COASTAL ZONE MANAGEMENT PLAN

WHARF ROAD

NORTH BATEMANS BAY

MAY 2017

DRAFT COASTAL ZONE MANAGEMENT PLAN

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CONTENTS

FIGURES

TABLES

APPENDIX

COASTAL ZONE MANAGEMENT PLAN

WHARF ROAD NORTH BATEMANS BAY

1. INTRODUCTION

1.1 Background

Batemans Bay is a regional coastal centre 340km south of Sydney in the Eurobodalla Shire. The Wharf Road area is on the northern sandy shoreline of Batemans Bay, 480 metres downstream of the Princes Highway Bridge over the Clyde River (located on **Figure 1**).

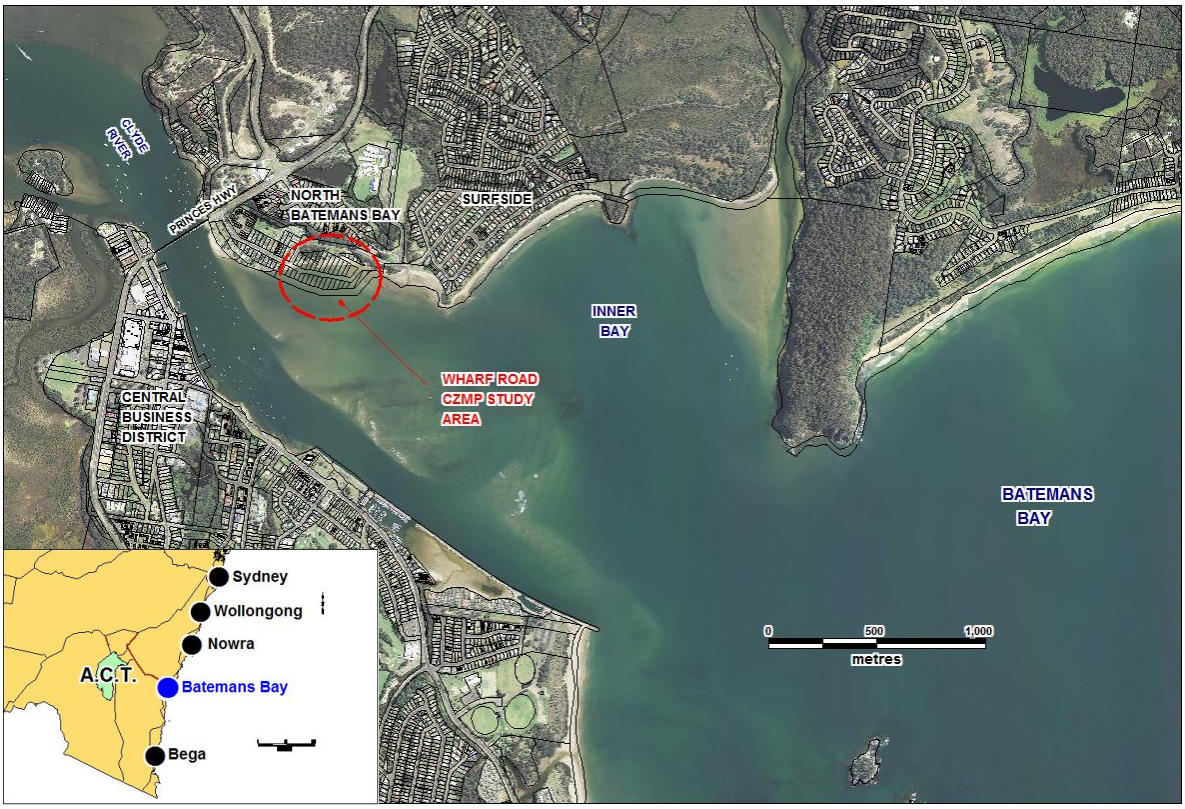


Figure 1: Locality - Wharf Road, North Batemans Bay

The back beach area at Wharf Road is low lying, and subject to immediate coastal inundation and erosion hazards. Assets and infrastructure include approximately 8 hectares of private property (some submerged), a public road and unformed (Crown) road reserves. Water and sewerage infrastructure are present in the back beach and high hazard area below ground.

The NSW Government has identified this part of Batemans Bay as a coastal erosion 'hotspot', requiring the preparation of a Coastal Zone Management Plan (CZMP) and Emergency Action Sub-plan (EAS).

Figure 2: Wharf Road 'Hotspot' Study Area

1.2 Section 55 Directive

Under the provisions of section 55B of the *Coastal Protection Act 1979* (the Act), a Directive to submit a Draft Coastal Zone Management Plan for the coastline within Batemans Bay between the Princes Highway Bridge and the Mundarra Way intersection was issued by The Hon Frank Sartor M.P. on 25/2/2011. The area identified within directive specifically refers to "the coastline that is a beach" and can reasonably exclude the eastern rock headland and the existing coastal protection works adjacent to the Big 4 Holiday Park. The beach within the study area is included on the schedule of coastal erosion hotspots in NSW.

This Plan has been prepared in accordance with Part 4A of the Act to comply with the Minister's Directive.

1.3 Coastal Zone Management Plan area

This plan applies to the beach and foreshore area from south-east of the Big 4 Holiday Park (on Wharf Road) extending approximately 450 metres to the east (see **Figure 2**). It comprises 41 privately owned residential lots, road reserve and Crown Reserve, all of which were created by subdivision (when the shoreline was accreted) during the 1890's.

1.4 Past studies

Relevant studies of the coastal processes of Batemans Bay date back to the 1980's. The Public Works Department's 1989 Batemans Bay Inundation Study predicted storm surge levels along the Batemans Bay coastline. In 1996 the results of detailed modelling of ocean storm processes and photogrammetric analysis of beach recession were presented in the Batemans Bay Vulnerability Study (*DLWC 1996*).

The Estuary Processes Study for Batemans Bay (*WBM 1999*) examined sedimentation processes in the inner bay. This incorporated aerial photographic analysis, numerical modelling of waves and hydrodynamic modelling to explain sediment movement and shoreline behaviour at locations including the subject land.

The Draft Batemans Bay Coastline Hazard Management Plan was prepared for Council in 2001 (*Webb McKeown & Associates* - WMA - final version is dated September 2006). This report defined coastal hazards and provided information upon which council has based its planning decisions along the Batemans Bay shoreline for the last 15 years. This document remains current until a revised plan for the Batemans Bay shoreline (in preparation) with updated sea level rise information is adopted. The WMA report included Wharf Road in two precincts - west and east - with the east precinct corresponding to the study area.

The 2008 Wharf Road Coastal Hazard Assessment and Hazard Management Plan (*BMT WBM May 2008*) further refined the level of knowledge on the behaviour of the subject land under coastal processes.

The historic shoreline behaviour analysis at Wharf Road was analysed and the estuarine processes within Batemans Bay were described. Percentage exceedance lines for the historical shoreline alignment were identified and storm tide levels including sea level rise were calculated. It was found that the Wharf Road east precinct will be impacted by non-storm tidal inundation by year 2100. Coastal values and the significance of the Clyde River estuary and Batemans Bay were described.

Management options were assessed and ranked. Voluntary acquisition was selected as the preferred option.

1.5 Priority issues

Coastal inundation poses a serious risk to existing development along the Wharf Road coastal strip. Inundation depths in a current 1% ocean storm of up to 0.6 metres combine with potential wave runup to effectively prevent future development.

The risk of ocean inundation of the Wharf Road area would be significantly increased due to future SLR that is expected to occur in association with global warming. Sea level rise of 0.9m (expected on the Eurobodalla coast after year 2100) would elevate the Highest Astronomic Tide (HAT) level to around 1.9 m AHD, which would result in ocean inundation of the Wharf Road precinct in the absence of storm surge and wave effects. (*BMT WBM 2008*).

In addition this part of the bay coastline is subject to a variable supply of sediment from the inner bay shoals, with potential for large shoreline fluctuations in both the medium and short term.

Beaches, tidal and sub-tidal areas of the estuary are under private ownership. The unavailability of legal public access to these beaches and indeed to the waters of the bay is a major amenity issue.

The area contains public infrastructure, including public roads, water and sewer mains that are under threat of wave attack and erosion.

1.6 Management options

Several management options to address the identified coastal issues at Wharf Road were formulated and reviewed in the *Batemans Bay Coastline Hazard Management Plan* (WMA 2001 and 2006). These options were further refined in the *Wharf Road Coastal Hazard Assessment and Hazard Management Plan - Preliminary Draft (BMT WBM 2008).*

The full range of management options relevant to Wharf Road east are detailed in Section 3.4 of this plan.

1.7 Current strategy

The current management strategies enacted to date by Council are summarised below.

1.7.1 Emergency action sub-plan

A Draft Emergency Action Sub-plan for the Wharf Road Coastal Erosion 'Hot Spot' (*Umwelt (Aust) Pty. Ltd. 2012*) was adopted by Council on 24 July 2012. See Section 7.1 for details.

1.7.2 Zoning

Council has acted to zone the whole of the subject land E2 Environmental Conservation under the Eurobodalla Local Environmental Plan 2012 in accordance with recommendations of *BMT WBM 2008*. This zone was applied to wetlands, littoral rainforests and some foreshore areas across the shire. The strategy aims to avoid current and future risk by preventing development unsuited to a high hazard coastal area.

1.8 Consultation

Public consultation over the use of the Wharf Road area has been ongoing since 2004 with the preparation of an Estuary Management Study and Plan for the Batemans Bay and Clyde River estuary. This consultation was broad in scope, indicative of the public's wider values and issues at that time.

More localised public comments were lodged with Council in response to a proposal for development of a number of residential units at Wharf Road East, reported in *BMT WBM (2008)*. As summarised in this plan under the section Socio-economic values, this provided opportunity to examine the values that the public placed specifically on the Wharf Road locality.

In developing the *Wharf Road Coastal Hazard Assessment and Hazard Management Plan (BMT WBM 2008), t*he consultants convened a public information meeting in Batemans Bay on 19th November 2008. A total of five written submissions and one petition were received following the public information meeting.

Consultation with the public and State agencies on the management of this area continued with the exhibition of the *Emergency Action Sub-plan for the Wharf Road Coastal Erosion 'Hot Spot'*. The Emergency Action Sub-plan was on public exhibition for the minimum period required of 28 days ending 4 July 2012. Written notification of the exhibition was forwarded to each property owner.

A total of one written submission was received during the exhibition period. The submission supported the initiative of Council in preparing the EAS. Council formally adopted the EAS on 24 July 2012.

This draft CZMP would be publicly exhibited for a minimum of 21 days in accordance with guidelines. No further public consultation is proposed in consideration of the prior public involvement to date.

Council would then consider all submissions, amend the draft as necessary and submit to the Minister for certification.

1.9 How we meet the coastal management principles, goals and objectives

The 2013 *Guidelines for Preparing Coastal Zone Management Plans* (referred to hereafter as the Guideline) set out ten principles for preparing CZMPs.

Table 1 overleaf demonstrates how these guidelines, the objectives of the Coastal Protection Act, and the goals of the NSW Coastal Policy interact (*SMEC 2015*). Many of the principles, goals and objectives are similar and have been grouped against the *Guideline* principles in Table 1.

This table shows how these statutory requirements have been considered in preparing this CZMP.

Table 1 Consideration of Coastal Management Principles, Goals and Objectives in CZMP Preparation

Guidelines for Preparing CZMPs - Principles	Coastal Protection Act - Objectives	NSW Coastal Policy - Goals	How Principles, Objectives and Goals have been considered in CZMP
1. Consider the objectives of the Coastal Protection Act 1979 and the goals, objectives and principles of the NSW Coastal Policy 1997 and the NSW Sea Level Rise Policy Statement 2009.	To encourage, promote and secure the orderly and balanced utilisation and conservation of the coastal region and its natural and man-made resources, having regard to the principles of ecologically sustainable development.	Providing for ecologically sustainable development and use of resources.	No reliance in this plan on structural protection to defend an inherently hazardous zone. Allows shoreline fluctuations in line with natural processes and future SLR. (Section 7.1) Provision for weed & rubbish control and amenity improvements when private lands placed into public ownership (Section 7.7).
	To recognise and foster the significant social and economic benefits to the State that result from a sustainable coastal environment, including: - benefits to the environment, - benefits to urban communities, fisheries, industry and recreation, - benefits to culture and heritage, and - benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water.	Providing for ecologically sustainable human settlement in the coastal zone. Protecting and enhancing the aesthetic qualities of the coastal zone.	Development of this high risk area not appropriate. Plan allows shoreline fluctuations in line with natural processes rather than visually obtrusive protective structures. (Section 7.1)
	To provide for the acquisition of land in the coastal region to promote the protection, enhancement, maintenance and restoration of the environment of the coastal region.	-	Acquisition of properties by the NSW government proposed for access and enhancement of these currently privately owned areas. (Section 7.2)
	-	Protecting and conserving the cultural heritage of the coastal zone.	No actions relate directly to preservation of heritage.

2. Optimise links between plans relating to the management of the coastal zone.	To ensure co-ordination of the policies and activities of the Government and public authorities relating to the coastal region and to facilitate the proper integration of their management activities.	Providing for integrated planning and management of the coastal zone.	There are no actions that are reliant on other plans for implementation.
3. Involve the community in decision-making and make coastal information publicly available.	To recognise the role of the community, as a partner with government, in resolving issues relating to the protection of the coastal environment.	Providing information to enable effective management of the coastal zone.	Recommended management actions recognise community input. A summary of consultation activities is provided in Section 1.8.
4. Base decisions on the best available information and reasonable practice; acknowledge the interrelationship between catchment, estuarine and coastal processes; adopt a continuous improvement management approach.	-	Recognising and accommodating the natural processes of the coastal zone.	The technical studies referred to in Section 1.4 provide detailed information on estuarine and coastal processes to the best current standards. These studies document the natural processes and other information that was used to assess coastal hazards and management options.
5. The priority for public expenditure is public benefit; public expenditure should cost-effectively achieve the best practical long term outcomes.	-	-	The general public and future generations would benefit from acquisition of private land at Wharf Road. (Section 7.2)
6. Adopt a risk management approach to managing risks to public safety and assets; adopt a risk management hierarchy involving avoiding risks where feasible and mitigation where risks cannot be reasonably avoided; adopt interim actions to manage high risks while long-term options are implemented.	-	-	High risk of development is avoided by appropriate land zoning. (Section 7.1) Council assets require assessment for long term protection or relocation. (Section 7.2) The Wharf Road Emergency Action Sub-Plan (*Umwelt 2012*) identifies actions to manage risks to public safety in the event of a coastal erosion or inundation emergency. (Section 7.1)

7. Adopt an adaptive risk management approach if risks are expected to increase over time, or to accommodate uncertainty in risk predictions.	To encourage and promote plans and strategies for adaptation in response to coastal climate change impacts, including projected sea level rise.	-	Locally adjusted sea level rise projections have been developed (*Whitehead 2014*) and are used in the review of coastal hazards and management options. (Section 2.3)
8. Maintain the condition of high value coastal ecosystems; rehabilitate priority degraded coastal ecosystems.	To protect, enhance, maintain and restore the environment of the coastal region, its associated ecosystems, ecological processes and biological diversity, and its water quality.	Protecting, rehabilitating and improving the natural environment of the coastal zone.	No high value ecosystems exist locally at Wharf Road. (Section 4)
9. Maintain and improve safe public access to beaches and headlands consistent with the goals of the NSW Coastal Policy.	To promote public pedestrian access to the coastal region and recognise the public's right to access.	Providing for appropriate public access and use.	Provision for enhanced public access to by Council once land in public ownership. Public access to beaches would be reinstated by acquisition of key properties. (Section 7.2)
10. Support recreational activities consistent with the goals of the NSW Coastal Policy.	To promote beach amenity.	As above.	Public access to beaches for walking, swimming, wading and sightseeing would result from the acquisition of key properties. (Section 6)

2. COASTAL PROCESSES

The Wharf Road area is subject to a complex interaction of forces from tidal currents, river floods and ocean waves. Wave influences are dominant during major ocean storm events with larger ocean waves from the southern to eastern quarter in particular propagating into the area.

2.1 Sediment Supply

Routine low to moderate wave action and ebb / flood tidal currents interact to cause slow but significant progressive sand transport and shoreline changes. Waves are dominant in moving sand from the ramp margin shoal onshore to Surfside Beach and Wharf Road. Wave induced sand movement at Wharf Road is along the shoreline, predominantly towards the west. Sand transport rates are variable, ranging from persistent low rates to occasional short term high rates of transport during storms.

Strong ebb currents dominate during major river flood events. These irregular events can cause gross re-distributions of sand in the offshore direction in a short time. They can break through the river mouth shoals as occurred in 1964 and recurred in August 2015. This mechanism is largely responsible for supply of sand to Surfside Beach, which in time can resupply the Wharf Road area.

A conceptual model of sand transport pathways within the inner Batemans Bay was reworked by WBM (1999) from a Patterson Britton & Partners study of nearby Cullendulla Beach (PBP 1992) and is reproduced here in **Figure 3**.

The natural sediment system of the inner bay is highly dynamic and at Wharf Road is the accumulated net result of many factors, some of which are slow and progressive while others are unpredictable and infrequent but of relatively major influence.

2.2 River Flooding

Flooding of the Clyde River can combine with elevated ocean levels to inundate the Wharf Road foreshore. A 5% river flood event is predicted to add an estimated 0.1m to inundation levels at Wharf Road (WMA 2006). An allowance for 5% river flooding has been adopted in determining inundation levels for the study area (see below).

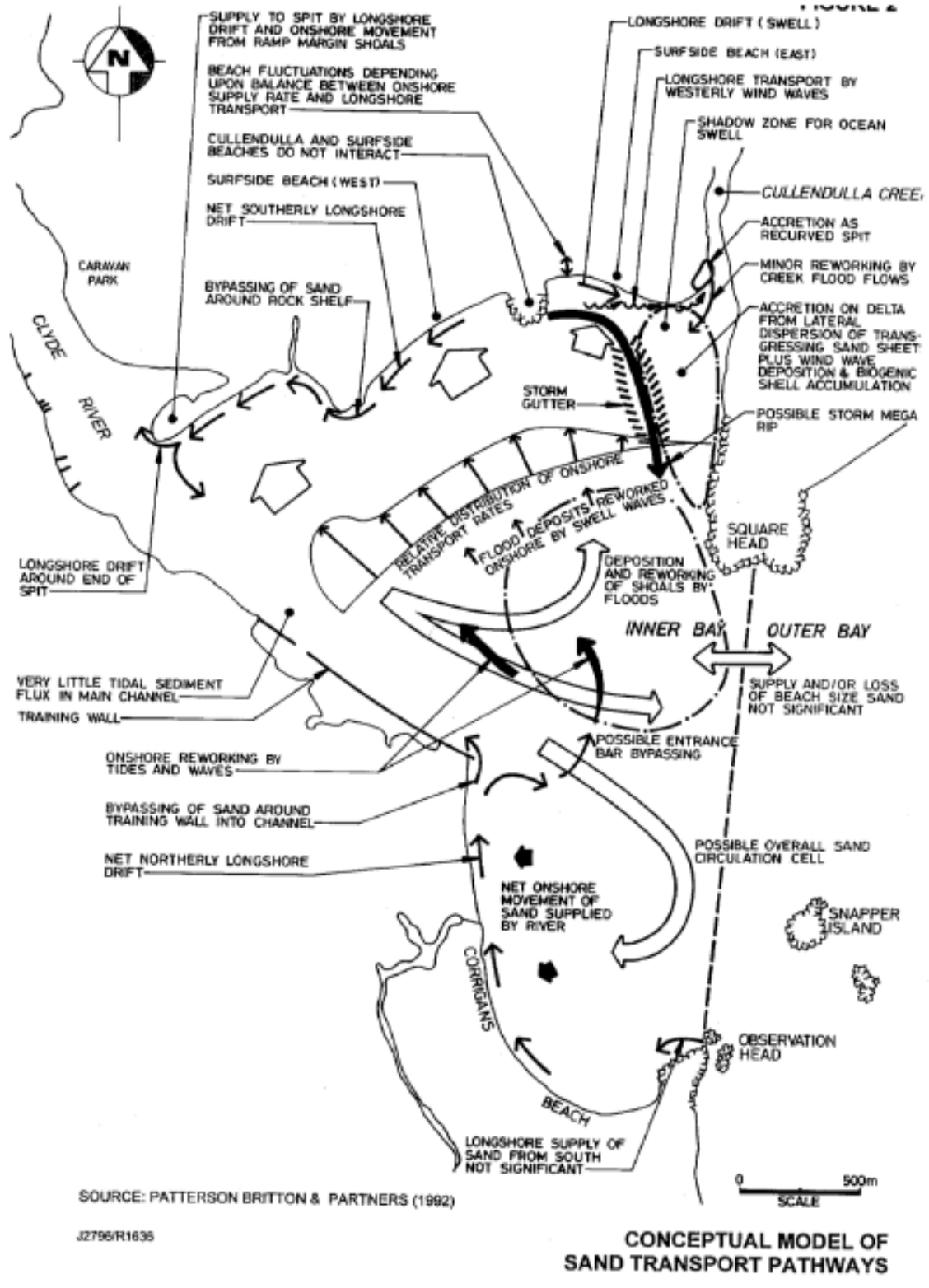


Figure 3: Sediment Transport Mechanisms in Batemans Bay (after Patterson Britton & Partners 1992)

2.3 Ocean Inundation

Some 80% of the subject 'land' is covered by tidal waters within the estuary. The land-based portions of the study area are low lying and subject to inundation from oceanic processes.

Wharf Road would experience nearshore wave heights of 1.3 metres during a 1% ocean storm with an offshore significant wave height of 10 metres (Webb McKeown 2006). At the peak of this event, the Wharf Road area would experience elevated water levels estimated by WMA at 1.8m AHD in the nearshore zone. In addition, localised wave setup would be generated due to waves breaking on the shoreline. WMA adopted a conservatively low wave setup value for a 1% storm of 0.25 metres at Wharf Road.

Note that numerical modelling undertaken in WBM (1999) suggested that significant wave setup (~0.4m) could be generated across the central and inner bay in general, due to waves breaking in the outer bay. The later assessment by BMT WBM (2008) includes a total allowance of 0.6m for wave setup at Wharf Road.

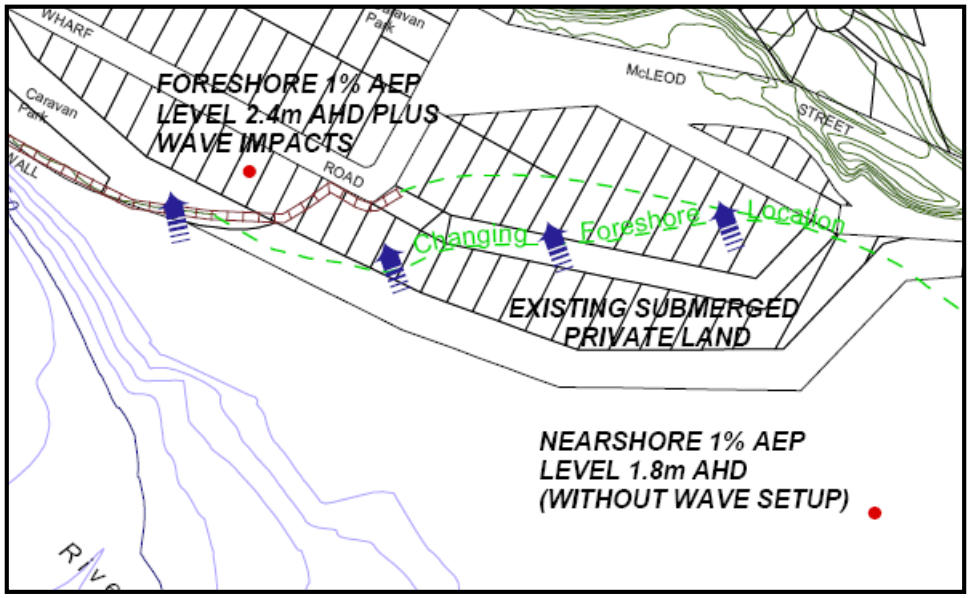


Figure 4: Extract from WMA 2001 showing foreshore locations and inundation levels (excluding wave setup)

Figure 4 is extracted from the WMA 2006 Coastal Zone Management Plan to show the projected inundation levels excluding wave setup and the approximate range of shoreline movement experienced at Wharf Road.

Future sea level rise (SLR) impacts are projected to be more severe than the 0.2 metre allowance used by WMA. Current SLR projections adopted by council after a regional study (*Whitehead and Associates, 2014*) are shown in **Table 2**.

The potential for inundation in the future will be more regular than identified in the report by WMA. Note that these conservative WMA levels will be revised, applying the current projections for sea level rise adopted by council, in a forthcoming coastal report for Batemans Bay in preparation.

Table 2: Locally adjusted sea level rise projections

(from Whitehead and Assoc, 2014)

Year	Locally Adjusted Sea Level Rise Projection (m)
2015	0.00
2020	0.03
2030	0.10
2040	0.15
2050	0.23
2060	0.30
2070	0.39
2080	0.50
2090	0.61
2100	0.72
2100+	1.00

Table 3 below shows Council's latest adopted inundation levels for the Wharf Road study area, incorporating an updated SLR component to year 2065 from *Whitehead 2014*.

Table 3: Adopted Inundation Levels for Wharf Road (WBM, 2008) inclusive of updated SLR

Annual Exceedance Probability	Astronomic Tide & Storm Surge (m AHD)	River Flooding Allowance (m)	Sea Level Rise (m) *	Wave Induced Setup (m)	Cumulative Water Level (m AHD)
5%	1.4	0.1	0.34	0.6	2.44
2%	1.45	0.1	0.34	0.6	2.49
1%	1.5	0.1	0.34	0.6	2.54

* ***Note**: a projection of 34cm is applied for the 50year planning period to year 2065.*

Council's LiDAR mapping indicates natural surface levels around 1.6m to 1.7m AHD in front of the existing development, with isolated patches 1.9m to 2.0m AHD on the back beach area blocks. The Wharf Road roadway is at an average elevation of 1.5m to 1.6m AHD with McLeod Street at 1.6m to 1.7m AHD.

The front beach blocks are at or below 0m AHD rising to 1.6 at the foredune. The current day 63% AEP (1year ARI) ocean inundation event for the site is 1.2mAHD (excluding wave run-up). The elevation of the site allows high frequency events to inundate large areas of the land. Larger events inundate the entire site.

Current ocean inundation events can result in a still water depth of around 0.6m over Wharf Road and 0.5m on the subject lands. With the advent of sea level rise, 1% ocean storm inundation depths would be 0.9 metres by year 2065.

3. COASTAL HAZARDS AND RISKS

3.1 Erosion

The Wharf Road precinct shoreline was substantially accreted during the 1890's when the now largely submerged subdivision was created. More recently, this area has experienced severe erosion such as the post-storm profiles in the mid 1970's, with erosion to the extent that all but three of the residential allotments were adversely affected.

Storm erosion occurs on the shortest of timescales during a severe storm. WBM BMT (2008) surmised that a 1% AEP ocean storm with a 1.6 m AHD storm tide level and 1.4 m breaking wave height would have the potential to cause in the order of 20 m^3/m erosion above 0 m AHD. This would amount to about 10-15 metres of 'storm bite' along the currently unprotected eastern segment of beach at Wharf Road.

Medium term cycles of substantial erosion/accretion have been observed to occur at Wharf Road. As discussed in the Estuary Processes Study (WBM, 1999), these arise from a complex interaction of morphological processes driven by waves, tides and infrequent river flooding. WBM BMT (2008) concluded that these cycles could produce an equilibrium shoreline well landward of its current location.

Future sea level rise is likely to significantly increase the erosion hazard posed to Wharf Road east, such that it can be expected that all residential allotments in this precinct will be at significant risk from erosion events over a 100-year planning period.

The presence of any 'hard' structures in the active beach zone along the eastern Wharf Road shoreline has the potential to induce localised erosion above and beyond the natural cycles described above. In particular, a "groyne" structure can cause some localised accretion on the updrift (eastern) side and localised erosion on the downdrift (western) side. While offering a level of protection from ongoing erosion to the updrift beach, its effectiveness in a period of sand supply deficit would be limited.

A preliminary assessment of coastal hazards undertaken by WRL in 2012 in association with the Eurobodalla Coastal Zone Management Plan confirmed the site to be at immediate risk from coastal hazards. Figure 5 below is an extract from the preliminary assessment which presents a deterministic representation of coastal erosion at the site out to 2100. The 2015 hazard line most closely aligns to Council's adopted projection for sea level rise out to 2065 (34cm).

The presence of the seawall was not considered in the assessment for the following reasons:

- Not a legally approved structure
- Not on council land and therefore not maintained by council
- Not built to engineering standards therefore long-term function not guaranteed
- No guarantee of long term maintenance.

Figure 5: Extract from WRL 2012 showing coastal erosion

Note: Landward movement of the shoreline could be modified by the presence of bedrock. Hazard lines are located at seawall unless otherwise shown. The presence of an unapproved groyne has been ignored as ESC has requested it be removed.

Wharf Road Coastal Erosion Hazard Lines With Seawalls
(Aerial photo 10/04/2010)

3.2 Beach Recession

Beach recession is defined as a progressive long term loss of beach width. Erosion and accretion of sand in the Wharf Road compartment is a result of the combination of coastal and fluvial processes and does not represent beach recession.

SMEC (2010) concludes that for beaches that are within estuaries such as Wharf Road would not necessarily undergo future recession related to SLR as the offshore profile is dominated by the dynamics of the tidal delta and sediment transport processes.

3.3 Ocean Inundation

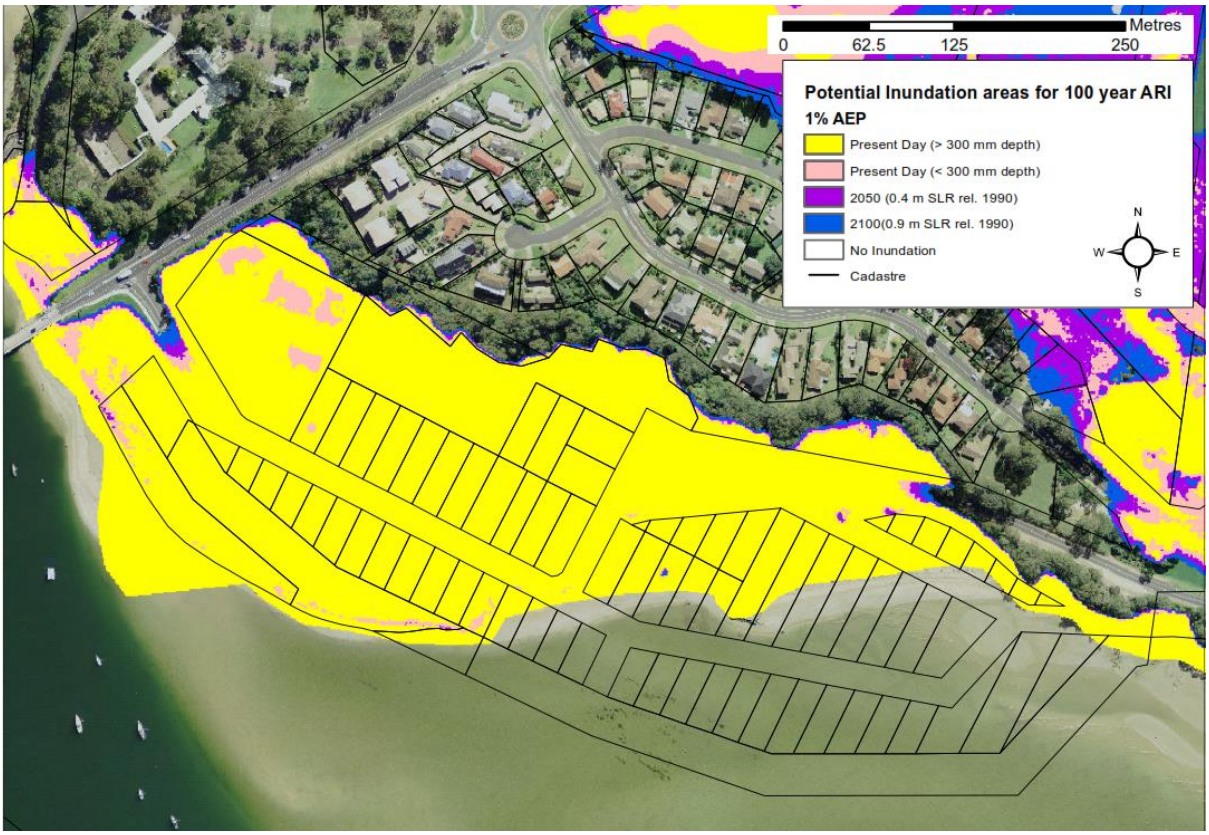
The major hazard identified by the 2001 CHMP for the Wharf Road precinct is ocean inundation as a result of high astronomic tides combined with storm surge (wind stress and barometric effects during major storms), together with additional minor Clyde River flooding effects. Additional wave setup in the inner bay plus wave runup overtopping the low foreshore adds to the hazard.

Based on the latest levels determined by WMA (2008), coastal inundation poses a serious current risk to existing development along the Wharf Road coastal strip. The back beach area would be inundated by around 0.5m of still water in a current 1% ocean storm event without wave runup.

Broken waves would pass across the subject land increasing the depth of inundation with each pulse of waves.

Future sea level rise would increase the frequency of inundation events. By year 2065 the 1% ocean storm inundation depth would increase to 0.8 metres. Sea level rise of 0.9m is projected in the Eurobodalla after year 2100. This would elevate the Highest Astronomic Tide (HAT) level to around 1.9 m AHD, which would result in ocean inundation of the Wharf Road precinct in the absence of storm surge and wave effects.

Figure 6: Potential Inundation Areas for Wharf Road during 1% AEP event (WRL, 2012)



3.4 Wave Runup

Potential wave runup with greater than a 5% AEP ocean storm would impact on the whole of the foreshore lands at Wharf Road east, with inundation extending across McLeod Street and Wharf Road. BMT WBM calculate wave runup at Wharf Road east at the peak of a 1% ocean storm to potentially extend a further 1.5m in elevation.

SMEC (2011) calculated wave run-up at the site at 2.95mAHD. Figure 6 below maps the extent of current day maximum wave run-up from the SMEC report. The whole site is inundated, including access along Wharf Road.

Figure 7: Areas overtopped by wave run-up (SMEC 2011)

3.5 Coastal hazards risk management options

The management options relevant to the study area at Wharf Road East developed in WMA 2001 are discussed as follows:

Environmental Planning:

Restrictive zonings

Due to the relatively low number of private land holdings in the Wharf Road East precinct that are currently developed, rezoning of the entire study area was recommended by WMA and has been acted upon by Council. This approach is in keeping with the NSW Coastal Policy goals and objectives.

This option would allow for the Wharf Road east precinct shoreline and backshore zone to naturally accommodate the coastal inundation and erosion that it is likely to experience in the future.

Land purchase

The return of beaches to public ownership has long been a foundation of the coastal management approach in NSW. Properties in private ownership are a priority for acquisition by the NSW government under this Plan.

Development Controls:

- minimum floor levels,
- building protection (raised floors & hazard proofing).

Development controls for the eastern Wharf Road precinct are impractical due to the high hazard and low lying nature of the land. Any buildings situated along the foreshore would be at risk of direct wave attack. The E2 zoning now precludes potential for future development at the site, rendering development controls unnecessary.

- building setbacks,

In the absence of practical protective works to alleviate inundation and erosion hazards, the adoption of standard setback lines (situated landward of the assessed high hazard zone) would normally be a feasible option. The location of these setback lines would, however, preclude residential or commercial development within the study area as it comprises a high hazard area in its entirety. The E2 zoning precludes potential for future development, such that building setbacks are not necessary.

Protective Works:

- training wall extension,

To protect parts of the private land along Wharf Road East, the existing training wall in front of the Big 4 Holiday Park could be extended along the foreshore, potentially some 400 metres eastwards. Likely impacts on sediment movement are periodic loss of sandy beach along the foreshore. Once exposed to wave action, the rock wall would increase wave reflection such that the beach would be absent for longer periods than at present. The prospect of future SLR suggests that a seawall alignment which could guarantee the continuance of a permanent beach along the Wharf Road foreshore would not be feasible.

Accepting the risk of adverse impacts associated with a seawall structure, in order to promote new development in such a marginal location (due to the influence of coastal hazards), is unlikely to be compatible with the goals and objectives of the NSW State Coastal Policy.

- beach nourishment

Rather than using rock, an artificial beach dune could be used to protect the eastern section of Wharf Road. The advantage of this option is that there would always be a sandy beach along the Wharf Road foreshore. The disadvantage is that the artificial dune may well be eroded away during a major flood event, which would seriously threaten any development behind the dune.

The severity of the inundation and erosion hazard is likely to preclude the implementation of “soft” protective works as an effective means of mitigating these hazards (BMT WBM 2008).

3.6 Costs and benefits of management options

BMT WBM (2008) estimated the cost of a 400 m long seawall with crest elevation at 4.0 m AHD to be in the vicinity of $1,000,000. To import sand to form a beach dune in front of development at Wharf Road would require 12,000 cu.m of sand and cost of the order $600,000. These expenditures do not attract any public benefit and these measures have not been adopted.

Traditional cost - benefit analysis is not relevant in this case as no costly works are proposed. Costs of all other CZMP actions are low, relative to the scale and significance of the issues they address and benefit provided. Benefits include improving public amenity enhancing community access, zoning controls to avoid risk to future development from coastal hazards, and accommodating natural coastal processes.

Costs of implementing these actions are considered by Council to be relatively minor and will clearly return a positive benefit/cost ratio.

3.7 Hazard Vulnerability Categories

The Hazard Vulnerability Category for Wharf Road has been determined in accordance with Section 3.2.4 of the Guidelines as follows:

- Risk Category 1 – Current Hazard
- Response Category 2
    - Coastal protection works are considered technically feasible but not cost-effective for public funding – unlikely to be implemented by a public authority.

The Hazard Vulnerability Category was determined following consideration of:

- Hazard information determined by previous reports
- A number of blocks are permanently inundated
- The number of undeveloped blocks
- The current zoning of the land
- Current controls in place prevent further development
- Assessment of the costs and benefits.

4. COASTAL & ESTUARINE ECOSYSTEMS

The study area lies within the estuarine zone of the Batemans Bay / Clyde River system. The Batemans Bay / Clyde River estuary is extensive and contains regionally significant coastal wetlands, and a range of habitats including rocky shorelines, offshore islands, sandy beaches, seagrass beds and sand shoals.

The estuary provides habitat for a range of species, including listed threatened or migratory birds. A compilation of listed bird species occurring in the Batemans Bay estuarine area is shown below.

Table 4: Listed bird species known to utilise Batemans Bay estuary

Common Name	Scientific Name	Status
Sooty Oystercatcher	*Haematopus fuliginosus*	Vulnerable
Pied Oystercatcher	*Haematopus longirostris*	Endangered
Hooded Plover	*Thinornis rubricollis*	Endangered
Osprey	*Pandion haliaetus*	Vulnerable
Black Bittern	*Ixobrychus flavicollis*	Vulnerable
Eastern Curlew	*Numenius madagascariensis*	JAMBA, CAMBA, ROKAMBA
Bar-tailed Godwit	*Limosa lapponica*	JAMBA, CAMBA, ROKAMBA
Sharp-tailed Sandpiper	*Calidris acuminata*	CAMBA, JAMBA, ROKAMBA

The Wharf Road estuary comprises tidal & sub-tidal areas and a sandy beach. Those birds that forage on sandy shorelines - notable Sooty and Pied Oyster Catchers - are likely to periodically forage on beaches in the study area. Osprey could use offshore estuarine waters for hunting.

Parts of the back beach area at Wharf Road comprises a 5,000 sq.m area of she-oak (*Casuarina glauca*) regrowth. Its location and current condition would suggest potential for regeneration to the Endangered Ecological Community '*Casuarina Swamp Oak on Coastal Floodplain*'.

5. COASTAL / ESTUARY VALUES

5.1 Ecological

Ecological values of the study area are minimal due to past disturbance and current landuse. The sandy beach and tidal foreshore are potential foraging areas for threatened shorebirds as described above. The back beach environment comprises degraded she-oak regrowth mixed with exotic grasses and weeds.

5.2 Cultural

Records of Aboriginal occupation identify numerous sites around the estuary shoreline that are significant to the indigenous community (WBM 2004). Notably undisturbed places such as at the nearby Cullendulla Nature Reserve contains significant Aboriginal heritage sites.

Past disturbance of the study area combined with the tidal inundation of the beach and submerged land components suggests that the presence of sites at Wharf Road is unlikely.

5.3 Socio-economic

Community consultation undertaken by WBM Oceanics for the Estuary Management Study (2004) articulates the local values and broad significance attached to the Clyde River estuary and Batemans Bay. The most common uses of the estuary are primarily recreational, as detailed below (ranked in order of community priority):

1. Recreational fishing
2. Swimming
3. Riding and/or walking
4. Picnicking
5. Power boating
6. Sailing

Of these primary uses, recreational fishing was considered the highest priority by more than half of the respondents. Respondents indicated that the most highly utilised area is the stretch of the Clyde River spanning from the Princes Highway Bridge upstream to Nelligen. The northern and southern foreshores of Batemans Bay are also highly utilised for shore-based fishing, riding, walking and swimming.

Estuary values were also identified by community responses as part of Estuary Management Study. The six most highly valued aspects of the estuary were:

1. Natural surroundings
2. Recreational opportunities
3. “Good” water quality
4. Access to water
5. Peace and tranquillity
6. Aesthetic appreciation i.e. views.

In response to a proposal for development of a number of residential units at Wharf Road East, public comments were lodged with Council. As reported in BMT WBM 2008, this provided

opportunity to examine, indirectly, the values that the public placed specifically on the Wharf Road locality.

The major issues raised by the public that relate to the development of a CZMP are:

- Visual Amenity

  Impacts of the development on views to the site and the natural amenity of the sandy estuary shoreline figured prominently. Distant views of the northern shoreline were important from public vantage points such as the Central Business District on the southern shore, from Beach Road and the Bay itself. These comments related not only to the proposed residential development but to the proposal for a continued rock wall at 4.5 to 5.0m AHD to manage wave runup. The required bulk and height of the rock revetment figured prominently in responses.

- Impacts on Adjacent Foreshore

  Submissions suggested the possibility of resultant impacts on sediment supply elsewhere on the Batemans Bay foreshore, such as Surfside and Cullendulla Beaches.

- Public Access

  Public access to beaches should be retained.

- Local Drainage Issues

  Submissions pointed out the current local stormwater drainage problems in the area north of Wharf Road. Natural drainage from this area is largely reliant on a broad permeable area for infiltration. Gradients to the bay are too flat for traditional piped urban stormwater systems. The proposed development is situated in the natural drainage path.

- Maintenance Cost

  Maintenance of the seawall was an issue - preference was expressed for the wall to be wholly on private land rather than on public land. The issue was that public moneys should not be expended on maintaining infrastructure essential to protect private development.

6. COMMUNITY USES

6.1 Access

This sheltered beach is used by walkers, sightseers and swimmers or paddlers. It can be popular with tourist users as it adjoins the Big 4 Tourist Park and another nearby caravan park. It has the advantage in summer of being largely sheltered from prevailing north-east winds.

Access points to the beach are limited by she-oak regrowth and by fenced and unfenced private land. The Wharf Road reserve adjacent the right angled bend near the Big 4 Holiday Park forms the sole legal access to a 20m wide strip of public beach. The access used mostly by the public is a more accessible flatter track across private land. The beach beyond this 20m width is privately owned, although public access is not limited by the current owners.

6.2 Amenity

The amenity of the beach and foreshore is low. As much of the area has no owner presence or use, it is not routinely maintained and contains large and small items of rubbish and weed & grass infestation. Developed parts of the back beach comprise partially built sheds, stored tents, caravans and vehicles.

The overall appearance is an unkempt and visually unattractive landscape.

7. COASTAL MANAGEMENT STRATEGY

The primary objective of this plan is to ensure that future management of the Wharf Road east precinct is compatible with its current and future hazard levels. The hazard assessments undertaken by past studies have identified that the Wharf Road east precinct is a high-hazard zone due to the effects of both coastal inundation and periodic shoreline erosion. In the absence of feasible measures to mitigate these hazards, it is not considered a suitable location for future land development.

The priority coastal management issues for the Wharf Road coastline discussed in proceeding sections of the CZMP are summarised with the corresponding adopted management actions.

The strategy for managing the Wharf Road East study area is split into two sections - actions that have been completed or in progress, and those actions proposed for the future. A timeframe for implementation of the latter is proposed in this plan.

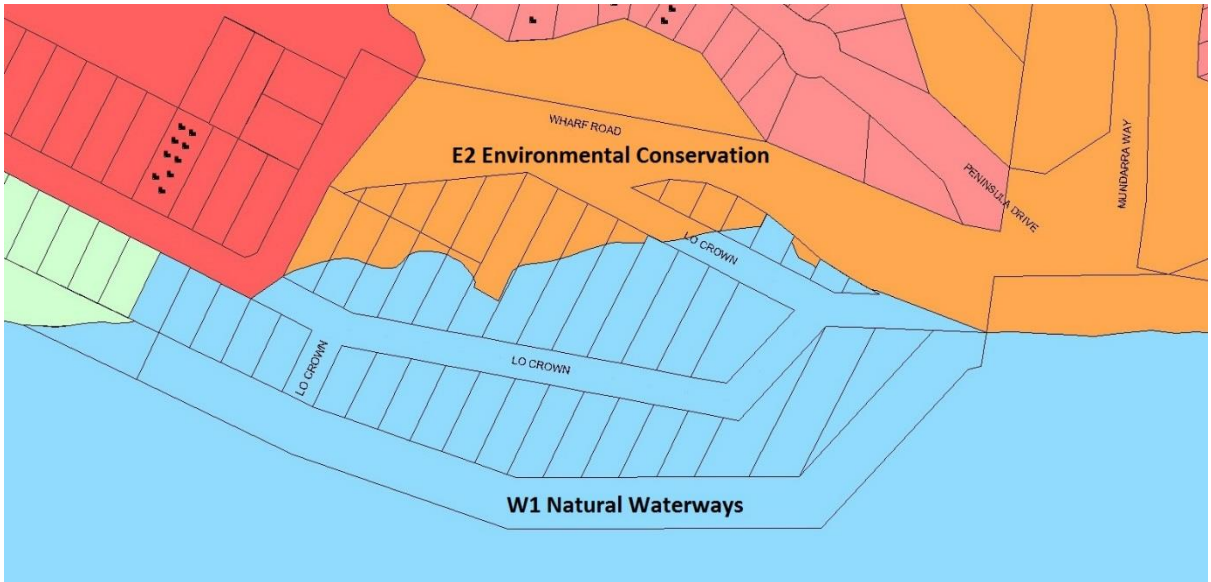
7.1 Completed Actions

Environmental Planning - restrictive zonings

Rezoning of private property within the study area was recommended by WMA and has been acted upon by Council. This approach is in keeping with the NSW Coastal Policy goals and objectives. Accordingly the non-submerged land has been zoned E2 Environmental Conservation under the Eurobodalla Local Environmental Plan (LEP) 2012. All submerged lands have been Zoned W1 Natural Waterways. Relevant objectives of this zone are to identify sensitive coastal lakes, estuaries, wetlands, overland flow paths and riparian zones and those areas at risk from coastline hazards, including sea level rise; and to protect and enhance the natural environment for recreation purposes (See Appendices 1, 2).

This action allows for the Wharf Road east precinct shoreline and backshore zone to naturally accommodate the coastal inundation and erosion that it is likely to experience in the future.

Figure 8: Eurobodalla Local Environmental Plan 2012 – Land use Zoning



Emergency Action Sub-plan

An Emergency Action Sub-plan for the Wharf Road Coastal Erosion 'Hot Spot' (*Umwelt (Aust) Pty. Ltd. 2012*) was adopted by Council on 24 July 2012. It will form a sub-plan of this CZMP.

The assets that are in the immediate inundation and erosion hazard zones at Wharf Road east include:

- informal beach access;
- a small area of mainly she-oak vegetation;
- an existing low rock revetment fronting the bend in Wharf Road;
- a short rock groyne;
- private properties; and
- Council infrastructure (roads, sewerage gravity main and rising mains and water supply trunk main).

Actions proposed under the Emergency Action Sub-plan are:

- Pre-Storm Emergency - preparations such as stockpiling rock material; ensure suitable plant and equipment on stand-by.
- During Emergency - use of sand bags where appropriate to minimise erosion and/or flooding; placement of additional rock material to stabilise the shoreline and protect Council assets; if excessive overtopping of the rock revetment results in the inundation of Wharf Road, Council should be prepared with signage and/or safety barriers to close the road to traffic and pedestrians.
- Post-Emergency - erect signage warning of hazards, or if public safety risks are considered to be extreme, temporarily close access to this beach area; inspect the road, beach and rock revetments after damaging storm events and carry out works to ensure area is safe.

7.2 Actions for Future Implementation

Beach ownership

Public ownership of beaches has long been a foundation of the coastal management approach in NSW. Public ownership of the beach at Wharf Road is a priority issue for this Plan. with approximately 365 metres of sandy beach under private ownership. Applications by Council to state agencies to purchase this land in the past have been refused. The zoning adequately manages coastal risk without the need for land acquisition. However it is considered appropriate to incorporate in this plan a priority action for the NSW government to purchase the privateproperty. This would return the areas of beach and the beach access to public ownership.

Public Infrastructure protection

Wharf Road and its extension into McLeod Street form one link from North Batemans Bay and Surfside to the Princes Highway. The vulnerable point at the Wharf Road bend where it is closest to

the bay would preclude safe use by traffic during a moderate to severe ocean storm with elevated tide levels. The road has been closed at this location in the past.

With this road closure in place, McLeod Street is the sole means of emergency egress to the east for one caravan park at the corner of Wharf Road and McLeod Street.

Sewerage mains are located in the Wharf Road reserve at the location where Wharf Road is closest to the bay foreshore (**Figure 5)**. Two are pressure mains (rising mains) that service residential development at the nearby village of Surfside. A sewer gravity main services parts of North Batemans Bay. All are critical items of infrastructure with no alternative if they were to fail.

These infrastructure items would be subject to wave attack in severe ocean storms. The existing seawall at this corner of Wharf Road was found to be at high risk of failure due to erosion, overtopping and undersize armour (*WBM 2008*). It is inadequate for complete protection to a severe 1% storm and will be increasingly liable to damage as SLR progresses.

The Council water main is a 250mm pressure main that feeds the village of Surfside. There are alternative supplies to Surfside such that this main could be isolated if it failed. Nonetheless it is in a vulnerable location and could damage the adjacent sewer mains if it was ruptured.

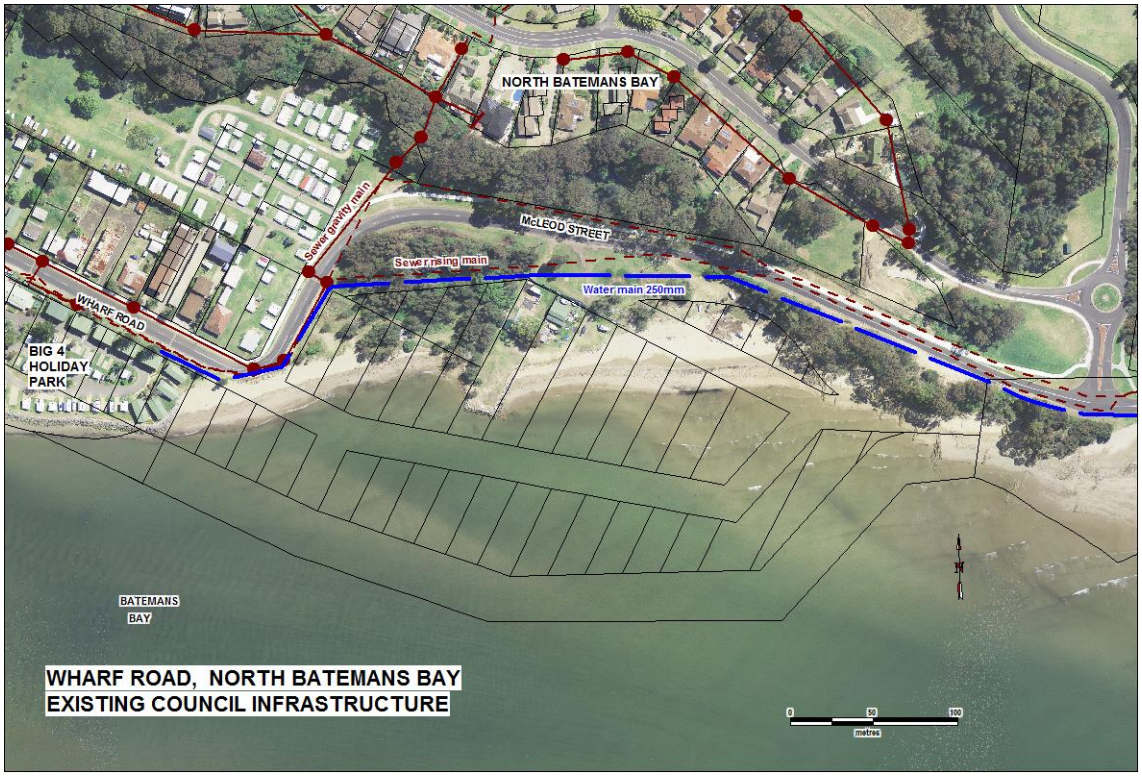


Figure 9: Council infrastructure in study area

Any reconstruction of the seawall would need to tie into the existing wall in front of the Big 4 Tourist Park. A length overall of 100m of new seawall would be required at a cost estimated at $250,000. Maintenance after severe storms would require additional ongoing funding. Impacts of the seawall such as a temporary loss of sand after ocean storms should be considered in full.

Investigations by Council's *Eurowater* group are required into options for the relocation or improved protection of these assets. This issue will be picked up across the whole of the Shire in Council's

forthcoming CZMP. Actions for this area should be prioritised against other at-risk infrastructure which will be finalised in that plan.

Weeds, rubbish clean-up and access improvements

Access to the Public reserve should be improved to a safe standard. Regeneration of land areas and clean up by volunteers would be a positive community engagement activity to reinforce and promote eventual public ownership of the adjoining site. These actions are currently on public land and can be implemented independent of the outcome of the purchase of some or all of the lots in this area as discussed above.

7.3 Actions Implementation Summary

Table 5 presents a summary of actions and responsibilities under this plan.

Table 5 Actions Implementation Summary

	Action	Responsibility	Timeframe	Cost	Status
1.	Apply for the NSW government to purchase private properties at Wharf Road to assure current and future generations have public access to the foreshore and beaches.	NSW government	Application within 2 months of CZMP adoption	Unknown, dependant on number of lots. Offer will be determined by Valuer General's assessment	Past requests to agencies have not been supported.
2.	Investigate options for the relocation or improved protection of water and sewer mains at Wharf Road and prioritise against other infrastructure in the shire.	ESC (Eurowater)	End 2018	Nil (in house Investigations)	Commence upon Gazettal
3.	Access improvements, weed and rubbish control on public land adjacent to Wharf Road	ESC with local Landcare	End 2018	Nominally $5,000 plus volunteer contribution	Commence upon Gazettal
4.	Upon successful implementation of Action (1) above: • Site remediation and clean-up	ESC with agency support	Application within 2 months of CZMP adoption	50,000	Commence upon Gazettal
5.	Incorporate incomplete actions into the Eurobodalla Coastal Management Program when finalised.	ESC	End 2018	Nil	Investigations underway and report in preparation.
6.	Review CZMP or incorporate into broader Eurobodalla Coastal Management Program in accordance with legislation.	ESC	31 Dec 2021	Nil additional budget	-

Relevant actions are detailed on **Figure 10** overleaf.

Figure 10 Action Plan Summary - Wharf Road CZMP

8. MONITORING AND REVIEW

This plan will be monitored and reviewed before 31 December 2021 in accordance with the intended provisions of Schedule 3, Part 2(6(4)) of the *Coastal Management Act 2016*. Where appropriate and achievable, any outstanding actions will be incorporated into the Eurobodalla Coastal Management Program prior to this date.

9. MONITORING AND REVIEW

This plan will be monitored and reviewed before 31 December 2021 in accordance with the intended provisions of Schedule 3, Part 2(6(4)) of the *Coastal Management Act 2016*. Where appropriate and achievable, any outstanding actions will be incorporated into the Eurobodalla Coastal Management Program prior to this date.

10. REFERENCES

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APPENDIX 1 – LAND USE OBJECTIVES

Zone E2 Environmental Conservation

1 Objectives of zone

• To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.

• To prevent development that could destroy, damage or otherwise have an adverse effect on those values.

• To identify sensitive coastal lakes, estuaries, wetlands, overland flow paths and riparian zones and those areas at risk from coastline hazards, including sea level rise.

• To protect and improve water quality.

• To protect and enhance the natural environment for recreation purposes.

• To manage items, places and landscapes of Aboriginal cultural heritage significance into the future in collaboration with the local Aboriginal community.

2 Permitted without consent

Environmental protection works

3 Permitted with consent

Camping grounds; Environmental facilities; Roads; Sewerage systems; Water recreation structures; Water supply systems

4 Prohibited

Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not specified in item 2 or 3.

Zone W1 Natural Waterways

1 Objectives of zone

• To protect the ecological and scenic values of natural waterways.

• To prevent development that would have an adverse effect on the natural values of waterways in this zone.

• To provide for sustainable fishing industries and recreational fishing.

2 Permitted without consent

Environmental protection works

3 Permitted with consent

Aquaculture; Boat launching ramps; Boat sheds; Environmental facilities; Jetties; Mooring pens; Moorings; Sewerage systems; Water recreation structures; Water supply systems

4 Prohibited

Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not specified in item 2 or 3

APPENDIX 2 – LAND USE MATRIX

APPENDIX 3 – EMERGENCY ACTION SUB-PLAN FOR THE WHARF ROAD

Emergency Action Subplan for the Wharf Road Coastal Erosion 'Hot-spot'

Batemans Bay, NSW

February 2012

Amended November 2016

Emergency Action Subplan for the Wharf Road Coastal Erosion 'Hot Spot' Batemans Bay, NSW

Prepared by

Umwelt (Australia) Pty. Ltd. & WRL

on behalf of

Eurobodalla Shire Council

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TABLE OF CONTENTS

FIGURES (after page...)

• Introduction

This report presents the draft Emergency Action Subplan (EAS) for the Wharf Road Coastal Erosion 'hot spot' (as identified by the NSW Office of Environment and Heritage, OEH), at Batemans Bay, NSW.

The emergency action and response plan is presented for the beach area from south-east of the Big4 Holiday Park (on Wharf Road) along the frontage towards McLeod Street, approximately 400 metres to the east (**Figure 1.1**).

SMEC (2010) prepared maps of immediate coastal erosion hazard areas and immediate coastal inundation hazard areas for beaches along the Eurobodalla coastline as part of the Scoping Study. These maps, and the underlying process assessments and assumptions, provide the basis for this draft EAS, as well as the findings of the Wharf Road Coastal Hazard Assessment and Hazard Management Plan (BMT WBM, 2009). This is until the new Coastal Hazard Study is undertaken by WRL as part of the Batemans Bay Coastal Zone Management Plan, after which this EAS will be updated.

The shoreline and hinterland area at Wharf Road is subject to immediate coastal inundation and erosion hazards. The immediate coastal erosion hazard zone is defined as the zone of wave impact (storm bite), plus the zone of reduced foundation capacity from immediate storm bite. These zones will be established through the Coastal Hazard Study as well as the landward extent of the immediate and future hazard zones.

Assets and infrastructure are situated within the immediate coastal erosion and inundation hazard zones. This includes approximately 8 hectares of private property (based on the overtopping/wave runup areas identified in SMEC, 2010) and a public road. Water and sewerage infrastructure are also present below ground.

The plan is prepared to meet statutory requirements and guidelines determined by the NSW Government through the Office of Environment and Heritage (OEH (DECCW), 2010).

○ Purpose

The existing hazard management plan (BMT WBM, 2009) for the Wharf Road area does not address emergency response. Therefore this EAS is to ensure compliance with state legislation, and provide Council with an outline schedule of actions to undertake during an emergency or non-emergency flood or erosion event.

○ Definitions Relating to Coastal Emergencies

Definitions used in this EAS are those used in the *Coastal Protection Act 1979* and the *Coastal Protection and Other Legislation Amendment Act 2010*. In 2011, three additional documents were released by the NSW Government relating to coastal protection works, the Statutory Requirements for Emergency Coastal Protection Works for private landowners (OEH, 2011a), the *Code of Practice under the Coastal Protection Act 1979* (OEH, 2011b) and the *Coastal zone management guide note: Emergency action plans* (OEH, 2011c). Definitions of some key terms in relation to the legislation are as follows:

Emergency action sub plan: that part of a coastal zone management plan that deals with the matter referred to in section 55C (1) (b) of the *Coastal Protection Act 1979*. In s55C(1) (b) coastal zone management plans must make provision for emergency actions carried out during periods of beach erosion, including the carrying out of related works, such as works for the protection of property affected or likely to be affected by beach erosion, where beach erosion occurs through storm activity or an extreme or irregular event.

Coastal protection works: activities or works to reduce the impact of coastal hazards on land adjacent to tidal waters, including sea walls, revetments, groynes and beach nourishment.

Emergency coastal protection works: works comprising the placement of the following material on a beach or a sand dune adjacent to a beach, to mitigate the effects of wave erosion on land (in compliance with the requirements of Section 55P (1) of the Coastal Protection and Other Legislation Amendment Act 2010):

(a) Sand or fabric bags filled with sand (other than sand taken from a beach or a sand dune adjacent to a beach);

(b) Other objects or material prescribed by the regulations (other than rocks, concrete, construction waste or other debris).

The Act does not provide a specific definition of a *coastal emergency*. However, it does define '*storm conditions*' as a period during which a severe weather warning for large waves or damaging surf issued by the Bureau of Meteorology applies.

NSW Coastal Panel

The NSW Coastal Panel is a statutory authority under Part 2A of the *Coastal Protection Act 1979*, with membership comprising local government and public authority nominees. The Panel's role is to provide expert advice to the Minister administering the Act and to local councils. The Minister may also refer draft coastal zone management plans to the Panel for review. The Coastal Panel is also the consent authority in relation to coastal protection works on the open coast where no coastal zone management plan exists, or is yet to be adopted (http://www.environment.nsw.gov.au/coasts/coastalpanel.htm).

○ Statutory and Policy Context

Emergency actions subplans may include emergency coastal protection works. Legislation relating to coastal protection works carried out as part of emergency response changed significantly during 2010. This section outlines the current requirements.

Minister's Guidelines for Preparing Coastal Zone Management Plans

Coastal local government areas that commence the preparation of a coastal zone management plan (CZMP) after 1 January 2011 must prepare CZMPs in accordance with the Guidelines, which were adopted by the Minister for Climate Change and Environment under Section 55D of the Coastal Protection Act 1979 in December 2010. In addressing coastal risks, a CZMP must include an EAS, which describes:

- Intended emergency actions to be carried out during periods of beach erosion (other than matters dealt with in any plan made under the *State Emergency and Rescue Management Act 1989*). In general, these emergency actions will include property or asset protection.

- Any site specific requirements for landowner emergency coastal protection works. The CZMP must identify suitable locations where landowners could construct coastal protection works (subject to cost sharing arrangements with Council and to the requirements of the *Environmental Planning and Assessment Act 1979*).

- Consultation carried out with owners of land affected by the plan.

OEH Coastal Erosion 'Hot spots' and Authorised Locations

In NSW locations with very high to extreme immediate coastal hazard risks are identified as coastal erosion 'hot spots' and authorised locations which are listed in a schedule attached to the Coastal Protection Act and OEH Guidelines. **Table 1.1** and **Table 1.2** list places which are identified as hot spots or authorised locations. Batemans Bay is noted in **Table 1.1** as a 'hot spot'; however is not an Authorised Location.

Table 0.1 - Coastal Erosion 'Hot Spots'

LGA	Beach
Byron Shire Council	Belongil Beach
Ballina Shire Council	Lennox Head
Clarence Valley Council	Brooms Head
	Wooli
Port Macquarie-Hastings Council	Lake Cathie
Greater Taree City Council	Old Bar Beach
Great Lakes Council	Winda Woppa - Jimmys Beach
Wyong Shire Council	The Entrance North
	Noraville
	Norah Head
Gosford City Council	Wamberal/Terrigal
Pittwater Council	Bilgola
	Mona Vale
Warringah Council	Collaroy/Narrabeen
Eurobodalla Shire Council	**Batemans Bay**

Table 0.2 - Authorised Locations for Emergency Coastal Protection Works

Authorised Locations for Emergency Coastal Protection Works
Basin Bay/Beach, Mona Vale
Belongil Beach, Byron Bay
Bilgola Beach, Bilgola
Brooms Head, north of the outlet from Cakora Lagoon
Collaroy Beach, Collaroy
Hargraves Beach, Noraville
Narrabeen Beach, Narrabeen
North Entrance Beach, The Entrance (North)
Mollymook Beach, Mollymook

Authorised Locations for Emergency Coastal Protection Works
Pearl Beach, Pearl Beach
Wamberal Beach, Wamberal
Wooli Beach, Wooli

Guide to the Statutory Requirements for Emergency Coastal Protection Works

The OEH guidelines for emergency protection works (2011a) primarily relate to works for private landowners. The document provides some helpful information, considerations and implementation information in relation to the design of emergency protection works. It also details the process private landowners must follow to gain permission to undertake emergency works.

Since the Wharf Road area of Batemans Bay is not an Authorised Location, private landowners are unable to undertake emergency works. For any protection works to be undertaken, a standard Development Application must be lodged.

Coastal Zone Management Guide Note: Emergency Action Plans (OEH, 2011c)

Any emergency works undertaken in the Wharf Road area must be done or commissioned by Council and/or the Department of Lands. Works must be carried out in accordance with the draft Emergency Action Subplan. The final version of the Subplan will be updated as part of the final Coastal Management Program in 2011/17.

Council is responsible (though not obligated) to undertake emergency works where necessary to protect its coastal assets. Under NSW legislation, Council is not required to obtain prior consent for works (as is required for private landowners), as long as an adequate environmental assessment has been carried out and the NSW Coastal Panel has been notified. Adequate environmental assessment could be in the form of a REF or EIS. In this case, the CZMP is considered to be an adequate assessment.

If a CZMP and Emergency Action Subplan are not currently in place, Council is still able to undertake works as long as the NSW Coastal Panel is informed. The Coastal Panel then have 21 days to respond. For minor works with sand bags, or minor repair and maintenance works to structures, Council is able to undertake this at their discretion with no requirement for Coastal Panel notification.

As stated in the *Coastal zone management guide note: Emergency Action Plans* (OEH, 2011c), there is no requirement for Council to follow the *Code of Practice under the Coastal Protection Act* (1979) in contrast to the emergency works allowances of private landowners. Therefore, if necessary Council may choose to place rock on as an emergency protection measure for public assets at risk from coastal erosion.

Under the current legislation relating to emergency works and local and government organisation responsibilities, some specific points are noted:

- Council is not responsible for the protection of private property
- Although they may choose to undertake works to protect public property, they are not legally required to;
- The responsibility of State Emergency Service (SES) is to protect people, and minimise risk to life (i.e. co-ordinate evacuations etc.). They are not permitted to undertake any kind of works in the coastal zone to mitigate the effects of coastal erosion or inundation to property.

○ Communication

Pre Emergency Preparation

The NSW State Emergency Service has responsibilities to educate the community on the safety measures to be undertaken prior to and during emergency events. Council should ensure staff are aware of the protocols and measures to be taken during emergency events, prior to them occurring. This will ensure preparedness during emergencies, which will reduce the risk to people and property.

Storm Prediction

It is suggested that triggers relating to forecast storm events be established. This will enable Council to effectively prepare when a large event is forecast. For example, when extreme wave conditions are forecast to occur, and, when extreme wave conditions are forecast to occur at the same time as a very high tide.

Although it is the Bureau of Meteorology's (BoM) responsibility to forecast extreme weather events, it will also be in Council's interest to keep track of high tide predictions and wave conditions forecast by the BoM, and plan and act accordingly.

Pre Storm Warnings

Council may assist the SES in provision of information to nearby residents about approaching coastal emergencies using the following mechanisms:

- During and after a coastal emergency event, Council will provide information on its website about road and access closures and reopening (if any).
- Support community engagement strategies identified and lead by the SES.

○ Access for Emergency Activities

After major coastal storms that cause flooding or erosion of the beach, dunes and hinterland, emergency access to the area is via McLeod St from Peninsula Drive. Access to Wharf Road is only available from Princes Highway (when heading South), as there is no right turn in to Wharf Road (when heading North).

• Emergency Response

○ Immediate Hazard Zones

There is potential for inundation from wave runup, overtopping, and surface flooding behind the shoreline and rock revetment. Storm erosion damage along the shoreline may result in intermittent erosion of the beach. There may potentially be damage to the rock revetments protecting Wharf Road and the holiday park depending on the magnitude of the storm.

The emergency action and response plan is presented for the beach area from south east of the Big4 Holiday Park (on Wharf Road) along the frontage towards McLeod Street, approximately 400 metres

to the east (**Figure 1.1**). The emergency action measures to be taken in the wider Batemans Bay areas will be established once the Coastal Hazard Study has been completed.

Figure 2.1 shows where wave run-up/overtopping inundation may occur in the Wharf Road 'hot spot' area. This was presented in the Scoping Study (SMEC, 2010). This inundation extent is based on previously undertaken empirical calculations which determined the maximum run-up level, and included:

- astronomical tide;
- barometric setup;
- wind setup; and
- wave setup.

For the Wharf Road area, this level is given as 2.95 mAHD. An approximate depth of inundation in the vicinity of each property is not given; however, it can be assumed that the depth of water will decrease with distance from the shoreline, unless flows are channelled to low points. This zone of inundation will be updated after the coastal hazard study is completed.

Figure 2.2 shows the immediate coastal erosion risk zones in the Wharf Road 'hot spot' area. These zones are approximated based on the findings of the BMT WBM (2009). The short term erosion demand on the eastern side of the unauthorised revetment was calculated to be approximately 20 m^3/m, equating to an approximate horizontal distance of 10 to 15 metres (the two lines shown in **Figure 2.2**). No permanent residences are in the immediate coastal erosion hazard zone; however some mobile homes are located in the eastern corner of the beach. There is erosion risk on the north-western side of the unauthorised revetment also, however no calculations have been done thus far to quantify the erosion demand, thus there is no horizontal erosion distance presented for that side. Once the coastal hazard study is completed, **Figure 2.2** will be updated to include this and any other relevant areas.

The assets that are in the immediate inundation and erosion hazard zones include:

- informal beach access ways across the low frontal dune;
- a small area of vegetation;
- an existing low rock revetment fronting the bend in Wharf Road and the holiday park;
- private properties; and
- Council infrastructure (roads, sewerage and water lines)

○ Proposed Emergency Response Actions

It is suggested that for an effective response to rapidly changing beach conditions, Council and Department of Lands prepare an agreement whereby each Agency's obligations and responsibilities for lands under their management and control are set out for clarity.

Due to the OH&S risks apparent during an extreme event, any actions near the shoreline should be kept to a minimum unless **absolutely necessary**. If there is risk to life, the SES will order an evacuation of the area. Council will assist as per arrangements under the Eurobodalla Disaster Plan. If excessive overtopping of the rock revetment occurs resulting in the inundation of Wharf Road, Council should be prepared with signage and/or safety barriers to close the road to traffic and pedestrians. If there is

no immediate risk to property, infrastructure or lives, then post storm clean-up measures are favoured.

In some cases, works may be necessary to protect public property or infrastructure (if Council chooses to), however these actions should be seen as a last resort, and only when there is imminent danger to property or infrastructure (as determined by Council engineers). The infrastructure includes Wharf Road, and the water and sewerage lines that are below ground. Therefore, the following actions relate to works on the shoreline to protect these public assets, during an emergency event.

Actions Prior to an Emergency

To facilitate emergency works along the shoreline, the following should be noted:

- a stockpile of appropriate gradation rock material should be available near to the location; and
- access is needed to suitable plant (i.e. dumpers, bobcats, filling frames, sewing machine etc.) nearby, or the ability to mobilise it at short notice. Note, there may be surface flooding of the area during an emergency, thus, the plant used should be able to withstand this.

Actions During an Emergency

If damage to infrastructure is imminent, the following measures could be taken at Council's discretion following an assessment of risk to Staff:

- the use of sand bags where appropriate to minimise erosion and/or flooding; and
- the placement of additional rock material to stabilise the shoreline and protect Council's assets (only where the Wharf Road rock revetment already exists, not in the location of the unauthorised rock structure (shown in **Figure 2.2**) or any other locations adjoining private property.

Post Storm Clean-up and Rehabilitation Works

Although the immediate frontage is mostly in private tenure, there is a small strip of public land fronting the area as well as an area of vegetation where access may be temporarily inhibited. The location east of the rock revetment (where the unauthorised rock structure is located) has a lot of debris on the foreshore (tyres, car bodies), that may be moved or exposed following a storm event. If this is the case, Council should erect signage warning of the hazard, or if the public safety risks are considered to be extreme, temporarily close access to this beach area, until said risks are mitigated. Council will inspect the road, beach and rock revetments after damaging storm events and carry out works to ensure the area is safe before taking down signage, or reopening the area.

When inspecting damaged beach access ways and carrying out repairs prior to reopening, Council should also note the presence of:

- broken or protruding timber, slats, platforms or posts;
- broken or protruding metal posts and chains;
- broken or protruding wire; and
- erosion scarps of no more than 0.5 metre are suggested for the seaward end of a safe beach access way.

These features should be repaired and/or replaced before public access to the beach is reinstated.

Council should consider whether works undertaken to protect infrastructure require removal after the storm.

○ Records of Storm Impacts and Emergency Response Activities

Emergency response is one part of Council's strategic approach to managing its coastline. Other aspects of Council's strategy will be set out in the Coastal Zone Management Plan. The monitoring of emergency response activities and outcomes will inform more strategic decisions about coastal zone management approaches.

To track these activities Council should add information to a data base after each damaging storm. This will include:

- locations of assets and infrastructure that were damaged by the storm and details of the extent of damage;
- photographs of the impact of the storm on assets and infrastructure at key locations;
- undertaking a survey of the beach levels and other features to provide a greater understanding of the hazard;
- what rectification works have been carried out;
- the date of rectification works; and
- cost of rectification works.

The records of storm events, extent of damage and rectification works will assist Council to understand how climate change and/or extreme events are affecting its coastline and to better plan for retreat of some assets over time, to adapt to the effects of sea level rise and other factors such as storm frequency and intensity.

• Summary Action Table

The following implementation table details the actions Council should follow prior to, during, and after an emergency storm event.

Pre-storm preparation	**Actions**	**Responsibility**
	Make the public aware of the hazards & risks.	SES and Council
	Storm prediction and monitoring.	BoM, SES and Council
	Stock pile materials for emergency works.	Council
	Pre-arrange access to suitable plant.	Council
Storm phase	**Actions**	**Responsibility**
	Erect temporary signage of dangers or closure of the road etc.	Council
	Alert residents if risk level is high and if any emergency management actions are being implemented.	SES
	Evacuate residents if necessary.	SES
	Use sand bags where appropriate to protect public infrastructure.	Council
	Undertake emergency works to protect public infrastructure if necessary.	Council
Post storm	**Actions**	**Responsibility**
	General clean-up.	Council
	Inspect properties, revetments, and the general area for dangers and mitigate.	Council and OEH authorised Coastal Officer
	Repair Wharf Road if necessary.	Council
	Erect permanent warning signs if necessary.	Council
	Remove emergency works if necessary.	Council
	Record and document all actions taken, and monitor area after the event. This will include measuring and quantifying volumes of erosion.	Council

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Eurobodalla Disaster Plan

State Storm Plan