Make simple channel through silt following natural line, no need for removal of mangroves, but do need to manage them.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.CCC.23
Central Coast Council	Hardys Bay	Provide an enforceable dinghy management mechanism to enable unused and abandoned watercraft to be removed. This would provide better access to the foreshore for those who need to use it.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.CCC.07
Central Coast Council	Hardys Bay	Provide clear navigation access to Killcare Wharf to enable future ferry access (potential ferry to Woy Woy). Currently the mooring alignment is crowding the bay.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Comment provided to TfNSW for their consideration in future planning.
Central Coast Council	Hardys Bay	The historic site at the foreshore at Stanley Street is State Listed as "Rickard's Wharf"-an important piece of maritime archaeology for Brisbane Water. It is neglected, silting up and will disappear if no action is taken. WTKCA have proposed a Conservation Plan of Management for the site (Consultant cost $15000). We are currently seeking a grant for this important piece of work to guide conservation actions.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	This action can be covered by CCC Heritage Plans. Passed onto Heritage Group for consideration.
Central Coast Council	Hardys Bay	Interpretive artwork and identification of the early public baths next to Killcare Public Wharf	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Covered by Option S3.CCC.02

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
Central Coast Council	Hardys Bay	New public toilets needed at Killcare Wharf	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Covered by Option S3.CCC.02
Central Coast Council	Hardys Bay	Keep this Mudflat Creek outfall clear. It is a good channel inland, but silts up. Clear all the way out through the sediment in the bay.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.CCC.23
Central Coast Council	Hardys Bay	Get rid of oyster leases which are untended. They are a hazard to navigation as well as impeding natural flows. No probs if productive.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Comment provided to DPI-Fisheries for their consideration in future planning.
Central Coast Council	Hardys Bay	Reinforce collapsed foreshore road edge near Killcare Extension Wharf. Provide steps to wharf and adjacent foreshore.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.CCC.24
Central Coast Council	Marlow	There are significant issues around Marlow with large cruisers coming too close to the foreshore and generating significant wake which is eroding the foreshore	Not incorporated into Stage 3 Long List	Outside CMP Scope	Comment provided to TfNSW for their consideration in future planning.
Central Coast Council	Mooney Mooney	An Oyster Farming (Marine Science) High School	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Covered by S4.CMP.04
Central Coast Council	Mooney Mooney	More foreshore restoration and regen work is needed at cheerio point peninsula	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Covered by S5.CMP.05
Central Coast Council	Mooney Mooney	Iâ€™d like to see better access to the water for swimming. Some sandstone steps running down into the water. It can protect the bank and provide access	Not incorporated into Stage 3 Long List	Considered unfeasible or impractical	Unlikely to achieve a positive economic cost/benefit ratio when access is available nearby at Mooney Mooney
Central Coast Council	Patonga	On 25/9/23, representatives from CCC and NSW Govt attended a meeting on Patonga Creek, arranged by members of the Patonga community. The problem of heavy siltation in Patong Creek, off Larkins Flat was presented to them, from the viewpoint of a barge on the water. The bank erosion, plus exposure of all the tree roots along this bank were evidence of the destruction wrought by speeding pleasure craft, which has increased in the last few years. The reps agreed that there was a problem. We Patonga community members believe that the shallowing of the creek further up is caused by this ongoing siltation. Patonga Creek is known to be a fish nursery for the broader Hawkesbury, but has been shallowing over the last twenty years. Locals consistently try to slow down speeding pleasure craft, but holiday makers don't care. Even government workers were seen speeding their boat along Larkins Flat in spite of speed limit signage. We need a study/report done to confirm the best way to solve this sedimentation problem, eg coir logs; floating mesh (similar	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.19.

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
		to those mandated by construction sites on water ways); sandbags; additional mangrove planting. A physical protection is the only way to avoid further erosion.			
Central Coast Council	Patonga	Latin fflatt	General Comment		
Central Coast Council	Patonga	rocks have come loose at this seawall	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.CCC.25
Central Coast Council	Patonga	seawall is falling over in some places	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.CCC.26
Central Coast Council	Pearl Beach	Ensure local residents do not interfere with the natural form of the southern lagoon at Pearl Beach. If the lagoon needs to be opened to prevent flooding, then it should be along the natural course of the lagoon as seen in this aerial image.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Already covered by Council entrance opening policy
Central Coast Council	Pearl Beach	Consider a low intervention handrail assist ambulant access from the sand on Pealr Beach to the rock pool platform. Consult with community on several options.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.CCC.08
Central Coast Council	Pearl Beach	Consider methods to remove weeds from the cliff above the Pearl Beach Rock Pool and replace them with native species.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing option - S6.CCC.15
Central Coast Council	Pearl Beach	Reconsider the bush regeneration on Green Point to create a more open headland with Eucalyptus Maculata (spotted gum) as th dominant indigenous tree species rather than Casurinas. Remove the extensive weeds from the Paul Landa Reserve.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.15
Central Coast Council	Pearl Beach	Prepare a Pearl Beach Foreshore Masterplan including improved road safety and parking options in surrounding streets. Consider safe pedestrian access from Crystal Avenue, past the shop to Agate Avenue. Consider Toilet change room design and rubbish collection points.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.CCC.09
Central Coast Council	Pearl Beach	Because Pearl Beach is a surrounded by bushland and presents a special focus for Broken Bay, the enactment and review of the development control aims and provisions is important to the Hawkesbury Nepean River System Coastal Management Program. This process warrants a special independent consultant study including extensive community consultation.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	This is being undertaken by Council as part of their regular operations
Central Coast Council	Phegans Bay	Footpath around foreshore connecting phegans bay to woy woy	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.CCC.10
Central Coast Council	Pearl Beach	Create a walkway with sandstone steps from the water tower connecting Mt Ettalong lookout to Pearl Beach. This should be in addition to improving pedestrian access from Mt Ettalong to Umina Beach. This would be a similar track to that from Warrah Lookout down into Patonga. It would be a wonderful walk then from Patonga Wharf to Ettalong Wharf.	Not incorporated into Stage 3 Long List	Outside CMP Scope	

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
Central Coast Council	Pretty Beach	The lack of proper drainage along Venice road is resulting in runoff containing silt and debris collecting in the drainage wetland area. We need kerb and guttering or sediment traps at Venice rd to prevent this wetland filling with road debris	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing option - S3.CCC.02
Central Coast Council	Pretty Beach	The foreshore road, paths and drainage need attention. The road runoff is contributing to the erosion by stripping the foreshore from behind. I dont know if its part of the masterplan, but proper ker/gutter, drainage and a footpath to go behind the seawall upgrade would make this area a lot better and help reduce erosion	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing option - S3.CCC.02
Central Coast Council	Pretty Beach	Consider restoration or Pretty Beach Pool. Would need for clearing out of silt and mangrove roots. Also some beach nourishment from sandbar opposite.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing option - S3.CCC.02
Central Coast Council	Pretty Beach	Control stormwater flow to Pretty Beach. Control tidal flooding of adjacent parkland and dwellings. Sediment traps, backflow prevention etc.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing option - S3.CCC.02
Central Coast Council	Saratoga	really good example of an environmentally friendly seawall. We love it. Can we look at implementing this kind of seawall elsewhere?	General Comment		Covered by multiple other actions
Central Coast Council	Saratoga	Really like this walkway. Could we have similar walkways elsewhere around Brisbane Water?	General Comment		Covered by multiple other actions
Central Coast Council	Singletons Mill	Mangrove planting needed as there is extensive mangrove die- back post the floods, this will improve riparian buffers and provide habitat to fish, prawns and other crustaceans	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S5.CMP.05
Central Coast Council	Spencer	The amenities and functionality of the foreshore need to be improved, particularly regarding pedestrian safety, shade availability, and inadequate boat access. The public wharf has helped increase boat access, but there are still inadequate mooring opportunities for commuters, particularly from boat access communities like Marlow. It would also be great to reinstate the old swimming enclosure. Consider developing a Spencer Foreshore Masterplan as an outcome of the CMP	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.CCC.12
Central Coast Council	Spencer	For boat access communities there is an inadequate number of bins at land bases like Spencer Public Wharf. There is also a lack of suitable boat parking, particularly in peak times	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.CCC.12
Central Coast Council	Spencer	The current pump-out facilities are inadequate. With the increase in the number of people living on boats there may be an increase in the amount of waste being incorrectly disposed of.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.CCC.12
Central Coast Council	Umina Beach	The lower parts of the Southern headland at Umina Beach, an area often referred to as â€œKiddies Cornerâ€• and flanked by Mt Ettalong Rd at the South, is covered in invasive weeds. These are now dominating the area, and are ugly and ecologically damaging. I suggest a project be launched to first remove the weeds and later replant the area with local native species.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.15

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
Central Coast Council	Umina Beach	Stormwater pipes increasing erosion. Can we find a way to reduce this stormwater erosion while also preventing lower on the beach Iâ€™ve noticed a lot of coke bottles too	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.18
Central Coast Council	Umina Beach	This stormwater outlet is causing erosion and this is affecting the ability to access the beach. Can wr channel the flow straight out and build the dunes up around it.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.18
Central Coast Council	Umina Beach	Iâ€™ve noticed some Bitou bush and other weeds in the dunes here. Weed removal and planting of local dune species like pig face would we keep the dunes healthier	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.18
Central Coast Council	Umina Beach	Ban jet skis from Pearl Beach between Mt Ettalong and Green Point.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Comment provided to TfNSW for their consideration in future planning.
Central Coast Council	Pearl Beach	Reinstate the pedestrian and cycle path around Mt Ettalong to provide a resident and visitor connection. Also this path is heritage listed so deserves to be conserved. It would also provide a route out of Pearl Beach for pedestrians in the event of a major bushfire closing the road into Pearl Beach.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.CCC.13
Central Coast Council	Pearl beach	Create a steel supported walkway for pedestrians and clyclists from Umina Beach to the lower lookout at Green Point where the road is too narrow from Umina Beach to the lower lookout at Mt Ettalong because the road is too narrow and pedestrians and cyclists are using this road at great danger. This could take the form of the walkway between Palm Beach Ferry Wharf and the Palm Beach and the Golf Club along Barrenjoey Road.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.CCC.13
Central Coast Council	Umina Beach	The caravan park should be made to remove all the "private property" and "keep out signs" which are on the crown reserve outside their lease area. They are trying to make this area of the beach a private beach which is completely against the crown land act for public access to crown land.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Outside scope of CMP - comment has been passed on to Council rangers
Central Coast Council	Umina Beach	The private property at 8 Berima Crescent should be purchased by the government and the bulk of the land separated from the home. The home parcel could be resold and the other land retained and managed by CCC as environmentally sensitive land.	Not incorporated into Stage 3 Long List	Considered unfeasible or impractical	Not economically feasible for Council at this time
Central Coast Council	Umina Beach	This whole are in front of the caravan park has been under scrubbed which leaves it vulnerable to erosion and diminishes the whole ecology of the area. It also enables wind and storms to have a much greater impact on the banksia forrest and will ultimately lead to its demise. The mid and ground canopy here need to be urgently restored and maintained.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.15
Central Coast Council	Umina Beach	There is room for a row of shade trees in the new car park where the painted island is (between car park and road). This car park is stifling hot with the new black tarmac. It would beautify and provide much welcomed shade. At the moment cars are parking on this island when car park is full. There's also room for a couple of trees at south end of car park.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Outside scope of CMP - passed on to Council open space team

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
Central Coast Council	Umina Beach	Signage is needed re bag and size limits for Pippi harvesting. In holiday times in particular many people take bucket loads of pippies from the beach - many of them very juvenile and well below eating size, as well as bucket loads of mature ones. Signage should include who to advise if rules read breached.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Passed onto DPI-Fisheries
Central Coast Council	Umina Beach	'We cannot underestimate how fragile the dunes are in and around Umina Beach and Ocean Beach surf clubs and beyond to Ettalong. A boardwalk along these fragile dunes would run the risk of a facilitating a collapse of the dunes (similar to what happened a few years ago nearer to Ettalong when the road almost collapsed). The council are improving the paths from Umina to Ettalong which has helped enormously.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by multiple existing actions - S6.CCC.14, S6.CCC.15
Central Coast Council	Umina Beach	One of the least vegetated dune areas, is directly outside the UBSLC. Contractors should be engaged to fully plant out this area and see it is protected. CCC should also work closely with the Surf Club to see its members respect and help the vegetation grow.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by multiple existing actions - S6.CCC.14, S6.CCC.15
Central Coast Council	Umina Beach	The protection and regeneration of the dunes is critical. The dunes provide habitat for wildlife, reduce erosion and protect the infrastructure behind them - roads, houses, utilities.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by multiple existing actions - S6.CCC.14, S6.CCC.15
Central Coast Council	Umina Beach	The storm water waste collection at Ocean Beach at the end of Trafalgar Ave has been an excellent asset . We have seen much less rubbish on the beach. This system could be used in other places to protect our beaches, keep our waterways healthy. These waste collection points need to be frequently emptied and maintained especially after heavy rainfall.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.18
Central Coast Council	Umina Beach	Remove the parking spots that directly face the beach and expand the forecourt area around the club house. This way more families and groups can enjoy the beach area.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Outside scope of CMP - passed on to Council open space team
Central Coast Council	Umina Beach	The public beach shower should be relocated away from people enjoying the cafe. People are seating at tables looking over bathers showering themselves including children. Not very pleasant for women and children washing sand off.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Outside scope of CMP - passed on to Council open space team
Central Coast Council	Umina Beach	Erosion of the dunes is impacted by this open drain. The drain needs to redesigned relocated under ground and extended into the water to reduce the constant erosion and scouring from it. The site needs to be renourished and revegetated.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.18
Central Coast Council	Umina Beach	Consider making the Esplanade one way only (cars on the houses side only), creating a promenade for walkers, joggers, bikes, prams and wheelchairs all the way from Bangalow St to Umina Beach Surf club. It is not necessary for car thoroughfare except for the dwellings there on one side. And it has very high use by pedestrian traffic, who often have to step out onto the road to pass each other. It could be a beautiful stretch for people to enjoy the outdoors with much more space together.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Outside scope of CMP - passed on to Council open space team
Central Coast Council	Umina Beach	Dangerous and unlicensed jetskiers are coming week after week. Driving irregularly and out of control too close to boats, swimmers and fishers. Marine police are having a limited impact as they are handing out warnings only. They are banned in Sydney Harbour and Newcastle for a reason. But allowed in the Hawkesbury. Ban them from	Not incorporated into Stage 3 Long List	Outside CMP Scope	Comment provided to TfNSW for their consideration in future planning.

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
		the shore side of Ettalong/booker bay/Woy Woy and umina. Restrict them to the other side or move them to the Hawkesbury.			
Central Coast Council	Umina Beach	There is illegal parking of trucks and trailers here - on the verge and in the sensitive dune area - please put sandstone blocks here like you have in wagstaffe.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Already actioned by Council
Central Coast Council	Umina Beach	Stringent controls on major developments seaward of West Street (excluding SLSCs)	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Already covered by Councils existing development controls
Central Coast Council	Umina Beach	Continue with current Coastal Frontage environmental controls around Umina/Ocean Beach including but not limited to Floor level controls Offsets from the 100 year hazard zone	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Already covered by Councils existing development controls
Central Coast Council	Umina Beach	Update CCC LEP to specifically cover â€œforeduneâ€• protection in line with the NSW Coastal Policy	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Already covered by Councils existing development controls
Central Coast Council	Umina Beach	Work with the two surf clubs to see they implement an eco surf coordinator and programs in line with the surf life saving australia policy on eco surf.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Outside CMP Scope
Central Coast Council	Umina Beach	Management Plan to specifically state, Lot 7175/1066208 and Lot 7002/1122309 to be designated as foredunes and as a buffer zone, and no nonessential development to be allowed on these lots.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Covered by Council zoning reviews
Central Coast Council	Umina Beach	The two Crown Lots (foredunes) 7175/1066208 and 7002/1122309 to be rezoned from RE1 Recreation to E2 Conservation.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Covered by Council zoning reviews
Central Coast Council	Umina Beach	Assist/encourage community groups with dune management actions including Dunecare/Bushcare	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S5.CMP.06
Central Coast Council	Umina Beach	Maintain Public Access way fencing and ensure that existing access ways are maintained in a â€¯dog legâ€™ fashion to prevent â€¯wind tunnellingâ€™ and sand erosion.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by multiple existing actions - S6.CCC.14, S6.CCC.15
Central Coast Council	Umina Beach	Use of Beach Nourishment techniques at the eastern and western ends of the beach	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.17
Central Coast Council	Umina Beach	Complete a vegetation profile for the Umina and Ocean Beach and support the natural vegetation profile.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.15
Central Coast Council	Umina Beach	Increase shade areas around the grassed areas and car parks near the SLSCs	Not incorporated into Stage 3 Long List	Outside CMP Scope	Passed onto Councils open space team

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
Central Coast Council	Umina Beach	Development of local area (Umina/Ocean Beach) online fact sheets and encourage local educational programs in schools regarding the dunes and waste impacts	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S4.CMP.01
Central Coast Council	Umina Beach	The CCC LEP â€œenvironmentally sensitive area for exempt or complying developmentâ€• should be extended to state that land identified as â€œBeaches, frontal dunes and undeveloped headlandsâ€• should be covered and no allow developments.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by Councils existing development controls
Central Coast Council	Umina Beach	The trigger to build the TPS should also include any major upgrades of The Esplanade. The community are working with state and federal government to complete a major redesign of the pathway to have a shared pathway and dedicated bike lanes. It would make sense such a large scale redevelopment should also be a trigger to implement a buried sea wall, rather than have this major work dug up later to out in the seawall.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.16
Central Coast Council	Umina Beach	For properties that border with the foreshore, run a education program on best practices (and why) to how to manage the border with the foreshore.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S4.CMP.01
Central Coast Council	Umina Beach	Provide bins all year round on the beach, not just in summer to help see the beach remain clear of litter.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Passed onto Councils open space team
Central Coast Council	Pearl Beach	can we place sand from dredging on Pearl Beach?	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.CCC.17.
Central Coast Council	Wagstaffe	Provide sediment trap at stormwater outfall at Wagstaffe Wharf. Renourish beach areas either side of wharf from sandbar opposite. Stabilise parkland interface with beach area to south of wharf. Repair access ramp to wharf (trip hazard).	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S5.CCC.01
Central Coast Council	Wagstaffe	Work with National Parks and property owners to rationalise inland property boundaries and water interface. Inaccessible waterfront public land adjacent to private properties should go to those properties. Unusable private land adjacent to National Park should be transferred to NP and/or CCC.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Passed onto NPWS for consideration in future planning
Central Coast Council	West Gosford	I paddle down Narara creek and Patonga creek a lot and have noticed an ice ease in marine litter. Can we try and litter boom like have been used successfully in other areas	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S5.CCC.01
Central Coast Council	Woy Woy	It would be great to undertake a project whereby this concrete drainage channel could be naturalised. Ive seen this done in other locations, such as Johnstons Creek in Sydney (https://www.sydneywatertalk.com.au/johnstonscreek). As per Sydney Water: "Naturalisation involves removing the channelâ€™s steep concrete banks and creating gently sloping banks that are stabilised with native plants and boulders or sandstone blocks. Since the stormwater channels were once natural waterways, they are important ecological links for plants and animals. If it is possible to naturalise the channel, this will create habitat and also provide an attractive space for the community to enjoy"	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New option S5.CCC.05

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
Central Coast Council	Woy Woy	id like to see some mangrove planting next to the boat ramp. at the moment the bitumen runs directly into the water. planting mangroves would give the foreshore a more natural feel, provide habitats, and help fight erosion from undermining the road	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S3.CMP.05
Hawkesbury City Council	Cattai	lots of great freshwater lagoons here we should be trying to protect	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S3.CMP.05
Hawkesbury City Council	Cornwallis	Drainage issues in these swamps after flooding events. Water can back up for weeks and weeks	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S5.HCC.03
Hawkesbury City Council	Lower Portland	Inundation effectson low lying areas around the colo	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.HCC.01
Hawkesbury City Council	North Richmond	Id like to see improved access to the river at Richmond. can we extent the network of walking paths and create a river boardwalk, or a bigger jetty that wont get washed away in every flood	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S7.CMP.03
Hawkesbury City Council	Sackville North	Erosion here after the floods. The bank here needs to be stabilized	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.HCC.03
Hawkesbury City Council	Windsor	Can we extent and improve the native vegetation planting along the riverbank of the public reserve here. It would be useful all across the foreshore but especially important where the landslip/erosion occurred back in 2022 (right in front of the clubhouse building). Then we can try and connect the walking path back up.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.HCC.06
Hawkesbury City Council	Windsor	stabilising the eroded bank	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.HCC.05
Hornsby Shire Council	Apple Tree Bay	I would like to make a suggestion regarding tying up at Apple Tree Bay. Lately {particularly in Summer} at the end of a nice day there is much conflict at the Jetty. If I could suggest that you make it a rule for Jet Skis to use one side of the Jetty and Boats use the other side, even better if they could be entirely separated. The problem is boats need two bollards to tie up, Jet skis only need one. So if you are waiting in a queue and a single bollard comes up, a jet ski rider will jump the queue causing upset and conflict as jet ski after jet ski do the same thing. I am sure I am not the only one who has experienced this.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Already covered by NPWS Plan of Management
Hornsby Shire Council	Apple Tree Bay	I would like to address the jetty at Apple Tree Bay. As the jet skis become more popular on the river, we are finding it harder to dock our small river boat particularly on the weekends. The jet skis only require one bollard to tie up, we as a boat, require two bollards. Quite often sitting in the queue at the boat ramp on the weekends, we find the jet skis will see one bollard free and jump the queue time after time and we boats are left sitting in this queue. Not only that, when we finally do get to tie up to two bollards, quite often a jet ski will pull up right next to us and actually scratch out transom as in ride up on the back of our boat to get their spot. My husband and I would like to suggest that you make the jetty one side for boats and one side for jet	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Already covered by NPWS Plan of Management

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
		skis. Thanks and if you could respond to me via email so I know you have received my suggestion as I have tried to submit this idea before but getting rejected for some reason			
Hornsby Shire Council	Berowra Waters	Sewer on-site inspections for houses and marinas needed as sewer pollution is a concerned	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S5.CMP.10
Hornsby Shire Council	Berowra Waters	First Nations Comment: Bar Island cemetery is the burial place of Granny Lewis and several other members of my family from the late 1800's. On a recent visit with family members I noted the path is in disrepair and dangerous and needs repairing. The signage is also in poor condition and needs refreshing.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S8.CMP.01 and S8.CMP.02
Hornsby Shire Council	Berowra Waters	In the last two weeks there has been a spate of boat damage from the wash of large boats around Dangar Island. There seems to be a trend for large boats and jet skis to go in line formation in large groups and speeding. This trend has caused large waves which have resulted in damaged boats. If this occurs upstream from Dangar Island where the river is narrower and mangrove shores are more vulnerable to wash it will cause considerable erosion. A big brush approach with regulation and education to pull in this trend is needed. With the growing boat numbers on the river more education and regulation on boating safety and environmental protection on impacts of boat wash is needed before an accident occurs.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S4.CMP.02
Hornsby Shire Council	Brooklyn	I see an estuary-action around Blue carbon but would like to emphasize the need for on-going protection of seagrass beds	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S4.CMP.02
Hornsby Shire Council	Brooklyn	Provide improved passive recreation access as part of foreshore stabilisation works at end of Wharf Street	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Included this in Action S6.HSC.04
Hornsby Shire Council	Brooklyn	Iâ€™ve noticed some water quality issues around the marinas of sandbrook inlet.	General Comment		
Hornsby Shire Council	Brooklyn	Ive noticed runoff from the train lines easement discharging into the river. it would be good to have some way of preventing or treating this runoff becuase it often contains sprays and pesticides chemicals from	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	There is already a stormwater retention and biofilter area at the end of Government Road.
Hornsby Shire Council	Brooklyn	Love the river as it is full of fish- I come all the time to get fish, had no issues with the river	General Comment		
Hornsby Shire Council	Brooklyn	We have seen more oil sleeks recently- this needs to be looked at	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S7.HSC.01

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
Hornsby Shire Council	Brooklyn	Seagrasses have shifted to the west- hence seagrass warning buoys should be relocated along the cardinal markers, these markers need to be upgraded with new stickers	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Comment passed onto TfNSW
Hornsby Shire Council	Brooklyn	Can we look at the feasibility and cost of dredging in the inlet. Access is currently very limited and there are a lot of people who rely on that access	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.HSC.09
Hornsby Shire Council	Brooklyn	Schedule regular dredging of Sandbrook Inlet in Brooklyn. This inlet serves as a vital gateway for multiple vessels that rely on this sheltered area for berthing, as well as access to various maintenance facilities. Additionally, it provides crucial access for rescue vessels in the event that Brooklyn is closed off due to fires or other disasters. Ensuring the depth of the water in Sandbrook Inlet is adequate is critical, as the current depth creates an unwanted hazard and only getting worse.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S7.HSC.09
Hornsby Shire Council	Crosslands	Ensure that this section of the waterway limits power boats as it is shallow and there sections of sea grasses . Also this area is quite busy with passive boating so jet skies should also be limited to operate in this section	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Comment passed onto TfNSW
Hornsby Shire Council	Crosslands	Make Crosslands swimmable by 2030	General Comment		
Hornsby Shire Council	Crosslands	Would like to make sure this area stays swimmable	General Comment		
Hornsby Shire Council	Dangar Island	I wish to bring to your attention the gradual shoreline erosion along Bradleys Beach on Dangar Island. Considering the immediate location of houses to Bradleys beach having minimal elevation and distance from the shoreline it would be wise to consider erosion works to help mitigate erosion as planned for Great Mackeral beach. There have been a few planting efforts to plant indigenous trees and ground covers to create a matrix of shallow and deep roots	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.HSC.06
Hornsby Shire Council	Dangar Island	I wish to bring to your attention the gradual shoreline erosion along Bradleys Beach on Dangar Island. Considering the immediate location of houses to Bradleys beach having minimal elevation and distance from the shoreline it would be wise to consider erosion works to help mitigate erosion as planned for Great Mackeral beach. Some planting activities have been organised with council but more action is needed	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.HSC.06
Hornsby Shire Council	Dangar Island	At Dangar island we have observed regular net fishing with nets of some hundreds of metres set between foreshore jetties and moorings. This practise so close to shore and shelter seems incompatible with fish stock conservation	Not incorporated into Stage 3 Long List	Outside CMP Scope	Comment passed onto DPI-Fisheries
Hornsby Shire Council	Deadhorse Bay	The magnificent views of the lower Hawkesbury River and natural beauty available for people to appreciate would be amazing if there was a waterside walk created from Parsley Bay around this point to Dead Horse Bay/Lookout Bay. As a bonus having the best swimming beach in the shire accessible for people with mobility issues all the way from the train station around the waterfront would create an amazing walk.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S7.HSC.01

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
Hornsby Shire Council	Deadhorse Bay	Improve access to Deadhorse Bay - allow more of the community to enjoy this beautiful location. Currently only available to those fit enough and brave enough to navigate the difficult bush track. Perhaps a walkway around the foreshore might be an excellent solution.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S7.HSC.01
Hornsby Shire Council	Deadhorse Bay	Enhance access (and amenity) to Hornsby Ku-ring-gai Sailing Club at Dead Horse Bay. This club is focused on teaching children/youth and adults to sail while keeping them engaged and active in life. Improved amenity and access will allow the club to maintain it's programs and continue to engage the local and surrounding community in outdoor recreation and sport.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S7.HSC.01
Hornsby Shire Council	Hornsby	Improve sewage Treatment at STP and throughout network to minimise nutrient and faecal pollution	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Covered by Sydney Water Management Plans
Hornsby Shire Council	Hornsby	Reduce pollution, nutrients etc from all sewage treatment plants in the system	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Covered by Sydney Water Management Plans
Hornsby Shire Council	Hornsby	Improve Sewage Treatment at STP and reduce overflows/leaksthroughout network	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Covered by Sydney Water Management Plans
Hornsby Shire Council	Parsley Bay	My idea is to move the cleaning tables back from the water onto the grass. At the moment the muck from the tables runs off straight into the water	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S7.HSC.01
Hornsby Shire Council	Parsley Bay	Enhanced passive craft (kayaks/sailing boat) launching and riggin facilities here on the east side of the breakwall would benefit many members of the community. It would enable better access to a superb part of the river and encourage higher waterway use. Currently having to share the motor boat ramp is not suitable for passive craft, especically with motor boat drivers who frequently do not obey the 4 knot/no wash signs.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S6.HSC.01
Hornsby Shire Council	Parsley Bay	Develop a boat house facility which can serve the various water sports and recreational clubs operating out of Parsley Bay and the surrounds.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S7.HSC.01
Hornsby Shire Council	Brooklyn	Provide real time weather data including wind on water quality monitoring buoy. To allow river users like fishing, kayaking, sailing to make decisions about safety of planned activities. Currently we can get info from Terry Hills which is 200 metres in the sky and very different to sea level.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S2.CMP.01
Northern Beaches Council	Bayview	Runoff from urban areas through Council owned stormwater outlets is a priority threat to our coastal waterways. When it rains, water washing over these landscapes, can pick up various pollutants along the way, such as fertiliser, pesticides, oil, litter, and soil. This polluted runoff includes excess nutrients, soil and chemicals, and finds its way into rivers and streams, which then flow into our coastal waterways and estuaries. As a result, the water quality of our coastal waterways can decline as a result. This can lead to toxic algal blooms, reduce oxygen levels, and impact aquatic life in our	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S2.NBC.04

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
		waterways, affecting both the environment and the communities that rely on these waterways for fishing, recreation, and tourism. Proper management of diffuse source pollution by Council is crucial to safeguard the health and sustainability of our precious coastal resources.			
Northern Beaches Council	Bayview	i'd like to see the Bayview Baths restored. It would be great to refurbish the old timber structure while keeping the heritage look and feel	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S2.NBC.04
Northern Beaches Council	Bayview	this old wall does does its job to protect the shoreline but it would be great to instal some features to make it a fish habitat. living seawall panels or seahorse hotels or something like that	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S2.NBC.04
Northern Beaches Council	Careel Bay	Would be great to see a number of oyster reefs installed in this area to provide habitat for aquatic animals, clean the water and help accret sand to protect the foreshore from erosion	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Linked to Action S5.CMP.05
Northern Beaches Council	Church Point	Make sourthern Pittwater swimmable! Water quality in this area is frequently poor and needs to be cleaned up. People want to swim here but it's not inviting enough at the moment.	General Comment		
Northern Beaches Council	Great Mackeral Beach	It would be great to have some formal dinghy racks here	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.NBC.04
Northern Beaches Council	Great Mackeral Beach	The path that connects Monash Ave to the wharf is a narrow and relatively low coastal dune. It is one of the most important access routes for most residents at Great Mackerel Beach. This dune has eroded several metres in the last 15 years, most often during large storm events such as a multiday SE low. We would like council help us reduce dune erosion from storm damage and foot traffic by replenishing the sand, asissting with appropriate waterfront planting and installing beach access pathways near the waters edge. Permanent storage of boats on the foreshore is in many cases unnecessary and exacerbates the problem. Council built a vehicle access point to the beachfront at the intersection of Monash Ave and Ross Smith Parade. Owners with level access from their property should bring their kayaks and tinnies to the beach on wheels and take them home for permanent storage after the holidays or weekend. Some people with more challenged access on the hill at Ross Smith Parade and owners of tenders to vessels moored at Mackerel may need a permit. There are 115 dwellings and many households have more than 3 boats. There will never be enough real estate for everyone to store their boats on the beachfront - even if a permit system or boat racks were installed. Boat racks would barely touch the sides of demand and would meet huge opposition from those residents affected at the beachfront. At present most of the community has recognised that the status quo is not sustainable and have taken their boats home so that community-based erosion control planting and sandbagging can take place. A small number of individuals still think they are entitled to install winches and chain	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.NBC.04

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
		boats to trees on the council reserve. This makes regen planting work challenging and for NBC Parks to mow. Letters or stickers from council to have these chains and winches removed would be appreciated.			
Northern Beaches Council	Great Mackeral Beach	Current NBC bi-annual Household Waste Collection location near the wharf contributes to dune erosion. This location is narrow, often restricts access to the wharf when the pile gets too large for the site and is in a very fragile part of the coastal dune. This areas has been prioritised by the community for replanting and sand bags installed to reduce erosion from wave action. In the last 6 months more than 100 native plants have been planted in this area. In the immediate term the location for future collection needs to be moved to a more open site next to the main vehicle access point at the intersection of Monash Avenue and Ross Smith Parade. Longer term the waste contractors should bring over a truck on a barge for kerbside collection, just like they currently do for the green waste collection.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.NBC.04
Northern Beaches Council	Great Mackeral Beach	To reduce dune erosion from foot traffic please install stairs or a ramp to allow direct access from the beach to the wharf on both sides. Keeping foot traffic off the fragile edge of the dune would assist with the establishment of protective native grasses such as lomandra, on the council reserve.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.NBC.04
Northern Beaches Council	Great Mackeral Beach	Please install a ramp for wheel barrows and gorilla carts used by residents to access their properties along the beachfront and on the hill of Ross Smith Parade. There used to be one but it was washed away in the big SE Low storm of 2016. Putting in a proper access path would reduce the number of informal footpaths through the fragile coastal dune that contribute to accelerated erosion	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.NBC.04
Northern Beaches Council	Great Mackeral Beach	Boats have been chained to trees on the council reserve, limiting the space available for recreation. More boats and trailers have appeared recently. Owners should be encouraged to park their boats on their own land rather than use them to discourage public use of the reserve.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.NBC.04
Northern Beaches Council	Ku-ring-gai Chase	Please rewild the entire West Head peninsula by building a roadside feral-proof fence from McCarrs Creek Road to Akuna Bay, by removing all feral species inside the fence, and by reintroducing local native species that have been preyed upon.	Not incorporated into Stage 3 Long List	Outside CMP Study Area	Passed onto NPWS for consideration in future planning
Northern Beaches Council	McCarrs Creek	Create a walking track from the McCarrs Creek bus stop to Mackerel Beach Wharf, visiting as many park attractions as possible along the way.	Not incorporated into Stage 3 Long List	Outside CMP Scope	Passed onto NPWS for consideration in future planning
Northern Beaches Council	Palm Beach	We need to retain and protect this seagrass meadow (education on boating activities around this area, no anchoring, no dogs) could promote its environmental significants - eco tourism ect.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Covered by existing Action - S4.CMP.02
Northern Beaches Council	Pittwater	We are worried about vessel pump out impacts on waterways. Can we get transport safety officers to also inspect pump out systems to make this more efficient. More compliance officers are also needed.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing actions - S5.CMP.07 and S5.CMP.08
Northern Beaches Council	Pittwater	Replace all traditional chain moorings with Seagrass Friendly Moorings! It will be one of the best ways to increase the aquatic animal population	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing actions - S5.CMP.03

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
Northern Beaches Council	Pittwater	We installed a seagrass mooring as an environmentally friendly option more than 10 years ago. It has been a nightmare. Local mooring contractors refuse to service them, and at one stage it was 3 years before we found a diver who could do it. Boat insurance becomes invalid if a mooring has not been serviced within 12 months. Waterways in Pittwater are well aware of the problem during their mooring audits but have no solutions. Until there is a reliable and cost effective method of servicing them annually, it is irresponsible to recommend them to boat owners.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing actions - S5.CMP.03
Northern Beaches Council	Sandy Beach	Runoff from the road during rainfall events strip some sand off the beach and it smothers the sea grass beds. Some stormwater controls would help here	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S2.NBC.04
Northern Beaches Council	Sandy Beach	Similar stormwater runoff issues here and smothering of seagrass. Stormwater retention and aquifer recharge could work well here	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S2.NBC.04
Northern Beaches Council	Sandy Beach	We need more signage that tells people the importance of seagrass of whites seahorse. The signage doesnâ€™t have to be overload, it can be neat and not over the top. But people need to know how important these things are.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Passed onto Fisheries
Northern Beaches Council	Sandy Beach	People taking their dogs down to the beach is damaging precious seagrass beds. Can we get more compliance about dogs here please the seagrass is important.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Already covered by existing Council policy
Northern Beaches Council	Scotland Island	Urge NSW State Govt and Sydney Water to build infrastructure to connect Scotland Island to Water and Sewerage facilities. This will improve Pittwater's water quality.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Outside scope of CMP - passed onto Sydney Water and NBC wastewater team
Northern Beaches Council	Scotland Island	Advocate to the State Government Minister for water for the connection of sewerage and water to Scotland Island to preserve the Pittwater estuary from sewerage runoff following heavy rain. The nutrients being washed into Pittwater not only affect the health of swimmers but contribute to the spread of Caulerpa Taxifolia, which is destroying native sea grasses and therefore the number of fish.	Not incorporated into Stage 3 Long List	Already covered by alternate plan or policy	Outside scope of CMP - passed onto Sydney Water and NBC wastewater team
Northern Beaches Council	Snappermans Beach	This car park and seawall and the northern side of the wharf is a lot lower than on the other side of the wharf. Iâ€™ve seen this overtop with waves and push cars around. Can we please raise the seawall and the car park because with sea level rise this will only get worse over time.	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S3.NBC.04
Northern Beaches Council	Snappermans Beach	In heavy rainfall events water will run down the road, miss storm drains and flood the car park below. Something needs to be done to slow water down in the roadsides and guide it to a filtered drainage system, whereby it can easily flow into the pipes and to the ocean.	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by existing action - S2.NBC.04
Northern Beaches Council	Terrey Hills	In 2016 St Anthonys Kierans Creek Landcare Group at the Catholic Church, 46 Myoora Rd Terrey Hills formed to restore and rehabilitate Kierans Creek which comes from a spring underneath Hills Flower Market, 287 Mona Vale Rd, crosses 46, 42-44 Myoora Rd, the corner of 40 Myoora Rd, under Myoora Rd, joins with Neverfail Creek (another spring-fed creek), then flows into Cowan Creek. The creek and wildlife corridors are under stress from increased development, water run-off from	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Much of this is covered by Council BAU DA processes. Others are covered by existing actions around Rip Zone Management and

LGA	Locality	Comment (verbatim)	CMP Progression Status	Rationale	Additional Comments
		hard surfaces and weed infestation. There is erosion, creek widening, destabilisation of the channel banks and undermining vegetation; Kierans Creek needs to be considered as a defined fluvial channel with defined creek banks and bed and be permitted to run freely and cared for as a functional habitat corridor. It should not be considered as a creek only downstream of Myoora Rd and should not be culvertised. We would like incentives for collaboration between the private landholders in caring for the whole creek as a waterway and wildlife corridor. We collaborate with the Northern Region Landcare Network, the Northern Beaches Council Bushcare Network, Dundundra Reserve Trust, Terrey Hills- Duffys Forest Community and Local Schools. We ask:1.Urgently look at current plans submitted for 40 Myoora Rd 2.Recognise Kierans Creek from its spring fed origin 3. Contact Geologist John Byrnes and local people who know about the spring 4.Consult with the Aboriginal knowledge holders through the Northern Beaches AECG and the Aboriginal Support Group 5.Encourage the restoration of the riparian zones of the creek on private properties 6. With new developments, reduce the amount of hard surfaces and incorporate stormwater harvesting for irrigation and toilet flushing to reduce runoff 7. Ensure that developments and businesses mitigate the upstream risks to the creek during construction and ongoing 8. Obligate developers to play a positive part in contributing to social and ecological community obligations.			Engagement with TO knowledge holders
Northern Beaches Council	The Basin	I think the rock seawall should be removed and extend the sandbag seawall across the foreshore. sandbags look batter and you can walk across them to the water	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.SGA.04
River Wide Action	Wisemans Ferry	seawall design guidelines canh/should also consider safe access to the waterway for people. Look at the Lake Macquiare examples of foreshore design guidelines - this could be done for the hawkesbury	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S3.CMP.06
The Hills Shire Council	Lower Portland	erosion close to the road	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S6.THC.06
The Hills Shire Council	Wisemans Ferry	Erosion has resulted in a reduction of safe access to the water, and the need for stabilisation - this needs to be considered in planning	Incorporated into in Stage 3 Long List	Suggestion covered by existing action, or a comment on existing action	Already covered by Action S6.THC.03
The Hills Shire Council	Wisemans Ferry	Iâ€™d like to see regular surveys of the river. Annually at least. Itâ€™s more difficult for navigation in certain stretches it would benefit safety to understand changes	Incorporated into in Stage 3 Long List	New Idea incorporated into Long List	New Option S2.CMP.04

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APPENDIX B
STRATEGIC DIRECTION SUMMARY

HAWKESBURY-NEPEAN RIVER SYSTEM
COASTAL MANAGEMENT PROGRAM: STAGES 3 - 4

STRATEGIC DIRECTION SUMMARY DOCUMENT

Version 1

21 December 2023

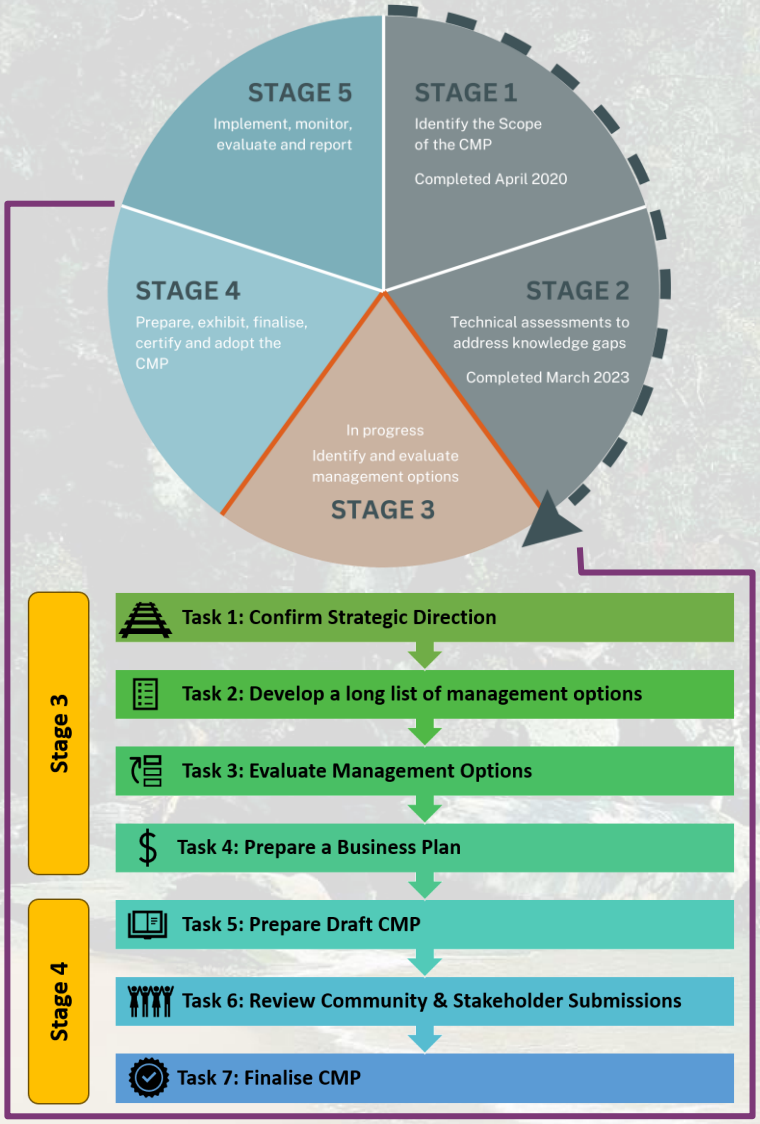


Figure 1 Project Structure

INTRODUCTION

The purpose of this document is to provide clear guidance for the strategic direction for the delivery of Stages 3 and 4 of the Hawkesbury-Nepean River System (HNRS) Coastal Management Program (CMP).

The project is being delivered through the five-stage process set out in the NSW Coastal Management Manual (see Figure 1). After successful completion of the Stage 1 Scoping Study in 2020, and a suite of Stage 2 technical studies in early 2023, Stage 3 of the project commenced in late 2023.

Stages 3 and 4 of the CMP will be delivered through a sequence of discrete tasks shown in Figure 1. The first task involves the Project Steering Committee - comprising representatives of the 6 Partner Councils (PCs) and the Department of Planning and Environment (DPE) - confirming the strategic direction of the project. This requires consideration of three key factors, shown in Figure 3.

Figure 3 Strategic Direction Premise

A ***Strategic Direction Workshop*** was held with the Steering Committee members on 5 December 2023 (see Figure 2). The purpose of the workshop was to facilitate decision making in these areas, and to guide development of the CMP.

The outcomes of this workshop are summarised in this document.

Figure 2 Strategic Direction Workshop

WHAT ARE WE WORKING TOWARDS?

Vision, Purpose, and Objectives

The Purpose, Vision, and Objectives for this CMP were co-designed by the Partner Councils in Stage 1 and are detailed in the Scoping Study Report. The Vision and Purpose play a crucial role in the CMP hierarchy, as they provide the framework for defining strategic objectives. The Objectives, in turn, provide an operational roadmap for development of specific actions and targets.

The Purpose, Vision, and Objectives for this CMP were reaffirmed at the Strategic Direction workshop by the Project Steering Committee and will provide the framework for strategic decision-making through the project delivery. They are summarised in Figure 4 .

There was consensus at the workshop for the idea that in order to realise its Vision and achieve its Objectives, the CMP should adopt a "systems approach" to addressing issues, risks, and opportunities across the HNRS. This represents the most effective way to meaningfully address estuary health issues and the impacts of urban catchment pressures.

This will include addressing catchment-based stressors to the greatest extent practicable, with an acute knowledge of the CMP certification requirements set out in the *Coastal Management Act 2016* (CM Act) and NSW Coastal Management Manual.

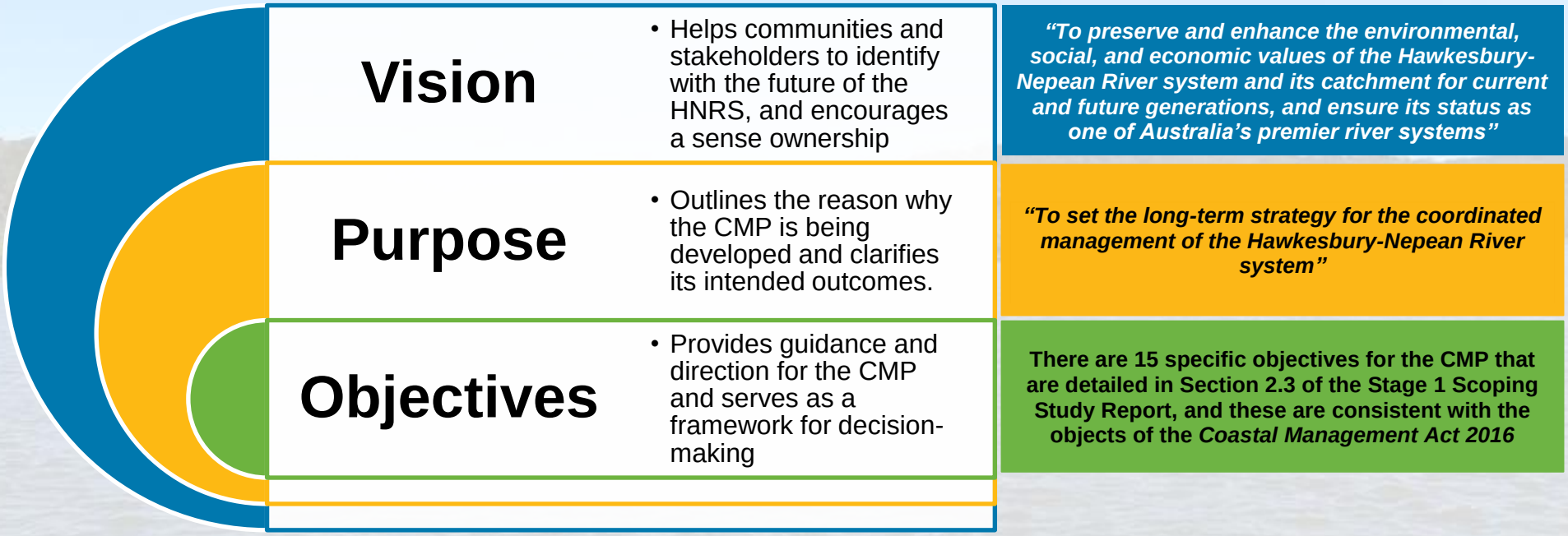


Figure 4 Vision, Purpose, and Objectives for the CMP

WHAT ARE WE WORKING TOWARDS?

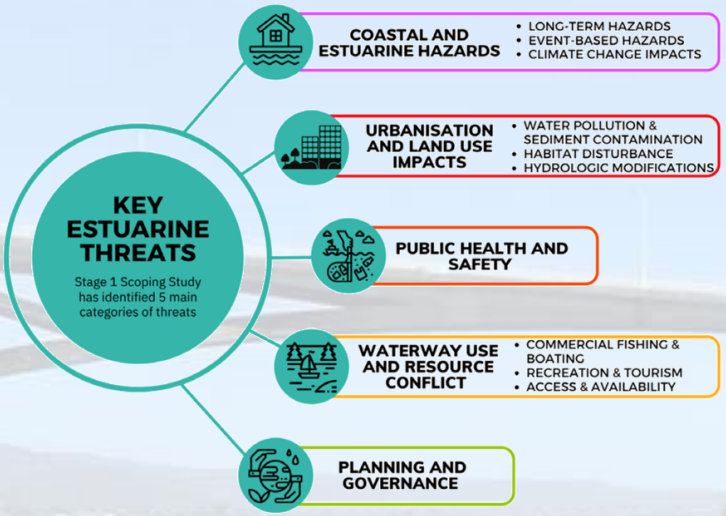


Figure 5 Key threats across the HNRS

Issues, Risks, and Opportunities

A key component in determining the strategic direction for the CMP is an in-depth understanding of the issues and risks that it must address. In Stage 1, a First Pass Risk Assessment (FPRA) was undertaken to assess the impact of 67 different stressors that were banded under five (5) threat categories (see Figure 5). In Stage 2, these key issues and risks were summarised in a series of 6 factsheets to help inform communities and other relevant stakeholders, and to guide decision making in Stages 3 and 4. A range of detailed studies were also undertaken in Stage 2 in order to develop an undertaking of a number of key issues, to inform the development of management actions in Stage 3:

HNRS Physical and Ecological Processes Abridgement Report

HNRS Bank Erosion Assessment and Options Report

Pittwater Beach Erosion and Shoreline Recession Assessment

HNRS Coastal Inundation Study

HNRS Community Values and Uses Report

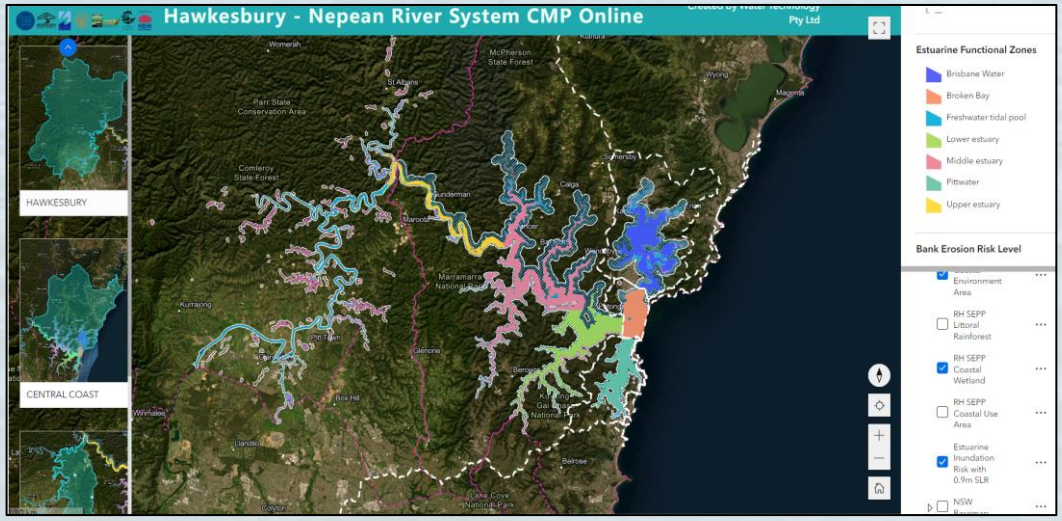


Figure 6 CMP Online Mapping Portal for Issues and Risks

To help identify and map priority areas at a local level, an online mapping portal has been established for the project to display and interrogate key datasets and share this information with key stakeholders. This portal includes a range of information from the Stage 2 studies listed above, as well as broader NSW government environmental datasets used in the FPRA, such as the NSW Estuary Health Risk dataset, the NSW River Condition Index, Catchment Land Use Mapping, and additional coastal hazard mapping datasets.

To aid in decision making, the mapping portal also includes relevant administrative datasets such as mapping of Coastal Management Areas from the Resilience and Hazards SEPP, as well as LGA boundaries and catchment mapping. The portal will be updated with additional relevant datasets as the project progresses.

HOW WILL WE GET THERE?

The Structure of the CMP Document

The Challenge:

The CMP will need to address risks and opportunities at a range of geographical and organisational scales. The CMP will need to simultaneously:

Address - in a coordinated and integrated manner - the interconnected issues that exist at a system-wide scale and extend across the catchment, waterways, and foreshores of the HNRS. This includes management of estuary health, water quality, ecological risks, coastal hazards, and development pressures.

Retain the granularity, focus, and detail to address the multitude of localised issues, risks, and opportunities that exist across a very large study area.

Enable a collaborative approach to management of the HNRS between the stakeholders (especially the Partner Councils), while providing all stakeholders with a clear understanding of their individual financial and resourcing commitments.

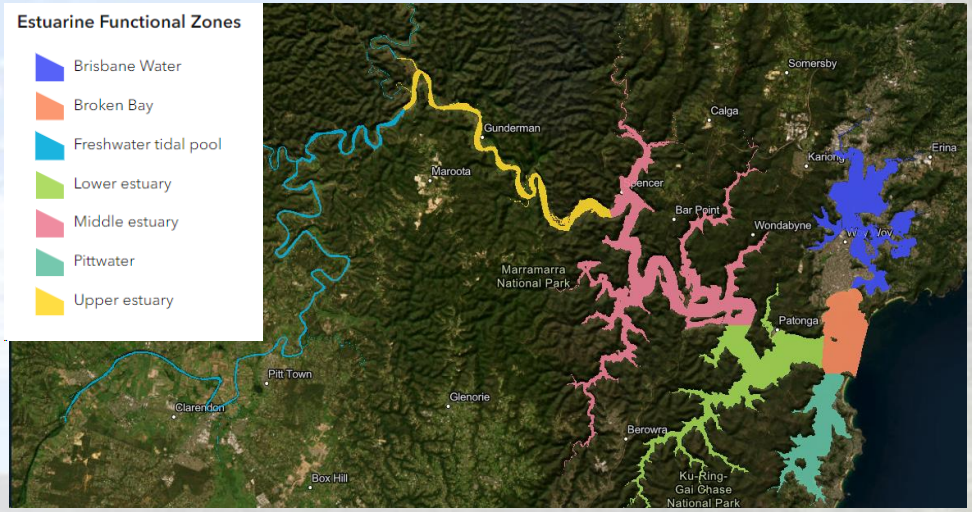


Figure 7 The HNRS is a large, but interconnected system comprising 7 distinct estuarine functional zones

Decision Point on Strategic Direction:

The structure of the CMP document will utilise a hierarchical approach, depicted in Figure 9 (see Page 7).

The CMP will identify and address system-based issues and opportunities through a series of integrated and coordinated HNRS management strategies.

Sitting beneath these strategies will be a series of interconnected implementation plans for each LGA. This will provide each Partner Council with a clear program of both its individual management responsibilities and its collaborative commitments to the CMP.

HOW WILL WE GET THERE?

Approach to Catchment Based Issues

The Challenge:

The CMP represents generational opportunity to address estuary health and system-scale risks and opportunities in a coordinated and collaborative way. This will involve addressing issues that are based in the broader HNRS catchment area. However, Section 13(2) of the CM Act specifies that:

'*a Coastal Management Program may be made in relation to the whole, or any part of the area included* ***within the coastal zone***'.

This means that there is no provision in the CM Act for land or actions to be included in a certified CMP, where that land or actions reside outside the legally defined coastal zone - which is based on RH SEPP mapping of the four (4) coastal management areas:

- Coastal Use Area - typically a 250 m buffer around the estuary foreshore.
- Coastal Environment Area – the estuary waterways plus a variable buffer of 100-500 m beyond the foreshore.
- Coastal Wetland & Littoral Rainforest Area(s).
- Coastal Vulnerability – the areas directly affected by coastal hazards.

Therefore, the legally defined CMP study area represents only 2.2% of the total HNRS catchment area – see Figure 8.

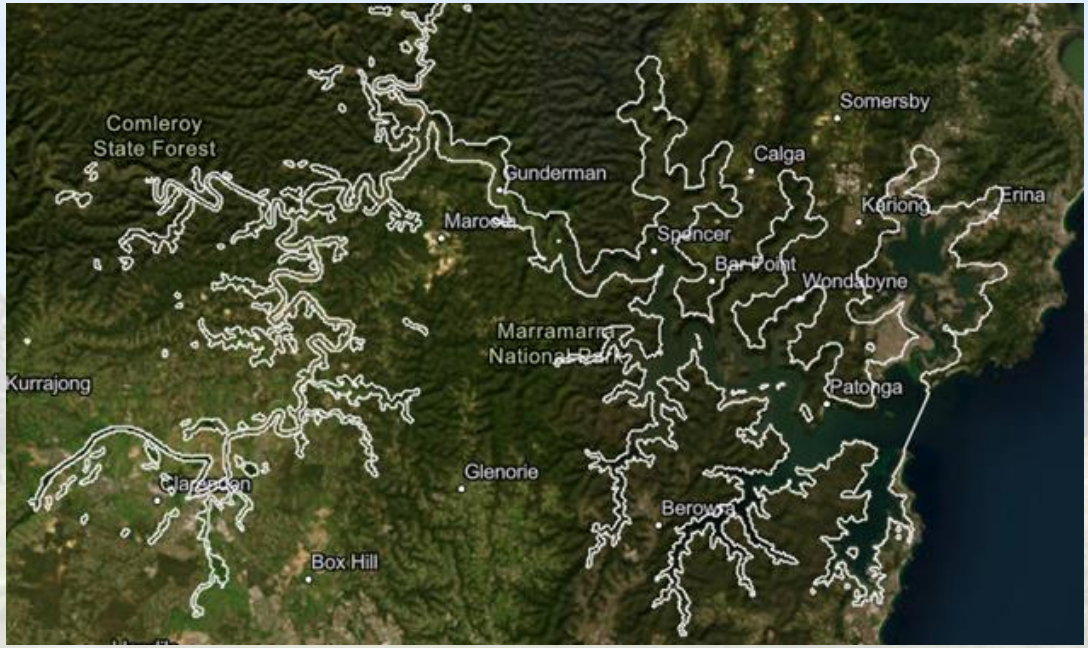


Figure 8 **The legally defined CMP coastal zone of the HNRS (white outline)**

Decision Point on Strategic Direction:

The structure of the CMP document will utilise a specific document sub-section for any strategies or actions that are located outside of the coastal zone in the broader HNRS catchment - as depicted in Figure 9 (see Page 7).

The catchment-based "companion section" will clearly be labelled as being external to the certifiable portion of the CMP. However, it will still be included in the CMP document body - in order to retain linkages to coastal zone actions and ensure that management of the estuary system is undertaken in a coordinated and integrated manner.

Representatives from DPE's Marine, Coastal, Estuary and Flooding (MCEF) team confirmed at the workshop that this approach would allow the CMP to be legally certified under the requirements of the CM Act.

HOW WILL WE GET THERE?

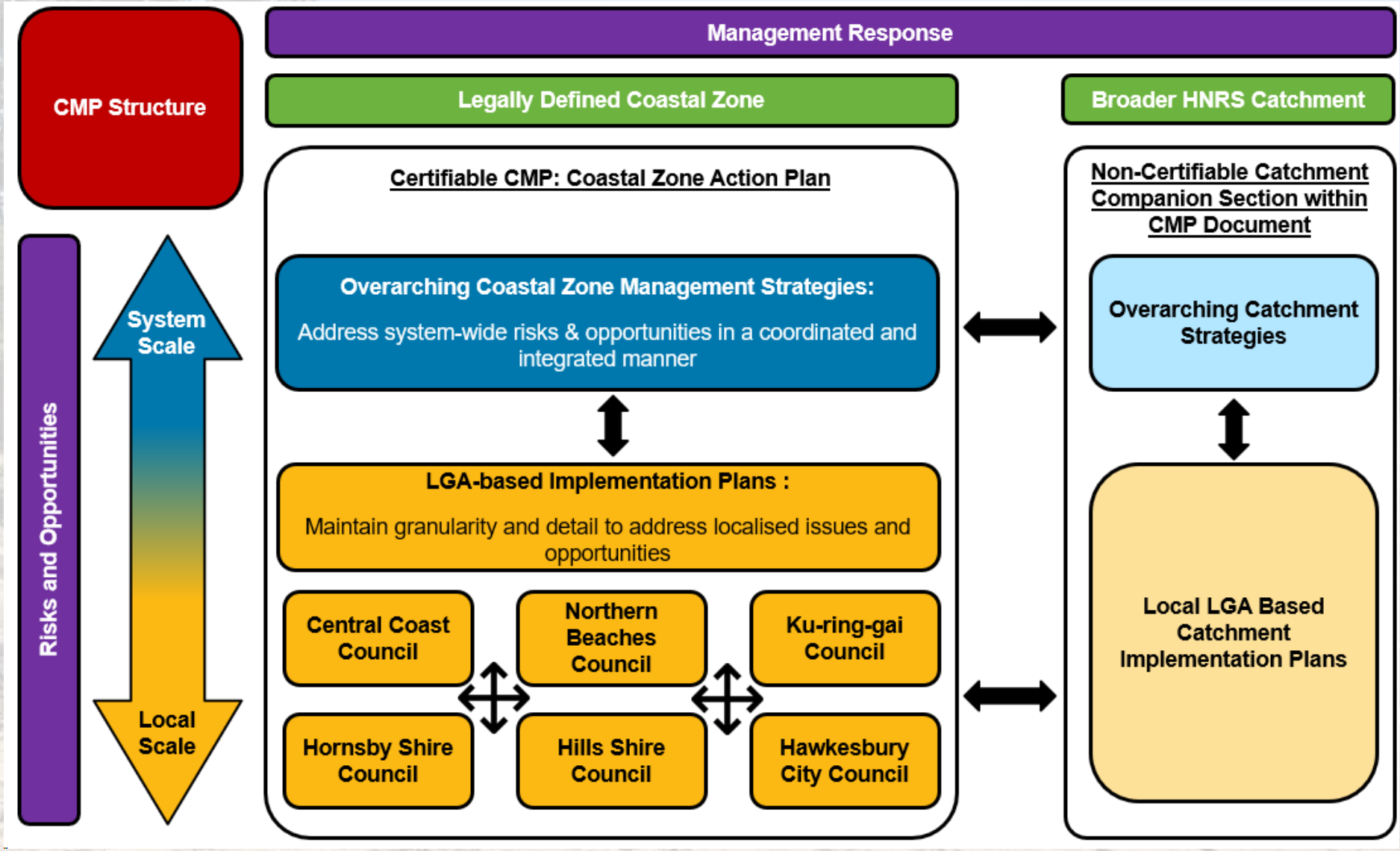


Figure 9 Proposed CMP Structure

HOW WILL WE ENGAGE ALONG THE WAY?

Community & Stakeholder Engagement Plan

A key deliverable for the project at the outset of Stage 3 (Task 1) has been to progress the Community and Stakeholder Engagement Strategy from Stage 1 into a detailed Community and Stakeholder Engagement Plan for implementation in Stages 3 and 4 (see Figure 10).

The purpose of the Plan is to:

- Reaffirm the overarching approach to community and stakeholder engagement for Stages 3 and 4.
- Provided a detailed action plan outlining the methods, timing, and responsibilities for engagement activities.

During November 2023, coastal technical experts and communications/community engagement staff from each of the Partner Councils were interviewed to help inform the engagement plan. This included developing a detailed understanding of the local engagement methods and tools that work within each LGA, and identification of important local stakeholder groups and existing engagement networks.

The first draft of the Plan was submitted to the Steering Committee in December 2023. The Plan will serve as a living document and be updated to reflect progress as the project progresses.

Plan Overview

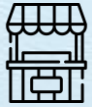
The Plan includes:

- An overview of the statutory and mandatory requirement for engagement set out in the CM Act and the Coastal Management Manual.
- A detailed stakeholder analysis, including identification of over 100 local community stakeholder groups, 15 relevant State Government agencies, and a range of First Nations representative groups and upper catchment stakeholders.
- A detailed engagement action plan that includes preparation, implementation, and closeout of each engagement activity.

Decision Point: Engagement Approach

The CMP will utilise a diverse range of engagement tools.

Online engagement tools, such as web-based mapping portals to harness community ideas and feedback on management actions.



A suite of in-person drop-in sessions at strategic locations across the study area.

The potential leveraging of existing community events to promote the CMP and encourage involvement in CMP activities.

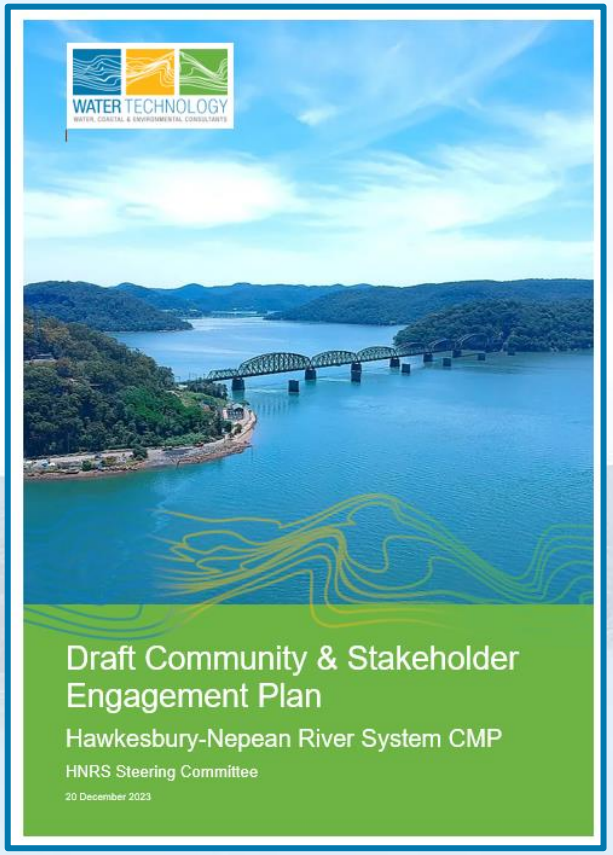


Figure 10 **The Draft (Living) Community and Stakeholder Engagement plan**

The Plan also includes a strategy for engagement with diverse and disparate communities and stakeholder across the upper catchment of the HNRS. This approach was discussed at the Strategic Direction workshop in December 2023. Details of the decision points and the proposed approach can be found inside the Plan.

THE NEXT STEPS

Briefing Stakeholders

The next step in the project will be to brief relevant stakeholders about the Strategic Direction of the CMP, and to provide information about the forthcoming Stage 3 Community and Stakeholder Engagement activities. This will include briefing the following stakeholders in early 2024:

- State agency stakeholder working group
- First Nations representative groups
- Upper catchment stakeholder working group

Task 2: Option Identification

Task 2 for the project will be undertaken throughout early to mid-2024, and will involve developing a suite of potential management options to address risks identified in Stages 1 and 2. A key step in this process will be to harness the technical expertise and local knowledge of relevant stakeholders and the community. This will be undertaken through a combination of facilitated workshops and more personalised engagement activities.

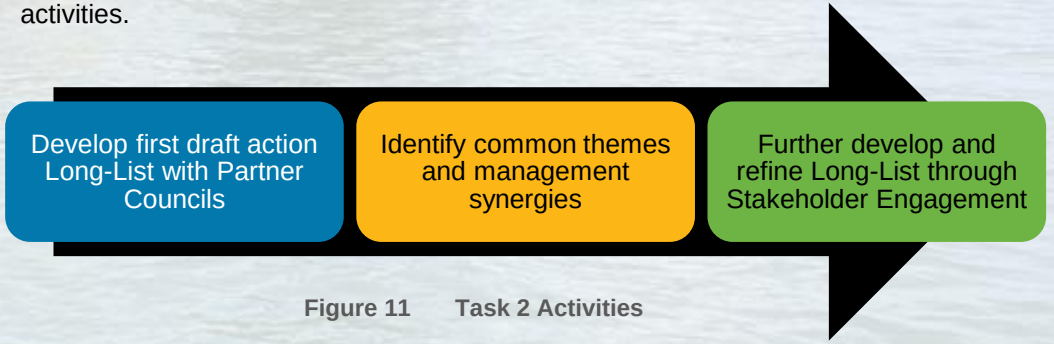


Figure 11 Task 2 Activities

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APPENDIX C
ELECTRONIC APPENDIX STAGE 3 CMP OPTIONS LONG LIST AND OPTION ASSESSMENT

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APPENDIX D
ACCEPTABILITY ASSESSMENT OUTCOMES

Table D-1 Acceptability Assessment Outcomes

ID	Action Name		Community	State Agencies	First Nations Groups	Total Accept. Score
S1.CMP.01	Implement the CMPs formal governance partnership for the river system		0.95	1.00	1.00	**0.95**
S1.CMP.02	Develop and execute a communications plan for Stage 5 of the CMP		1.00	1.00	1.00	**1.00**
S2.CMP.01	Design and implement an integrated and coordinated water quality monitoring program		0.98	1.00	1.00	**0.98**
S2.CMP.02	Implement a bank stability and condition monitoring program across the estuary foreshores		0.95	1.00	1.00	**0.95**
S2.CMP.03	Implement a bank stability and condition monitoring program across the creeks and waterways of the catchment		1.00	1.00	1.00	**1.00**
S2.CMP.04	Undertake periodic surveys of the River in between Wisemans Ferry and Richmond		1.00	1.00	1.00	**1.00**
S3.CMP.01	Review and update Partner Council planning instruments to ensure a consistent best practice approach to managing stormwater and downstream estuarine water quality		0.92	1.00	1.00	**0.92**
S3.CMP.02	Review and update coastal hazard risk planning controls every 10 years		0.83	1.00	1.00	**0.83**
S3.CMP.03	Encourage eco-friendly features in seawall development applications		0.82	1.00	1.00	**0.82**
S3.CMP.04	Undertake a Hawkesbury River System Blue Carbon Scoping Study		0.82	1.00	1.00	**0.82**
S3.CMP.05	Prepare a Hawkesbury River Coastal Wetland Sea Level Rise Adaptation Strategy		0.95	1.00	1.00	**0.95**
S3.CMP.06	Develop Foreshore Stabilisation and Rehabilitation Guidelines for the HNRS		1.00	1.00	1.00	**1.00**
S3.CMP.07	Support the proposal for the development of the Ku-ring-gai GeoRegion		1.00	1.00	1.00	**1.00**
S4.CMP.01	Design and Implement a Community Engagement and Education Program to support the vision and objectives of the CMP		0.95	1.00	1.00	**0.95**
S4.CMP.02	Develop an education package for recreational boaters		1.00	1.00	1.00	**1.00**
S4.CMP.03	Community education and outreach program for estuary frontage communities		0.94	1.00	1.00	**0.94**
S4.CMP.04	Develop and implement a Hawkesbury River school environmental education program focused on water quality, estuary health, and coastal hazards		0.95	1.00	1.00	**0.95**
S4.CMP.05	Implementing a community-based carp fishing initiative		1.00	1.00	1.00	**1.00**
S4.CMP.05	Hawkesbury River Marine Compliance & Education Campaign		1.00	1.00	1.00	**1.00**
S5.CMP.01	Prepare a Litter Prevention Strategy for the Hawkesbury River System		0.93	1.00	1.00	**0.93**
S5.CMP.02	Identify opportunities to retrofit existing public seawalls with eco-friendly features		1.00	1.00	1.00	**1.00**
S5.CMP.03	Investigate opportunities to increase uptake of environmentally friendly moorings (EFM) across the lower estuary		0.91	1.00	1.00	**0.91**
S5.CMP.05	Undertake a coordinated riparian rehabilitation works program across the River System		0.94	1.00	1.00	**0.94**
S5.CMP.06	Continue to support Floating Landcare (and other relevant Landcare networks) across the river system		0.98	1.00	1.00	**0.98**
S5.CMP.07	Develop a strategy for managing vessel pumpouts across the Hawkesbury River System		0.98	1.00	1.00	**0.98**

ID	Action Name		Community	State Agencies	First Nations Groups	Total Accept. Score
S5.CMP.08	Engage with government and the community to reduce the impacts of liveaboards (and associated discharges) on the waterways		0.89	1.00	1.00	**0.89**
S5.CMP.09	Support the NSW Government's breeding and release program for the endangered White's Seahorse		0.98	1.00	1.00	**0.98**
S5.CMP.10	Coordination and resource sharing for inspection of OSMS at key river settlements		0.95	1.00	1.00	**0.95**
S5.CMP.11	Fencing of riparian foreshores on high risk agricultural lands		0.95	1.00	1.00	**0.95**
S5.CMP.12	Undertake a coordinated creek rehabilitation works program across the Partner Council's upper catchment waterways		1.00	1.00	1.00	**1.00**
S6.CMP.01	Activate the "Coastal Hazard Emergency Action Sub-Plans" (CZEAS) for each beach as required after storm events		1.00	1.00	1.00	**1.00**
S6.CMP.02	Riverine bank erosion recovery works after erosion events		0.94	1.00	1.00	**0.94**
S6.CMP.03	Develop a Tide Alert Calendar Tool for the low lying communities of the river system to encourage citizen science in monitoring tidal inundation		1.00	1.00	1.00	**1.00**
S7.CMP.01	Develop a Hawkesbury-Nepean River Maritime Infrastructure Strategy		0.95	1.00	1.00	**0.95**
S7.CMP.02	Undertake a trial of webcams at high usage boat ramps		0.97	1.00	1.00	**0.97**
S7.CMP.03	Undertake a feasibility investigation for the Great Hawkesbury Walk - connecting Penrith to Brooklyn via Wisemans Ferry		0.85	1.00	1.00	**0.85**
S7.CMP.03	Update and Extend the Upper Hawkesbury River Dredging Investigations		1.00	1.00	1.00	**1.00**
S8.CMP.01	Engage First Nations teams where appropriate to undertake bush regeneration works including weeding and revegetation		0.86	1.00	1.00	**0.86**
S8.CMP.02	Further develop and implement community education programs for awareness and appreciation of Indigenous cultural heritage		0.85	1.00	1.00	**0.85**
S8.CMP.03	Support cultural education and awareness of estuary health issues for First Nations Groups		0.78	1.00	1.00	**0.78**
S8.CMP.04	Prepare a heritage tourism strategy and plan for the Hawkesbury River System		0.80	1.00	1.00	**0.80**
S8.CMP.05	Develop a Hawkesbury heritage central display		0.87	1.00	1.00	**0.87**
S8.CMP.06	Identify opportunities for, and undertake cultural land management practices, including cultural burning		0.87	1.00	1.00	**0.87**
S8.CMP.07	Engage with local First Nations Groups to protect and preserve cultural heritage items across the coastal zone		0.88	1.00	1.00	**0.88**
S9.CMP.01	Collaborate with local universities and research institutions to establish a list of research priorities for the Hawkesbury-Nepean River System		0.92	1.00	1.00	**0.92**
S9.CMP.02	Establish information sharing and reporting protocols for the identification of pest species		0.97	1.00	1.00	**0.97**
S3.THC.01	Coastal Wetland Mapping Update		1.00	1.00	1.00	**1.00**
S6.THC.01	Implement the outcomes of the Blundells Swamp Inundation Mitigation Study		1.00	1.00	1.00	**1.00**
S6.THC.02	Inundation and Drainage Study at Michael Duggan Reserve		1.00	1.00	1.00	**1.00**
S6.THC.03	Lambs Creek Inundation and Drainage Study		1.00	1.00	1.00	**1.00**
S6.THC.04	Erosion remediation at Wisemans Ferry		1.00	1.00	1.00	**1.00**
S6.THC.05	Erosion Remediation at Webbs Creek Ferry Foreshore		1.00	1.00	1.00	**1.00**
S6.THC.05	Erosion investigation and design at River Road, Leets Vale		1.00	1.00	1.00	**1.00**
S6.THC.06	Erosion remediation at River Road, Lower Portland		1.00	1.00	1.00	**1.00**

ID	Action Name		Community	State Agencies	First Nations Groups	Total Accept. Score
S2.NBC.01	Install a CoastSnap Camera Cradles at strategic locations across the LGA foreshore		1.00	1.00	1.00	**1.00**
S2.NBC.02	Implement a Pittwater Beach Monitoring Program		0.98	1.00	1.00	**0.98**
S2.NBC.03	Install permanent tide gauges at strategic locations around the waterway		1.00	1.00	1.00	**1.00**
S2.NBC.04	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure		1.00	1.00	1.00	**1.00**
S3.NBC.02	Develop and update coastal hazard information		1.00	1.00	1.00	**1.00**
S3.NBC.03	Update planning certificates with coastal hazard information		1.00	1.00	1.00	**1.00**
S3.NBC.04	Develop planning controls to ensure buildings are sited and designed to consider coastal hazard information including coastal erosion and estuarine inundation.		1.00	1.00	1.00	**1.00**
S3.NBC.04	Long Term Adaptation Plan for Coastal Assets and Infrastructure		1.00	1.00	1.00	**1.00**
S5.NBC.01	Investigate the feasibility of naturalisation of Careel Creek		1.00	1.00	1.00	**1.00**
S5.NBC.02	Upgrade the Careel Bay litter trap		1.00	1.00	1.00	**1.00**
S5.NBC.03	Investigate WSUD solutions within the Careel Creek Drainage catchment.		1.00	1.00	1.00	**1.00**
S6.NBC.01	Foreshore naturalisation and restoration works at Station Beach		1.00	1.00	1.00	**1.00**
S6.NBC.02	Beach scraping and sand redistribution works at the western end of Sand Point Beach		1.00	1.00	1.00	**1.00**
S6.NBC.03	Foreshore naturalisation and restoration works along Sand Point Beach		0.75	1.00	1.00	**0.75**
S6.NBC.04	Great Mackerel Beach Foreshore Master Plan		1.00	1.00	1.00	**1.00**
S6.NBC.05	Foreshore naturalisation and restoration works at Currawong Beach		1.00	1.00	1.00	**1.00**
S6.NBC.06	Foreshore naturalisation and restoration works at Clareville Beach Reserve		1.00	1.00	1.00	**1.00**
S6.NBC.07	Foreshore naturalisation and restoration works at Bayview Park foreshore		1.00	1.00	1.00	**1.00**
S6.NBC.08	Coastal hazard resilience for both built and natural asset owners		1.00	1.00	1.00	**1.00**
S6.NBC.12	Pittwater dredging and beach nourishment feasibility investigation and implementation		0.94	1.00	1.00	**0.94**
S6.NBC.13	Investigate the feasibility of channel maintenance works within Careel Bay and Careel Creek		1.00	1.00	1.00	**1.00**
S7.NBC.01	Upgrade and repair of waterway access points		0.95	1.00	1.00	**0.95**
S7.NBC.06	Boat Ramp Upgrade		1.00	1.00	1.00	**1.00**
S9.NBC.01	Pittwater Wave Climate Study		1.00	1.00	1.00	**1.00**
S4.KRG.01	Support Community Engagement undertaken as part of the Ku-ring-gai Council – Water Sensitive City Strategy		1.00	1.00	1.00	**1.00**
S5.KRG.01	Prepare and implement a catchment study and management plan for the Cowan Creek catchment		1.00	1.00	1.00	**1.00**
S5.KRG.02	Update the catchment studies for Ku-ring-gai Creek and Lovers Jump Creek		1.00	1.00	1.00	**1.00**
S2.HSC.01	Install a permanent tide gauge at Berowra Waters		0.80	1.00	1.00	**0.80**
S2.HSC.02	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure		1.00	1.00	1.00	**1.00**
S5.HSC.01	Installation of Stormwater Quality Improvement Devices at Parsley Bay		1.00	1.00	1.00	**1.00**
S5.HSC.02	Installation of Stormwater Quality Improvement Devices at The Gateway		1.00	1.00	1.00	**1.00**
S5.HSC.03	Installation and upgrade of Stormwater Quality Improvement Devices at Brooklyn Park		1.00	1.00	1.00	**1.00**

ID	Action Name		Community	State Agencies	First Nations Groups	Total Accept. Score
S6.HSC.01	Repair and Renewal of the Parsley Bay Breakwater		1.00	1.00	1.00	**1.00**
S6.HSC.02	Repair and renewal of seawall protecting loading dock access road		1.00	1.00	1.00	**1.00**
S6.HSC.03	Sea Level Rise adaptation for Brooklyn Road		1.00	1.00	1.00	**1.00**
S6.HSC.04	Wharf Street Foreshore Improvement Works		1.00	1.00	1.00	**1.00**
S6.HSC.05	Repair and renewal of seawall at the base of the Bar Island jetty		1.00	1.00	1.00	**1.00**
S6.HSC.06	Bradleys Beach Foreshore Restoration works		1.00	1.00	1.00	**1.00**
S6.HSC.07	Repair and renewal of seawall from Brooklyn to Parsley Bay		1.00	1.00	1.00	**1.00**
S7.HSC.01	Develop Infrastructure strategy for the Lower Hawkesbury		1.00	1.00	1.00	**1.00**
S7.HSC.02	Parsley Bay Loading Dock Upgrade		1.00	1.00	1.00	**1.00**
S7.HSC.03	Parsley Bay Dredging Feasibility Study		1.00	1.00	1.00	**1.00**
S7.HSC.04	Upgrade of Kangaroo Point Pumpout Pontoon		1.00	1.00	1.00	**1.00**
S7.HSC.05	Upgrade of McKell Park Tidal Pool		1.00	1.00	1.00	**1.00**
S7.HSC.06	Upgrade of public pontoons at Parsley Bay		1.00	1.00	1.00	**1.00**
S7.HSC.07	Dangar Island Loading Dock Upgrade		1.00	1.00	1.00	**1.00**
S7.HSC.08	Upgrade of the Wisemans Ferry old public wharf		1.00	1.00	1.00	**1.00**
S7.HSC.09	Sandbrook Inlet Dredging Feasibility Study		1.00	1.00	1.00	**1.00**
S7.HSC.10	Bayden Powell Avenue Dinghy and Foreshore Access improvement		1.00	1.00	1.00	**1.00**
S7.HSC.11	Design and install boardwalk from Brooklyn Public Wharf to Lower McKell Park		1.00	1.00	1.00	**1.00**
S3.HCC.01	Write a specific WSUD chapter in Hawkesbury City Council DCP		1.00	1.00	1.00	**1.00**
S3.HCC.02	Undertake a review and update of the Council OSSM policy.		1.00	1.00	1.00	**1.00**
S3.HCC.03	Environmental Conservation zoning for coastal wetland areas		1.00	1.00	1.00	**1.00**
S4.HCC.01	Establish an environmental program for the Turf Farmers across the Hawkesbury LGA		1.00	1.00	1.00	**1.00**
S5.HCC.01	Incentivising private landowners to undertake best practice management of their riparian zones		1.00	1.00	1.00	**1.00**
S5.HCC.02	Continue Council's Yabby Trap Round-Up Program		1.00	1.00	1.00	**1.00**
S5.HCC.03	Implement the recommendations of the Hawkesbury Floodplain Drainage Review		1.00	1.00	1.00	**1.00**
S6.HCC.01	Sea Level Rise adaptation for the local road network along the Colo River, Webbs Creek, and The Macdonald River		1.00	1.00	1.00	**1.00**
S6.HCC.02	Bank Erosion Remediation at Holmes Drive Reserve		1.00	1.00	1.00	**1.00**
S6.HCC.03	Erosion remediation at Churchills Wharf Reserve		1.00	1.00	1.00	**1.00**
S6.HCC.04	Relocation of Utilities Infrastructure at Argyle Bailey Memorial Reserve		1.00	1.00	1.00	**1.00**
S6.HCC.05	Bank Erosion Remediation Design: The Terrace, Windsor		1.00	1.00	1.00	**1.00**
S6.HCC.06	Bank Erosion Remediation Works at Governor Phillip Park		1.00	1.00	1.00	**1.00**
S7.HCC.01	Upgrade the Punt Road Public Boat Ramp		1.00	1.00	1.00	**1.00**
S2.CCC.01	Coastal dynamics monitoring program		1.00	1.00	1.00	**1.00**
S2.CCC.02	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure		1.00	1.00	1.00	**1.00**
S2.CCC.03	Install permanent water level gauges at key locations within Brisbane Water and Broken Bay		1.00	1.00	1.00	**1.00**
S3.CCC.01	Environmental Conservation zoning for coastal wetland areas		1.00	1.00	1.00	**1.00**
S3.CCC.02	Implement the Hardys Bay Foreshore Master Plan		1.00	1.00	1.00	**1.00**
S3.CCC.03	Implement the Phegans Bay Waterfront Foreshore Master Plan		1.00	1.00	1.00	**1.00**

ID	Action Name		Community	State Agencies	First Nations Groups	Total Accept. Score
S3.CCC.04	Update RH SEPP Coastal Wetlands and Littoral Rainforest Mapping for the LGA		1.00	1.00	1.00	**1.00**
S3.CCC.05	Review and update Council's Development Control Plan		1.00	1.00	1.00	**1.00**
S3.CCC.06	Compliance auditing of private development encroachment onto public land		1.00	1.00	1.00	**1.00**
S3.CCC.07	Investigate opportunities to purchase saltmarsh areas for incorporation into Council's reserve system.		1.00	1.00	1.00	**1.00**
S5.CCC.01	Water Quality Improvement Plan for Brisbane Water		1.00	1.00	1.00	**1.00**
S5.CCC.04	Undertake a sedimentation study for major creek outlets		1.00	1.00	1.00	**1.00**
S5.CCC.05	Investigate the feasibility of Naturalisation of the Austin Butler Drainage Channel		1.00	1.00	1.00	**1.00**
S5.CCC.06	Implement a wetland monitoring, management and restoration program		1.00	1.00	1.00	**1.00**
S5.CCC.07	Green and Golden Bell Frog Key Population Management Plan		1.00	1.00	1.00	**1.00**
S6.CCC.01	Implement foreshore restoration and stabilisation works at Bayside Drive Reserve		1.00	1.00	1.00	**1.00**
S6.CCC.02	Implement foreshore restoration and stabilisation works at Edgewater Avenue Reserve		1.00	1.00	1.00	**1.00**
S6.CCC.03	Implement foreshore restoration and stabilisation works at Pretty Beach Road		1.00	1.00	1.00	**1.00**
S6.CCC.04	Implement foreshore restoration and stabilisation works at Lara Street		1.00	1.00	1.00	**1.00**
S6.CCC.05	Implement foreshore restoration and stabilisation works at the Woy Woy waterfront		1.00	1.00	1.00	**1.00**
S6.CCC.06	Implement foreshore restoration and stabilisation works at Araluen Drive Reserve		1.00	1.00	1.00	**1.00**
S6.CCC.07	Implement foreshore restoration and stabilisation works at Palermo Reserve		1.00	1.00	1.00	**1.00**
S6.CCC.08	Implement foreshore restoration and stabilisation works at Illoura Reserve		1.00	1.00	1.00	**1.00**
S6.CCC.09	Implement foreshore restoration and stabilisation works at the Point Clare waterfront		1.00	1.00	1.00	**1.00**
S6.CCC.10	Repair and renewal of the Lance Webb Reserve Seawall		0.92	1.00	1.00	**0.92**
S6.CCC.11	Implement construction of the foreshore stabilisation works near Rip Road Reserve.		1.00	1.00	1.00	**1.00**
S6.CCC.12	Tidal inundation stormwater audit and adaptation investigation		1.00	1.00	1.00	**1.00**
S6.CCC.13	Sea Level Rise adaptation for Wisemans Ferry Road		1.00	1.00	1.00	**1.00**
S6.CCC.14	Develop and Implement a Beach Maintenance Program.		0.97	1.00	1.00	**0.97**
S6.CCC.15	Develop and implement a coastal vegetation and dune management strategy		1.00	1.00	1.00	**1.00**
S6.CCC.16	Implement the Umina-Ocean Beach Erosion Management Strategy		0.97	1.00	1.00	**0.97**
S6.CCC.17	Prepare and Implement a Broken Bay Beach Nourishment Framework		1.00	1.00	1.00	**1.00**
S6.CCC.18	Management of stormwater outlets on beaches		1.00	1.00	1.00	**1.00**
S6.CCC.19	Patonga Sand Management Plan		1.00	1.00	1.00	**1.00**
S6.CCC.20	Patonga Levee Feasibility Investigation and Design		1.00	1.00	1.00	**1.00**
S6.CCC.21	Implement recommendations from Gosford Lagoons & Creek Entrance Management Review (Salients 2017) for Green Point Creek, Pearl Beach Lagoon and Ettalong Creek.		1.00	1.00	1.00	**1.00**
S6.CCC.22	Repair and renewal of Patonga Seawall		1.00	1.00	1.00	**1.00**

ID	Action Name		Community	State Agencies	First Nations Groups	Total Accept. Score
S6.CCC.23	Investigate the potential inclusion of RSL Creek and Mudflat Creek in the Central Coast Council Priority Creek Program		1.00	1.00	1.00	**1.00**
S6.CCC.24	Implement foreshore restoration and stabilisation works at the Hardys Bay extension wharf		1.00	1.00	1.00	**1.00**
S6.CCC.25	Repair and renewal of the Patonga Creek Training Wall		1.00	1.00	1.00	**1.00**
S6.CCC.26	Repair and renewal of the Patonga Creek foreshore protection works		1.00	1.00	1.00	**1.00**
S6.CCC.27	Implement foreshore restoration and stabilisation works at Wagstaffe Wharf		1.00	1.00	1.00	**1.00**
S6.CCC.28A	Pearl Beach Foreshore Resilience: Option A - Beach Scraping and Dune Building		1.00	1.00	1.00	**1.00**
S6.CCC.28B	Pearl Beach Foreshore Resilience: Option B - Coastal Protection Works		1.00	1.00	1.00	**1.00**
S6.CCC.29	Pearl Beach Lagoon Erosion Management Investigation		1.00	1.00	1.00	**1.00**
S6.CCC.29	Ettalong Beach Foreshore Stabilisation Investigation		1.00	1.00	1.00	**1.00**
S6.CCC.30	Implement foreshore restoration and stabilisation works at Phegans Bay Road		1.00	1.00	1.00	**1.00**
S7.CCC.01	Construction of an all-abilities beach access point at Ocean Beach SLSC		1.00	1.00	1.00	**1.00**
S7.CCC.02	Support the Gosford Foreshore Masterplan		1.00	1.00	1.00	**1.00**
S7.CCC.03	Develop and implement a foreshore masterplan for Patonga Creek		1.00	1.00	1.00	**1.00**
S7.CCC.04	Strategic assessment of SLSC patrol towers		1.00	1.00	1.00	**1.00**
S7.CCC.05	Review of coastal zone waste facilities and collection		1.00	1.00	1.00	**1.00**
S7.CCC.06	Increase foreshore connectivity between Hardys Bay and Fishermans Point		1.00	1.00	1.00	**1.00**
S7.CCC.07	Prepare Central Coast Council Dinghy Management Plan		1.00	1.00	1.00	**1.00**
S7.CCC.08	Feasibility Investigation: Ambulant Access at Pearl Beach Rock Pool Access		1.00	1.00	1.00	**1.00**
S7.CCC.09	Develop and implement a foreshore masterplan for Pearl Beach		1.00	1.00	1.00	**1.00**
S7.CCC.10	Feasibility Investigation: Increase foreshore connectivity between Phegans Bay and Woy Woy		1.00	1.00	1.00	**1.00**
S7.CCC.12	Develop and implement a foreshore masterplan for Spencer		1.00	1.00	1.00	**1.00**
S7.CCC.13	Feasibility Investigation: Reinstating Umina Point foreshore connection		1.00	1.00	1.00	**1.00**
S7.CCC.14	Undertake strategic upgrades of Council owned boat ramps in Brisbane Water		1.00	1.00	1.00	**1.00**
S7.CCC.15	Implement the St Huberts Island Canals maintenance program		1.00	1.00	1.00	**1.00**
S8.CCC.01	Identify the location and condition of ship wrecks near the old bar via a maritime archaeological survey.		1.00	1.00	1.00	**1.00**
S6.SGA.01A	Station Beach Coastal Adaptation Option A: GSC Coastal Protection Works		1.00	1.00	1.00	**1.00**
S6.SGA.01B	Station Beach Coastal Adaptation Option B: Sand Redistribution and Dune Building		1.00	1.00	1.00	**1.00**
S6.SGA.01C	Station Beach Coastal Adaptation Option C: Relocation of Assets		1.00	1.00	1.00	**1.00**
S6.SGA.02A	West Basin Coastal Adaptation Option A: GSC Coastal Protection Works		1.00	1.00	1.00	**1.00**
S6.SGA.02B	West Basin Foreshore Coastal Protection Option B: Sand Redistribution Program		1.00	1.00	1.00	**1.00**
S6.SGA.03	Eastern Foreshore Beach Nourishment		1.00	1.00	1.00	**1.00**
S6.SGA.04	Seawall Monitoring		1.00	1.00	1.00	**1.00**

ID	Action Name		Community	State Agencies	First Nations Groups	Total Accept. Score
S6.SGA.05	Investigate Sea Level Rise Adaptation of Bobbin Head Foreshore		1.00	1.00	1.00	**1.00**

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

APPENDIX E
FEASIBILITY ASSESSMENT OUTCOMES

Table E-1 Feasibility Assessment Outcomes

ID	Action Name	Feasibility Assessment											Feasibility Score		
		Level of Risk Mitigation				Associated Environmental, Social, and Cultural Impacts							Total Score		
		Level of Risk Being Mitigated	Risk Rating Score	Effectiveness at Risk Mitigation	Risk Mitigation Score	Water Quality	Biodiversity	Physical Processes & Hazards	Social/ Recreational Amenity	Public Safety	Cultural Heritage Values	Impact Score	Total Benefit Score	Scale Factor	Total Feasibility Score
S1.CMP.01	Implement the CMPs formal governance partnership for the river system	Extreme	+4	+3	**+12**	+3	+3	+3	+3	+3	+3	**+18**	**+30**	3	**90**
S1.CMP.02	Develop and execute a communications plan for Stage 5 of the CMP	Moderate	+2	+3	**+6**	0	0	0	0	0	0	**0**	**+6**	3	**18**
S2.CMP.01	Design and implement an integrated and coordinated water quality monitoring program	Extreme	+4	+4	**+16**	+4	+2	0	+2	+2	0	**+10**	**+26**	3	**78**
S2.CMP.02	Implement a bank stability and condition monitoring program across the estuary foreshores	High	+3	+3	**+9**	+2	+2	+3	+1	+2	+2	**+12**	**+21**	3	**63**
S2.CMP.03	Implement a bank stability and condition monitoring program across the creeks and waterways of the catchment	Moderate	+2	+3	**+6**	+2	+2	+3	+1	+2	+2	**+12**	**+18**	3	**54**
S2.CMP.04	Undertake periodic surveys of the River in between Wisemans Ferry and Richmond	Low	+1	+2	**+2**	0	0	0	+2	+2	0	**+4**	**+6**	2	**12**
S3.CMP.01	Review and update Partner Council planning instruments to ensure a consistent best practice approach to managing stormwater and downstream estuarine water quality	Extreme	+4	+4	**+16**	+4	+3	+1	+3	+3	+2	**+16**	**+32**	3	**96**
S3.CMP.02	Review and update coastal hazard risk planning controls every 10 years	Extreme	+4	+4	**+16**	+1	+1	+3	+2	+3	+2	**+12**	**+28**	3	**84**
S3.CMP.03	Encourage eco-friendly features in seawall development applications	High	+3	+2	**+6**	+1	+3	0	0	0	0	**+4**	**+10**	3	**30**
S3.CMP.04	Undertake a Hawkesbury River System Blue Carbon Scoping Study	High	+3	+2	**+6**	+2	+4	+1	0	0	0	**+7**	**+13**	3	**39**
S3.CMP.05	Prepare a Hawkesbury River Coastal Wetland Sea Level Rise Adaptation Strategy	Extreme	+4	+4	**+16**	+2	+3	+1	0	0	0	**+6**	**+22**	3	**66**
S3.CMP.06	Develop Foreshore Stabilisation and Rehabilitation Guidelines for the HNRS	Extreme	+4	+3	**+12**	+1	+2	+4	+1	+1	+1	**+10**	**+22**	3	**66**
S3.CMP.07	Support the proposal for the development of the Ku-ring-gai GeoRegion	Moderate	+2	+3	**+6**	+1	+3	+1	+1	0	0	**+6**	**+12**	2	**24**
S4.CMP.01	Design and Implement a Community Engagement and Education Program to support the vision and objectives of the CMP	Extreme	+4	+3	**+12**	+1	+1	+1	+1	+1	+1	**+6**	**+18**	3	**54**
S4.CMP.02	Develop an education package for recreational boaters	High	+3	+2	**+6**	0	+1	0	+1	+1	0	**+3**	**+9**	3	**27**
S4.CMP.03	Community education and outreach program for estuary frontage communities	Extreme	+4	+2	**+8**	0	+1	+1	+1	+1	0	**+4**	**+12**	3	**36**
S4.CMP.04	Develop and implement a Hawkesbury River school environmental education program focused on water quality, estuary health, and coastal hazards	Extreme	+4	+2	**+8**	+1	+1	+1	+1	+1	+1	**+6**	**+14**	3	**42**
S4.CMP.05	Implementing a community-based carp fishing initiative	High	+3	+3	**+9**	0	+3	0	0	0	0	**+3**	**+12**	2	**24**
S4.CMP.05	Hawkesbury River Marine Compliance & Education Campaign	High	+3	+3	**+9**	+2	+2	0	+1	+1	0	**+6**	**+15**	3	**45**
S5.CMP.01	Prepare a Litter Prevention Strategy for the Hawkesbury River System	High	+3	+1	**+3**	+1	+1	0	0	0	0	**+2**	**+5**	3	**15**
S5.CMP.02	Identify opportunities to retrofit existing public seawalls with eco-friendly features	Moderate	+2	+2	**+4**	0	+2	0	0	0	0	**+2**	**+6**	3	**18**
S5.CMP.03	Investigate opportunities to increase uptake of environmentally friendly moorings (EFM) across the lower estuary	Moderate	+2	+2	**+4**	0	+3	0	0	0	0	**+3**	**+7**	3	**21**

ID	Action Name	Feasibility Assessment											Feasibility Score		
		Level of Risk Mitigation				Associated Environmental, Social, and Cultural Impacts							Total Score		
		Level of Risk Being Mitigated	Risk Rating Score	Effectiveness at Risk Mitigation	Risk Mitigation Score	Water Quality	Biodiversity	Physical Processes & Hazards	Social/ Recreational Amenity	Public Safety	Cultural Heritage Values	Impact Score	Total Benefit Score	Scale Factor	Total Feasibility Score
S5.CMP.05	Undertake a coordinated riparian rehabilitation works program across the River System	High	+3	+4	**+12**	0	+4	0	0	0	0	**+4**	**+16**	3	**48**
S5.CMP.06	Continue to support Floating Landcare (and other relevant Landcare networks) across the river system	High	+3	+3	**+9**	+1	+3	0	+1	+2	0	**+7**	**+16**	3	**48**
S5.CMP.07	Develop a strategy for managing vessel pumpouts across the Hawkesbury River System	Extreme	+4	+4	**+16**	+4	+3	0	+4	+4	0	**+15**	**+31**	3	**93**
S5.CMP.08	Engage with government and the community to reduce the impacts of liveaboards (and associated discharges) on the waterways	Moderate	+2	+4	**+8**	+2	0	0	+2	+1	0	**+5**	**+13**	3	**39**
S5.CMP.09	Support the NSW Government's breeding and release program for the endangered White's Seahorse	Extreme	+4	+4	**+16**	0	+4	0	0	0	0	**+4**	**+20**	2	**40**
S5.CMP.10	Coordination and resource sharing for inspection of OSMS at key river settlements	Extreme	+4	+4	**+16**	+4	+2	0	0	+1	0	**+7**	**+23**	2	**46**
S5.CMP.11	Fencing of riparian foreshores on high risk agricultural lands	Moderate	+2	+4	**+8**	+3	+2	+2	0	0	0	**+7**	**+15**	3	**45**
S5.CMP.12	Undertake a coordinated creek rehabilitation works program across the Partner Council's upper catchment waterways	High	+3	+4	**+12**	+3	+4	0	0	0	0	**+7**	**+19**	3	**57**
S6.CMP.01	Activate the "Coastal Hazard Emergency Action Sub-Plans" (CZEAS) for each beach as required after storm events	Extreme	+4	+4	**+16**	0	0	0	+4	+4	+2	**+10**	**+26**	2	**52**
S6.CMP.02	Riverine bank erosion recovery works after erosion events	Extreme	+4	+4	**+16**	0	0	0	+4	+4	+2	**+10**	**+26**	3	**78**
S6.CMP.03	Develop a Tide Alert Calendar Tool for the low lying communities of the river system to encourage citizen science in monitoring tidal inundation	High	+3	+3	**+9**	0	0	+3	0	+3	0	**+6**	**+15**	3	**45**
S7.CMP.01	Develop a Hawkesbury-Nepean River Maritime Infrastructure Strategy	Extreme	+4	+3	**+12**	+2	+2	+2	+2	+2	+1	**+11**	**+23**	3	**69**
S7.CMP.02	Undertake a trial of webcams at high usage boat ramps	Low	+1	+4	**+4**	0	0	0	+4	+1	0	**+5**	**+9**	3	**27**
S7.CMP.03	Undertake a feasibility investigation for the Great Hawkesbury Walk - connecting Penrith to Brooklyn via Wisemans Ferry	Low	+1	+2	**+2**	0	-1	0	+3	+1	0	**+3**	**+5**	2	**10**
S7.CMP.03	Update and Extend the Upper Hawkesbury River Dredging Investigations	Moderate	+2	+3	**+6**	0	0	0	+2	+1	0	**+3**	**+9**	2	**18**
S8.CMP.01	Engage First Nations teams where appropriate to undertake bush regeneration works including weeding and revegetation	Moderate	+2	+3	**+6**	+1	+3	0	0	0	+2	**+6**	**+12**	3	**36**
S8.CMP.02	Further develop and implement community education programs for awareness and appreciation of Indigenous cultural heritage	High	+3	+2	**+6**	0	0	0	0	0	+4	**+4**	**+10**	3	**30**
S8.CMP.03	Support cultural education and awareness of estuary health issues for First Nations Groups	High	+3	+2	**+6**	0	0	0	0	0	+4	**+4**	**+10**	3	**30**
S8.CMP.04	Prepare a heritage tourism strategy and plan for the Hawkesbury River System	Low	+1	+2	**+2**	0	0	0	+2	0	+2	**+4**	**+6**	3	**18**
S8.CMP.05	Develop a Hawkesbury heritage central display	Low	+1	+2	**+2**	0	0	0	0	0	+2	**+2**	**+4**	2	**8**
S8.CMP.06	Identify opportunities for, and undertake cultural land management practices, including cultural burning	High	+3	+2	**+6**	+2	+2	0	0	0	+2	**+6**	**+12**	3	**36**

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S8.CMP.07	Engage with local First Nations Groups to protect and preserve cultural heritage items across the coastal zone	High	+3	+4	**+12**	0	0	0	0	0	+4	**+4**	**+16**	3	**48**
S9.CMP.01	Collaborate with local universities and research institutions to establish a list of research priorities for the Hawkesbury-Nepean River System	High	+3	+4	**+12**	+1	+1	+1	+1	+1	+1	**+6**	**+18**	3	**54**
S9.CMP.02	Establish information sharing and reporting protocols for the identification of pest species	High	+3	+2	**+6**	0	+2	0	0	0	0	**+2**	**+8**	3	**24**
S3.THC.01	Coastal Wetland Mapping Update	Moderate	+2	+2	**+4**	+2	+2	0	0	0	0	**+4**	**+8**	1	**8**
S6.THC.01	Implement the outcomes of the Blundells Swamp Inundation Mitigation Study	High	+3	+3	**+9**	0	0	+4	+4	+4	0	**+12**	**+21**	1	**21**
S6.THC.02	Inundation and Drainage Study at Michael Duggan Reserve	Low	+1	+3	**+3**	+2	+2	+1	0	+1	0	**+6**	**+9**	1	**9**
S6.THC.03	Lambs Creek Inundation and Drainage Study	High	+3	+3	**+9**	+1	+1	+1	0	+1	0	**+4**	**+13**	1	**13**
S6.THC.04	Erosion remediation at Wisemans Ferry	Low	+1	+4	**+4**	0	+2	+1	0	+4	0	**+7**	**+11**	1	**11**
S6.THC.05	Erosion Remediation at Webbs Creek Ferry Foreshore	Extreme	+4	+4	**+16**	0	0	0	+4	+4	0	**+8**	**+24**	1	**24**
S6.THC.05	Erosion investigation and design at River Road, Leets Vale	High	+3	+4	**+12**	0	0	0	0	+4	0	**+4**	**+16**	1	**16**
S6.THC.06	Erosion remediation at River Road, Lower Portland	High	+3	+4	**+12**	0	+2	+1	+1	+4	0	**+8**	**+20**	1	**20**
S2.NBC.01	Install a CoastSnap Camera Cradles at strategic locations across the LGA foreshore	High	+3	+2	**+6**	0	0	+2		+2	0	**+4**	**+10**	2	**20**
S2.NBC.02	Implement a Pittwater Beach Monitoring Program	High	+3	+3	**+9**	0	0	+1	+1	+1	0	**+3**	**+12**	2	**24**
S2.NBC.03	Install permanent tide gauges at strategic locations around the waterway	Moderate	+2	+3	**+6**	0	0	0	0	+2	0	**+2**	**+8**	2	**16**
S2.NBC.04	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	High	+3	+4	**+12**	+2	+1	+1	+2	+2	0	**+8**	**+20**	2	**40**
S3.NBC.02	Develop and update coastal hazard information	High	+3	+4	**+12**	0	0	0	0	+4	0	**+4**	**+16**	2	**32**
S3.NBC.03	Update planning certificates with coastal hazard information	High	+3	+4	**+12**	0	0	0	0	+4	0	**+4**	**+16**	2	**32**
S3.NBC.04	Develop planning controls to ensure buildings are sited and designed to consider coastal hazard information including coastal erosion and estuarine inundation.	High	+3	+4	**+12**	0	0	0	0	+4	0	**+4**	**+16**	2	**32**
S3.NBC.04	Long Term Adaptation Plan for Coastal Assets and Infrastructure	Extreme	+4	+4	**+16**	0	0	+2	+2	+2	0	**+6**	**+22**	2	**44**
S5.NBC.01	Investigate the feasibility of naturalisation of Careel Creek	Moderate	+2	+2	**+4**	+2	+3	+1	+3	0	0	**+9**	**+13**	1	**13**
S5.NBC.02	Upgrade the Careel Bay litter trap	High	+3	+4	**+12**	+4	+3	0	+3	+2	0	**+12**	**+24**	1	**24**
S5.NBC.03	Investigate WSUD solutions within the Careel Creek Drainage catchment.	Extreme	+4	+3	**+12**	+3	+3	0	+2	+1	0	**+9**	**+21**	1	**21**
S6.NBC.01	Foreshore naturalisation and restoration works at Station Beach	High	+3	+3	**+9**	0	+2	+2	+1	+2	0	**+7**	**+16**	1	**16**
S6.NBC.02	Beach scraping and sand redistribution works at the western end of Sand Point Beach	High	+3	+4	**+12**	0	0	0	+2	+2	0	**+4**	**+16**	1	**16**
S6.NBC.03	Foreshore naturalisation and restoration works along Sand Point Beach	High	+3	+3	**+9**	0	+1	+2	+3	+2	0	**+8**	**+17**	1	**17**
S6.NBC.04	Great Mackerel Beach Foreshore Master Plan	Extreme	+4	+4	**+16**	0	+3	+2	+3	+3	0	**+11**	**+27**	1	**27**
S6.NBC.05	Foreshore naturalisation and restoration works at Currawong Beach	High	+3	+4	**+12**	0	+2	+2	+1	+2	0	**+7**	**+19**	1	**19**
S6.NBC.06	Foreshore naturalisation and restoration works at Clareville Beach Reserve	Moderate	+2	+3	**+6**	0	+1	+1	+2	+1	0	**+5**	**+11**	1	**11**

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S6.NBC.07	Foreshore naturalisation and restoration works at Bayview Park foreshore	Moderate	+2	+3	**+6**	0	+3	+1	+3	+1	0	**+8**	**+14**	1	**14**
S6.NBC.08	Coastal hazard resilience for both built and natural asset owners	High	+3	+2	**+6**	0	0	0	0	+2	0	**+2**	**+8**	2	**16**
S6.NBC.12	Pittwater dredging and beach nourishment feasibility investigation and implementation	Extreme	+4	+3	**+12**	0	0	0	0	0	0	**0**	**+12**	2	**24**
S6.NBC.13	Investigate the feasibility of channel maintenance works within Careel Bay and Careel Creek	High	+3	+4	**+12**	0	0	+1	0	+3	0	**+4**	**+16**	1	**16**
S7.NBC.01	Upgrade and repair of waterway access points	High	+3	+4	**+12**	0	0	0	+4	+4	0	**+8**	**+20**	2	**40**
S7.NBC.06	Boat Ramp Upgrade	High	+3	+4	**+12**	0	0	0	+3	+3	0	**+6**	**+18**	1	**18**
S9.NBC.01	Pittwater Wave Climate Study	Extreme	+4	+3	**+12**	0	0	+2	0	+2	0	**+4**	**+16**	2	**32**
S4.KRG.01	Support Community Engagement undertaken as part of the Ku-ring-gai Council – Water Sensitive City Strategy	Moderate	+2	+2	**+4**	+1	+1	+1	0	0	+1	**+4**	**+8**	2	**16**
S5.KRG.01	Prepare and implement a catchment study and management plan for the Cowan Creek catchment	High	+3	+2	**+6**	+2	+2	+1			+1	**+6**	**+12**	1	**12**
S5.KRG.02	Update the catchment studies for Ku-ring-gai Creek and Lovers Jump Creek	High	+3	+2	**+6**	+2	+2	+1			+1	**+6**	**+12**	1	**12**
S2.HSC.01	Install a permanent tide gauge at Berowra Waters	Low	+1	+2	**+2**	0	0	+1	+1	+1	0	**+3**	**+5**	1	**5**
S2.HSC.02	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	High	+3	+4	**+12**	+2	+1	+1	+2	+2	0	**+8**	**+20**	2	**40**
S5.HSC.01	Installation of Stormwater Quality Improvement Devices at Parsley Bay	High	+3	+4	**+12**	+4	+1	0	+1	+1	0	**+7**	**+19**	1	**19**
S5.HSC.02	Installation of Stormwater Quality Improvement Devices at The Gateway	High	+3	+4	**+12**	+4	+1	0	+1	+1	0	**+7**	**+19**	1	**19**
S5.HSC.03	Installation and upgrade of Stormwater Quality Improvement Devices at Brooklyn Park	High	+3	+4	**+12**	+4	+1	0	+1	+1	0	**+7**	**+19**	1	**19**
S6.HSC.01	Repair and Renewal of the Parsley Bay Breakwater	Moderate	+2	+4	**+8**	0	0	+3	+4	+4	0	**+11**	**+19**	1	**19**
S6.HSC.02	Repair and renewal of seawall protecting loading dock access road	High	+3	+4	**+12**	0	0	+3	+3	+3	0	**+9**	**+21**	1	**21**
S6.HSC.03	Sea Level Rise adaptation for Brooklyn Road	Low	+1	+4	**+4**	0	0	+2	+2	+2	0	**+6**	**+10**	1	**10**
S6.HSC.04	Wharf Street Foreshore Improvement Works	Moderate	+2	+4	**+8**	0	0	+4	+2	+2	0	**+8**	**+16**	1	**16**
S6.HSC.05	Repair and renewal of seawall at the base of the Bar Island jetty	Moderate	+2	+4	**+8**	0	0	-1	+3	+3	0	**+5**	**+13**	1	**13**
S6.HSC.06	Bradleys Beach Foreshore Restoration works	Moderate	+2	+2	**+4**	0	+2	+2	+2	+1	0	**+7**	**+11**	1	**11**
S6.HSC.07	Repair and renewal of seawall from Brooklyn to Parsley Bay	Moderate	+2	+4	**+8**	0	0	0	+2	+2	0	**+4**	**+12**	1	**12**
S7.HSC.01	Develop Infrastructure strategy for the Lower Hawkesbury	High	+3	+3	**+9**	+2	+3	0	+4	+4	0	**+13**	**+22**	2	**44**
S7.HSC.02	Parsley Bay Loading Dock Upgrade	Extreme	+4	+4	**+16**	0	0	0	+4	+2	0	**+6**	**+22**	1	**22**
S7.HSC.03	Parsley Bay Dredging Feasibility Study	Moderate	+2	+3	**+6**	0	0	0	+3	0	0	**+3**	**+9**	1	**9**
S7.HSC.04	Upgrade of Kangaroo Point Pumpout Pontoon	Moderate	+2	+2	**+4**	+3	0	0	+2	0	0	**+5**	**+9**	1	**9**
S7.HSC.05	Upgrade of McKell Park Tidal Pool	Moderate	+2	+4	**+8**	0	0	0	+2	+1	0	**+3**	**+11**	1	**11**
S7.HSC.06	Upgrade of public pontoons at Parsley Bay	Moderate	+2	+4	**+8**	0	0	0	+4	+3	0	**+7**	**+15**	1	**15**
S7.HSC.07	Dangar Island Loading Dock Upgrade	Extreme	+4	+4	**+16**	0	0	0	+4	+2	0	**+6**	**+22**	1	**22**
S7.HSC.08	Upgrade of the Wisemans Ferry old public wharf	High	+3	+4	**+12**	0	0	0	+4	+3	0	**+7**	**+19**	1	**19**
S7.HSC.09	Sandbrook Inlet Dredging Feasibility Study	High	+3	+3	**+9**	0	0	0	+3	+3	0	**+6**	**+15**	1	**15**
S7.HSC.10	Bayden Powell Avenue Dinghy and Foreshore Access improvement	Moderate	+2	+3	**+6**	0	+1	+1	+2	+2	0	**+6**	**+12**	1	**12**
S7.HSC.11	Design and install boardwalk from Brooklyn Public Wharf to Lower McKell Park	Moderate	+2	+3	**+6**	0	0	0	+3	+2	0	**+5**	**+11**	1	**11**

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S3.HCC.01	Write a specific WSUD chapter in Hawkesbury City Council DCP	Extreme	+4	+4	**+16**	+4	+3	0	0	0	0	**+7**	**+23**	2	**46**
S3.HCC.02	Undertake a review and update of the Council OSSM policy.	Extreme	+4	+4	**+16**	+4	+3	0	0	0	0	**+7**	**+23**	2	**46**
S3.HCC.03	Environmental Conservation zoning for coastal wetland areas	Extreme	+4	+4	**+16**	+2	+2	0	0	0	+2	**+6**	**+22**	2	**44**
S4.HCC.01	Establish an environmental program for the Turf Farmers across the Hawkesbury LGA	High	+3	+4	**+12**	+4	+4	+4	0	0	+2	**+14**	**+26**	2	**52**
S5.HCC.01	Incentivising private landowners to undertake best practice management of their riparian zones	Extreme	+4	+4	**+16**	+2	+2	+2	0	0	0	**+6**	**+22**	2	**44**
S5.HCC.02	Continue Council's Yabby Trap Round-Up Program	Moderate	+2	+2	**+4**	0	+1	0	+1	+1	0	**+3**	**+7**	2	**14**
S5.HCC.03	Implement the recommendations of the Hawkesbury Floodplain Drainage Review	Moderate	+2	+4	**+8**	+3	+3	+2	+1	+2	0	**+11**	**+19**	2	**38**
S6.HCC.01	Sea Level Rise adaptation for the local road network along the Colo River, Webbs Creek, and The Macdonald River	Low	+1	+4	**+4**	0	0	0	+2	+2	0	**+4**	**+8**	2	**16**
S6.HCC.02	Bank Erosion Remediation at Holmes Drive Reserve	Moderate	+2	+4	**+8**	+2	+3	+3	+1	+3	0	**+12**	**+20**	1	**20**
S6.HCC.03	Erosion remediation at Churchills Wharf Reserve	Extreme	+4	+4	**+16**	+1	+2	-1	+3	+4	0	**+9**	**+25**	1	**25**
S6.HCC.04	Relocation of Utilities Infrastructure at Argyle Bailey Memorial Reserve	Extreme	+4	+4	**+16**	0	0	0	0	+4	0	**+4**	**+20**	1	**20**
S6.HCC.05	Bank Erosion Remediation Design: The Terrace, Windsor	Extreme	+4	+4	**+16**	0	0	0	+4	+4	0	**+8**	**+24**	1	**24**
S6.HCC.06	Bank Erosion Remediation Works at Governor Phillip Park	Extreme	+4	+4	**+16**	0	+3	+2	+2	+2	0	**+9**	**+25**	1	**25**
S7.HCC.01	Upgrade the Punt Road Public Boat Ramp	Moderate	+2	+4	**+8**	0	0	0	+4	+4	0	**+8**	**+16**	1	**16**
S2.CCC.01	Coastal dynamics monitoring program	Extreme	+4	+4	**+16**	0	0	+2	+2	+2	+2	**+8**	**+24**	2	**48**
S2.CCC.02	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	High	+3	+4	**+12**	+2	+1	+1	+2	+2	0	**+8**	**+20**	2	**40**
S2.CCC.03	Install permanent water level gauges at key locations within Brisbane Water and Broken Bay	High	+3	+4	**+12**	0	+1	+1	+1	+4	0	**+7**	**+19**	2	**38**
S3.CCC.01	Environmental Conservation zoning for coastal wetland areas	Extreme	+4	+4	**+16**	+2	+2	0	0	0	0	**+4**	**+20**	2	**40**
S3.CCC.02	Implement the Hardys Bay Foreshore Master Plan	High	+3	+4	**+12**	+2	+2	+2	+2	+2	+3	**+13**	**+25**	1	**25**
S3.CCC.03	Implement the Phegans Bay Waterfront Foreshore Master Plan	High	+3	+4	**+12**	+2	+2	+2	+2	+4	+3	**+15**	**+27**	1	**27**
S3.CCC.04	Update RH SEPP Coastal Wetlands and Littoral Rainforest Mapping for the LGA	Extreme	+4	+4	**+16**	+2	+4	0	0	0	0	**+6**	**+22**	2	**44**
S3.CCC.05	Review and update Council's Development Control Plan	Extreme	+4	+4	**+16**	+4	+4	+4	+2	+2	+4	**+20**	**+36**	2	**72**
S3.CCC.06	Compliance auditing of private development encroachment onto public land	Moderate	+2	+3	**+6**	+1	+3	0	+2	0	0	**+6**	**+12**	2	**24**
S3.CCC.07	Investigate opportunities to purchase saltmarsh areas for incorporation into Council's reserve system.	High	+3	+3	**+9**	+1	+3	0	0	0	0	**+4**	**+13**	2	**26**
S5.CCC.01	Water Quality Improvement Plan for Brisbane Water	Extreme	+4	+4	**+16**	+4	+4	0	+4	+3	0	**+15**	**+31**	2	**62**
S5.CCC.04	Undertake a sedimentation study for major creek outlets	Moderate	+2	+2	**+4**	+2	+2	0	0	0	0	**+4**	**+8**	2	**16**
S5.CCC.05	Investigate the feasibility of Naturalisation of the Austin Butler Drainage Channel	Moderate	+1	+1	**+1**	+2	+2	0	+1	0	0	**+5**	**+6**	1	**6**
S5.CCC.06	Implement a wetland monitoring, management and restoration program	Extreme	+4	+4	**+16**	+2	+4	+1	+1	+1	+1	**+10**	**+26**	2	**52**

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S5.CCC.07	Green and Golden Bell Frog Key Population Management Plan	High	+3	+4	**+12**	0	+4	0	0	0	0	**+4**	**+16**	2	**32**
S6.CCC.01	Implement foreshore restoration and stabilisation works at Bayside Drive Reserve	High	+3	+4	**+12**	0	+2	+2	+2	+2	0	**+8**	**+20**	1	**20**
S6.CCC.02	Implement foreshore restoration and stabilisation works at Edgewater Avenue Reserve	Extreme	+4	+4	**+16**	0	-1	-1	+2	+4	0	**+4**	**+20**	1	**20**
S6.CCC.03	Implement foreshore restoration and stabilisation works at Pretty Beach Road	Extreme	+4	+3	**+12**	0	+2	+2	+2	+3	0	**+9**	**+21**	1	**21**
S6.CCC.04	Implement foreshore restoration and stabilisation works at Lara Street	Extreme	+4	+3	**+12**	0	+2	0	+2	+3	0	**+7**	**+19**	1	**19**
S6.CCC.05	Implement foreshore restoration and stabilisation works at the Woy Woy waterfront	High	+3	+4	**+12**	0	0	0	+2	+2	+2	**+6**	**+18**	1	**18**
S6.CCC.06	Implement foreshore restoration and stabilisation works at Araluen Drive Reserve	Extreme	+4	+4	**+16**	0	+2	0	+3	+3	+2	**+10**	**+26**	1	**26**
S6.CCC.07	Implement foreshore restoration and stabilisation works at Palermo Reserve	Moderate	+2	+4	**+8**	0	-1	-1	+2	+1	0	**+1**	**+9**	1	**9**
S6.CCC.08	Implement foreshore restoration and stabilisation works at Illoura Reserve	Moderate	+2	+4	**+8**	0	-1	-1	+2	+1	+2	**+3**	**+11**	1	**11**
S6.CCC.09	Implement foreshore restoration and stabilisation works at the Point Clare waterfront	Moderate	+2	+3	**+6**	0	+1	+1	+1	+1	0	**+4**	**+10**	1	**10**
S6.CCC.10	Repair and renewal of the Lance Webb Reserve Seawall	Extreme	+4	+4	**+16**	0	0	0	+3	+4	0	**+7**	**+23**	1	**23**
S6.CCC.11	Implement construction of the foreshore stabilisation works near Rip Road Reserve.	High	+3	+4	**+12**	0	0	0	+3	+3	+4	**+10**	**+22**	1	**22**
S6.CCC.12	Tidal inundation stormwater audit and adaptation investigation	High	+3	+3	**+9**	0	0	+3	0	+3	0	**+6**	**+15**	1	**15**
S6.CCC.13	Sea Level Rise adaptation for Wisemans Ferry Road	Moderate	+2	+3	**+6**	0	0	0	+2	+3	0	**+5**	**+11**	1	**11**
S6.CCC.14	Develop and Implement a Beach Maintenance Program.	Extreme	+4	+4	**+16**	0	+2	+4	+4	+4	+3	**+17**	**+33**	2	**66**
S6.CCC.15	Develop and implement a coastal vegetation and dune management strategy	Extreme	+4	+4	**+16**	0	+4	+2	+1	+1	+1	**+9**	**+25**	2	**50**
S6.CCC.16	Implement the Umina-Ocean Beach Erosion Management Strategy	Extreme	+4	+4	**+16**	0	-1	-2	+4	+4	0	**+5**	**+21**	1	**21**
S6.CCC.17	Prepare and Implement a Broken Bay Beach Nourishment Framework	Extreme	+4	+3	**+12**	0	+2	+4	+4	+2	0	**+12**	**+24**	2	**48**
S6.CCC.18	Management of stormwater outlets on beaches	Moderate	+2	+3	**+6**	+2	0	+2	+2	+1	0	**+7**	**+13**	2	**26**
S6.CCC.19	Patonga Sand Management Plan	High	+3	+3	**+9**	0	+3	+3	+3	+2	0	**+11**	**+20**	1	**20**
S6.CCC.20	Patonga Levee Feasibility Investigation and Design	High	+3	+4	**+12**	0	0	0	+2	+4	0	**+6**	**+18**	1	**18**
S6.CCC.21	Implement recommendations from Gosford Lagoons & Creek Entrance Management Review (Salients 2017) for Green Point Creek, Pearl Beach Lagoon and Ettalong Creek.	High	+3	+4	**+12**	0	0	0	+4	+4	0	**+8**	**+20**	1	**20**
S6.CCC.22	Repair and renewal of Patonga Seawall	High	+3	+4	**+12**	0	0	0	+4	+4	0	**+8**	**+20**	1	**20**
S6.CCC.23	Investigate the potential inclusion of RSL Creek and Mudflat Creek in the Central Coast Council Priority Creek Program	High	+3	+2	**+6**	+2	-1	0	0	+3	0	**+4**	**+10**	1	**10**
S6.CCC.24	Implement foreshore restoration and stabilisation works at the Hardys Bay extension wharf	Extreme	+4	+3	**+12**	0	+2	0	+3	+3	0	**+8**	**+20**	1	**20**
S6.CCC.25	Repair and renewal of the Patonga Creek Training Wall	Moderate	+2	+4	**+8**	0	0	0	+2	+4	0	**+6**	**+14**	1	**14**
S6.CCC.26	Repair and renewal of the Patonga Creek foreshore protection works	Moderate	+2	+4	**+8**	0	0	0	+2	+4	0	**+6**	**+14**	1	**14**

ID	Action Name	Feasibility Assessment											Feasibility Score		
		Level of Risk Mitigation				Associated Environmental, Social, and Cultural Impacts							Total Score		
		Level of Risk Being Mitigated	Risk Rating Score	Effectiveness at Risk Mitigation	Risk Mitigation Score	Water Quality	Biodiversity	Physical Processes & Hazards	Social/ Recreational Amenity	Public Safety	Cultural Heritage Values	Impact Score	Total Benefit Score	Scale Factor	Total Feasibility Score
S6.CCC.27	Implement foreshore restoration and stabilisation works at Wagstaffe Wharf	Extreme	+4	+4	**+16**	+3	-1	-1	0	+3	0	**+4**	**+20**	1	**20**
S6.CCC.28A	Pearl Beach Foreshore Resilience: Option A - Beach Scraping and Dune Building	Extreme	+4	+3	**+12**	0	+2	+2	+1	+3	0	**+8**	**+20**	1	**20**
S6.CCC.28B	Pearl Beach Foreshore Resilience: Option B - Coastal Protection Works	Extreme	+4	+4	**+16**	0	-2	-1	+1	+4	0	**+2**	**+18**	1	**18**
S6.CCC.29	Pearl Beach Lagoon Erosion Management Investigation	Moderate	+2	+3	**+6**	0	+2	+2	+1	+2	0	**+7**	**+13**	1	**13**
S6.CCC.29	Ettalong Beach Foreshore Stabilisation Investigation	Moderate	+2	+2	**+4**	0	0	+2	+4	+2	0	**+8**	**+12**	1	**12**
S6.CCC.30	Implement foreshore restoration and stabilisation works at Phegans Bay Road	Extreme	+4	+4	**+16**	0	+2	0	+3	+3	0	**+8**	**+24**	1	**24**
S7.CCC.01	Construction of an all-abilities beach access point at Ocean Beach SLSC	Moderate	+2	+3	**+6**	0	0	0	+4	+4	0	**+8**	**+14**	1	**14**
S7.CCC.02	Support the Gosford Foreshore Masterplan	Extreme	+4	+2	**+8**	+2	+2	0	0	0	0	**+4**	**+12**	1	**12**
S7.CCC.03	Develop and implement a foreshore masterplan for Patonga Creek	Moderate	+2	+4	**+8**	+1	+2	+2	+4	+2	0	**+11**	**+19**	1	**19**
S7.CCC.04	Strategic assessment of SLSC patrol towers	Moderate	+2	+3	**+6**	0	0	+3	0	+3	0	**+6**	**+12**	2	**24**
S7.CCC.05	Review of coastal zone waste facilities and collection	Moderate	+2	+4	**+8**	0	0	0	+3	0	0	**+3**	**+11**	2	**22**
S7.CCC.06	Increase foreshore connectivity between Hardys Bay and Fishermans Point	Low	+1	+3	**+3**	0	-1	0	+3	0	0	**+2**	**+5**	1	**5**
S7.CCC.07	Prepare Central Coast Council Dinghy Management Plan	Moderate	+2	+2	**+4**	0	0	+2	+2	+1	0	**+5**	**+9**	1	**9**
S7.CCC.08	Feasibility Investigation: Ambulant Access at Pearl Beach Rock Pool Access	High	+3	+3	**+9**	0	0	0	+4	+3	0	**+7**	**+16**	1	**16**
S7.CCC.09	Develop and implement a foreshore masterplan for Pearl Beach	Low	+1	+4	**+4**	+1	+1	+1	+2	+2	0	**+7**	**+11**	1	**11**
S7.CCC.10	Feasibility Investigation: Increase foreshore connectivity between Phegans Bay and Woy Woy	Low	+1	+3	**+3**	0	0	0	+4	+3	0	**+7**	**+10**	1	**10**
S7.CCC.12	Develop and implement a foreshore masterplan for Spencer	Moderate	+2	+4	**+8**	+1	+1	0	+4	+2	0	**+8**	**+16**	1	**16**
S7.CCC.13	Feasibility Investigation: Reinstating Umina Point foreshore connection	Low	+1	+3	**+3**	0	0	0	+2	0	0	**+2**	**+5**	1	**5**
S7.CCC.14	Undertake strategic upgrades of Council owned boat ramps in Brisbane Water	High	+3	+3	**+9**	0	0	0	+4	+4	0	**+8**	**+17**	2	**34**
S7.CCC.15	Implement the St Huberts Island Canals maintenance program	Moderate	+2	+3	**+6**	0	0	0	+3	+3	0	**+6**	**+12**	1	**12**
S8.CCC.01	Identify the location and condition of ship wrecks near the old bar via a maritime archaeological survey.	Low	+1	+4	**+4**	0	0	0	0	0	+4	**+4**	**+8**	1	**8**
S6.SGA.01A	Station Beach Coastal Adaptation Option A: GSC Coastal Protection Works	Moderate	+2	+4	**+8**	0	-2	-2	-1	+2	0	**-3**	**+5**	1	**5**
S6.SGA.01B	Station Beach Coastal Adaptation Option B: Sand Redistribution and Dune Building	Moderate	+2	+3	**+6**	0	+2	+2	+2	+2	0	**+8**	**+14**	1	**14**
S6.SGA.01C	Station Beach Coastal Adaptation Option C: Relocation of Assets	Moderate	+2	+4	**+8**	0	-1	0	0	-2	0	**-3**	**+5**	1	**5**
S6.SGA.02A	West Basin Coastal Adaptation Option A: GSC Coastal Protection Works	Moderate	+2	+4	**+8**	0	-2	-2	-1	+2	0	**-3**	**+5**	1	**5**
S6.SGA.02B	West Basin Foreshore Coastal Protection Option B: Sand Redistribution Program	Moderate	+2	+3	**+6**	0	+2	+2	+2	+1	0	**+7**	**+13**	1	**13**
S6.SGA.03	Eastern Foreshore Beach Nourishment	High	+3	+3	**+9**	0	+2	+2	+2	+1	0	**+7**	**+16**	1	**16**
S6.SGA.04	Seawall Monitoring	High	+3	+2	**+6**	0	0	0	+2	+4	0	**+6**	**+12**	1	**12**

ID	Action Name	Feasibility Assessment											Feasibility Score		
		Level of Risk Mitigation				Associated Environmental, Social, and Cultural Impacts							Total Score		
		Level of Risk Being Mitigated	Risk Rating Score	Effectiveness at Risk Mitigation	Risk Mitigation Score	Water Quality	Biodiversity	Physical Processes & Hazards	Social/ Recreational Amenity	Public Safety	Cultural Heritage Values	Impact Score	Total Benefit Score	Scale Factor	Total Feasibility Score
S6.SGA.05	Investigate Sea Level Rise Adaptation of Bobbin Head Foreshore	Extreme	+4	+4	**+16**	0	0	0	+4	+4	0	**+8**	**+24**	1	**24**

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

APPENDIX F
VIABILITY ASSESSMENT OUTCOMES

Table F-1 Viability Assessment Outcomes

ID	Action Name	Economic Viability Assessment												
		Capital, Operational & Maintenance Cost Estimates											Total Cost & Score	
		Economic Assessment Method	Cost Notes / Description	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Yr NPV Cost (5% discount rate)	Viability Score
S1.CMP.01	Implement the CMPs formal governance partnership for the river system	Intermediate	Cost assumption includes 1 x FTE CMP coordinator. Additional costs include administration costs - vehicles, equipment, etc	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$1,216,173	**6.1**
S1.CMP.02	Develop and execute a communications plan for Stage 5 of the CMP	Intermediate	In kind managed by project coordinator	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S2.CMP.01	Design and implement an integrated and coordinated water quality monitoring program	Intermediate	Addition costs include dashboard development and reporting	$50,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$192,156	**5.3**
S2.CMP.02	Implement a bank stability and condition monitoring program across the estuary foreshores	Intermediate	In kind delivery by PC staff. Addition costs include field equipment and reporting	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$243,235	**5.4**
S2.CMP.03	Implement a bank stability and condition monitoring program across the creeks and waterways of the catchment	Intermediate	In kind delivery by PC staff. Addition costs include field equipment and reporting	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$243,235	**5.4**
S2.CMP.04	Undertake periodic surveys of the River in between Wisemans Ferry and Richmond	Intermediate	Includes mobilisation, fieldwork, data processing, and reporting.	$100,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$100,000	**5.0**
S3.CMP.01	Review and update Partner Council planning instruments to ensure a consistent best practice approach to managing stormwater and downstream estuarine water quality	Intermediate	Would involve review of the Planning Controls, Policies and Conditions of Consent etc of PC's and beyond then recommending best practice approaches. Similar to Standardising the Standards undertaken by the PRCG	$60,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$60,000	**4.8**
S3.CMP.02	Review and update coastal hazard risk planning controls every 10 years	Intermediate	In kind delivery by PC staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S3.CMP.03	Encourage eco-friendly features in seawall development applications	Intermediate	In kind delivery by PC staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S3.CMP.04	Undertake a Hawkesbury River System Blue Carbon Scoping Study	Intermediate	Cost to deliver technical study - assuming by consultant. Can be $0 if delivered by State Government	$80,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$80,000	**4.9**
S3.CMP.05	Prepare a Hawkesbury River Coastal Wetland Sea Level Rise Adaptation Strategy	Intermediate	Cost to deliver technical study - assuming by consultant. Can be $0 if delivered by State Government	$65,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$65,000	**4.8**
S3.CMP.06	Develop Foreshore Stabilisation and Rehabilitation Guidelines for the HNRS	Intermediate	Cost to deliver technical study - assuming by consultant. Can be $0 if delivered by State Government or internally by PCs	$30,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$30,000	**4.5**
S3.CMP.07	Support the proposal for the development of the Ku-ring-gai GeoRegion	Intermediate	In kind delivery by PC staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S4.CMP.01	Design and Implement a Community Engagement and Education Program to support the vision and objectives of the CMP	Intermediate	Mainly delivered by PC staff and managed by project coordinator. Additional annual costs include logistics, travel, development of comms materials, advertising etc - as well as consultancy assistance for program design and delivery	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$405,391	**5.6**
S4.CMP.02	Develop an education package for recreational boaters	Intermediate	Mainly delivered by PC staff and managed by project coordinator. Additional annual costs include development of comms materials etc	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	**4.4**
S4.CMP.03	Community education and outreach program for estuary frontage communities	Intermediate	Predominantly in kind delivery by PC staff. Additional costs include consultancy assistance in providing program design & delivery.	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$202,696	**5.3**
S4.CMP.04	Develop and implement a Hawkesbury River school environmental education program focused on water quality, estuary health, and coastal hazards	Intermediate	In kind delivery by Dept of Ed	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S4.CMP.05	Implementing a community-based carp fishing initiative	Intermediate	Predominantly in kind delivery by PC staff. Additional costs include promotion & advertising, and prizes etc	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$162,156	**5.2**
S4.CMP.05	Hawkesbury River Marine Compliance & Education Campaign	Intermediate	Predominantly in kind delivery by PC staff. Additional costs include travel and logistics	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$162,156	**5.2**
S5.CMP.01	Prepare a Litter Prevention Strategy for the Hawkesbury River System	Intermediate	Costs cover consultancy engagement for strategy development	$90,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$90,000	**5.0**
S5.CMP.02	Identify opportunities to retrofit existing public seawalls with eco-friendly features	Intermediate	In kind delivery by PC staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S5.CMP.03	Investigate opportunities to increase uptake of environmentally friendly moorings (EFM) across the lower estuary	Intermediate	In kind delivery by TfNSW staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**

ID	Action Name	Economic Viability Assessment													
		Capital, Operational & Maintenance Cost Estimates											Total Cost & Score		
		Economic Assessment Method	Cost Notes / Description	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Yr NPV Cost (5% discount rate)	Viability Score
S5.CMP.05	Undertake a coordinated riparian rehabilitation works program across the River System	Intermediate	Predominantly delivered in kind by Councils as part of their operating budget. Additional annual budget allowance set out herein for C&E Grant Assistance for specific identified projects classified as EPW on RHSEPP Coastal Wetland Areas. Nominal allowance to be discussed by PCs and confirmed in Stage 4.	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$1,621,564	6.2
S5.CMP.06	Continue to support Floating Landcare (and other relevant Landcare networks) across the river system	Intermediate	Predominantly delivered by volunteers - by funding assists with logistics, equipment, and promotion. Noted: base funding from the NSW Environmental Trust	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$243,235	5.4
S5.CMP.07	Develop a strategy for managing vessel pumpouts across the Hawkesbury River System	Intermediate	Cost estimate based on early desktop and engagement work followed by rollout of incentives and other works.	$65,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$207,156	5.3
S5.CMP.08	Engage with government and the community to reduce the impacts of liveaboards (and associated discharges) on the waterways	Intermediate	Substantially in kind delivery of PC and TfNSW staff. Additional funding allowance for engagement, monitoring, and waste facility installation	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$202,696	5.3
S5.CMP.09	Support the NSW Government's breeding and release program for the endangered White's Seahorse	Intermediate	Action delivered In Kind by staff - includes only identification of sites and discussions	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	2.0
S5.CMP.10	Coordination and resource sharing for inspection of OSMS at key river settlements	Intermediate	In kind delivery by PC staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	2.0
S5.CMP.11	Fencing of riparian foreshores on high risk agricultural lands	Intermediate	Implementation of works at different sites under these plans is often dependent on the willingness of private landowners to participate, so timing and precise location of works cannot always be prepared in advance. A nominal allowance has been provided to be discussed with PCs and LLS	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$810,782	5.9
S5.CMP.12	Undertake a coordinated creek rehabilitation works program across the Partner Council's upper catchment waterways	Intermediate	Predominantly delivered in kind by Councils as part of their operating budget. Additional annual budget allowance set out herein for C&E Grant Assistance for specific identified projects classified as EPW on RHSEPP Coastal Wetland Areas. Nominal allowance to be discussed by PCs and confirmed in Stage 4.	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$810,782	5.9
S6.CMP.01	Activate the "Coastal Hazard Emergency Action Sub-Plans" (CZEAS) for each beach as required after storm events	Intermediate	Varied based on frequency and extent of emergency works. Nominal allowance provided for discussion with NBC and CCC. Might need to be split into 2 separate actions (one for each Council) to make costs and funding clearer	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$810,782	5.9
S6.CMP.02	Riverine bank erosion recovery works after erosion events	Intermediate	Varied based on frequency and extent of emergency works. Nominal allowance provided for discussion with PCs.	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$1,621,564	6.2
S6.CMP.03	Develop a Tide Alert Calendar Tool for the low lying communities of the river system to encourage citizen science in monitoring tidal inundation	Intermediate	Estimated @ $100k to undertake the underling analysis, hotspot ID, and comms package development. $20k for annual comms execution.	$100,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$242,156	5.4
S7.CMP.01	Develop a Hawkesbury-Nepean River Maritime Infrastructure Strategy	Intermediate	Allowance ofr development of desktop study and action plan	$80,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$80,000	4.9
S7.CMP.02	Undertake a trial of webcams at high usage boat ramps	Intermediate	Assumes 5 x trial locations. Estimated at $10k set-up per camera - plus $2k per camera per year for monitoring & maintenance	$50,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$121,078	5.1
S7.CMP.03	Undertake a feasibility investigation for the Great Hawkesbury Walk - connecting Penrith to Brooklyn via Wisemans Ferry	Intermediate		$35,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$35,000	4.5
S7.CMP.03	Update and Extend the Upper Hawkesbury River Dredging Investigations	Intermediate	Cost assumes Action S2.CMP.04 has been undertkaen - otherwise a survey would be required to undertake this study.	$75,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$75,000	4.9
S8.CMP.01	Engage First Nations teams where appropriate to undertake bush regeneration works including weeding and revegetation	Intermediate	Nominal annual allowance - to be discussed	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$405,391	5.6
S8.CMP.02	Further develop and implement community education programs for awareness and appreciation of Indigenous cultural heritage	Intermediate	Nominally assumes $35k for development, and then $50k p.a for implementation	$35,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$390,391	5.6

ID	Action Name	Economic Viability Assessment												
		Capital, Operational & Maintenance Cost Estimates											Total Cost & Score	
		Economic Assessment Method	Cost Notes / Description	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Yr NPV Cost (5% discount rate)	Viability Score
S8.CMP.03	Support cultural education and awareness of estuary health issues for First Nations Groups	Intermediate	Nominal annual allowance - to be discussed	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$162,156	**5.2**
S8.CMP.04	Prepare a heritage tourism strategy and plan for the Hawkesbury River System	Intermediate	Nominal allowance - happy to discuss	$60,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$60,000	**4.8**
S8.CMP.05	Develop a Hawkesbury heritage central display	Intermediate		$15,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$15,000	**4.2**
S8.CMP.06	Identify opportunities for, and undertake cultural land management practices, including cultural burning	Intermediate	Nominal allowance - happy to discuss	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$405,391	**5.6**
S8.CMP.07	Engage with local First Nations Groups to protect and preserve cultural heritage items across the coastal zone	Intermediate	Costs involve commissioning of survey(s) and management plan development	$150,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$150,000	**5.2**
S9.CMP.01	Collaborate with local universities and research institutions to establish a list of research priorities for the Hawkesbury-Nepean River System	Intermediate	Delivered in kind by PC staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S9.CMP.02	Establish information sharing and reporting protocols for the identification of pest species	Intermediate	Delivered in kind by PC staff and project coordinator	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S3.THC.01	Coastal Wetland Mapping Update	Intermediate	Costs cover consultancy fees for ecological field work and mapping component, as well as stakeholder engagement	$35,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$35,000	**4.5**
S6.THC.01	Implement the outcomes of the Blundells Swamp Inundation Mitigation Study	Intermediate		$55,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$55,000	**4.7**
S6.THC.02	Inundation and Drainage Study at Michael Duggan Reserve	Intermediate		$55,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$55,000	**4.7**
S6.THC.03	Lambs Creek Inundation and Drainage Study	Intermediate		$55,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$55,000	**4.7**
S6.THC.04	Erosion remediation at Wisemans Ferry	Intermediate	Cost Estimate provided in S2 Report and verified / updated in S3	$230,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$230,000	**5.4**
S6.THC.05	Erosion Remediation at Webbs Creek Ferry Foreshore	Intermediate	Bespoke costing, using units cost assumptions consistent with the S2 report (and therefore consistent with other similar actions)	$150,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$150,000	**5.2**
S6.THC.05	Erosion investigation and design at River Road, Leets Vale	Intermediate	Cost Estimate provided in S2 Report and verified / updated in S3	$50,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	**4.7**
S6.THC.06	Erosion remediation at River Road, Lower Portland	Intermediate	Cost Estimate provided in S2 Report and verified / updated in S3	$50,000	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$67,770	**4.8**
S2.NBC.01	Install a CoastSnap Camera Cradles at strategic locations across the LGA foreshore	Intermediate	Nominal budget allowance of $10k per year to install and maintain	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$81,078	**4.9**
S2.NBC.02	Implement a Pittwater Beach Monitoring Program	Intermediate	Assumes all survey undertaken In Kind by Council staff. Additional $20 k p.a. allowance for data processing and analysis by 3rd parties if needed.	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$162,156	**5.2**
S2.NBC.03	Install permanent tide gauges at strategic locations around the waterway	Intermediate	Assumed @ $20k per install based on discussions with MHL	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$40,000	**4.6**
S2.NBC.04	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	Intermediate	Assed to be undertaken In Kind by Council assets team & engineers.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S3.NBC.02	Develop and update coastal hazard information	Intermediate	Nominal allowance to cover future updates to existing coastal hazard mapping	$50,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	**4.7**
S3.NBC.03	Update planning certificates with coastal hazard information	Intermediate	Council in kind staff time	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S3.NBC.04	Develop planning controls to ensure buildings are sited and designed to consider coastal hazard information including coastal erosion and estuarine inundation.	Intermediate	Council in kind staff time	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S3.NBC.04	Long Term Adaptation Plan for Coastal Assets and Infrastructure	Intermediate	Assumed as being delivered externally - but could potentially be undertaken internal by Council staff if resourcing allows	$150,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$150,000	**5.2**
S5.NBC.01	Investigate the feasibility of naturalisation of Careel Creek	Intermediate	Assumed as being delivered externally - but could potentially be undertaken internal by Council staff if resourcing allows	$65,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$65,000	**4.8**
S5.NBC.02	Upgrade the Careel Bay litter trap	Intermediate	Cost estimate includes design & approvals, supply of litter boom, installation and site works.	$90,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$161,078	**5.2**

ID	Action Name	Economic Viability Assessment												
		Capital, Operational & Maintenance Cost Estimates											Total Cost & Score	
		Economic Assessment Method	Cost Notes / Description	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Yr NPV Cost (5% discount rate)	Viability Score
			Additional Costs - also cover ongoing annual maintenance (assumed at $10k pa)												
S5.NBC.03	Investigate WSUD solutions within the Careel Creek Drainage catchment.	Intermediate	Study assumed as being delivered externally - but could potentially be undertaken internal by Council staff if resourcing allows	$45,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$45,000	**4.7**
S6.NBC.01	Foreshore naturalisation and restoration works at Station Beach	Intermediate	Assumes initial work focusses on in front of car park. Annual allowed to extend to other areas	$87,500	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$158,578	**5.2**
S6.NBC.02	Beach scraping and sand redistribution works at the western end of Sand Point Beach	Intermediate	Based on sand volume requirements of WRL (2019), plus allowance for contractor mobilisation etc. Assumed to be undertaken annually as per the WRL report.	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$129,725	**5.1**
S6.NBC.03	Foreshore naturalisation and restoration works along Sand Point Beach	Intermediate	Cost estimate also includes fencing costs	$80,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$80,000	**4.9**
S6.NBC.04	Great Mackerel Beach Foreshore Master Plan	Intermediate	Custom costed including each of the components listed in the description. Plus allowance for annual beach scraping and sand redistribution works	$250,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$321,078	**5.5**
S6.NBC.05	Foreshore naturalisation and restoration works at Currawong Beach	Intermediate	Cost estimate also includes fencing, and dune & swale construction under Additional Costs	$98,500	$0	$0	$0	$0	$0	$0	$0	$0	$0	$98,500	**5.0**
S6.NBC.06	Foreshore naturalisation and restoration works at Clareville Beach Reserve	Intermediate	Cost estimate also includes fencing costs	$62,500	$0	$0	$0	$0	$0	$0	$0	$0	$0	$62,500	**4.8**
S6.NBC.07	Foreshore naturalisation and restoration works at Bayview Park foreshore	Intermediate	Cost estimate also includes fencing costs	$33,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$33,000	**4.5**
S6.NBC.08	Coastal hazard resilience for both built and natural asset owners	Intermediate	Council in kind staff time	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S6.NBC.12	Pittwater dredging and beach nourishment feasibility investigation and implementation	Intermediate	Cost for consultants report, including lab testing of sediments etc	$80,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$80,000	**4.9**
S6.NBC.13	Investigate the feasibility of channel maintenance works within Careel Bay and Careel Creek	Intermediate	Nominal budget allowance of $20k per year to maintain channel	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$162,156	**5.2**
S7.NBC.01	Upgrade and repair of waterway access points	Intermediate	Nominal budget allowance of $100k per year to maintain and repair assets	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$810,782	**5.9**
S7.NBC.06	Boat Ramp Upgrade	Intermediate	Cost estimate includes Detailed Design & Engineering, Demolition & Preparation, Ramp Resurfacing, Foundation Works	$100,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$100,000	**5.0**
S9.NBC.01	Pittwater Wave Climate Study	Intermediate	Cost estimate includes temporary	$80,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$80,000	**4.9**
S4.KRG.01	Support Community Engagement undertaken as part of the Ku-ring-gai Council – Water Sensitive City Strategy	Intermediate	Nominal allowance of $20k pa for comms materials and engagement effort	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$162,156	**5.2**
S5.KRG.01	Prepare and implement a catchment study and management plan for the Cowan Creek catchment	Intermediate	Assumed as being delivered externally - but could potentially be undertaken internally by Council staff if resourcing allows	$65,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$65,000	**4.8**
S5.KRG.02	Update the catchment studies for Ku-ring-gai Creek and Lovers Jump Creek	Intermediate	Assumed as being delivered externally - but could potentially be undertaken internally by Council staff if resourcing allows	$45,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$45,000	**4.7**
S2.HSC.01	Install a permanent tide gauge at Berowra Waters	Intermediate		$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	**4.3**
S2.HSC.02	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	Intermediate	Assed to be undertaken In Kind by Council assets team & engineers.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S5.HSC.01	Installation of Stormwater Quality Improvement Devices at Parsley Bay	Intermediate	Includes additional costs for design & sizing of GPT & biofilter, and construction	$320,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$320,000	**5.5**
S5.HSC.02	Installation of Stormwater Quality Improvement Devices at The Gateway	Intermediate	Includes additional costs for design & sizing of GPT & biofilter, and construction	$320,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$320,000	**5.5**
S5.HSC.03	Installation and upgrade of Stormwater Quality Improvement Devices at Brooklyn Park	Intermediate	Includes additional costs for design & sizing of GPT & biofilter, and construction	$320,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$320,000	**5.5**
S6.HSC.01	Repair and Renewal of the Parsley Bay Breakwater	Intermediate	Have added 25% to estimate for design & contingency	$1,562,500	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$1,619,363	**6.2**
S6.HSC.02	Repair and renewal of seawall protecting loading dock access road	Intermediate	Have added 25% to estimate for design & contingency	$750,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$778,431	**5.9**

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S6.HSC.03	Sea Level Rise adaptation for Brooklyn Road	Intermediate	High level estimate for raising 5km of Wisemans Ferry road based on TfNSW guideline unit rates. Assume costs would be met by Councils road and assets budget (not C&E Budget)	$3,300,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,300,000	6.5
S6.HSC.04	Wharf Street Foreshore Improvement Works	Intermediate	Have added 25% to estimate for design & contingency	$187,500	$900	$900	$900	$900	$900	$900	$900	$900	$900	$193,897	5.3
S6.HSC.05	Repair and renewal of seawall at the base of the Bar Island jetty	Intermediate	Have added 100% to estimate for design & contingency - based on additional costs of barge transport of materials	$120,000	$600	$600	$600	$600	$600	$600	$600	$600	$600	$124,265	5.1
S6.HSC.06	Bradleys Beach Foreshore Restoration works	Intermediate	Costs cover sand redistribution & reveg / restoration. Sand redistribution works assumed as needed every 3 years	$21,000	$0	$0	$21,000	$0	$0	$21,000	$0	$0	$21,000	$68,348	4.8
S6.HSC.07	Repair and renewal of seawall from Brooklyn to Parsley Bay	Intermediate	Have added 25% to estimate for design & contingency	$750,000	$3,800	$3,800	$3,800	$3,800	$3,800	$3,800	$3,800	$3,800	$3,800	$777,010	5.9
S7.HSC.01	Develop Infrastructure strategy for the Lower Hawkesbury	Intermediate	Assumed as being delivered externally - but could potentially be undertaken internal by Council staff if resourcing allows	$65,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$65,000	4.8
S7.HSC.02	Parsley Bay Loading Dock Upgrade	Intermediate	This includes condition assessments, structural repairs to piles and decking, safety and access upgrades, remote site logistics, and project management and approvals	$250,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$250,000	5.4
S7.HSC.03	Parsley Bay Dredging Feasibility Study	Intermediate	Cost for consultants repot, including lab testing of sediments etc	$50,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	4.7
S7.HSC.04	Upgrade of Kangaroo Point Pumpout Pontoon	Intermediate	This includes condition assessments, pontoon and pumpout system upgrades, landside infrastructure improvements, environmental compliance measures, and project management	$200,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$200,000	5.3
S7.HSC.05	Upgrade of McKell Park Tidal Pool	Intermediate	This includes condition assessments, structural and surface repairs, safety and accessibility upgrades, minor amenities, and project management	$250,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$250,000	5.4
S7.HSC.06	Upgrade of public pontoons at Parsley Bay	Intermediate	Based on cost of Berowra Water Pontoon upgrade ($75k), factored up for inflation	$170,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$170,000	5.2
S7.HSC.07	Dangar Island Loading Dock Upgrade	Intermediate	This includes condition assessments, structural repairs to piles and decking, safety and access upgrades, remote site logistics, and project management and approvals	$350,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$350,000	5.5
S7.HSC.08	Upgrade of the Wisemans Ferry old public wharf	Intermediate		$150,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$150,000	5.2
S7.HSC.09	Sandbrook Inlet Dredging Feasibility Study	Intermediate	Cost for consultants repot, including lab testing of sediments etc	$60,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$60,000	4.8
S7.HSC.10	Bayden Powell Avenue Dinghy and Foreshore Access improvement	Intermediate	Based on costs for similar Paradise Beach Dinghy and Watercraft Storage, Clareville	$80,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$80,000	4.9
S7.HSC.11	Design and install boardwalk from Brooklyn Public Wharf to Lower McKell Park	Intermediate		$300,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$300,000	5.5
S3.HCC.01	Write a specific WSUD chapter in Hawkesbury City Council DCP	Intermediate		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	2.0
S3.HCC.02	Undertake a review and update of the Council OSSM policy.	Intermediate		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	2.0
S3.HCC.03	Environmental Conservation zoning for coastal wetland areas	Intermediate		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	2.0
S4.HCC.01	Establish an environmental program for the Turf Farmers across the Hawkesbury LGA	Intermediate	Predominantly delivered In Kind by Council but cost estimate includes other components such as engagement, seeking technical expertise, and engagement materials (assume $25k pa)	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$202,696	5.3
S5.HCC.01	Incentivising private landowners to undertake best practice management of their riparian zones	Intermediate	Predominantly delivered In Kind by Council	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	2.0
S5.HCC.02	Continue Council's Yabby Trap Round-Up Program	Intermediate	Assume $20k pa for logistics and disposal costs	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$162,156	5.2

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S5.HCC.03	Implement the recommendations of the Hawkesbury Floodplain Drainage Review	Intermediate	Nominal allowance of $500k over 10 years to implement findings	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$405,391	**5.6**
S6.HCC.01	Sea Level Rise adaptation for the local road network along the Colo River, Webbs Creek, and The Macdonald River	Intermediate	High level estimate for raising 5km of Wisemans Ferry road based on TfNSW guideline unit rates. Assume costs would be met by Councils road and assets budget (not C&E Budget)	$6,600,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$6,600,000	**6.8**
S6.HCC.02	Bank Erosion Remediation at Holmes Drive Reserve	Intermediate	Cost Estimate provided in S2 Report and verified / updated in S3	$300,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$300,000	**5.5**
S6.HCC.03	Erosion remediation at Churchills Wharf Reserve	Intermediate	Cost Estimate provided in S2 Report and verified / updated in S3	$280,000	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$289,951	**5.5**
S6.HCC.04	Relocation of Utilities Infrastructure at Argyle Bailey Memorial Reserve	Intermediate		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S6.HCC.05	Bank Erosion Remediation Design: The Terrace, Windsor	Intermediate	Cost Estimate provided in S2 Report and verified / updated in S3	$150,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$150,000	**5.2**
S6.HCC.06	Bank Erosion Remediation Works at Governor Phillip Park	Intermediate		$80,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$80,000	**4.9**
S7.HCC.01	Upgrade the Punt Road Public Boat Ramp	Intermediate	Based on Similar Boat Ramp upgrade projects (https://maps.transport.nsw.gov.au/egeomaps/boating-now/index.html)	$150,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$150,000	**5.2**
S2.CCC.01	Coastal dynamics monitoring program	Intermediate	Monitoring would be undertaken by Council and/or DCCEEW. Has assumed some additional budget for equipment maintenance, and servicing consultants to help with interpretation, analysis and reporting	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$202,696	**5.3**
S2.CCC.02	Develop and implement a program for regular and ongoing monitoring of public coastal assets and infrastructure	Intermediate	Assed to be undertaken In Kind by Council assets team & engineers.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S2.CCC.03	Install permanent water level gauges at key locations within Brisbane Water and Broken Bay	Intermediate		$60,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$60,000	**4.8**
S3.CCC.01	Environmental Conservation zoning for coastal wetland areas	Intermediate	In kind delivery by Council staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S3.CCC.02	Implement the Hardys Bay Foreshore Master Plan	Intermediate	Very high level budget allowance based on historical FMP type projects (noting WT haven't seen specific plans for the FMP yet)	$500,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$500,000	**5.7**
S3.CCC.03	Implement the Phegans Bay Waterfront Foreshore Master Plan	Intermediate	Very high level budget allowance based on historical FMP type projects (noting WT haven't seen specific plans for the FMP yet)	$500,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$500,000	**5.7**
S3.CCC.04	Update RH SEPP Coastal Wetlands and Littoral Rainforest Mapping for the LGA	Intermediate	In kind delivery by Council staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S3.CCC.05	Review and update Council's Development Control Plan	Intermediate	In kind delivery by Council staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S3.CCC.06	Compliance auditing of private development encroachment onto public land	Intermediate	In kind delivery by Council staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S3.CCC.07	Investigate opportunities to purchase saltmarsh areas for incorporation into Council's reserve system.	Intermediate	Has assumed In kind delivery by Council staff - but could add additional budget for external technical advice	$0	-	-	-	-	-	-	-	-	-	$0	**2.0**
S5.CCC.01	Water Quality Improvement Plan for Brisbane Water	Intermediate	Assumes the development of the plan will be delivered externally.	$250,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$250,000	**5.4**
S5.CCC.04	Undertake a sedimentation study for major creek outlets	Intermediate	Assumes the development of the plan will be delivered externally.	$80,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$80,000	**4.9**
S5.CCC.05	Investigate the feasibility of Naturalisation of the Austin Butler Drainage Channel	Intermediate		$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$40,000	**4.6**
S5.CCC.06	Implement a wetland monitoring, management and restoration program	Intermediate	Cost estimate includes strategy development only. Costs for works are rolled into Action S5.CMP.05	$35,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$35,000	**4.5**
S5.CCC.07	Green and Golden Bell Frog Key Population Management Plan	Intermediate	Assumes the development of the plan will be delivered externally.	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	**4.4**
S6.CCC.01	Implement foreshore restoration and stabilisation works at Bayside Drive Reserve	Intermediate	Have added 25% for design and approvals	$1,406,250	$7,031	$7,031	$7,031	$7,031	$7,031	$7,031	$7,031	$7,031	$7,031	$1,456,227	**6.2**

ID	Action Name	Economic Viability Assessment												
		Capital, Operational & Maintenance Cost Estimates											Total Cost & Score	
		Economic Assessment Method	Cost Notes / Description	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Yr NPV Cost (5% discount rate)	Viability Score
S6.CCC.02	Implement foreshore restoration and stabilisation works at Edgewater Avenue Reserve	Intermediate	Have added 25% for design and approvals	$2,500,000	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$2,588,848	**6.4**
S6.CCC.03	Implement foreshore restoration and stabilisation works at Pretty Beach Road	Intermediate	Have added 25% for design and approvals	$1,937,500	$9,688	$9,688	$9,688	$9,688	$9,688	$9,688	$9,688	$9,688	$9,688	$2,006,357	**6.3**
S6.CCC.04	Implement foreshore restoration and stabilisation works at Lara Street	Intermediate	Have added 25% for design and approvals	$2,187,500	$10,938	$10,938	$10,938	$10,938	$10,938	$10,938	$10,938	$10,938	$10,938	$2,265,242	**6.4**
S6.CCC.05	Implement foreshore restoration and stabilisation works at the Woy Woy waterfront	Intermediate	Have added 25% for design and approvals	$3,262,500	$16,313	$16,313	$16,313	$16,313	$16,313	$16,313	$16,313	$16,313	$16,313	$3,378,446	**6.5**
S6.CCC.06	Implement foreshore restoration and stabilisation works at Araluen Drive Reserve	Intermediate	Have added 25% for design and approvals	$1,125,000	$5,625	$5,625	$5,625	$5,625	$5,625	$5,625	$5,625	$5,625	$5,625	$1,164,981	**6.1**
S6.CCC.07	Implement foreshore restoration and stabilisation works at Palermo Reserve	Intermediate	Have added 25% for design and approvals	$375,000	$18,750	$18,750	$18,750	$18,750	$18,750	$18,750	$18,750	$18,750	$18,750	$508,272	**5.7**
S6.CCC.08	Implement foreshore restoration and stabilisation works at Illoura Reserve	Intermediate	Have added 25% for design and approvals	$656,250	$32,813	$32,813	$32,813	$32,813	$32,813	$32,813	$32,813	$32,813	$32,813	$889,475	**5.9**
S6.CCC.09	Implement foreshore restoration and stabilisation works at the Point Clare waterfront	Intermediate		$250,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$250,000	**5.4**
S6.CCC.10	Repair and renewal of the Lance Webb Reserve Seawall	Intermediate	Have added 25% to estimate for design & contingency	$2,437,500	$121,875	$121,875	$121,875	$121,875	$121,875	$121,875	$121,875	$121,875	$121,875	$3,303,766	**6.5**
S6.CCC.11	Implement construction of the foreshore stabilisation works near Rip Road Reserve.	Intermediate	Have added 25% to estimate for design & contingency	$625,000	$6,250	$6,250	$6,250	$6,250	$6,250	$6,250	$6,250	$6,250	$6,250	$669,424	**5.8**
S6.CCC.12	Tidal inundation stormwater audit and adaptation investigation	Intermediate	Assumes the development of the plan will be delivered externally.	$70,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$70,000	**4.8**
S6.CCC.13	Sea Level Rise adaptation for Wisemans Ferry Road	Intermediate	High level estimate for raising 5km of Wisemans Ferry road based on TfNSW guideline unit rates. Assume costs would be met by Councils road and assets budget (not C&E Budget)	$15,840,000										$15,840,000	**7.2**
S6.CCC.14	Develop and Implement a Beach Maintenance Program.	Intermediate	WT might need some guidance here regarding costing split with the open coast CMP. For Broken Bay Beaches - assume 50k to develop the plan then ... $50k pa to undertake beach maintenance operations)? Is that anywhere near ball park?	$100,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$455,391	**5.7**
S6.CCC.15	Develop and implement a coastal vegetation and dune management strategy	Intermediate	Nominally assuming around 1000m2 of dune restoration works per year across the broken bay beaches	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$283,774	**5.5**
S6.CCC.16	Implement the Umina-Ocean Beach Erosion Management Strategy	Detailed	Detailed CBA already undertaken by Advisian. CBA outcomes will be referenced in Stage 3 Report.	$19,500,000	$195,000	$195,000	$195,000	$195,000	$195,000	$195,000	$195,000	$195,000	$195,000	$20,886,025	**7.3**
S6.CCC.17	Prepare and Implement a Broken Bay Beach Nourishment Framework	Intermediate	Assumes the development of the plan will be delivered externally.	$25,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$167,156	**5.2**
S6.CCC.18	Management of stormwater outlets on beaches	Intermediate	Assumes delivered in kind by Council assets and coastal teams. However allowance could be made for external structural assessments.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S6.CCC.19	Patonga Sand Management Plan	Intermediate	Cost for detailed study including sediment analysis	$80,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$80,000	**4.9**
S6.CCC.20	Patonga Levee Feasibility Investigation and Design	Intermediate	Includes investigation, design and approvals, and construction (per metre)	$65,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$65,000	**4.8**
S6.CCC.21	Implement recommendations from Gosford Lagoons & Creek Entrance Management Review (Salients 2017) for Green Point Creek, Pearl Beach Lagoon and Ettalong Creek.	Intermediate	Assumes delivered in kind by Council	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S6.CCC.22	Repair and renewal of Patonga Seawall	Intermediate	Includes Condition Assessment and Repair Design ($30k), and Construction (assuming $5000/m @ 90 m length)	$480,000	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$514,118	**5.7**
S6.CCC.23	Investigate the potential inclusion of RSL Creek and Mudflat Creek in the Central Coast Council Priority Creek Program	Intermediate	In Kind work undertaken as part of Councils existing program	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S6.CCC.24	Implement foreshore restoration and stabilisation works at the Hardys Bay extension wharf	Intermediate	Have added 25% for design and approvals	$375,000	$1,875	$1,875	$1,875	$1,875	$1,875	$1,875	$1,875	$1,875	$1,875	$388,327	**5.6**

ID	Action Name	Economic Viability Assessment												
		Capital, Operational & Maintenance Cost Estimates											Total Cost & Score	
		Economic Assessment Method	Cost Notes / Description	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Yr NPV Cost (5% discount rate)	Viability Score
S6.CCC.25	Repair and renewal of the Patonga Creek Training Wall	Intermediate	Includes Condition Assessment and Repair Design ($40k), and Construction (assuming $5000/m @ 120 m length)	$690,000	$6,900	$6,900	$6,900	$6,900	$6,900	$6,900	$6,900	$6,900	$6,900	$739,044	**5.9**
S6.CCC.26	Repair and renewal of the Patonga Creek foreshore protection works	Intermediate	Repair costs and are likely to be lower than the Patonga Boat Ramp seawall as condition is better and it is exposed to lower wave energy. More likely to be patch work upgrades	$285,000	$2,850	$2,850	$2,850	$2,850	$2,850	$2,850	$2,850	$2,850	$2,850	$305,257	**5.5**
S6.CCC.27	Implement foreshore restoration and stabilisation works at Wagstaffe Wharf	Intermediate	Includes design, construction, and approvals	$125,000	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$142,770	**5.2**
S6.CCC.28A	Pearl Beach Foreshore Resilience: Option A - Beach Scraping and Dune Building	Detailed	See detailed economic assessment	$50,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	**4.7**
S6.CCC.28B	Pearl Beach Foreshore Resilience: Option B - Coastal Protection Works	Detailed	See detailed economic assessment	$3,050,000	$30,500	$30,500	$30,500	$30,500	$30,500	$30,500	$30,500	$30,500	$30,500	$3,266,789	**6.5**
S6.CCC.29	Pearl Beach Lagoon Erosion Management Investigation	Intermediate	CBA	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	**4.3**
S6.CCC.29	Ettalong Beach Foreshore Stabilisation Investigation	Intermediate	Assumes delivered externally	$65,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$65,000	**4.8**
S6.CCC.30	Implement foreshore restoration and stabilisation works at Phegans Bay Road	Intermediate	Have added 25% for design and approvals	$1,187,500	$5,938	$5,938	$5,938	$5,938	$5,938	$5,938	$5,938	$5,938	$5,938	$1,229,703	**6.1**
S7.CCC.01	Construction of an all-abilities beach access point at Ocean Beach SLSC	Intermediate	Estimate includes Beach access matting (e.g. Mobi-Mat, 30–50m), Accessible amenities (seating, shower, etc.), Beach wheelchair (e.g. Sandcruiser), Design, approvals, and project management	$20,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$20,000	**4.3**
S7.CCC.02	Support the Gosford Foreshore Masterplan	Intermediate	Assumes delivered in kind by Council	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S7.CCC.03	Develop and implement a foreshore masterplan for Patonga Creek	Intermediate	High level estimate. Difficult to cost until MP is developed more fully. Estimate based on a fairly straight forward plan development, with allowances for parking, access points, improved roads and drainage and Dinghy storage	$250,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$250,000	**5.4**
S7.CCC.04	Strategic assessment of SLSC patrol towers	Intermediate	Assumes review & engagement undertaken by Council in kind	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S7.CCC.05	Review of coastal zone waste facilities and collection	Intermediate	Assumes review & engagement undertaken by Council in kind	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S7.CCC.06	Increase foreshore connectivity between Hardys Bay and Fishermans Point	Intermediate	Based on the cost of the recently completed Huskisson Boardwalk in Jervis Bay (scaled based on length)	$2,500,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,500,000	**6.4**
S7.CCC.07	Prepare Central Coast Council Dinghy Management Plan	Intermediate	Assume undertaken internally by Council (in kind)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S7.CCC.08	Feasibility Investigation: Ambulant Access at Pearl Beach Rock Pool Access	Intermediate	Assume undertaken internally by Council (in kind)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S7.CCC.09	Develop and implement a foreshore masterplan for Pearl Beach	Intermediate	High level estimate. Difficult to cost until MP is developed more fully. Areas is probably space limited in terms of provision of anything new. Estimate based on a fairly straight forward plan development, with allowances for parking, access points, improved roads and drainage	$150,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$150,000	**5.2**
S7.CCC.10	Feasibility Investigation: Increase foreshore connectivity between Phegans Bay and Woy Woy	Intermediate	Assumed as being delivered externally - but could potentially be undertaken internal by Council staff if resourcing allows	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	**4.4**
S7.CCC.12	Develop and implement a foreshore masterplan for Spencer	Intermediate	High level estimate. Difficult to cost until MP is developed more fully. Areas is probably space limited in terms of provision of anything new. Estimate based on a fairly straight forward plan development, with allowances for parking, access points, improved roads and drainage, plus renewal of the swimming enclosure	$400,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$400,000	**5.6**
S7.CCC.13	Feasibility Investigation: Reinstating Umina Point foreshore connection	Intermediate	Assumed as being delivered externally - but could potentially be undertaken internal by Council staff if resourcing allows	$25,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	**4.4**
S7.CCC.14	Undertake strategic upgrades of Council owned boat ramps in Brisbane Water	Intermediate	Allowance made for upgrading 3 ramps in 10 year CMP period	$250,000	$0	$0	$0	$250,000	$0	$0	$0	$0	$250,000	$616,828	**5.8**
S7.CCC.15	Implement the St Huberts Island Canals maintenance program	Intermediate	Includes survey and dredging feasibility study	$50,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	**4.7**

ID	Action Name	Economic Viability Assessment												
		Capital, Operational & Maintenance Cost Estimates											Total Cost & Score	
		Economic Assessment Method	Cost Notes / Description	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Yr NPV Cost (5% discount rate)	Viability Score
S8.CCC.01	Identify the location and condition of ship wrecks near the old bar via a maritime archaeological survey.	Intermediate	Includes, Desktop study & historical research, Diver-based or ROV inspection , Data processing, interpretation, & reporting, Heritage and cultural consultation	$50,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	**4.7**
S6.SGA.01A	Station Beach Coastal Adaptation Option A: GSC Coastal Protection Works	Detailed	As per independent memo prepared for NPWS	$400,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$456,863	**5.7**
S6.SGA.01B	Station Beach Coastal Adaptation Option B: Sand Redistribution and Dune Building	Detailed	As per independent memo prepared for NPWS	$22,000	$0	$0	$0	$0	$22,000	$0	$0	$0	$0	$39,238	**4.6**
S6.SGA.01C	Station Beach Coastal Adaptation Option C: Relocation of Assets	Detailed	As per independent memo prepared for NPWS	$187,950	$0	$0	$0	$0	$0	$0	$0	$0	$0	$187,950	**5.3**
S6.SGA.02A	West Basin Coastal Adaptation Option A: GSC Coastal Protection Works	Intermediate	As per independent memo prepared for NPWS	$950,000	$19,000	$19,000	$19,000	$19,000	$19,000	$19,000	$19,000	$19,000	$19,000	$1,085,049	**6.0**
S6.SGA.02B	West Basin Foreshore Coastal Protection Option B: Sand Redistribution Program	Intermediate	As per independent memo prepared for NPWS	$29,000	$0	$0	$0	$29,000	$0	$0	$0	$29,000	$0	$72,487	**4.9**
S6.SGA.03	Eastern Foreshore Beach Nourishment	Intermediate	As per independent memo prepared for NPWS	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$24,323	**4.4**
S6.SGA.04	Seawall Monitoring	Intermediate	As per independent memo prepared for NPWS	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**2.0**
S6.SGA.05	Investigate Sea Level Rise Adaptation of Bobbin Head Foreshore	Intermediate	As per independent memo prepared for NPWS	$65,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$65,000	**4.8**

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APPENDIX G
DETAILED COST BENEFIT ANALYSES

G-1 Introduction

Economic assessment approaches can be used to evaluate the viability of management actions. They can help decision-makers better understand the socio-economic implications of adopting various management options and help them to make choices about which options will provide net benefits to the community.

A cost-benefit analysis (CBA) is one form of economic assessment that can be used to estimate changes to the economic wellbeing of local and wider communities in response to a change in management. The CBA involves estimating and comparing the costs and benefits of implementing a proposed project or management activity, with the costs and benefits of a 'base case', which represents a continuation of current conditions under which the proposed project/policy is not implemented (NSW Government, 2020).

In the case of CBAs for proposed coastal management activities, the base case would represent a continuation of Council's prevailing approach to coastal management (i.e., a 'business as usual' situation). The costs and benefits of alternative management options are then compared with the costs and benefits of the base case to identify any incremental differences between the base case and the alternative approaches.

A more detailed economic CBA approach has been applied for options where risks and both (a) the impacts are high and (b) the economic costs and benefits can be reasonably estimated. This level of assessment has been applied to five potential options – with three at the northern end of Station Beach, in Pittwater and the other two located at Pear Beach in Broken Bay (see Table G-1) - all applying a probabilistic Monte-Carlo CBA method (Beadle, Smith, & Colleter, 2022). The primary goal of the assessment was to assess the cost-benefit ratio of several potential options identified to protect:

- Station Beach: Key NPWS assets, including the Knotts Cottage and Shed that were identified as being at risk of coastal erosion and inundation hazard (WRL, 2023). These options were labelled as S6.SGA.01A, B, and C.
- Pearl Beach: Key public assets and infrastructure – including the amenities block, and public road (Pearl Parade). Secondary benefits of the protection of private properties behind Pearl Parade were also considered in the analysis.

Table G-1 Options for which a detailed probabilistic CBA was carried out

ID	Location	Option Name
S6.SGA.01A	Station Beach	Station Beach Coastal Adaptation Option A: GSC Coastal Protection Works
S6.SGA.01B	Station Beach	Station Beach Coastal Adaptation Option B: Sand Redistribution and Dune Building
S6.SGA.01C	Station Beach	Station Beach Coastal Adaptation Option C: Relocation of Assets
S6.CCC.28A	Pearl Beach	Pearl Beach Foreshore Resilience: Option A - Beach Scraping and Dune Building
S6.CCC.28B	Pearl Beach	Pearl Beach Foreshore Resilience: Option B - Coastal Protection Works

G-2 Methodology

G-2-1 Definition of the Base Case

As part of any robust CBA exercise, the assessment needs to develop detailed descriptions of a range of alternative options that could achieve the desired outcomes. This includes a detailed base case, which

represents a continuation of present management activity. The base case provides the reference case against which alternative options should be considered (NSW Government, 2020).

The 'base case' in this instance is the 'business as usual' option. As noted above, this is not the same as a 'do nothing' approach. The reason for the base case to be defined as the 'business as usual' option is that a coastal manager may already be undertaking coastal management activities, for example through sand nourishment, dune management and stabilisation, and/or protective works. However, the base case should not include costs incurred for routine clean-up activities not directly associated with the above erosion management activities, where these activities are part of a managers normal operational/ beach maintenance activities and would continue irrespective of which specific erosion management strategy was adopted.

Subsequently, for each options the base case considered:

- The presence and efficacy of any existing costal protection works.
- Any existing proactive management approaches such as dune management (building or restoration).
- The resulting vulnerability of assets and infrastructure – as defined by the coastal hazard mapping/

The costs and benefits associated with the base case identified were and (where possible) monetised over time. The task involves estimating a stream of costs and benefits associated with current Council activities into the future, relative to the present. This process will identify whether, and to what extent, continuing with their current management activities will reduce risks associated with coastal hazards over time.

G-2-2 Valuation of At-Risk Assets

In most instances, the primary costs associated with the base case included the costs associated with incurring coastal hazard damages to (a) public and private property, and (b) public assets and infrastructure. The valuation of assets was undertaken in a manner consistent with sound economic principles, as per guidance provided in Appendix 5 of the Guidelines for using cost-benefit analysis to assess coastal management options (NSW Government, 2020). Values are based on the replacement cost values of individual asset types, with unit rate valuation applied as per standard engineering approaches and NSW government guidelines. Furthermore, assets replacement values for NPWS land and assets was provided by NPWS for the purposes of this assessment. Public and private land parcels were valued as per the NSW Valuer General's land value for the relevant or similar parcel (NSW Government, 2020).

G-2-3 Calculation of Costs Associated with Coastal Hazard Damages

In order to inform the CBA, probabilistic coastal hazard mapping undertaken in Stage 2 - including Coastal erosion hazard mapping for the beaches of Pittwater (WRL, 2023), and Broken Bay (WorleyParsons, 2014; Worleys, 2025). The use a probabilistic Monte Carlo approach provides a means to quantify and capture some of this uncertainty from a CBA perspective (Beadle, Smith, & Colleter, 2022) – noting that an economic CBA in only one tool amongst a range of available tools to ranks and prioritise options.

Subsequently, the probabilistic calculation of coastal hazard damages was undertaken over a forward 100-year planning period (from year 2025 to 2125) using the following approach:

- The available probabilistic coastal hazard mapping was superimposed over existing asset and infrastructure databases in order to determine (for a given planning horizon):
  - What specific assets and infrastructure would be impacted by a 1% AEP event.
  - The extent to which they would be impacted (i.e., the length of road, the number of private properties, or the area of public foreshore).

  - The damage cost associated with the impact – based on unit valuation approaches provided in Section G-2-2.

- Damages at interceding years were calculated through linear interpolation between the nearest hazard line years. With this process, the increased vulnerability to coastal hazards over time was captured, with a greater quantity of at-risk assets exposed in the year 2125 (Year 100), compared to the year 2025 (Year 1).
- In reality, damage costs are weather dependant and inherently unpredictable, with costs being incurred after severe storm events. Therefore, hazard damages cannot be precisely forecast over a given CBA assessment period. Consequently, a stochastic approach was adopted that provided the statistical range of potential damage costs. This assessment has utilised a Monte-Carlo method, whereby the 100-year forward assessment period has been simulated 1000 times using a sequence of randomly generated storm events. The following steps have been undertaken for each asset:
  - For each management option (including the associated base case), the forward 100 years assessment period was simulated 1,000 times.
  - For each simulation, a random number generator was applied that produced a decimal number in between 0 and 1 (from a prescribed normal probability distribution) for each year in the assessment period: From *Year 1* through to *Year 100*. These numbers represented the AEP of the most severe storm event to occur in any given year.
  - For each *Year* within a particular simulation, coastal hazard damage was deemed to have occurred to a particular asset if the AEP decimal exceeded (i.e., is lower than) the AEP event considered to cause damage to the asset (based on the coastal hazard lines). The incidence of erosion-based damage was deemed to occur once the structure was intersected by the coastal hazard line.
- The sum of all hazard damages for all assets was collated across each simulation, with all costs discounted to present day (2023) dollars using a NPV approach and a discount rate of 5% (see Section 4.6). Sensitivity testing wall also undertaken using discount rates of 3%, and 7%.
- The dataset of the 1,000 simulations was then analysed statistically in order to generate the potential range (and the statistical distribution) of incurred damage costs. This data was displayed in terms of the probability of exceedance of particular damage costs – with output provided for the 1% probability of exceedance, as well as the 5%, 10%, 50%, and 90% values.
  - In this sense, the 1%, 5%, and 10% values represent the potential asset damages during forward planning periods that are particularly stormy.
  - The 50% value represents the potential asset damages during a forward planning period that represents a median case.
  - The 90% value represents the potential asset damages during a forward planning period that are statistically calm – or below average in terms of storm occurrence.
- To aid in decision making, NPV costs were calculated over a range of forward planning periods. The CBA evaluation period should be long enough to capture all costs and benefits attributable to the option under consideration. The timeframe should reflect the expected economic life of the principal asset (e.g., coastal protection works). Subsequently, NPVs were calculated for forward planning periods of:
  - 10 Years – to align with the CMP lifecycle period.
  - 50 Years – which is typical of coastal protection works such as rock armoured seawalls.
  - 100 Years – to provide a long-term planning information. Because of the uncertainty involved in forecasting costs and benefits over long periods, caution should be exercised when considering result over this period. However, this has been provided for informational purposes.

It should be noted that these costs only consider the cost of damage to the asset in today's dollars, and do not consider broader economic costs such as loss of revenue to local businesses, loss of recreational or tourism revenue (due to damage to the environment or infrastructure at the beach), or costs associated with any environmental remediation work caused by failure of the assets such as water or wastewater infrastructure.

G-2-4 Calculation of Costs Associated with Option Implementation

Full life cycle costs have been estimated for all assessed options. For coastal infrastructure works such as a coastal protection works, the capital cost for design and construction has been estimated based on the development of preliminary concept design parameters. It should be noted that for a number of options, assumptions have either taken into account local site-specific factors, and/or have been based on detailed concept designs and cost estimates developed in historical studies. These cost estimates have been developed based on:

- Engagement with relevant stakeholders
- The costs for historical capital works and environmental management programs, based on Council records.
- Industry standard guidelines, such as the *Rawlinsons Australian Construction Handbook 2023* (Rawlinsons, 2024).
- Coastal engineering and coastal management experience of the project team

The basis of CBA assumptions used in option costing is provided in Table G-2 and G-3. It should be noted that option costings are not intended as detailed costings for implementation, but rather as cost estimates to be used to rank and assess options. Cost estimates are likely accurate to ±50%.

Station Beach

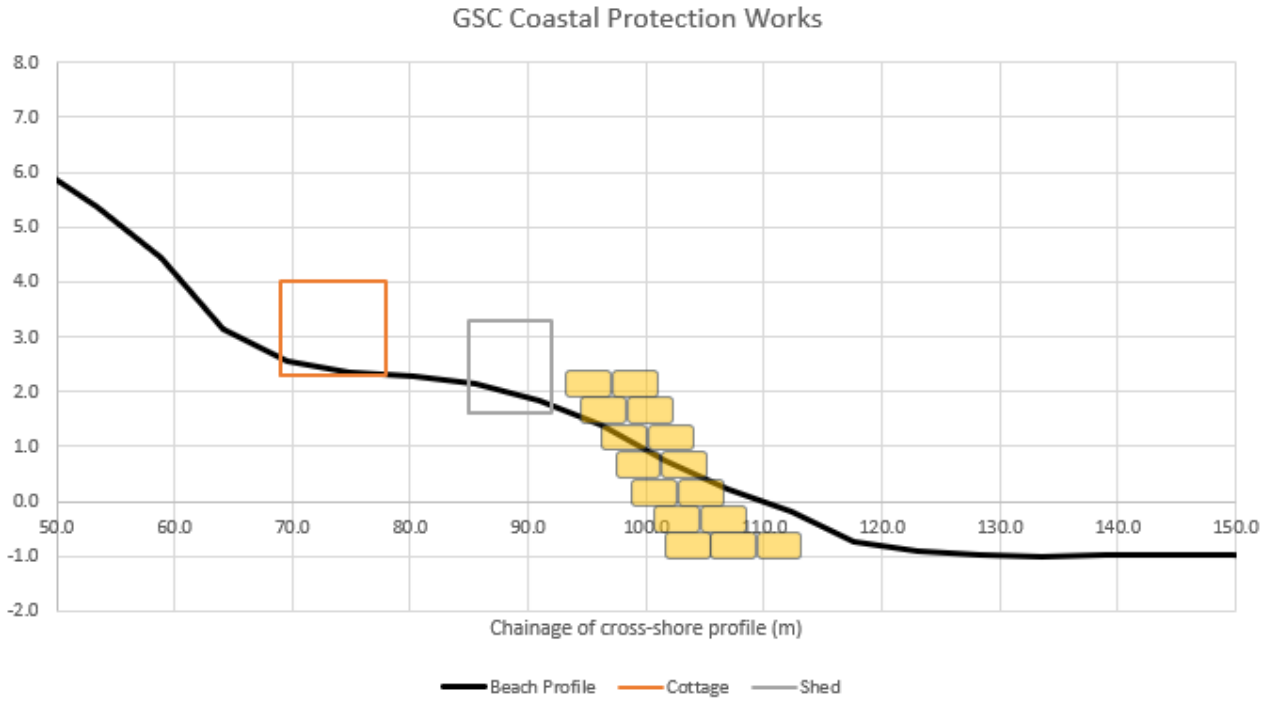

Figure G-1 Concept of S6.SGA.01A - Station Beach NPWS Assets Adaptation Pathway - Coastal Protection Works (CPW)

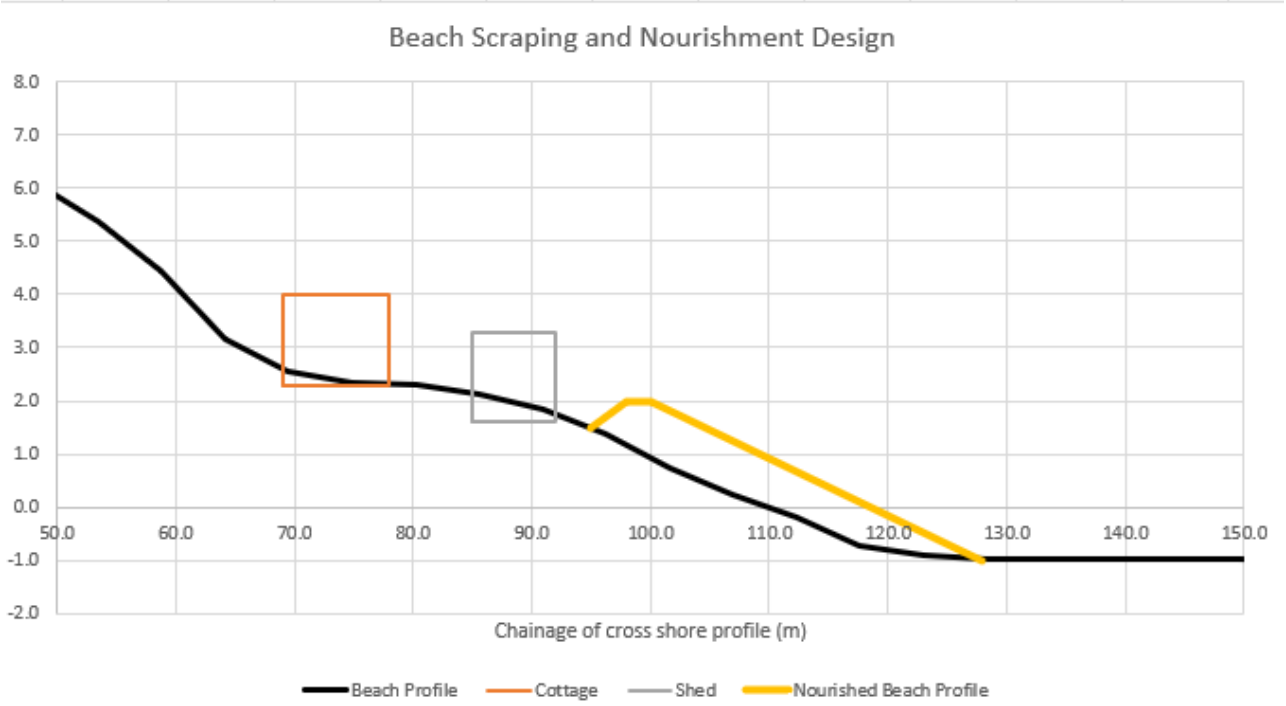

Figure G-2 Concept of S6.SGA.01B - Station Beach NPWS Assets Adaptation Pathway - Beach Scraping and Dune Building

Table G-2 Cost Estimate Basis for Assessed Options at Station Beach

S6.SGA.01A	**Station Beach NPWS Assets Adaptation Pathway - Coastal Protection Works (CPW)**	
Option Cost Component	**Values**	**Notes**
Capital Construction Costs	$5,000	$/m length - 1.2m3 GSC Units. Note that the Basin GSC seawall is estimated to cost approx. $3k/m. However, a cost of around $5k/m is more common, and factors in inflation since the 2019 GSC wall at the basin was constructed.
Length of Seawall	80	m
Total Capital Construction Costs	**$400,000**	
Annual Maintenance Costs %	2%	Assumption of standard coastal engineering convention for GSC
Annual Maintenance Costs $	**$8,000**	
S6.SGA.01B	**Station Beach NPWS Assets Adaptation Pathway - Beach Scraping and Dune Building**	
Option Cost Component	**Values**	**Notes**
Assumed rate of Beach Scraping	$15	per cubic metre
Estimated length of nourished beach	80	m long
Estimated required nourishment volume in m3/m	18.0	m3/m - Sand Buffer to protect from 100 yr ARI (as per WRL, 2020)
Total Nourishment Volume	1440	m3
Estimated Nourishment Costs	$21,600	
Total Ongoing Program Costs	**$22,000**	Rounded to 2 sig figs
Recurrence - every XX Years	5	Years

S6.SGA.01C	Station Beach NPWS Assets Adaptation Pathway - Planned Relocation of Assets	
Option Cost Component	**Values**	**Notes**
Knotts Cottage	$170,000	As per Asset Valuation provided by NPWS
Knotts Cottage Shed	$15,000	As per Asset Valuation provided by NPWS
Rainwater tank	$1,000	As per Asset Valuation provided by NPWS
Power control board	$1,500	As per Asset Valuation provided by NPWS
signs	$450	As per Asset Valuation provided by NPWS
Total Asset Value Costs	**$187,950**	
Demolition & Site Remediation, + New Site Preparation	25%	Assumption based on Planned Relocation Report (Rhelm, 2023)
Total Cost for Planned Relocation of Assets	**$230,000**	

Pearl Beach

Table G-3 Cost Estimate Basis for Assessed Options at Pearl Beach

S6.CCC.28A	Pearl Beach Adaptation Pathway - Beach Scraping and Dune Building	
Option Cost Component	**Values**	**Notes**
Assumed rate of Beach Scraping	$15	per cubic metre
Estimated length of nourished beach	220	m long
Estimated required nourishment volume in m3/m	30.0	m3/m - Sand Buffer to protect from 100 yr ARI (as per WRL, 2020)
Total Nourishment Volume	6600	m3
Estimated Nourishment Costs	$99,000	
Total Ongoing Program Costs	**$99,000**	Rounded to 2 sig figs
Recurrence - every XX Years	5	Years
Additional Year 1 Capital Costs	**$44,000**	Dune Revegetation
S6.CCC.28B	**Pearl Beach Adaptation Pathway - Coastal Protection Works (CPW)**	
Option Cost Component	**Values**	**Notes**
Capital Construction Costs	$15,000	$/m length – Assuming rock armoured seawall structure.
Length of Seawall	220	m
Total Capital Construction Costs	**$3,300,000**	
Annual Maintenance Costs %	1%	Assumption of standard coastal engineering convention for GSC
Annual Maintenance Costs $	**$33,000**	

G-2-5 Calculation of Benefit Cost Ratio (BCR)

Net present value (NPV) is the sum of the discounted project benefits less the sum of the discounted project costs. The benefit-cost ratio (BCR) is the ratio of the present value of benefits to the present value of costs. In this sense, the BCR is intended to provide information on the 'value for money' proposition of a management option.

In economic analysis, a party is judged to obtain a benefit when it does not have to bear a cost it would otherwise have to incur. Owners of infrastructure or assets that would otherwise be damaged or lost due to coastal hazards would benefit from management options that reduce or eliminate the risk from the hazard. That is, the benefit they receive is the avoidance of the cost they would otherwise incur (NSW Government,

2020). Subsequently, the NPV benefits for the various options were essentially considered to be equivalent to the damage costs calculated for the base case. Whilst this would not always be the case for a given CBA, the approach was applicable in these instances due to the specific nature of the base case(s), where the incurred costs exclusively comprised hazard damage costs.

As discussed in Section G-2-3, the benefits of each option (which comprise avoided hazard damage costs) have been calculated probabilistically due to the uncertainty associated with future storm activity. Subsequently, the corresponding BCR has also been calculated probabilistically. This provided the statistical range of potential BCR values that an option may provide of a set planning horizon.

An example of this output is provided in Table G-3, which provides an explainer of how these results have been set out. In this example:

- Value **X**: Represents the 50 Year NPV Cost of implementing a given option.
- Value **Y**: Represents the economic benefits that have a 1% probability of being reached (or exceeded) during a 50 years planning horizon. In this sense, it is representative of the benefits gained during a future planning horizon that is statistically in the top 1% for storminess.
- Value **Z**: Represents the BCR that has a 1% probability of being reached (or exceeded).

Table G-4 Interpretation of BCR outcomes for options analysis

Discount Rate:	5%										
Life Cycle	Costs	Benefits (Avoided Storm Damage Costs) - Probability of Exceedance					BCR - Probability of Exceedance				
		1%	5%	10%	50%	90%	1%	5%	10%	50%	90%
10 Year NPV											
50 Year NPV	X	Y					Z				
100 Year NPV											

BCR values for 1%, 5%, and 10% probabilities of exceedance will be higher. This is because these values represent future scenarios that have been statistically “stormy”. Therefore, the economic benefits will and associated BCRs will be higher, and a large amount of storm damage has been avoided.

Conversely, BCR values for the 50% and 90% probability of exceedance levels will be lower, as these represent future scenarios that are statistically less stormy in nature. Therefore, less benefits in the form of avoided storm damages will be accrued during the course of those scenarios.

In this context, it is recommended that consideration of the BCR values is more heavily weighted towards the outcomes for lower probabilities, such as 1%, 5%, and 10%. It is the aim of coastal protection works to provide protection from severe, low probability storm scenarios, and therefore these values will provide a more appropriate suite of scenarios from a coastal hazard risk-management perspective.

G-3 Results and Discussion

The calculated BCR values have been provided with a colour code based on Table G-5 below.

Table G-5 Interpretation of BCR outcomes for options analysis

Outcomes	Stage 3 Approach
BCR < 0.8	Consider removing option from long list
0.8< BCR < 1.2	Consider keeping option in long list – but strongly consider the results of the CBA sensitivity analysis, and take care to weight the option against feasibility and acceptability scores
BCR >1.2	Consider progression of option to Stage 3 - taking into account feasibility and acceptability scores

As previously discussed, the calculated BCR values should not be used as the sole means of ranking and prioritising options. Rather, the BCR results provide one tool amongst many tools, to assess options and therefore should be considered in the full context of the Feasibility and Viability Assessments.

Station Beach

A summary of the outcomes has been provided in Table G-6 below. The outcomes show that Option B (Beach Scraping and Dune Building) provides the highest cost-benefit-ratio. – across all assessed planning periods out to 100 years. This is because:

- This option has the initial lowest capital cost - with the majority of its costs deferred to future years, reducing the NPV of the costs.
- This option can provide the same level of protection (even considering a 5 year recurring program) but with significantly costs for implementation.
- The hazard line mapping indicates that while the shed is likely at immediate risk of damage in a 100 year ARI storm event, the Cottage would likely not be at risk until around 2100 or later.

Option B also has the benefit of being highly adaptable if future circumstances change (such as future storm events/vulnerability, or NPWS strategic priorities, or NPWS asset dilapidation and renewal works impact the need for protection). Subsequently, Option B is recommended.

Table G-6 Monte-Carlo CBA Outcomes at Station Beach

S6.SGA.01A	Station Beach NPWS Assets Adaptation Pathway - Coastal Protection Works (CPW)								
Discount Rate:	5%								
Life Cycle	Costs	Benefits (Avoided Storm Damage Costs) - Probability of Exceedance				BCR - Probability of Exceedance			
		1%	10%	50%	90%	1%	10%	50%	90%
10 Year NPV	$ 456,863	$ 35,156	$ 21,905	$ 9,669	$ -	0.08	0.05	0.02	0.00
50 Year NPV	$ 758,943	$ 97,424	$ 77,610	$ 55,843	$ 36,244	0.13	0.10	0.07	0.05
100 Year NPV	$ 802,656	$ 128,079	$ 108,177	$ 82,101	$ 58,881	0.16	0.13	0.10	0.07

S6.SGA.01B	Station Beach NPWS Assets Adaptation Pathway - Beach Scraping and Dune Building								
Discount Rate:	5%								
Life Cycle	Costs	Benefits (Avoided Storm Damage Costs) - Probability of Exceedance				BCR - Probability of Exceedance			
		1%	10%	50%	90%	1%	10%	50%	90%
10 Year NPV	$ 39,238	$ 35,156	$ 21,905	$ 9,669	$ -	0.90	0.56	0.25	0.00
50 Year NPV	$ 92,766	$ 97,424	$ 77,610	$ 55,843	$ 36,244	1.05	0.84	0.60	0.39
100 Year NPV	$ 100,856	$ 128,079	$ 108,177	$ 82,101	$ 58,881	1.27	1.07	0.81	0.58

S6.SGA.01C	Station Beach NPWS Assets Adaptation Pathway - Planned Relocation of Assets								
Discount Rate:	5%								
Life Cycle	Costs	Benefits (Avoided Storm Damage Costs) - Probability of Exceedance				BCR - Probability of Exceedance			
		1%	10%	50%	90%	1%	10%	50%	90%
10 Year NPV	$ 187,950	$ 35,156	$ 21,905	$ 9,669	$ -	0.19	0.12	0.05	0.00
50 Year NPV	$ 187,950	$ 97,424	$ 77,610	$ 55,843	$ 36,244	0.52	0.41	0.30	0.19
100 Year NPV	$ 187,950	$ 128,079	$ 108,177	$ 82,101	$ 58,881	0.68	0.58	0.44	0.31

Pearl Beach

A summary of the outcomes has been provided in Table G-7 below. The outcomes show that:

- Option A – Beach Scraping and Dune Building has
  - Lower upfront cost but potentially lower long-term structural protection.
  - Shows strong BCR performance across all timeframes under higher damage scenarios (e.g. large storms).
  - Over a 100-year life cycle, the BCR exceeds 6.7 under 10% exceedance probability and remains above 1.4 under the 50% exceedance case — indicating cost-effectiveness under most scenarios.
  - However, BCR drops below 1 under low-damage scenarios (90% exceedance), meaning the benefits are not realised if storms are mild or infrequent.
- Option B – Rock Armoured Seawall
  - Substantially higher upfront cost than Option A.
  - Demonstrates positive BCR only under more extreme storm scenarios.
  - Over a 100-year life cycle, BCR reaches 2.63 under the 1% exceedance case and 1.29 under 10% — indicating that the investment is only justified if future storm damage is severe and frequent.
  - Under moderate or mild damage scenarios (≥50% exceedance), the BCR falls below 1 — suggesting the costs outweigh the benefits in those cases.

Option A is more cost-effective across a broader range of storm scenarios, particularly over longer asset lifespans. It represents a lower-cost, flexible intervention that delivers strong value under a wide range of future conditions. Option B may be justified in high-risk scenarios but is more exposed to overcapitalisation risk if storm impacts are less frequent or less severe than projected. Option B may be warranted over the long term if increasing storm severity or frequency is anticipated.

Table G-7 Monte-Carlo CBA Outcomes at Pearl Beach

BCR CALCULATIONS - OPTION S6.CCC.28A: Pearl Beach Option A - Beach Scraping and Dune Building												
Discount Rate:	5%											
		Benefits (Avoided Storm Damage Costs) - Probability of Exceedance					BCR - Probability of Exceedance					
Life Cycle	Costs	1%	5%	10%	50%	90%	1%	5%	10%	50%	90%	
10 Year NPV	$ 366,212	$ 3,212,592	$ 2,540,721	$ 1,036,600	$ -	$ -	8.77	6.94	2.83	0.00	0.00	
50 Year NPV	$ 10,689	$ 9,615,048	$ 6,271,538	$ 3,696,577	$ -	$ -	13.53	8.82	5.20	0.00	0.00	
100 Year NPV	$ 766,058	$ 10,495,605	$ 6,786,530	$ 5,140,197	$ 1,122,913	$ -	13.70	8.86	6.71	1.47	0.00	

BCR CALCULATIONS - OPTION S6.CCC.28A: Pearl Beach Option B Rock Armoured Coastal Protection Works												
Discount Rate:	5%											
		Benefits (Avoided Storm Damage Costs) - Probability of Exceedance					BCR - Probability of Exceedance					
Life Cycle	Costs	1%	5%	10%	50%	90%	1%	5%	10%	50%	90%	
10 Year NPV	$ 3,567,558	$ 3,212,592	$ 2,540,721	$ 1,036,600	$ -	$ -	0.90	0.71	0.29	0.00	0.00	
50 Year NPV	$ 3,932,568	$ 9,615,048	$ 6,271,538	$ 3,696,577	$ -	$ -	2.44	1.59	0.94	0.00	0.00	
100 Year NPV	$ 3,987,730	$ 10,495,605	$ 6,786,530	$ 5,140,197	$ 1,122,913	$ -	2.63	1.70	1.29	0.28	0.00	

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