District Plan Review

Coastal Hazard Provisions

Prepared for **Kapiti Coast District Council**

August 2011

District Plan Review: Coastal Hazard Provisions

Report prepared for:

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1 PART ONE: BACKGROUND INFORMATION

1.1 Introduction

Kapiti Coast District Council is undertaking the ten year review of the District Plan. Focus Resource Management Group was commissioned to prepare a report covering:

- a review of the "hazard and amenity based" coastal development setback areas in light of a reassessment of hazard risks to determine whether any different planning provisions are needed; and
- a review of the methodology for developing planning provisions for coastal development undertaken in 2007 and revise if required, given the managed retreat and 100 year planning horizon concepts included in the NZCPS (2010) and Proposed Wellington RPS; and
- a draft set of District Plan provisions, and other non plan methods, for coastal hazards using the methodology developed.

In undertaking this work, we have drawn on the various background reports that have been prepared by the Council to inform the Review of the District Plan. In addition we met with various Council staff to discuss our initial thoughts and to gather knowledge of practical issues facing difference sectors of Council. A site visit was undertaken of all key areas of the coast. We reviewed the detailed coastal hazards assessment (undertaken by Coastal Systems Ltd, 2008a; 2008b and 2008c), and the planning methodology (Tonkin & Taylor, 2007), previously prepared for Kapiti Coast District Council.

As per the contract, the specific outputs included in this report are:

- methodology used for determining the draft coastal hazard lines
- a map showing the associated hazard lines
- an overview of the planning framework that contributes to the management of the coastal areas potentially subject to coastal hazards
- draft s32 analysis of management options considered
- draft plan provisions

It is noted that the contract was not seeking specific wording for the plan provisions, rather a framework which could then be appropriately finalised by staff for inclusion into the District Plan. In addition it is noted that the draft hazard zones will need further refinement, in light of the final "science report" (Coastal Systems Ltd, *in prep*.) .

1.2 Structure of Report

This report is structured as follows:

Part One: Background Information: This section of the report provides background information on the Kapiti coast along with an outline of the policy context.

Part Two: Consideration of alternatives, benefits and costs: This section of the report provides an analysis of the possible management options that could be considered for inclusion into the District Plan. This section addresses the requirements of s32 of the Resource Management Act, 1991 (RMA).

Part Three: Proposed Changes to the District Plan: This section of the report provides details of the proposed changes to the District Plan, based on the preferred option arising from the s32 RMA analysis.

Appendices: This incorporates further detailed information to support different sections of this report.

1.3 Description of Coast

The Kapiti coast extends approximately 40 km in length from Otaki in the north to Paekakariki in the south, with most of the coastline (approximately 25 km) having urban development adjacent to the coastal edge.

The northern section of the Kapiti coast (north of Waikanae) generally consists of wide sandy beaches backed by dunes. Development exists in the form of several isolated settlements (including Peka Peka, Te Horo and Otaki), separated by long stretches of undeveloped coast. The Paraparaumu area further south consists of a cuspate foreland with sandy beaches backed by dunes. This portion of the coast is extensively developed.

South of Paraparaumu, beaches are narrower, extensively developed and in most places backed by various forms of shoreline erosion control structures, with the exception of the Queen Elizabeth II Regional Park and south of Paekakariki. There are also engineering structures around many inlet entrances, to limit erosion to adjacent coastline areas.

Further description of the coast is provided in the Operative District Plan (sections B10 Coastal Issues, C9 Coastal Environment and C15 Natural Hazards) and in the Kapiti Coast District Plan Review: Discussion Document: Natural Hazards and Managed Retreat.

1.4 Coastal Erosion Hazard

A range of coastal hazard studies have investigated shoreline change patterns on the Kapiti coast (Donnelly, 1959; Gibbard, 1972; Gibb, 1978; Gibb & De Pledge, 1980; Holland & Holland, 1985; Lumsden, 1999; NIWA, 2000; Coastal Systems Ltd, 2008a, 2008b). The most recent and detailed studies by Coastal Systems Ltd examined historical patterns of shoreline change from available data. This work has shown that a change in long-term beach behaviour occurs near the "apex" or the cuspate foreland that has formed in the lee of Kapiti Island (at Paraparaumu). Areas immediately south of this apex are relatively stable, while areas further to the south are generally undergoing long-term landward retreat (up to 0.25 m/yr). There is a general trend for shoreline accretion (average 0.42 m/yr and up to 1.5 m/yr) on northern sections of the coast, from Waikanae to north of Otaki.

The shoreline also experiences dynamic shoreline fluctuations over periods of years and decades. These fluctuations are typically 20-30 m (Coastal Systems Ltd, 2008a), with areas of greater fluctuations between Paraparaumu and Waikanae, and smaller fluctuations immediately south of Paraparaumu town centre.

Complex and active sediment dynamics drive large-scale shoreline changes near estuary entrances. These areas experience high current velocities, large areas of breaking waves, and active sediment transport. Significant transfers of sand occur, often in episodic pulses, between the shorelines and the ebb and flood tidal delta systems that occur seaward and landward of the entrances, respectively. Spit or bar breaching can also result in catastrophic change over a range of time scales.

Greater Wellington Regional Council (GWRC) maintains the location of many inlet entrances on the Kapiti coast through dredging and/or training walls, and in doing so limits the extent of shoreline fluctuation in these areas. Coastal Systems Ltd (2008b) examined shoreline change at inlets on the Kapiti coast from aerial photographs and cadastral surveys and provided future inlet shapes for both managed and unmanaged scenarios.

Projected climate change is expected to drive future changes in sea level and coastal processes. These changes are expected to drive long-term shoreline recession on sandy beaches such as those on the Kapiti coast. In areas where the coast is currently accreting, sea level rise may cancel out or even reverse this trend. Coastal Systems Ltd (2008a) considered the likely impact of future sea level rise on Kapiti beaches, and estimated recession of typically 10-17 m in 50 years, and 40-60 m over a 100 year timeframe. The expected extent of shoreline retreat in response to sea level rise depends greatly on the sea level rise scenario chosen and site specific characteristics (particularly beach slope).

Where seawalls exist, the shoreline is often held seaward of its natural location. In these areas, some extra adjustment would occur if structures were damaged or removed. This adjustment has been estimated by Coastal Systems Ltd (2008a) and included in erosion estimates.

1.5 Coastal Hazard Management Issues

Results of recent coastal erosion studies (as discussed in section 1.4) have confirmed that there is a real threat to private property in many areas even under existing sea level and climate conditions. This threat is particularly severe from Marine Parade to Paekakariki, and will be further exacerbated with the continuation of current shoreline trends. In the most severely affected areas (Raumati South), the entire extent of beachfront property lots lie within the area at risk within the next 50 years, with **existing** sea level rise and shoreline trends.

There are also extensive areas of existing residential development that would be at risk from inlet migration if current inlet management is not maintained (Coastal Systems Ltd, 2008b). This is particularly severe on the south-western side of Waikanae inlet. With current inlet management regimes, there are relatively few properties in the District at risk in the short to medium term, but this risk increases with long-term sea level rise effects.

Long-term climate change is expected to drive an increase in the rate of sea level rise and may also result in increased rainfall, changes in storm frequency and characteristics, and sediment delivery. It is widely accepted that some of these changes are likely to increase erosion rates and further extend the area at risk from coastal erosion. In areas where accretion is currently occurring, sea level rise may cancel out or even reverse this trend. Considerable uncertainty around the effects of climate change further complicates coastal hazard planning.

There is great uncertainty surrounding the scale and timing of sea level rise and other climate change effects. These uncertainties relate to both the extent and rate of sea level rise that will be experienced, and the response of the shoreline to this change (MfE, 2008; Royal Society of NZ, 2010).

Widespread coastal retreat associated with long-term trends and future sea level rise is likely to result in widespread loss of coastal dune systems. In many places, these natural dune systems currently exist on narrow strips of publicly owned coastal reserve, much of which is at risk over the next 50-100 years. Maintenance of a naturally functioning dune buffer is an important component for the protection of the coast.

Hard protection structures (seawalls) are already impacting on coastal processes and human values in southern areas through end effects, a loss of high tide beach, restricted access, and natural character and visual effects. In the medium to long term, these impacts will increase in severity and there will be further challenges and costs associated with maintaining the structures in the face of ongoing erosion trends and climate change.

Through consideration of the current knowledge of coastal hazards, and as identified in the KCDC discussion documents (refer Section 1.6 below) and associated public consultation, the following is a summary of the key issues to be addressed through the District Plan review:

- There is a need to address the potential impacts of climate change on coastal processes that will likely affect the coastal edge.
- Sea level rise is likely to exacerbate the existing erosion hazard and change will be on-

going

- Reliance on structural defences will not be a sustainable option for protecting some areas of the coast into the future.
- Resilience of communities will need to be increased over time, with a focus on risk avoidance and risk reduction
- The Council needs to provide certainty for owners, and provide flexibility to address the uncertainty associated with timing and extent of coastal change in the future.
- Dune buffers need to be protected and restored.

1.6 Policy Context for Managing Coastal Hazards

This section of the report provides an overview of key documents that will inform the discussion of policy development and management options, along with the identification of a preferred management approach (as outlined in Parts 2 and 3 of this report).

1.6.1 RESOURCE MANAGEMENT ACT 1991 (RMA)

Key provisions of the RMA informing the proposed changes to the District Plan, in relation to managing natural hazards and climate change include:

S6	Matters of National Importance: *"…shall recognise and provide for the following matters of national importance..."* (a) the preservation of the natural character of the coastal environment… and protection of them from inappropriate subdivision, use and development (b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use and development (d) the maintenance and enhancement of public access to and along the coastal marine area
S7	Other Matters: *"…shall have particular regard to…"* (c) the maintenance and enhancement of amenity values (f) maintenance and enhancement of the quality of the environment (i) the effects of climate change
S10	Existing uses are provided for (3) This section does not apply if reconstruction or alteration of, or extension to, any building to which this section applies increases the degree to which the building fails to comply with any rule in a district plan or proposed district plan
S31	Functions of territorial authorities: *"...shall have the following functions…"* (1)(b) the control of any actual or potential effects of the use, development, or protection of land, including for the purpose of – (i) the avoidance or mitigation of natural hazards
S 330, 330A, 330B, 331	Emergency Works provisions

Section 31 provides the directive for Councils to manage natural hazards, while sections 6, 7 and 10 underpin the District Plan provisions. Sections 330–331 are important to be considered in terms of management responses in the event of an emergency.

1.6.2 NEW ZEALAND COASTAL POLICY STATEMENT 2010 (NZCPS)

Section 75(3)(b) of the RMA states that any District Plan must "give effect to" the NZCPS. Objectives and policies in the NZCPS of particular relevance to the management of coastal hazards include, in brief:

Objectives:

1. safeguarding the form, functioning and resilience of the coastal environment
2. preservation of the coastal environment
4. enhancing public open space and recreational opportunities
5. managing coastal hazard risks and taking account of climate change
6. matters related to subdivision, use and development

Policies:

3. Adopt a precautionary approach, particularly to coastal resource potentially vulnerable to effects of climate change
4. Provide for integrated management, particularly above or below MHWS
6. Manage infrastructure and built environment in the coastal environment
7. Strategic planning for residential, rural residential and urban development, and protection of the coastal environment from inappropriate development
13. Preservation of natural character and protection from inappropriate subdivision, use and development
14. Restoration or rehabilitation of natural character
15. Protecting natural features and natural landscapes from inappropriate subdivision, use and development
18. Recognising the need for public open space, including considering the likely impacts of coastal processes and climate change
19. Maintain and enhance public walking access to, along and adjacent to the coastal marine area
20. Control use of vehicles, particularly damage to dunes
24. Identification of coastal hazards
25. Subdivision, use and development in areas of coastal hazard risk
26. Natural defences against coastal hazards
27. Strategies for protecting significant existing development from coastal hazard risk

Those objectives and policies which directly refer to management of coastal hazards are attached in Appendix A.

The NZCPS provides a strong direction on managing the coastal edge in a way that recognises the potential effects of climate change and the need for communities to adapt over time to ensure that public values such as natural character, access, amenity and significant landforms such as dunes are not lost for future generations. There is a clear directive to manage "inappropriate" development and in the context of coastal hazards this includes controlling development and encouraging managed retreat in certain areas. There is also a strong directive about hard protection works.

1.6.3 PROPOSED REGIONAL POLICY STATEMENT 2009 (RPS)

Section 75(3)(c) of the RMA states that any District Plan must "give effect to" the RPS.

Key objectives and policies of the Greater Wellington Proposed RPS include:

Objective 18: The risks and consequences to people, communities, their businesses, property and infrastructure from natural hazards and climate change effects are reduced.

Objective 19: Hazard mitigation measures, structural works and other activities do not increase the risk and consequences of natural hazard events.

Objective 20: Communities are more resilient to natural hazards, including the impacts of climate change, and people are better prepared for the consequences of natural hazards events.

Policy 28: Avoiding subdivision and inappropriate development in areas at high risk from natural hazards

Policy 50: Minimising the risks and consequences of natural hazards

Policy 51: Minimising adverse effects of hazard mitigation measures

The wording of these policies is set out in Appendix B.

These objectives and policies build on the RMA and the NZCPS and place emphasis on assessing risks and managing them in a way that reduces the risks. In assessing risk there is a need to address the potential impacts of climate change, along with aiming to build communities that are more resilient to the potential impacts of natural hazards and recognising that climate change will exacerbate these hazards. Policy 28 requires District Plans to identify high risk areas and to avoid subdivision and inappropriate development in these areas. Policy 50 focuses on minimising the risk and consequences on people, communities, property and infrastructure. Policies 50 and 51 outline a range of matters that must be considered when assessing if activities are "appropriate".

1.6.4 REGIONAL COASTAL PLAN 2000 (RCP)

Section 75(4)(b) of the RMA states that any District Plan must "not be inconsistent with" a regional plan for any matter stated in s30(1) (functions of regional councils, including the avoidance or mitigation of natural hazards).

General Objectives
4.1.5 The natural character of the coastal marine area is preserved and protected from inappropriate use and development.
4.1.11 Any adverse effects from natural hazards are reduced to an acceptable level.
4.1.12 That the location of structures and/or activities in the coastal marine area does not increase the risk from natural hazards beyond an acceptable level.

General Policy
4.2.21 Use and development of the coastal marine area must take appropriate account of natural hazards…
Explanation: *Natural hazards in the coastal marine area include erosion, sedimentation, inundation, tsunami, and earthquake…..What is "appropriate" will vary depending on the circumstances, and be related to the degree of risk associated with the activity.*

Objectives for structures includes:
6.1.1 Appropriate structures which enable people and communities to provide for their economic and social well-being are allowed.
6.1.2 There is no inappropriate use or development of structures in the coastal marine area.

Policy for Structures:

6.2.2 To not allow the use or development of structures in the coastal marine area where there will be: …significant adverse effects on:

- the risk from natural hazards;

6.2.3 To discourage the development of ad hoc shore protection structures; and to not allow the development of seawalls, groynes, or other "hard" shore protection structures unless all feasible alternatives have been evaluated and found to be impracticable or to have greater adverse effects on the environment.

6.2.5 To ensure that adequate allowance is made for the following factors when designing any structure:

- rising sea levels as a result of climate change, using the best current estimate scenario of the International Panel on Climate Change (IPCC);
- waves and currents;
- storm surge; and
- major earthquake events.

Objectives for deposition

8.1.2 Beach nourishment is used as a means of mitigating the adverse effects of coastal erosion.

Policy for Deposition:

8.2.1 To allow the deposition of sand, shingle, shell or other natural material on areas of foreshore or seabed if the purpose of that deposition is to combat beach or shoreline erosion, or to improve the amenity value of the foreshore, provided that all of the following criteria can be met:

- the composition of the material is suitable for the site, will remain on the foreshore or seabed for a reasonable period of time, and will not result in increased water turbidity or wind borne sediment transport;
- the deposition will not adversely affect the amenity value of the foreshore or seabed through significant changes in beach slope or texture; and
- the deposition will not cause any significant adverse effects on marine fauna or flora, or human values or uses of the area.

The RCP, while managing the area from MHWS seawards, addresses natural hazard risks. The Plan recognises that some structures may be located in the coastal marine area, for the management of hazard risk, but that in utilising structures they must be “appropriate” and other feasible alternatives must have been considered. Beach nourishment is supported as a method for managing the effects of hazards.

It is noted that there is a range of other policies (in addition to the above) that also impact on the management of natural hazard effects. These include for example, natural character, amenity, landscape, public access. These are matters that are also addressed in the operative District Plan for the landward side of MHWS.

1.6.5 IWI MANAGEMENT PLANS

Section 74(2A) of the RMA states that the territorial authority must "take into account" any planning document recognised by an iwi authority.

Proposed Ngati Raukawa Otaki River and Catchment Iwi Management Plan 2000

The plan provides a vision for Ngati Raukawa and policy to guide the fulfillment of that vision.

The Vision:

2.1.1 The mauri of the Otaki River and its people restored and revitalised.

2.1.1.1 To seek the protection and ongoing enhancement of the mauri of the Otaki River and Catchment, the fulfillment of Ngati Raukawa Kaitiakitanga responsibilities and the transferral of those responsibilities to future generations empowered and prepared to accept them.

Secondary Vision Statement

The mauri of the Otaki River and Catchment protected, sustained, nurtured and enhanced so that Ngati Raukawa in turn may be protected, sustained, nurtured and enhanced by it.

Policy directions set out in section 4.1 include:

- Management guided by environmental principles (as at 2000 "to be prepared"); having a common base-line of protection and enhancement of mauri;
- Pending the preparation of those principles, a precautionary approach is to be taken.

Ecological Restoration:

Objective: To ensure that all future management decisions lead cumulatively to the enhancement of the mauri of the Otaki River and Catchment.

Policy: that all policy established by agencies must seek ultimately to restore the natural processes necessary for a healthy functioning ecosystem.

Environmental Monitoring

Objective: To ensure effective and accurate monitoring of the health of the Otaki River environment.

Policy: Nga Hapu o Otaki will consider five primary indicators when monitoring the health of the environment of the Otaki River: …
(iii) the abundance and spread of toheroa(coastal)
(iv) the abundance and spread of tamure (marine)…

This proposed Iwi Management Plan was produced in 2000. While the focus is strongly on the management of the Otaki River and catchment, there is also a strong reminder that this area is linked to the coastal areas and what happens upstream impacts on the coast. There is emphasis placed on integrated management that will restore the mauri and the quality of the environment.

Kakapanui: Te Runanga o Ati Awa ki Whakarongotai Inc.: Nga Korero mo Te Taio: Policy Statements Manual

The Iwi Management Plan for Te Runanga o Ati Awa ki Whakarongotai Inc is being developed in modules. While the coastal environment module has not as yet been developed, guiding

principles can be drawn from the existing modules.

The intent of this Iwi Management Plan is to develop community based solutions for environmental awareness, protection and management through a Treaty partnership process, and to protect the interests of future generations.

Key principles that have been presented through other modules include:

- Adopting a precautionary approach
- Ensuring that environmental health is maintained
- Progressively improving and restoring the natural and healthy state of waterways and land (including sea, estuary, coastline)
- Acknowledging the value of the natural resources including coastlines
- Restoring natural environments and ecosystems.

Of particular note are the following policies on stormwater:

Policy 1: To oppose any level of untreated stormwater discharge to areas required for food.

Policy 4: To progressively remove untreated discharges from all waterways and commence with a process of remedial action to heal these places.

Policy 5: To maintain that rahui until monitoring shows an improvement in water quality that meets shellfish taking and tikanga safety standards.

Policy 13: To promote a community "ethic of care" based on good stewardship as part of our responsibilities to future generations.

1.6.6 OPERATIVE DISTRICT PLAN 1999 (DP)

The District Plan 1999 contains the following key provisions:

A7 Vision: *a district with communities informed of the risk of natural hazards and the response necessary to minimise risks*.

C1.1.Policy1 highlights the importance of **amenity values**, including reference to the natural environment, natural processes and access. This is supported by Policy 2 which also addresses the natural environment.

C4.1 Policy 2 Landforms - recognises the importance of sand dunes to the coastal landscape, in Paraparaumu town centre.

C.6.1 Policy 7 protects the characteristics of the coastal environment that are of special value to **Tangata Whenua**.

C7 focuses on **subdivision and development**, in relation to various zones and geographical areas.

C.7.1 Residential subdivision: Objective 2: Policy recognises the importance of natural features in the coastal environment.

C.7.2 Rural subdivision and development: Objective 1: Policies 2 and 3 particularly identify the importance of coastal dunes. Policy 8 seeks to avoid adverse effects of subdivision on the coastal environment. Policy 12 focuses on natural character of the coastal environment, Policy 13 on the natural form of sand dunes. Policy 17 aims to avoid natural hazards when land is subdivided.

C.7.3 Earthworks: Objective 1: Policies 1 and 2 recognise the importance of protecting dunes,

native vegetation and outstanding landscapes, including access and recreational opportunities.

C.9 Coastal Environment: Of particular relevance in this chapter are:

Objective 1: To protect and enhance the natural character, natural values and associated amenity values of the coastal environment. Policy 1 ensures protection of landforms, dunes, vegetation and habitats. Policy 2 discourages development prone to coastal erosion or the effects of sea level rise. Policy 3 controls residential buildings within areas subject to coastal erosion. Policy 4 discourages coastal protection works and encourages managed retreat and coastal renourishment.

Objective 2: To facilitate public access to and along the coast. Policy 1 requires esplanade reserves along the coast. Policy 2 addresses public access. Policy 3 protects foredunes.

C.10 Landscape Objective 1: Policies 3 and 4 support dune protection.

C.11 Ecology Objective 1: Various policies support the importance of natural environments including native plantings and identify the importance of buffer zones.

C.12 Open Spaces & Reserves Objective 1 and 2: various policies identify the importance of open space, amenity and recreational values and set out the Council's approach to esplanade reserves.

C.15 Natural Hazards

This chapter of the District Plan includes earthquake and geological hazards, coastal hazards and flood hazards. Present Coastal Hazards are identified as including: long-term erosion of the shoreline, short term fluctuations in the shore line, erosion from river mouth migration and wind erosion of dunes.

The Objectives and Policies of this section are set out in Appendix C. Other relevant provisions include:

D1.2 Residential Zone Standards: Yards: sets out:

"Coastal building line restrictions" are as follows:

- Waikanae, Te Horo Beach – 7.5 m from seaward title boundary
- Peka Peka – 70 m from the seaward edge of the existing esplanade reserve
- Paraparaumu, Raumati, Paekakariki – 20 m (as shown on maps)

In addition, "relocatable buildings" are required between 20 m and 50 m from the sea in some areas (defined in the glossary and shown on maps of the District Plan planning maps).

D2.2 Rural Zone Standards

Siting of buildings:

- The erection of buildings shall not be sited within 100 m of the seaward title boundary of the esplanade reserve or the toe of the foredune or vegetation line where this is within the esplanade title reserve.

- Yard setback: at least 100 m for all buildings.

D2.1.5 Prohibited Activity

- New buildings within 100 m (as described above) (D2.1.5(ii)).

These restrictions have the effect of avoiding new development seaward of the line stated for each area.

The District Plan has already taken a strong lead on the management of coastal hazard areas. The emphasis is on avoiding creating new or exacerbating existing hazards. The District Plan also envisaged that the coastal hazards zones would continue to be refined as further studies were undertaken (pC15-4).

1.6.7 OTHER PLANS/DOCUMENTS CONSIDERED

Section 74(2) of the RMA states that a territorial authority "shall have regard to" any management plans and strategies prepared under other Acts. This section of the report discusses other documents considered in the development of this report.

The following key documents have informed the preparation of this report and should also be considered as a part of the overall RMA section 32 process.

Kapiti Coast District Plan Review: Discussion Document Natural Hazards and Managed Retreat, 2010.

This discussion paper was one of a set of papers which formed the basis for discussing issues of importance to the District Plan Review. It provides a comprehensive overview of coastal hazards and the challenges being faced. It also outlines the legislative background to managing hazards. Managed retreat is discussed as a key method for risk reduction, along with recognition that a multi-year community discussion is required. This recognises that "the sea cannot be held back indefinitely" (p12).

The document identifies (p8) that there is a need to address natural hazard risks in a way that:

- Provides for certainty
- Plans for continuous change
- Plans for an uncertain threat
- Works with communities to find sustainable, long-term solutions.

The document also recognises that the District Plan is only one mechanism (albeit a key one), for managing coastal hazards and the associated risks to people and property.

The development of this report has drawn strongly on this Discussion Document and in the submissions Kapiti Coast District Council received on it.

Choosing Futures: Coastal Strategy, 2006

This KCDC Strategy builds on the *Kapiti Coast: Choosing Futures: Community Outcomes and Community Plan*. It was developed to guide management of the coastal environment over the next 20 years and to implement the community vision of "restore and enhance the wild natural feel of the coast". The community also wanted to see a comprehensive and integrated approach to coastal management (not just protection) which treats the coast as an ecosystem to be managed as a whole"(p16). The District Plan is one of the regulatory tools for implementing this strategy.

In relation to coastal hazards the following were particularly noted:

Overarching Objective: That environmental and lifestyle values that have always attracted people to the area are retained and enhanced and the historical, geological and cultural values

are maintained".

District-wide coastal outcomes:

- Public dune margins are no longer gardened with exotic species by adjacent owners.
- Restoration planting has been a priority on the foredune and has formed a natural erosion buffer.
- All access to the beach across the foredure is via a public accessway as these are suitable for all users and protect the environment.
- Any structures within the coastal reserve (protection and access structure) are part of the built character and must be well designed and multipurpose where possible.
- Improved understanding that the Coast is a single, contiguous natural resource, and that the coastal margins in front of public and private assets should be managed in a holistic way.

Management Principles:

- Long-term solutions which protect coastal processes and systems are sought for the benefit of current and future generations.
- Unique areas and interest along the coast are recognised and solutions are sought which protect character and the environment. This means management practices reflect that different parts of the coast have different needs.
- Private and public access is balanced within the constraints of coastal systems.
- Emergency management strategies and related processes are planned in advance of possible events.
- The coastal reserve and dune margins are treated and understood as an integrated natural system and managed as a community asset.

Erosion and other coastal hazards along with the built character of coastal development were identified as two of the seven main challenges for coastal management (p24).

The strategy (p51–59) provides an overview of coastal hazards along with outlining the erosion/accretion and hazards trends experienced along the Kapiti coast. It notes in particular the range of engineered structures that have been put in over time to address erosion effects.

It identifies that a revised assessment of coastal hazard risk was undertaken and that a review of the building setback lines would also be undertaken.

It states: The overall strategic response for hazards is to continue to protect existing structures on the coast while maintaining the dune areas, making them as natural as possible with native plantings and to consider soft engineering as an initial response to problems. (p55). A range of responses (many of which fall outside the scope of the District Plan) are identified to meet this challenge. In particular it is noted that Council's intention is to continue to protect only public assets.

The strategy (pp 60–62) also reflects on the built environment. It states: The overall strategic response is to protect character areas in the District Plan, ensure any building setbacks from the coast include consideration of amenity and ensure protection works are as minimal as possible and do not change the character of settlements.

A range of responses are identified to meet this challenge, including in particular ensuring new buildings are set back from the coast (for visual and amenity purposes) but also recognising the hazard role of setbacks. The Council stated it intended to retain the 70 m (Peka Peka) and 100 m (rural) setbacks.

1.6.8 SUMMING UP

The policy context which has been used to guide the development of the proposed District Plan provisions (as detailed in Parts 2 and 3 of this report), is comprehensive and provides clear directions for management approaches. The policy documents reviewed in this part of the report are cross referenced in key areas of the Part 2 analysis of options.

Key themes could be briefly summed up as:

- Sustainable management of the environment and restoration of environmental health.
- Addressing the effects of climate change and sea level rise on the coastal edge.
- Controlling the subdivision and use of land to avoid increasing hazard risk.
- Avoiding "inappropriate" subdivision, use or development.
- Taking precautionary and long-term strategic approaches.
- Discouraging shoreline structures but recognising they may be required in some areas.

2 PART TWO: ASSESSMENT OF ALTERNATIVES

2.1 Requirements of the s32 Assessment

Section 32 of the Resource Management Act 1991 requires an assessment to be undertaken of the proposed plan provisions. This includes the requirement to consider the alternatives, and benefits and costs of the options considered.

In particular section 32 states:

(1) In achieving the purpose of this Act, before a proposed plan, proposed policy statement, change, or variation is publicly notified … an evaluation must be carried out by—
(c) the local authority, for a policy statement or a plan...
(2) A further evaluation must also be made by—
(a) a local authority before making a decision under clause 10 or clause 29(4) of the Schedule 1; and
(3) An evaluation must examine—
(a) the extent to which each objective is the most appropriate way to achieve the purpose of this Act; and…
(b) whether, having regard to their efficiency and effectiveness, the policies, rules, or other methods are the most appropriate for achieving the objectives.
(4) For the purposes of this examination, an evaluation must take into account—
(a) the benefits and costs of policies, rules, or other methods; and
(b) the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the policies, rules, or other methods.
(5) The person required to carry out an evaluation under subsection (1) must prepare a report summarising the evaluation and giving reasons for that evaluation.
(6) The report must be available for public inspection at the same time as the document to which the report relates is publicly notified ….

This report has been prepared to address the requirements of section 32 in relation to the proposed coastal hazards provisions forming part of the District Plan Review.

2.2 Objective

Section 5 of the Resource Management Act promotes the sustainable management of natural and physical resources in a way that people and communities can provide for their social, economic and cultural wellbeing, and for their health and safety, both now and in the future.

For the purposes of this section 32 analysis, the appropriateness of the objective is considered, plus a range of options are assessed as alternative means of achieving the purpose of section 5.

The proposed objective for managing coastal hazards in the Kapiti Coast District would include the following components:

- A risk and scenario-based approach to managing coastal hazards.
- Plan for sea level rise over 50 and 100 years and take a precautionary approach to recognising uncertainty associated with the scale and timing of effects.
- Aim for increased resilience of communities over short and long-term, by requiring risk reduction through development controls, managed retreat and working with nature.
- Recognise the importance of natural character, amenity and public access (to and along the beach).

The following table summarises the extent to which the proposed objective is the most appropriate way to achieve the purpose of the RMA.

Purpose of RMA	**Achievement**
Sustain the potential of natural and physical resources to meet needs of future generations	The proposed objective would recognise that coastal hazards can impact on the environment and on people's property and lives. This proposed objective is relevant to sustaining the potential of natural and physical resources, by recognising that the environment is also at risk from human response to coastal hazard events. This proposed objective therefore recognises that an environment affected by hazard events must be managed in a way that allows for natural processes to occur and to enable future generations to experience a reduced level of risk from such events. Natural systems such as dunes can also provide buffers against the effects of a coastal hazard event on people and property. To be sustainable for the future, activities and development on the land must be managed carefully.

Safeguard the life-supporting capacity of air, water, soil and ecosystems	Coastal erosion is a natural phenomenon. The proposed objective recognises that the coast and its ecosystems are vulnerable to sudden changes and needs to be able to adapt to these changes. To enable the coastal edge to adjust and safeguard the associated life supporting capacity of the coast, it is important that the natural processes can occur as naturally as possible, (i.e. without being constrained by development or other physical structures). Existing protection works have significantly impacted on natural coastal processes. This proposed objective recognises the need to reduce the risk to the environment from inappropriate responses to natural hazard events.
Avoid, remedy or mitigate adverse effects of activities on the environment	This proposed objective seeks to ensure that activities are managed in a way that reduces the potential impacts of natural hazard events on property and life while preserving the coastal environment. Applying a risk management and reduction approach to activities in the coastal environment will be critical to managing the potential scale of adverse effects that could arise. It also recognises the importance of enabling the environment to "cope" with a hazard event in as natural a manner as possible.
Enable people and communities to provide for their social, economic and cultural well-beings	This proposed objective seeks to ensure that communities are located and designed in a way to reduce the potential impacts on them from hazard events. It is critical that the threats from coastal hazards are taken into account when considering the social, economic and cultural well-being of individuals and communities. This proposed objective seeks to reduce the social and economic costs of responding to, and recovering from, coastal hazard events. Aiming to reduce these costs would provide for more resilient communities. The proposed objective also recognises the importance of natural character, amenity values and public access for people's enjoyment, food gathering and recreation activities.

Enable people and communities to provide for their health and safety	By seeking to avoid and reduce risk from hazard events, this proposed objective makes a strong contribution to the health and safety of individuals and communities. The proposed objective also recognises that while there are uncertainties involved in the scale and timing of the impacts from climate change, it is clear that the projected sea level rise has the potential to exacerbate existing erosion trends. Therefore it is important to increase the resilience of communities to the potential effects of climate change.

2.2.1 SUMMING UP

Reducing the exposure of people and property to risk from coastal hazard events and potential climate change impacts would not only result in less impact on people and communities, but would also enable the coastline to respond and adjust in a natural way. It will be necessary to manage the built environment in areas at risk from coastal hazards to avoid any increase in vulnerability for future generations. The importance of dune systems to act as a natural buffer to the effects of natural hazards is also recognised.

Future climate change is predicted to lead to increased storminess, higher rainfall intensities and an increase in sea levels. As a consequence, current coastal hazards are expected to be exacerbated with the potential to increase the risk of damage to people and property.

This proposed objective is considered achievable and reasonable because it sets out a framework for managing activities in potential hazard-prone areas. This framework is based on a risk reduction approach. It requires that risk to people, property and the environment is assessed, and activities managed appropriately.

This proposed objective is supported by section 31(1)(b)(i) of the RMA, which sets out that the management of natural hazards is a function of territorial councils. This proposed objective also gives effect to a number of policies in the NZCPS (Appendix A).

In addition this proposed objective is supported by the following key pieces of legislation:

- Civil Defence Emergency Management Act 2002: In particular, section 17(1)(a)(iii) requires that members *"…identify and implement cost effective risk reduction."*
- Building Act 2004: Sections 71 to 74 require local authorities to restrict building work that occurs on land that is subject to the effects of natural hazards. For example, the local authority must refuse a building consent if *"…the land on which the building work is to be carried out is subject or is likely to be subject to one or more natural hazards..."*

On the basis of the above analysis, it is considered that this proposed objective is the most appropriate for achieving the purpose of the Resource Management Act.

2.3 Options for Achieving the Objective

The following alternative options for achieving the proposed objective by managing the effects of climate change and coastal hazards within the Kapiti Coast District have been identified:

- Option 1: Status Quo – this involves retaining the existing provisions;
- Option 2: Hold the line with hard protection structures
- Option 3: Hold the line with soft engineering
- Option 4: Single development setback line
- Option 5: No development controls
- Option 6: Management zones and a combination of responses

The six Options are assessed in the following sections to determine how appropriate each option is in achieving the proposed objective, taking into account efficiency and effectiveness. An overview of the analysis of these Options is provided in section 2.10.

2.4 Option 1 Status Quo

2.4.1 KEY FEATURES

The status quo Option refers to the current provisions of the operative District Plan, which are outlined in section 1.6 and Appendix C of this report and briefly summarised below. The operative District Plan aims to avoid development in high risk areas with a range of "coastal yards" and "relocatability" requirements as outlined in the following Table.

Table: Existing "coastal yards" in Kapiti Coast District.

Location(s)	Setbacks	Controls
Paekakariki Raumati Paraparaumu	20 m from seaward toe of frontal dune	Building setback
Paekakariki Raumati Paraparaumu	20 - 50 m from seaward toe of frontal dune (as shown on District Plan maps)	Requirement for relocatability
Waikanae Te Horo	7.5 m yard from seaward title boundary	Building setback
Peka Peka	70 m from seaward edge of the esplande reserve	Building setback
Rural Zone	100 m from seaward title boundary of esplanade reserve (or toe of dune or vegetation line where this is within esplanade reserve).	Building setback

Through the "Choosing Futures: Coastal Strategy" the Council has committed to maintaining seawalls where they protect public assets, specifically at Paekakariki and Raumati South.

In relation to the coastal edge, the operative District Plan also recognises the importance of managing natural character, landform, landscape, amenity and public access (refer Chapters C9 and C10, in particular).

2.4.2 EFFECTIVENESS IN ACHIEVING THE PROPOSED OBJECTIVE

The current building setbacks recognise the need to manage and restrict development in a way that reduces coastal hazard risk over time. The requirement for relocatability also provide for reasonable use while reflecting the possibility that retreat may be required in the future. In this respect, the intent of the current provisions is consistent with the proposed objective.

However, the currently applied coastal yards do not appear to be based on any detailed scientific investigation of hazard. In particular, the District Plan provisions do not incorporate the findings of the recent review of coastal erosion hazard and therefore do not reflect the most up-to-date information on existing and potential hazard risk (e.g. Coastal Systems Ltd, 2008a; 2008b). In some areas, the Status Quo provisions are adequate to provide for the avoidance of coastal hazards over the next century – such as the 100 m rural setback. However, in many other locations (e.g. the southern areas of the District), the current coastal yard setbacks are of insufficient width to provide protection to development from coastal erosion associated with existing coastal processes or with future climate change effects, as assessed in the recent review by Coastal Systems Ltd. Therefore, it is considered that the current provisions do not provide adequately for risk reduction in some areas. This is likely to result in an escalating risk profile in these areas and may also have implications for Council in respect to liability, given that the Council now holds improved information on coastal hazard risks.

The status quo Option is not consistent with the requirements of the NZCPS, including in particular Policies 24 and 25(a-d). The proposed RPS in policies 50 and 51 also require a stronger approach to minimising the risks and adverse effects of hazard management measures. The District Plan is required to "give effect to" these policy directions (RMA ss75(3)(b) and 75(3)(c)).

In addition the Iwi Management Plans support a precautionary approach and wish to ensure that environmental health is maintained. The status quo could be regarded as achieving these policy directives. However both plans also reflect concerns about the degradation of the environment and the associated impacts on the coast and food gathering activities.

Both the Council's "Choosing Futures: Coastal Strategy" and the "Discussion Document: Natural Hazards and Managed Retreat" identify the need to develop long-term solutions to protecting the coastal processes and systems, for the benefit of current and future generations. These documents indicate that the Status Quo is insufficient to meet future hazard risks.

The District Plan provisions do not specifically recognise and provide for projected sea level rise, and are therefore not effective in meeting the proposed objective. This is inconsistent with Section 7(i) of the RMA and Policy 24 (d),(e) and (h) of the NZCPS 2010.

The District Plan recognises the importance of providing for matters such as natural character, natural land forms, landscape, amenity and public access. Through other methods used to implement the objectives and policies of the District Plan, current management of coastal erosion achieves these matters in some areas. For instance, significant dune restoration and management work has been undertaken by Council, which has enhanced dune areas on public reserves. However, in many areas of the coast the management of coastal hazards does not adequately provide for the protection, enhancement and/or restoration of these matters. For example, the reliance on seawalls to manage coastal erosion has seriously degraded beach values in some areas, including restricting public access along the beach at high tide stages. There has also been relatively limited dune restoration along the frontage of private properties, despite the dunes in these areas often being in a degraded state. These matters have national and regional significance in accordance with the RMA, NZCPS and the proposed RPS.

There are significant questions over the long-term sustainability of relying on holding the shoreline using hard protection structures, as discussed in more detail in Option 2. It is therefore considered that the status quo Option is only partially effective in achieving the proposed objective.

2.4.3 EFFICIENCY: BENEFITS, COSTS AND RISKS

Benefits

- Adopting the status quo would mean that there would be no plan review costs for Council.
- Retaining the existing approach would provide for continuity for the public with the current management approaches.

Costs

- There would be an escalating risk profile over time in areas where the present coastal yards and associated controls do not adequately identify and manage existing and potential future coastal erosion hazards.
- There would be increasing social, environmental and financial costs associated with use of seawalls to protect public assets. This would also reinforce the expectation of private landowners for Council's to fund protection works. This could also lead to further degradation of coastal resources of importance to iwi.
- There would be ongoing costs of remedying end effects of seawalls on adjacent private property.
- There would be adverse impacts on natural beach values, amenity and public access arising from reliance on seawalls and associated lowering of the beach and reduction in beach width (as discussed in further detail under Option 2).
- It is considered that all costs (social, financial, cultural and environmental) will increase over time due to ongoing shoreline retreat and possible climate change effects.

Risks of Acting or Not Acting

- The status quo does not give effect to the requirements of the RMA, NZCPS or proposed RPS with regard to hazard management. In addition, it is considered that further attention should be placed on matters such as natural character, public access and amenity values.
- As existing setbacks are considered to be inadequate in many areas, new dwellings may be placed in areas of risk. This would lead to a failure to reduce risk over time and a high probability that existing levels of risk would be increased. It is possible (though less likely) that new public infrastructure might also be placed in risk areas, further exacerbating existing risk levels.
- The failure to adequately manage nearshore development in hazardous areas and the reliance on seawalls to manage severe erosion hazard is likely to see an increasing proliferation of shoreline armouring works over time, with associated costs and adverse effects.
- Failure to provide up-to-date information on hazard risk to property owners or prospective owners could result in inappropriate land use decisions and future liability issues for Council.
- There could be increasing liability issues for Council for ongoing end effects associated with public structures.

It is therefore considered that the status quo Option is of medium efficiency in achieving the proposed objective.

2.4.4 CONCLUSION

While the status quo clearly meets some elements of the proposed objective, the setbacks and associated controls do not reflect updated science information on existing and potential hazard risk (including the potential effects of sea level rise).

In addition the status quo does not adequately give effect to the management directions for coastal hazards signalled in the NZCPS and proposed RPS. It is clear that the Council's Choosing Futures: Coastal Strategy" and the "Discussion Document: Natural Hazards and Managed Retreat" identify the need for a stronger management approach for coastal hazards, for the future resilience and sustainability of the coastal communities.

The status quo does not provide adequately for the management of coastal hazard risk and would not protect natural values or increase community resilience. The status quo does however recognise the importance of natural character, amenity and public access (to and along the beach) and would be effective in meeting the proposed objective. The status quo Option is only partially effective and of medium efficiency in meeting the proposed objective.

2.5 Option 2: Hold the Line with Hard Protection Structures

2.5.1 KEY FEATURES

This Option involves minimal restrictions being placed on coastal development, with the protection of public and private property and infrastructure from coastal erosion relying on well engineered hard protection structures.

This "hold the line" approach has historically dominated the management of severe coastal erosion hazard on the Kapiti coast. In the past a wide variety of hard protection structures have been used to varying degrees of effectiveness. In areas subject to the most severe erosion, well-engineered rock walls have generally been required. This reflects the rigorous nature of hard structures required to effectively restrict erosion along this moderate-high wave energy coast.

Accordingly, in the short-medium term, this Option would most likely involve well engineered sloping rock walls. Other options (e.g. sea walls using geotextile containers) might also be used where appropriate to reduce adverse effects on visual values and access.

In the short-medium term climate change scenario, the projected exacerbation of coastal erosion over the next 50-100 years (Coastal Systems, 2008a; b; *in prep.*) would result in increasingly large portions of the coast being protected with hard structures, including all developed areas from Paraparaumu south and some northern settlements.

2.5.2 EFFECTIVENESS IN ACHIEVING THE PROPOSED OBJECTIVE

Appropriately engineered hard protection structures can provide protection from coastal erosion to values and assets further landward, including public and private property and public infrastructure. For instance, significant lengths of public infrastructure (e.g. roads, water supply, sewerage) and many private properties in South Raumati and Paekakariki would be severely damaged or even completely lost to erosion without the current hard protection structures.

In this respect this Option meets the risk reduction directive of the proposed objective. In addition the NZCPS Policy 27(3) envisages that some hard protection structures may be necessary. This policy also requires that where such structures are used, they must be designed and located to minimise the effects on the coastal environment, and if protecting private property should not be located on public land (unless there is a significant public or environmental benefit in doing so). Any decision to have a hard protection structure must also be evaluated against other options using the criteria of NZCPS Policy 27 (1) and (2). Policy 27(2) promotes management options that "reduce the need for hard protection structures and similar engineering interventions". This Policy and Policy 25(e) provide a strong directive that other options for risk reduction must also be considered. This Option does not give effect to the NZCPS.

The proposed RPS Policy 51, includes that "particular regard is given to avoiding hard structural protection works or hard engineering methods unless it is necessary to protect existing development or property from unacceptable risk and the works form part of a long-term hazard management strategy that represents the best practicable option for the future". The

"need" for such works and residual risk remaining after the works are also required to be considered. The "hold the line" Option would not give effect to the proposed RPS.

The range of adverse environmental effects that would result from the use of hard protection structures are outlined below. In the event that erosion is aggravated by sea level rise as assessed by Coastal Systems Ltd (2008a; 2008b; *in prep.*), beach loss and adverse effects would be widespread and significant.

While this Option can be designed and constructed to protect landward values, it results in adverse effects seaward of the structures. This particularly occurs on retreating shorelines where progressive beach loss *will* occur over time. Serious beach loss is already evident in the most significantly eroding areas of the Kapiti coast where hard protection structures in some places now extend almost to low tide.

Over time this would also result in the hard protection structure having to be upgraded which would include deepening of the structures to accommodate ongoing beach lowering and scour at the toe and an increase in the height of the structures to manage increased wave run-up and overtopping as wave forces on the structures increase in response to the greater depths seaward of the walls. Upgrades of this nature have already been required along the Kapiti coast and will be increasingly required when erosion is aggravated by projected sea level rise. Ultimately, the structures will become very large, extending to below low tide and at least 5-7 m above mean sea level.

In addition, hard protection structures can aggravate erosion of adjacent unprotected areas through "end effects". Analysis by Coastal Systems Ltd (2008a; 2010) indicates that such "end effects" are already significant in many areas along the Kapiti coast. For instance, Coastal Systems Ltd (2008a) identified increased erosion on unprotected shorelines adjacent to hard protection structures. These areas are subject to more severe erosion than they would be if hard protection structures were removed, and this is reflected in identified hazard areas. This Option would therefore have significant adverse effects on adjacent unprotected properties, which in turn would result in ongoing extensions to hard protection structures. This could eventually lead to a significant stretch of the coast being armoured. This would not be effective in meeting the proposed objective, in relation to protecting beach amenity, public access, natural character and allowing for the natural functioning of coastal processes.

This loss of a beach combined with larger structures (than exist currently) and the impacts on neighbouring areas will have significant adverse effects on natural character, amenity and recreational values, and public access along the beaches. This Option would not give effect to NZCPS Policies on natural character, landscape, amenity, public access. Likewise Policy 3 of the NZCPS requires that a precautionary approach is adopted when considering climate change in coastal areas so that:

- "avoidable social and economic loss and harm to communities does not occur;
- natural adjustments for coastal processes, natural defences, ecosystems, habitat and species are allowed to occur; and
- the natural character, public access, amenity and other values of the coastal environment meet the needs of future generations".

This Option does not give effect to these NZCPS policy directions. The Iwi Management Plans also support a precautionary approach and wish to ensure that the environmental health of

their rohe is maintained or restored. This Option would exacerbate current adverse effects on the seaward environment.

The proposed RPS Policy 50 provides guidance on determining whether an activity is "inappropriate" development, with a focus on minimising risks and consequences. This Policy along with Policy 51 (which focuses on minimising the adverse effects of hazard mitigation measures), would provide guidance on any evaluation of future hard protection structures. Provided these matters were considered, this Option would give effect to the proposed RPS. However, a "hold the line" approach could also encourage ongoing development in high risk areas, increasing potential vulnerability over time and increasing reliance on an engineered solution. This is not effective in meeting the proposed objective, in relation to reducing future risks.

The Regional Coastal Plan also provides guidance in Policy 6.2.2, which requires structures to be avoided if they have significant adverse effects on the risk from natural hazards and discourages ad hoc shore protection structures (unless all feasible alternatives have been evaluated). Reliance on hard protection structures as an Option would not be consistent with this approach.

Holding the line with hard protection structures will have significant adverse effects on the environment and have significant economic implications. While it is a short-term Option that is supported by the Council in its "Choosing Futures: Coastal Strategy" (for some areas), it is unlikely to be sustainable environmentally and economically into the future. This Option would not increase the resilience of the community to future effects from climate change and sea level rise. It is therefore considered that the Option of relying on hard protection structures is only partially effective in achieving the proposed objective.

2.5.3 EFFICIENCY: BENEFITS, COSTS AND RISKS

Benefits

The primary benefit of holding the line is the protection provided to public and private property and infrastructure. In some places on the Kapiti coast, the short-term financial benefits of this Option are significant. There are a large number of properties where reasonable use would be precluded without hard protection structures and other areas where significant infrastructure (roads and utilities) would otherwise be impacted.

Secondary benefits include:

- continuity of existing practices (i.e. people's perceptions that this approach has worked in the past and is therefore the most appropriate to use for future hazard events)
- potential to progressively maintain or extend hard protection structures over time, thereby sharing costs over generations

Costs

- There would be environmental effects, including beach loss along significant lengths of shoreline and degradation of natural character, amenity and recreational values, and public access to and along the coast. These effects would be particularly severe where

there is a trend for shoreline retreat.

- There would be loss of natural, functioning frontal dune systems and replacement with man-made engineering structures.
- There would be exacerbation of erosion on adjacent unprotected shorelines including adjacent private properties.
- On retreating shorelines, the cost of hard protection structures would progressively increase over time as there would be an increasing requirement for maintenance and upgrade of the structures.
- In the long term, with serious erosion, the increased wave forces accompanying progressive beach lowering may necessitate complete replacement of the existing structures with more robust works.
- All of the above costs would significantly increase over time and become more widespread along the coast if erosion is exacerbated by projected sea level rise as assessed by Coastal Systems Ltd (2008a; *in prep.*).
- There would be increasing social and financial costs associated with the use of hard protection structures. This could reinforce the public expectation of Council funding protection works.
- The lowering of the beach could have significant impacts on shellfish resources, and other coastal resources of significance to iwi.
- There is potential for decreased economic viability of the district due to significant degradation of the beach and associated values.

Risks of Acting or Not Acting

- The Option of "holding the line" with hard protection structures is addressed in the NZCPS (ref Policies 25 and 27 in particular) and the RPS (ref Policies 50 and 51). The national and regional policy directives require that a careful analysis of alternatives is considered, before a decision is taken to adopt a hard protection structure as the best option. This Option could give effect to these Policy directives. However this Option would not achieve the proposed objective in relation to natural character amenity values or public access, particularly on a retreating coastline (as set out in various NZCPS and RPS policies).
- It is anticipated that there would be escalating adverse effects on social, environmental, economic and cultural values in those areas currently subject to long-term trends for shoreline retreat.
- This Option would lead to an increasing proliferation of hard protection structures over time, which could ultimately extend along much of the developed length of the coast if erosion is aggravated by sea level rise.
- There could be an increased level of risk and vulnerability over time if new dwellings and infrastructure were placed in areas of hazard risk areas, under the expectation that they would be protected by hard protection structures.
- There is also potential liability to Council where public structures defend public assets

but in effect also protect private development immediately landward. Failure of these structures could put private assets at risk.

It is therefore considered that the Hold the line with hard protection structures Option is of medium efficiency in achieving the proposed objective.

2.5.4 CONCLUSION

While the Option of using hard protection structures meets some elements of the proposed objective, reliance on this one management method will not be environmentally and economically sustainable in the long term.

It is acknowledged that in the short-term there are few realistic alternatives to hard protection structures in some areas of the coast that are prone to severe erosion (e.g. Raumati and Paekakariki). Without such protection, reasonable use of private property would be precluded (i.e. without hard protection structures, the properties would largely be lost) and important public infrastructure severely impacted.

However, the adverse effects that would arise from the use of hard protection structures are contrary to many of the policies in the NZCPS and the proposed RPS. The social, cultural, economic and environmental costs of this approach are likely to escalate rapidly over time, particularly if erosion is aggravated by projected sea level rise. Therefore in the medium to long term, alternative strategies will be required to manage coastal erosion, including areas of severe erosion.

Likewise, any approach that holds the current shoreline using human intervention encourages ongoing investment within hazard areas at risk from coastal erosion and is therefore inconsistent with building community resilience and reducing risk over time.

This Option would be partially effective and of medium efficiency in achieving the proposed objective.

2.6 Option 3: Hold the Line with Soft Engineering

2.6.1 KEY FEATURES

The Option of "holding the line" with soft engineering solutions seeks to provide protection to assets by maintaining a naturally functioning beach and dune system to act as a buffer to storms and coastal erosion. This Option avoids many of the adverse environmental impacts associated with hard protection structures as discussed in Option 2. Public access, natural character and amenity values are protected, and in some cases enhanced through restoration.

This option involves minimal restrictions being placed on coastal development, with the protection of public and private property and infrastructure from coastal erosion relying on the use of "soft engineering" approaches. In this context, "soft engineering" is based on the establishment of a buffer to coastal hazards using natural beach materials ("beach nourishment").

Beach nourishment involves adding large volumes of suitable sand to the beach to offset long-term erosion and to provide an adequate dune buffer against storms. It is widely used for erosion control and is a well established approach (e.g. United States, Europe and the Netherlands). The approach has not been used in New Zealand for effective erosion protection on high energy beaches similar to Kapiti coast, but has been successfully implemented to create amenity beaches in relatively low energy environments.

In some cases, structures (such as groynes or offshore breakwaters) are placed across the beach or nearshore to trap and retain beach sediment and enhance the natural erosion buffer. These works are usually undertaken in combination with sand placement to extend the effectiveness of a beach nourishment scheme or avoid adverse impacts of sand retention structures on adjacent shorelines.

The projected exacerbation of coastal erosion over the next 50-100 years (Coastal Systems Ltd, 2008a; 2008b; *in prep.*) would result in increasingly large portions of the coast requiring protection in this way, including all developed areas from Paraparaumu south and some northern settlements.

2.6.2 EFFECTIVENESS IN ACHIEVING THE PROPOSED OBJECTIVE

Soft engineering options, including beach nourishment give effect to NZCPS Policy 3(2)(b) and 25(e) by providing a natural defence on the coast, along with Policy 26 which provides for the protection, restoration or enhancement of natural defences that protect coastal land from erosion. This Option is also an alternative management approach as envisaged by Policy 27 of the NZCPS, and in particular Policy 27(2) which promotes management options that reduce the need for hard protection structures.

The proposed RPS Policies 50 and 51 require a number of considerations to be taken into account when considering management of coastal erosion and the potential impacts of climate change, including whether soft engineering methods area more appropriate option. This Option gives effect to these policy directions.

There are uncertainties about the effectiveness of this as an Option for protecting the Kapiti

coast, particularly in those areas of the coast where retreat of the shoreline is the long-term trend. The use of this soft engineering Option along the Kapiti coast would require large volumes of suitable sand (i.e. appropriate grain size and from a compatible geological source) to form a protective beach of adequate dimensions. Ongoing placement of sand as a matter of maintenance would also be required to retain the designed level of beach protection. In addition, while there are reasonable design procedures for estimating the volume of fill required to form a protective beach, the estimation of maintenance requirements is more difficult and would be a significant uncertainty.

The volumes of sand required to form and maintain the beach protection can be reduced using sand retention structures. However, such structures can have significant adverse environmental effects on amenity and natural character values, public access and on erosion trends along the beach.

Soft engineering approaches can also include the use of submerged breakwaters or reefs. The use of these structures avoids many of the adverse environmental effects that occur with hard engineering solutions. Multi-purpose submerged reefs have been widely considered over the last decade. They can be designed to incorporate a range of benefits (e.g. shore protection, surfing, new habitat). However, there are ongoing design challenges and uncertainties associated with predicting structure performance. It is not yet clear whether these structures can provide cost effective protection on high energy eroding coastlines.

This Option of holding the line with soft engineering responses, on its own, does not give effect to the various policy requirements in the NZCPS and RPS for controlling development and reducing risk. Soft engineering options could encourage ongoing development in high risk areas, increasing potential vulnerability over time and increasing reliance on engineering works.

While the Iwi Management Plans support the maintenance and restoration of the environment within their rohe, it is not clear whether they would support beach nourishment on the scale that would be required as a defence for the length of the Kapiti coast.

The Regional Coastal Plan provides support for beach nourishment in Objective 8.1.2 and Policy 8.2.1. This Option would be consistent with this policy.

The Council's "Choosing Futures: Coastal Strategy" supports dune restoration, but also wishes to ensure that there are long-term solutions for the protection of the coastal resources, and for the benefit of future generations. This document states "*The overall strategic response for hazards is to continue to protect existing structures on the coast while maintaining the dune areas, making them as natural as possible with native plantings and to consider soft engineering as an initial response to problems.* (p55)." In addition the Council's "Discussion Document: Natural Hazards and Managed Retreat" recognises that the soft engineering Option will not be effective in all parts of the Kapiti coast.

Notwithstanding the importance of dunes as buffers to coastal hazards, this Option would not increase the resilience of communities to the future effects of climate change and sea level rise, in all parts of the coast. It is therefore considered that the Option of relying on soft engineering methods is only partially effective in achieving the proposed objective.

2.6.3 EFFICIENCY: BENEFITS, COSTS AND RISKS

Benefits

The primary benefit of holding the line is the protection provided to public and private property and infrastructure. In some places on the Kapiti coast, there would be short-term financial benefits for using this Option. There are a large number of properties where reasonable use would be precluded without some form of protection, and areas where significant infrastructure (roads and utilities) would otherwise be impacted.

Other benefits of this Option include:

- enhancement of natural character and amenity values through restoration of a beach and dune, particularly in the worst affected areas where there is now only limited beach width
- community involvement in dune and beach renourishment projects

Costs

- This Option would involve very high economic costs associated with construction and maintenance along the high energy Kapiti coast. It is uncertain what costs would be required in maintaining such works over time.
- It is anticipated that there would be escalating costs associated with increasing levels of maintenance over time in areas where the shoreline is retreating, and in locating and transporting suitable sand supplies**.**
- Environmental effects would include potential impacts on sand transfers along the coast over time (especially relevant for groynes) which could reduce sand supplies in other parts of the coast, causing exacerbated erosion at other sites. Visual amenity effects and public access issues would also arise for structures on the beach.
- In areas where the beach has already been lowered fronting hard protection structures, the effective use of soft engineering methods would require the beach scarp to move inland, affecting private land in many areas.
- On the high energy Kapiti coast, this approach would be expensive to implement and it is unlikely to be cost-effective relative to the value of the assets being protected.
- There is uncertainty around the effectiveness of this Option to address long-term erosion trends, and this would impact on economic and social resilience of the coastal communities.

Risks of Acting or Not Acting

- The Option of holding the line with soft engineering approaches is supported in the NZCPS (ref Policies 3, 25-27) and the RPS (Policies 50-51). This Option could give effect to these policies. However it is considered that on its own, this Option would not be effective in reducing the level of risk for existing coastal communities, and as such would only be partially effective in meeting the proposed objective.
- There is a significant risk associated with the uncertainties about the effectiveness of

this Option, particularly in light of current erosion trends and long-term sea level rise.

- New dwellings and infrastructure might be placed in areas of risk, increasing existing levels of risk and long-term vulnerability. Reliance on this Option to manage severe erosion hazard in the short to medium-term may lead to an increasing demand for hard protection structures in the future.
- A reliance on soft engineering options could result in future liability for Council, should the Option fail to provide adequate protection to property, particularly in the face of long-term sea level rise.
- There is also potential liability to Council where public protection schemes defend public assets but in effect also protect private development immediately landward. Failure of these schemes could put private assets at risk.
- This Option is unlikely to be cost-effective relative to the value of the assets being protected.

It is therefore considered that the Hold the line with soft engineering methods Option is of medium-low efficiency in achieving the proposed objective.

2.6.4 CONCLUSION

This Option of holding the line with soft engineering methods has the potential to protect land based assets while preserving environmental, social and cultural values associated with the beach. However, the magnitude and uncertainty of long-term financial costs are likely to make this option impractical for the Kapiti Coast District.

Likewise, any approach that holds the current shoreline using human intervention encourages ongoing investment within hazard areas at risk from coastal erosion and is therefore inconsistent with building community resilience and reducing risk over time.

This Option therefore would be partially effective and of medium-low efficiency in achieving the proposed objective.

2.7 Option 4: Single Development Setback Line

2.7.1 KEY FEATURES

This Option involves the application of a single development setback line for managing coastal hazards and is based on a report by Tonkin & Taylor (2007) which was prepared for the Kapiti Coast District Council.

The setback, based on a 50 year planning period, would be the greater of either the existing coastal setbacks (as per the Operative District Plan) or the future shorelines "seawalls repair" scenario, as proposed by Coastal Systems Ltd (2008a; 2008b). This shoreline scenario is based on an expectation that the existing seawalls would be maintained into the future. This scenario includes an allowance for short-term erosion following any sea wall failure but assumes the sea wall would be rapidly repaired. This Option proposes that new development and subdivision would be a non-complying activity seaward of the setback line. Any other development would not be restricted in coastal hazard areas.

2.7.2 EFFECTIVENESS IN ACHIEVING THE PROPOSED OBJECTIVE

This Option is reliant on the maintenance of existing structures, and is therefore similar to Option 2 in areas where there are existing seawalls. In addition this Option incorporates Option 1 which discussed the status quo (i.e. the current provisions of the Operative District Plan), as these current District Plan provisions apply where they lie landward of the Coastal Systems Ltd (2008a, 2008b) "seawall repair" line.

The discussion on effectiveness in achieving the proposed objective, along with the costs, benefits and risks outlined for both Options 1 and 2 broadly apply to this Option. This approach utilizes a "seawall repair" scenario (Coastal Systems Ltd, 2008a), which provides sufficient setback to allow for short-term seawall failure and repair, but does not account for long-term shoreline retreat. In a reas where there are no existing seawalls, this scenario includes natural long term shoreline retreat where relevant, and therefore does provide reasonable protection over the 50 year timeframe. This Option would therefore be partially effective in meeting the proposed objective, by reducing some of the risks from coastal hazards (in particular short-term risk).

In most areas of the coast, the setbacks recommended in this Option are seaward of the 100-year "unmanaged" future shorelines scenario assessed by Coastal Systems Ltd (*in prep.*). This Option does not therefore adequately provide for the 100 year planning period, nor for climate change and sea level rise as required by the NZCPS Policy 24. This Option would only be partially be effective in meeting the proposed objective.

In the event that existing erosion is exacerbated by projected sea level rise as assessed by Coastal Systems Ltd (2008a; 2008b; *in prep.*), this is likely in the long term to lead to a proliferation of hard protection structures and associated issues as discussed in Option 2.

Based on the more extensive discussions provided in Options 1 and 2, it is considered that this Option of relying on a combination of hard protection structures and setbacks (based on a managed shoreline scenario and existing setbacks), is only partially effective in achieving the proposed objective.

2.7.3 EFFICIENCY: BENEFITS, COSTS AND RISKS

The Benefits, Costs and Risks identified in Options 1 and 2 are also relevant.

Benefits

- There would be limited restrictions on the use of private properties in those areas with existing hard protection structures**.**
- There would be no additional restrictions on the use of private properties in other areas over and above those associated with existing District Plan setbacks.
- It would provide for limited failure of structures to occur without any resultant damage to assets.

Costs

- There would be environmental effects, including beach loss along significant lengths of shoreline (where hard protection structures are present) and associated degradation of natural character, amenity and recreational values, and public access to and along the coast. These effects will be particularly severe where there is a trend for shoreline retreat.
- There would be exacerbation of erosion on unprotected shorelines adjacent to hard armouring structures. Erosion hazard and accompanying setbacks would be more severe in these unprotected areas than would be the case if the seawalls were removed.
- There would be escalating cost associated with the increasing levels of maintenance and upgrade of sea walls required over time, particularly in areas where the shoreline is retreating.
- It is considered that all costs (social, financial, cultural and environmental) will increase over time due to ongoing shoreline retreat and possible climate change effects.

Risks of Acting or Not Acting

- This Option of a single development setback line does not meet the requirements of the NZCPS or the proposed RPS with regard to managing coastal hazards.
- New dwellings and infrastructure would be placed in areas of risk, increasing existing levels of risk and long-term vulnerability. This Option would not achieve the proposed objective in relation to long-term management of the coastal areas, particularly on a retreating coastline.
- Failure to provide up-to-date information on long-term hazard risk to property owners or prospective owners could result in inappropriate land use decisions and future liability for Council.
- There could be increasing liability issues for Council for ongoing end effects associated with public structures, as well as for the potential failure of hard protection structures

which could put private assets at risk.

It is therefore considered that the Single development setback line Option is of medium-low efficiency in achieving the proposed objective.

2.7.4 CONCLUSION

While this Option combines elements of both Options 1 and 2, it is considered that this Option provides inadequate preparation for long-term erosion trends that are likely to accompany projected sea level rise and climate change effects over the next 100 years.

The adverse effects that would arise from the use of hard protection structures are contrary to many of the policies in the NZCPS and the proposed RPS. The social, cultural, economic and environmental costs of this approach are likely to escalate rapidly over time, particularly if erosion is exacerbated by projected sea level rise. Therefore in the medium to long term, alternative strategies will be required to manage coastal erosion, including areas of severe erosion.

This Option of a single development setback line would be partially effective (i.e. in the short term) and of medium-low efficiency in achieving the proposed objective.

2.8 Option 5: No Development Controls

2.8.1 KEY FEATURES

This Option would involve removing all land use controls relating to coastal hazards from the District Plan. It would encourage individual decisions on how best to manage coastal hazards as and when they impacted on an individual's property. There would be no controls on the forms of protection structures or other options that might be adopted.

From historical experience, this Option would generally result in similar outcomes to those outlined in Option 2. As mentioned under Option 2, the projected exacerbation of coastal erosion over the next 50-100 years (Coastal Systems Ltd, 2008a; 2008b; *in prep.*) would result in increasingly large portions of the coast being protected with hard structures, including all developed areas from Paraparaumu south and some of the northern settlements.

2.8.2 EFFECTIVENESS IN ACHIEVING THE PROPOSED OBJECTIVE

This option is fundamentally a "free market" approach to subdivision, use and development in the coastal areas and to the management of coastal erosion.

There is little evidence to date to indicate that coastal property prices or insurance values are affected by hazard risk to coastal properties. Therefore the property market is unlikely to be effective in managing the increasing risk from climate change and sea level rise. In addition, this Option would enable owners to externalise the adverse effects of risk (i.e. the impacts of their decisions) onto other parties, by using hard protection structures. It is probable that the value of the properties could justify the cost of sea walls to protect them, at least until relatively advanced stages of shoreline retreat.

However the expected outcomes of using this Option are:

- an increased level of risk in hazard areas as properties are further subdivided or more intensely developed, undermining any long-term community resilience
- proliferation of shoreline armouring works along the coast with increasingly severe adverse effects over time as existing shoreline retreat trends continue and if (as anticipated) erosion is exacerbated by projected sea level rise

The increase in shoreline armouring works will in turn impact on public values such as beach amenity, public access and natural character. In the long term, increasing wave forces accompanying shoreline retreat may necessitate complete replacement of sea walls, at which stage it may no longer be economic to protect the properties and abandonment may be required. However, significant beach degradation is likely before this occurs – including, probably, complete elimination of an exposed and intertidal beach seaward of the seawalls.

The discussion on effectiveness in achieving the proposed objective, along with the costs, benefits and risks outlined for Option 2 would also apply to this Option.

This Option does not address climate change and the potential effects on sea level rise, as required by s7(i) of the RMA and NZCPS Policies 3, 7, and 25 in particular. This Option would

not give effect to the NZCPS nor to the proposed RPS.

In addition, this Option does not recognise the importance of natural character, amenity and public access (to and along the beach) as required by various policies in the NZCPS and the RPS and would not be effective in meeting the proposed objective in this respect.

This Option does not provide well for future uncertainty in long-term coastal trends nor for the potential impacts of climate change, as it is based on reactive rather than anticipatory adaptation. This Option in the short, medium and longer term would not increase the resilience of the community to withstand the effects of coastal hazards.

Accordingly, taking into account the discussion above and under Option 2, it is considered that this Option (no development controls) would not be effective in achieving the proposed objective.

2.8.3 EFFICIENCY: BENEFITS, COSTS AND RISKS

Benefits

- This Option provides for individual decision-making and responsibility on how to manage coastal hazard events and the risk of living on the coastal edge.
- This Option reinforces the provisions of the RMA relating to existing use rights.

Costs

- Inconsistent approaches would be taken to protection structures along the coastline, including structures that are not well designed.
- There would be environmental effects, including beach loss along significant lengths of shoreline (where hard protection structures are put in place) and degradation of natural character, amenity and recreational values, and public access to and along the coast. These effects will be particularly severe where the shoreline is retreating.
- There would be exacerbation of erosion on unprotected shorelines adjacent to hard protection structures.
- There would be escalating costs associated with increasing levels of maintenance and upgrade of hard protection structures, which will be required over time, particularly in areas where the shoreline is retreating.
- It is considered that all costs (social, cultural, financial and environmental) will increase over time due to ongoing shoreline retreat and possible climate change effects.
- There would be significant potential liability for the Council for having historically approved subdivision in these areas and for being expected to manage the costs associated with addressing the risks.

Risks of Acting or Not Acting

- The costs, benefits and risks of acting or not acting discussed in Option 2 are also relevant to this Option.
- This Option of no development controls does not give effect to the requirements of the NZCPS nor the proposed RPS, with regard to managing coastal hazard risk.
- This Option would enable owners to externalise the dis-benefits of their location onto the wider community and beach users through use of hard protection structures. The Option therefore risks significant adverse impacts on natural character, amenity values, public access and, probably, the economic value of many non-beachfront properties.
- There is a potential for decreased economic viability and significantly diminished lifestyle opportunities on the Kapiti coast accompanying degradation of beach values over time.
- There is a potential inability of groups of property owners to meet the financial costs of maintaining seawall defences in the longer term, requiring rapid adjustment and possible abandonment of properties.
- Council may inherit the cost of removing derelict structures following eventual abandonment of private properties.
- New dwellings and infrastructure could be placed in areas of hazard risk, thereby increasing existing levels of risk and long-term vulnerability of the coastal communities.

It is therefore considered that the no development controls Option is of low efficiency in achieving the proposed objective.

2.8.4 CONCLUSION

This Option of having no controls on subdivision, use and development that is potentially at risk from coastal hazards would result in significant loss of public values and significant and widespread environmental impacts. Over time, community resilience is likely to decrease and Council may face liability for a range of impacts.

This Option would not give effect to the NZCPS nor to the proposed RPS and as such could be considered to be *ultra vires*.

This Option would not be effective or efficient in achieving the proposed objective.

2.9 Option 6: Management Zones and a Combination of Responses

2.9.1 KEY FEATURES

This Option involves controlling subdivision, use and development within identified coastal hazard management zones in order to gradually adapt human use to live with coastal hazard risk. Accordingly, this Option emphasises risk avoidance and reduction (including managed retreat where required) and reliance on natural beach and dune protection. Reliance on hard protection structures would be avoided as far as practicable and ultimately could be phased out over time.

The emphasis on managing human use to live with coastal hazards reflects the fact that hard protection structures are unlikely to provide a sustainable long-term solution to coastal erosion (refer to discussion under Option 2).

Three coastal erosion management zones would be applied, as described below. These management zones specifically acknowledge climate change and the potential effects on sea level rise.

A 50 year coastal hazard management zone for urban areas (50 year Urban CHMZ).

This zone applies to areas of existing urban development. The objective for this zone is to recognise that this is the area most at risk within the District and to seek to reduce this risk over time, while providing where possible for "existing use" rights of property owners.

This zone includes the width of the coast potentially vulnerable to erosion over the next 50 years, including the possible impact of projected sea level rise (as defined by Coastal Systems Ltd, 2008a; 2008b; in prep.)

Management of development within this zone would reduce risk over time by encouraging progressive relocation of existing buildings and public infrastructure to areas further landward, while new buildings, additions or significant alternations would not be allowed. On-going maintenance of existing hard protection structures would be provided for in the short- to medium-term.

In areas where properties lie largely within this zone (e.g. Raumati), the development of a coastal hazard adaptation strategy would be required to provide for reasonable use of properties. The strategy would provide for a transition over time from the current situation to a future more sustainable pattern of use and development. The outcome of the strategy could include some alteration of the coastal hazard management zones and/or the associated rules to allow this to occur.

As soft approaches to shoreline protection (as outlined in Option 3) are unlikely to be practical as a long-term solution, it is likely that hazard adaptation strategies will ultimately lead to managed retreat and/or abandonment of infrastructure and properties. Coastal hazard adaptation strategies will need to address the transition to retreat (e.g. timelines and/or triggers for retreat; monitoring required, distribution of costs). These are very complex and difficult matters that will require extensive and on-going discussions with the community and

may need to be addressed in conjunction with management options that are outside of the District Plan provisions.

This Option would also involve the restoration of natural dune buffers where this is necessary (i.e. where dunes are currently absent or degraded) and the protection of natural dune buffers in other areas.

A 100 year coastal hazard management zone for urban areas (100 year Urban CHMZ)

This management zone would apply to the existing urbanised areas of the coast (i.e. current residential zones). The objective for this zone is to recognise long-term risk and to seek to avoid creating further risk for the future in this area. This zone includes:

- the shoreline width potentially vulnerable to coastal erosion over the next 100 years, as assessed by Coastal Systems Ltd (in prep.), and
- allowance for a 15 m protective dune buffer

In this zone, all new buildings would be required to be practicably relocatable. This will require applicants to specify how the dwelling could be relocated.

A 100 year coastal hazard management zone for rural areas (100 year Rural CHMZ)

This management zone would apply to the existing rural and open space areas of the coast. The objective of this zone is to recognise the "greenfields" nature of this area and to avoid any increase in risk profiles for the future. This zone includes:

- the shoreline width potentially vulnerable to coastal erosion over the next 100 years, as assessed by Coastal Systems Ltd (in prep.), and
- allowance for a 30 m protective dune buffer

Subdivision and new buildings would not be allowed in this zone.

2.9.2 EFFECTIVENESS IN ACHIEVING THE PROPOSED OBJECTIVE

This Option includes management zones and a combination of responses provides for long-term risk reduction, by avoiding exacerbation of existing risk, avoiding future risk in undeveloped areas, and transitioning to managed retreat in urban areas at most risk.

This Option gives effect to the RMA s7(i) by recognising the potential impact climate change may have on the Kapiti coast. It also gives effect to a number of NZCPS policies:

Policy 3, which requires a precautionary approach to be taken to the use and management of coastal resources so that:

> *"(a) avoidable social and economic loss and harm to communities does not occur;*
> *(b) natural adjustments for coastal processes, natural defences, ecosystems, habitat and species are allowed to occur; and*
> *(c) the natural character, public access, amenity and other values of the coastal environment meet the needs of future generations".*

Policy 7 requires a strategic approach to be taken to managing "inappropriate" use and development. In particular this Policy encourages the use of techniques such as zones "*to assist in determining when activities causing adverse cumulative effects are to be avoided*." This Option would give effect to this Policy.

By setting zones this Option gives effect to NZCPS Policy 24 (and the proposed RPS Policy 28), which requires coastal hazard areas to be identified and for the risk to be assessed over a 100 year period. This Option also gives effect to Policy 25 which requires that any increase in the level of risk is avoided and encourages changes in land use that would reduce risk, including by managed retreat and relocation. This also gives effect to the proposed RPS Policy 50. NZCPS Policy 25 "discourages hard protection structures" (as does the proposed RPS Policy 51) and in Policy 26 support for the protection, restoration or enhancement of dunes as natural defences against hazards is promoted. This Option has given effect to these national and regional directives.

Policy 27 of the NZCPS (and the proposed RPS Policy 51) focuses on areas of existing development and the need to consider various options to reduce coastal hazard risk. This Option seeks to meet the requirements of this Policy by establishing management zones and controls to avoid exacerbating existing risk and to reduce risk over time through land use changes. This Option also recognises that hard protection structures may be appropriate in some areas but that over time this is unlikely to be a sustainable approach for the retreating coastline of Kapiti Coast District.

This Option recognises the policy directives of the Regional Coastal Plan, by addressing natural character considerations and seeking to ensure appropriate use of structures in the coastal areas adjacent to mean high water springs.

In addition the Iwi Management Plans support a precautionary approach and wish to ensure that environmental health is maintained. In particular they reflect concerns about the degradation of the environment and the associated impacts on the coast and food gathering activities. This Option aims to achieve a precautionary approach and in a way that will address environmental and public values associated with the coast.

Both the Council's "Choosing Futures: Coastal Strategy" and the "Discussion Document: Natural Hazards and Managed Retreat" are critical to the development of this Option. The need to develop long-term solutions to protect the coast for the benefit of current and future generations is recognised in this Option.

Public submissions received on the "Discussion Document: Natural Hazards and Managed Retreat" were drawn on when developing this Option. Some general themes included the need to identify the level of risk and outline how this might be managed, through the District Plan as well as through other mechanisms, along with the requirement for ongoing consultation about managed retreat. This Option addresses these issues.

There are likely to be major difficulties associated with the implementation of this Option, given the fact that managed retreat is likely to be ultimately required in areas of severe erosion. This is not inconsistent with national policy or the proposed objective but will nonetheless raise very complex issues that will need to be resolved.

It is considered that this Option of using management zones and a combination of responses

would be highly effective in achieving the proposed objective.

2.9.3 EFFICIENCY: BENEFITS, COSTS AND RISKS

Benefits

- The primary benefit for this Option is that it provides certainty for land owners for the management of erosion on beachfront properties for present and prospective future owners. It also allows for a range of options to be used over time to address the coastal hazard risk (rather than relying on one approach).
- This Option would improve long-term community resilience by recognising and planning for long-term shoreline trends and climate change effects.
- This Option avoids exacerbating existing risk by requiring new buildings to be located away from coastal areas at most risk, and preventing subdivision in hazard areas that could lead to expectations of future buildings.
- This Option recognises that current management approaches are unlikely to be sustainable in the long term and management mechanisms such as relocatability and managed retreat will be required, to enable change and adaptation to occur over time.
- This Option would support the protection and restoration of natural protective dune buffers, which in turn meets the values people appreciate about the coast. The provision for a sustainable dune buffer width fronting development would provide for dune restoration and natural dune functioning, even after long term expected erosion.
- This Option would preserve natural character and maintain or enhance amenity values and public access, by moving away from an increasing reliance on hard protection structures along the coast.

Costs

- There could be loss of private property value due to recognition of risk and strict controls on development (however there is no evidence to indicate this has been the case in other parts of NZ).
- Beachfront properties could be damaged or lost if soft options did not prove to be practical or cost-effective.
- Significant financial costs are likely to be associated with identifying, agreeing and implementing appropriate long-term adaptation strategies for high risk, heavily developed areas.
- There could be litigation and other costs associated with the transition to managed retreat, where this becomes necessary.
- There could be liability for Council for past inappropriate decisions, when properties are affected.

Risks of Acting or Not Acting

- This Option which uses management zones and a combination or responses, would

give effect to the requirements of the RMA, NZCPS and proposed RPS, in respect of a range of matters including hazard management, natural character, public access and amenity/landscape values.

- This Option has taken into account the Council's "Discussion Document: Natural Hazards and Managed Retreat" and public submission made on this document.
- There could be significant legal, political and economic risks associated with any transition to managed retreat, if this transition is not managed carefully. It will need to involve extensive community conversations along with considering what mechanisms (other than the District Plan) are required to support the approach.
- Lack of policy directives in the proposed RPS on existing use rights, any District Plan provisions will be limited in effecting change to existing development in the serious hazard risk areas. This could undermine the effectiveness of risk reduction, particularly in urban areas.
- There is a risk that strong controls on development in serious hazard areas could lead to different coastal development patterns in neighbouring Districts (e.g. due to inconsistent management of shoreline armouring across jurisdictional boundaries.)
- There is potential for serious landowner resistance.

It is therefore considered that the Option of management zones and a combination of responses is of medium-high efficiency in achieving the proposed objective.

2.9.4 CONCLUSION

This Option applies management zones to control subdivision, use and development to address long-term risk, along with recognising that a combination of other responses may be appropriate in the short- to medium-term. As such information provided under Options 1, 2 and 3 is also relevant.

Historically it has generally been assumed that property can be protected through the use of hard protection structures, in perpetuity if the need arises. However as discussed in Option 2, this is not likely to be sustainable for the Kapiti coast in the long term. Accordingly, serious difficulties will have to be confronted and resolved in developing a transition to retreat.

While it is clear that parts of the Kapiti coast will be prone to serious erosion in the future (particularly in high risk areas), the issues for affected property owners and for public infrastructure are significant and will pose a range of implementation challenges. To give effect to this Option will require considerable time and effort in working with affected parties, and will require a long-term commitment by Council and community to finding appropriate solutions to very complex and challenging situations.

It is considered that this Option of management zones and a combination of response would be highly effective and of medium-high efficiency in achieving the objective in the short and long term.

2.10 Summary of Appropriate Policies and Methods

The following table summarises the appropriateness of the policy options to achieve the proposed objective:

Policy Option	Effectiveness	Efficiency	Selected Option/s
Option 1: Status Quo	Partial	Medium	No
Option 2: Hold the Line with Hard Protection Structures	Partial	Medium	No
Option 3: Hold the Line with Soft Engineering	Partial	Medium -low	No
Option 4: Single Development Setback line	Partial	Medium -low	No
Option 5:No Development Controls	Low	Low	No
Option 6: Management Zones and a Combination of Responses	High	Medium - high	Yes

Having regard to the information in the above table, and taking into account the benefits and costs, and the risks of acting or not acting due to insufficient information as discussed under each Option, it is considered that the most appropriate way of achieving the proposed objective is by the adoption of Option 6: Management zones and a combination of responses, and the inclusion of policy options as outlined in Part 3 of this report.

3 PART THREE: PROPOSED FRAMEWORK

3.1 Strategic Approach

This section of the report outlines the framework which is recommended as the basis for policy development for coastal hazards management in the review of the District Plan.

In this document, it is important to note that we have not sought to integrate coastal hazards issues with other management directions associated with the coastal environment. It is, however clear that as the policy development progresses under the review of the District Plan, additional linkages will need to be made. In addition, this Part does not provide specific wording for inclusion into the review of the District Plan, rather it suggests directions for the wording (as per the contract discussions).

Drawing on the national, regional and local policy framework and background information presented in Part 1 of this report, it is proposed that the following **strategic approach** is taken to managing coastal hazards within the Kapiti Coast District:

- Define management zones based on coastal erosion hazard risk over 50 year and 100 year timeframes.
- Include erosion likely to occur due to sea level rise of the next 50 years (0.3 m) and 100 years (0.9 m) within these zones.
- Avoid exacerbating risk within these management zones.
- Progressively reduce risk within areas at risk in the short to medium term.
- Manage development within long term hazard risk areas to recognise the risk while also providing for reasonable use.
- Recognise managed retreat will be a requirement in some circumstances, even with existing conditions and trends, and more so with projected sea level rise.
- Support rules with guidelines and community conversations that will assist in achieving the long-term focus on risk reduction through managed retreat and working with nature.
- Restore natural dune protection where required and protect existing natural dune buffers.
- Manage erosion hazard in a way that will protect and restore natural character, amenity values and public access.

3.2 Issues

It is proposed that the following matters be incorporated into the issue statement or description:

- There is a need to address the projected impacts of climate change (including sea level rise) that have the potential to exacerbate erosion hazard.
- Reliance on hard protection structures will not be a sustainable option for protecting property and infrastructure into the future.
- Community resilience will need to be increased over time, with a focus on risk avoidance, long-term risk reduction and working with nature.
- The Council needs to provide certainty for owners, and provide flexibility to address the uncertainty associated with timing and extent of coastal change in the future.

- Managing coastal hazards needs to provide for the protection and restoration of environmental and human values of the coast.

3.3 Framework for Objective(s)

3.3.1 PROPOSED OBJECTIVE

It is proposed that the following elements are incorporated into an objective(s):

- A risk and scenario-based approach to managing coastal hazards.
- Plan for sea level rise over 50 and 100 years and take a precautionary approach to recognising uncertainty associated with the scale and timing of effects.
- Aim for increased resilience of communities over short and long-term, by requiring risk reduction through development controls, managed retreat and working with nature.
- Recognise the importance of natural character, amenity and public access (to and along the beach).

Principal Reasons:

- The NZCPS policies 24-27 and proposed RPS Policies 50 and 51 are particularly relevant.
- Sea level rise is being predicted to impact significantly on NZ coasts, and is likely to exacerbate the existing erosion and inundation hazard.
- The RMA and the CDEMA require councils to consider natural hazards and to plan for resilient communities.
- Wise decision-making is required today to ensure hazard risks are not exacerbated for the future and that communities realise that they will need to make significant adjustments over time, if sustainable and affordable environmental outcomes are to be achieved for the coast.

3.4 Framework for Policies

It is proposed that the policy to support the above objective(s) incorporates the following areas:

General Policy on:

- coastal hazard management zones
- managing the coastal edge
- natural character, amenity and public access

Specific Policy on:

- 50 year urban coastal hazard management zone (50 year urban CHMZ)
- 100 year urban coastal hazard management zone (100 year urban CHMZ)
- 100 year rural coastal hazard management zone (100 year rural CHMZ)

3.5 General Policy: Zones

3.5.1 POLICY

Identify three coastal hazard management zones:

- 50 year urban coastal hazard management zone (50 year urban CHMZ)
- 100 year urban coastal hazard management zone (100 year urban CHMZ)
- 100 year rural coastal hazard management zone (100 year rural CHMZ)

Manage subdivision and land use by:

- avoiding exacerbating existing level of risk in all zones
- proactively promoting a reduction of risk within the 50 year urban CHMZ
- recognising long-term risk in the 100 year urban and rural CHMZs
- clarifying that for any building that "straddles" a zone boundary, the more restrictive provisions should apply to the whole building

Principal Reasons:

This approach:

- is aligned with national and regional policy directions, gives effect to NZCPS policies 7, 24, 25 and 27 and RPS policies 28 and 50, in particular
- provides certainty for property owners by identifying those areas that will be potentially affected by coastal hazards in the future
- will assist in avoiding future exacerbation of existing risk profiles
- provides a clear structure for managing land use and development in hazard risk zones, including location of future infrastructure

(Note: when developing this policy there may need to be a statement to address whether these policies take precedence over other related plan provisions. The reason for this is to provide certainty to land owners and people implementing the plan).

3.5.2 METHODS

Methods	***Reasons***
Policy and Rules associated with each of the zones	• Provides certainty for property owners • Allows for effective management within hazard risk areas
Zones identified on maps	

3.6 General Policy: Managing the Coastal Edge

3.6.1 POLICY

Accommodating natural shoreline movements and increasing resilience of coastal communities, by ensuring the best management options are used, which may include: dune management, engineering measures, managed retreat or a combination of these.

Moving towards a reliance on natural dune buffers and living with erosion. Natural dune buffers shall therefore be protected and where practicable enhanced, and enabled to migrate inland in response to shoreline retreat.

The use of hard protection structures to defend coastal land shall be discouraged by:

- avoiding any new private property protection structures on public land
- requiring the development of strategies to reduce and ultimately, over time eliminate reliance on hard protection structures
- undertaking specific planning for areas where there are existing public hard protection structures and ensuring the costs and benefits of maintaining such structures are affordable in light of long-term shoreline trends and climate change impacts of sea level rise and increased storms
- avoiding reliance on using emergency works provisions of the RMA

Where hard protection structures are being considered, a public-private cost-benefit analysis of all possible options shall be undertaken to determine whether a hard protection structure is both required, and the most appropriate option, taking into account environmental, economic, social, cultural factors and long-term sustainability considerations.

Where hard protection structures are assessed as being an appropriate option they must be:

- part of a broader long-term coastal hazard adaptation strategy for the affected area that will ultimately eliminate the need for these structures
- designed and located to minimise adverse effects on the environment and public values
- located as far landward as practicable and entirely on private land if protecting private assets
- designed and constructed to appropriate engineering standards
- designed to provide for public access to and along the coastal marine area

Managed retreat will be required when hard protection structures fail or are no longer able to be sustainably managed (environmental, economic, cultural and social costs and benefits to be assessed).

Principal Reasons:

- Gives effect to NZCPS policies 25, 26 and 27 and proposed RPS 50 and 51 in particular.
- Provides clarity on what approach Council will take to managing protection structures and recognises that decisions made now will impact on future risk profiles and environmental values.
- Recognises that the Council and communities may not be able to afford ongoing development and maintenance of protection structures, including that some protection structures will become increasingly unsustainable from an environmental perspective (lowering of beach, accelerated erosion of adjacent land, loss of beach width, increasing width and height of structures, associated impacts on amenity and natural character, etc.).
- Seeks to avoid ongoing reliance on existing hard protection structures, while recognising that in some areas these may be required to be maintained for a period as part of a long-term coastal hazard adaptation strategy for an area.
- Ensures a comprehensive cost-benefit evaluation of all options is undertaken as part

of any management of coastal hazards.

- Recognises the need to adjust over time to an increasing hazard risk profile, which already affects significant lengths of the coast.
- Ensures appropriate use of emergency works provisions.

3.6.2 METHODS

Methods	***Reasons***
Policy and Rules associated with each of the zones	Provides certainty for property owners Allows for effective management within hazard risk areas Aims to ensure that wider public values are recognised and provided for Recognises the need to address an area subject to erosion rather than specific properties to enable a more consistent and effective management approach Recognises that there are a variety of walls and techniques currently being used, some of which are ineffective and impact on the beach amenity and natural character and may not be sustainable or effective in the long term Complements rule on coastal protection structures Supports natural character, biodiversity and landscape objectives Recognises that many areas of the coast currently lack a naturally functioning dune buffer
Requirement for area specific coastal hazard adaptation strategies in the 50 year urban CHMZ where required, including design of coastal hazard protection works, dune management and restoration approaches and triggers for the removal of inappropriate structures	
Develop KCDC policy on encroachments, including structures on public land and illegal structures	Clarifies the approach that KCDC will take in terms of managing these matters Provides for integrated management between District Plan and other management options
Develop Guidelines on use of emergency works provisions of the RMA	Provides certainty on how these provisions would be used for managing coastal hazard risk, given that it is an identified and known risk

Implement dune protection and restoration works, including supporting care groups	Enables dunes to be managed more effectively due to community involvement and understanding of the importance of dunes Supports existing groups Recognises that KCDC has already prepared dune management guidelines and is undertaking dune restoration works
Ensure Reserves Plans take into account the implications of the proposed coastal hazard management zones	Ensures the management of reserves is undertaken in accordance with the zone policy
Develop infrastructure adaptation plans	Avoids location of any new infrastructure in hazard risk area Encourages anticipatory adaptation for existing infrastructure in hazard management zones
Liaison with GWRC re: • support for managing existing use rights • ensuring compatible controls in the RCP (i.e. to facilitate dune management and avoid hard protection structures)	Recognises risk reduction can be undermined by existing use rights and that only GWRC can control this through rules in regional plans Promotes integrated management of the coastal environment Aims to ensure that the plan provisions of the DP and RCP are aligned
Undertake community and stakeholder participation in the development of coastal hazard adaptation strategies and activities	Recognises that managed retreat poses challenges in some areas, and these issues will need to be worked through with all relevant stakeholders Individuals and communities will need to be informed of likely impacts and implications of climate change and erosion processes for the Kapiti coast Promotes "living with the natural coast" and the avoidance of reliance on protection structures

3.7 General Policy: Natural Character, Amenity and Public Access

3.7.1 POLICY

Preservation of natural character, protection of natural coastal features and habitat, and the maintenance and enhancement of amenity and public access by:

- reinstating naturally functioning dunes as buffers for as much of the coast as practicable
- providing managed access ways to the beach and avoiding damage to dunes from unmanaged access
- seeking to ensure that as far as practicable a high tide dry beach is available for public use
- avoiding encroachment of structures and private use onto the foreshore or public land
- ensuring that where hard structures are required, they are designed to mitigate adverse effects on visual amenity, natural character and public access
- removing existing unnecessary structures and associated waste materials from the foreshore

Principal Reasons:

- This policy protects natural character, amenity and access as matters of national significance under the RMA and NZCPS (policies 13, 14, 15, 19, 27 in particular).
- There is a need to recognise public values associated with the use and enjoyment of the coast, as well as the economic and ecological values of the natural coast, and to ensure these are taken into account when any private interests are being considered.
- This policy recognises that coastal structures generally degrade the coastal environment.

3.7.2 METHODS

Methods	***Reasons***
Policy, Rules and other methods associated with each of the management zones	Provides certainty for property owners re: coastal protection structures, access ways etc. Aims to ensure that wider public values are recognised and provided for
Liaison with GWRC re: • ensuring compatible controls in the RCP (i.e. to facilitate dune management and avoid built structures)	Promotes integrated management of the coastal environment Aims to ensure that the plan provisions of the District Plan and RCP are aligned

Develop KCDC policy on encroachments, structures on public land and illegal structures.	Clarifies the approach that KCDC will take in terms of managing these matters Provides for integrated management between District Plan and other management options
Implement dune protection and restoration works, including supporting care groups.	Enables dunes to be managed more effectively due to community involvement and understanding of the importance of dunes Supports existing groups Recognises that KCDC has already prepared dune management guidelines and is undertaking dune restoration works

3.8 Proposed Policy Directions for 100 year Rural Coastal Hazard Management Zone (100 yr Rural CHMZ)

3.8.1 POLICY:

Avoid future risk from coastal hazards by ensuring any new built development is located landward of the 100 year rural coastal hazard management zone (100 yr rural CHMZ), and any existing development within the zone does not increase in scale or intensity.

Principle Reasons

This management zone currently has relatively few buildings or subdivided lots where the expectation could be to locate a building. Avoiding future potential issues with coastal hazards impacting on sites within this area will enable the natural character of the area to be protected including enabling the beach and dunes to remain in a natural state, and public access and recreation values to be preserved. Controlling future development will enable the shoreline to move naturally with accretion or erosion trends, without the need for hard protection structures. This lack of development would also protect part of the KCDC coast as a relatively remote or natural environment experience.

Gives effect to NZCPS policies 7, 25 and 26 in particular.

3.8.2 RULES

Activity	***Classification***	***Reasons***
Subdivision within the 100 yr rural CHMZ	Prohibited	Avoids future risk in this area Avoids the need to protect future dwellings with hard protection structures Avoids expectation of being able to build in the future Allows for natural migration of the coast
New building, or new hard protection structures or new coastal retaining walls within the 100 yr rural CHMZ (NB: Does not include matters covered by permitted rule below)	Prohibited	

Renovation or replacement of existing buildings within the 100 yr rural CHMZ, where: • the scale, height and intensity does not increase the overall cubic metres of the existing building by more than 10% • the purpose of the existing building remains the same	Controlled Control reserved over: • the elevation of the building and/or floor levels • the requirement for a Council-approved area specific coastal hazard adaptation strategy if the building is located in an area that is potentially vulnerable to coastal erosion within 50 years (refer section 3.9)	Allows for reasonable use of existing properties without exacerbating the hazard risk through intensification of buildings
Renovation or replacement of existing buildings within the 100 yr rural CHMZ, which cannot meet the criteria for controlled activity.	Non-complying	Recognises that there may be exceptions that are appropriate to consider within this zone, and requires that they be assessed in accordance with the policies and are of a minor nature.
Within the 100 yr rural CHMZ: • safety signage/structures • fencing for dune planting protection • public access way structures that connect to public land • planting of native species • maintenance of existing stormwater and stream control structures (i.e. existing as of date of proposed plan)	Permitted	These activities recognise the importance of: • developing and maintaining resilient dunes • native species to biodiversity and other ecological values • managing public access • maintaining existing infrastructure

Earthworks and vegetation disturbance or clearance on dunes undertaken for the purpose of dune restoration and the associated removal of non-native plant species *(NB: in some instances a consent may also be required from the GWRC)*	Controlled Control reserved over: • Method and timing of dune works • Extent of any impact on immediately neighbouring areas • Timing of replanting and species to be used	These activities recognise: • that it is necessary to use earthworks to re-create or restore a dune in some areas • the need to ensure a dune is of appropriate dimensions to be sustainable • the biodiversity values to be added by removal of weed species • the need to consider bird nesting/ breeding cycles • the need to minimise effects of wind erosion • that the method used must be sustainable to minimise any adverse environmental effects on the beach or surrounds • recognises the importance of dunes as buffers
Earthworks and vegetation disturbance or clearance on dunes that does not meet the conditions of the above controlled rule *(NB: in some instances a consent may also be required from the GWRC)*	Discretionary (any criteria to aid decisions should include the bulleted points associated with the controlled rule)	
New (including replacement) infrastructure	Discretionary	Recognises that there may be exceptional circumstances when infrastructure may be required to be located in this zone
Maintenance of existing infrastructure	Permitted	Recognises the need to maintain existing infrastructure

NB: It is assumed all other activities would be permitted, or if they cannot meet the conditions of the above rules would be non-complying.

3.8.3 OTHER METHODS

Other methods which would support the policy approach could include:

Other Method	***Reasons***
Dune protection and restoration works, including care groups	Enables dunes to be managed more effectively due to community involvement and understanding of the importance of dunes Supports existing groups Provides for natural character, biodiversity and landscape outcomes Recognises that dunes are a natural coastal hazard buffer and that they will need to migrate inland if a long-term erosion trend occurs
Liaison with GWRC re: ensuring compatible controls on beach in the RCP (i.e. to facilitate dune management and avoid built structures)	Promotes integrated management of the coastal environment Aims to ensure that the plan provisions of the DP and RCP are aligned
Ensure Reserves Plans take into account the implications of the proposed coastal hazard management zones	Ensures the management of reserves is undertaken in accordance with the zone policy
Develop infrastructure adaptation plans	Avoids location of any new infrastructure in hazard risk area Encourages anticipatory adaptation for existing infrastructure in hazard management zones
Vehicle Management Bylaw	Ensures dunes are not damaged and opened up to further wind erosion
Building Act provisions - use of annotations on land titles that identify the coastal hazard risk	Makes future owners aware of the information held by Council on hazard risk and on the risk associated with the property

3.9 Proposed Policy Directions for 100 Year Urban Coastal Hazard Management Zone (100 yr Urban CHMZ)

Manage land use activities in the 100 year urban coastal hazard management zone (100 yr urban CHMZ) to ensure that the current level of hazard risk is not exacerbated by inappropriate development, and to recognise that over time buildings and infrastructure may need to be relocated landward of the zone.

3.9.1 PRINCIPAL REASONS:

This zone includes urbanised areas which may be at risk in the 50 year to 100 year period. It is important to plan now for this period of time and to avoid exacerbating the risk profile for the future. The zone seeks to enable reasonable use of the properties within it, and recognise that shifting buildings and infrastructure landward of the zone may also be required over time.

Gives effect to NZCPS policies 7, 25, 26 and 27 in particular.

3.9.2 RULES

Activity	*Classification*	*Reasons*
Subdivision within the 100 yr urban CHMZ	Prohibited	Avoiding exacerbation of future risk in this area Avoiding the need to protect future dwellings with hazard protection walls Recognises the potential long-term threat to this area
New residential building within the 100 year urban coastal hazard management zone, or any extension or renovation of an existing **relocatable** building within the 100 yr urban CHMZ, which would increase its site coverage, scale or intensity provided it • specifies the design features of the building or structure to demonstrate that it can be relocated if required • demonstrates that there is adequate access to enable removal of the building from the property	Controlled Control reserved over: • access for building to be removed if required to be relocated • adequacy of relocation design features • floor levels	Recognises that this is primarily an urban area and that appropriate development can occur
Any extension or renovation of an existing non-relocatable building within the 100 yr urban CHMZ, which would increase its site coverage, scale or intensity.	Non-complying	Recognises the need to minimise future risk
Any new infrastructure within the 100 yr urban CHMZ, which demonstrates that it is: • located as far landward as possible • installed perpendicular to the coast line	Controlled Control reserved over: • Design of infrastructure to withstand potential climate change impacts	Recognises the need to avoid exacerbating future hazard risks in this zone Recognises link to infrastructure planning/guidelines

Maintenance of existing infrastructure	Permitted	Recognises the need to maintain existing infrastructure

NB: It is assumed all other activities would be permitted, or if they cannot meet the conditions of the above rules would be non-complying.

3.9.3 OTHER METHODS

Other methods which would support the policy approach could include:

Other Method	***Reasons***
Requirement for area specific coastal hazard adaptation strategies in the 50 year urban CHMZ where required, including design of coastal hazard protection works, dune management and restoration approaches and triggers for the removal of inappropriate structures	Provides certainty for property owners Allows for effective management within hazard risk areas Aims to ensure that wider public values are recognised and provided for Recognises the need to address an area subject to erosion rather than specific properties to enable a more consistent and effective management approach Recognises that there are a variety of walls and techniques currently being used, some of which are ineffective and impact on the beach amenity and natural character and may not be sustainable or effective in the long term Complements rule on coastal protection structures Supports natural character, biodiversity and landscape objectives Recognises that many areas of the coast currently lack a naturally functioning dune buffer.
Liaison with GWRC re: • support for managing existing use rights • ensuring compatible controls in the RCP (i.e. to facilitate dune management and avoid hard protection structures)	Recognises risk reduction can be undermined by existing use rights and that only GWRC can control this through rules in regional plans. Promotes integrated management of the coastal environment Aims to ensure that the plan provisions of the DP and RCP are aligned
Ensure Reserves Plans take into account the implications of the proposed coastal hazard management zones	Ensures the management of reserves is undertaken in accordance with the zone policy

Develop infrastructure adaptation plans	Avoids location of any new infrastructure in hazard risk area Encourages anticipatory adaptation for existing infrastructure in hazard management zones.
Ongoing community consultation and participation	Recognises need for ongoing conversations with community about managed retreat Ensures individuals and communities are informed of likely impacts and implications of climate change and erosion processes for the Kapiti coast Increases awareness of and participation in decision making regarding realistic options to address future hazard risk
Building Act provisions - use of annotations on land titles that identify the coastal hazard risk	Makes future owners aware of the information held by Council on hazard risk and on the risk associated with the property

3.10 Proposed Policy Directions for 50 year Urban Coastal Hazard Management Zone (50 yr Urban CHMZ)

Manage land use activities in the 50 year urban coastal hazard management zone (50 yr urban CHMZ), by:

- avoiding any increase in current hazard risk, including by avoiding any new buildings and any increase in the existing scale and intensity of development within this zone
- progressively reducing risk by requiring managed retreat over time
- encouraging reliance on natural dune protection and progressively reducing reliance on hard protection works

3.10.1 PRINCIPAL REASONS:

This policy acknowledges that there are existing buildings and infrastructure in the 50 yr urban CHMZ and that every endeavour should be made to ensure the level of risk does not increase. Retreat from the coastal edge is likely to become a requirement in the future as it will not be economically or environmentally sustainable to continue to protect the coastal edge from natural erosion trends and the potential effects of climate change and sea level rise.

Gives effect to NZCPS policies 7, 25, 26 and 27 in particular.

3.10.2 RULES

Activity	***Classification***	***Reasons***
Subdivision within the 50 yr urban CHMZ	Prohibited	Avoids future risk in this area Avoids the need to protect future dwellings with hazard protection structures Recognises the level of threat posed to this part of the coast
Within the 50 yr urban CHMZ: • New buildings • Extension of an existing building which includes any increase in its site coverage, scale or intensity	Prohibited	

Any renovation of an existing building which is located within the 50 yr urban CHMZ, and which alters any external wall or roofline, or changes the building material used and which is not covered by a Council-approved area specific coastal hazard adaptation strategy for the area within which the property is located (as required by section 3.9) *(NB: Does not include matters covered by permitted rule below)*	Prohibited	Recognises existing use rights Recognises that built environment in this zone is particularly vulnerable Recognises that there are significant practical, economic and environmental costs associated with hard protection structures Focuses on managing retreat from these areas
Any renovation of an existing building which is located within the 50 yr urban CHMZ and which alters any external wall or roofline, or changes the building material used and which is covered by a Council-approved area specific coastal hazard adaptation strategy for the area within which the property is located (as required by section 3.9)	Discretionary	Recognises existing use rights Recognises that the current hazard risk profile should not be increased Recognises that built environment in this zone is particularly vulnerable but that provided there is an area specific management plan in place which would address retreat and relocation, reasonable ongoing use of the property could potentially occur for a number of years Recognises that there are significant practical, economic and environmental costs associated with hard protection structures
Within the 50 yr urban CHMZ: • New hard protection structures • New coastal retaining walls which are more or less parallel to the shore line	Non-complying	Recognises that ongoing protection of property in these areas will be difficult to maintain Recognises that secondary retaining walls may become front-line walls, exacerbating the problems

Maintenance or upgrade of existing hard protection structures or coastal retaining walls which are more or less parallel to the shore line	Discretionary	Enables a public process to consider : • public and private costs and benefits • environmental impacts • impacts on beach access • location of wall on private property • erosion trends and characteristics for a specific site or area • existing use rights • encroachments • design and location • materials used
Removal of any derelict structures *(NB: relates only to those above MHWS)*	Permitted	Recognises that there are a number of derelict structures along the beach and that this issue may arise more frequently in the future
Within the 50 yr urban CHMZ: • Safety signage/structures • fencing for dune planting protection • public access way structures that connect to public land • planting of native species • maintenance of existing stormwater and stream control structures (i.e. existing as of date of proposed plan)	Permitted	These activities recognise the importance of: • developing and maintaining resilient dunes • native species to biodiversity and other ecological values managing public access • maintaining existing infrastructure

Earthworks and vegetation disturbance or clearance on dunes undertaken for the purpose of dune restoration and the associated removal of non-native plant species *(NB: in some instances a consent may also be required from the GWRC)*	Controlled Control reserved over: • method and timing of dune works • extent of any impact on immediately neighbouring areas • timing of replanting and species to be used	These activities recognise: • that it is necessary to use earthworks to re-create or restore a dune in some areas • the need to ensure a dune is of appropriate dimensions to be sustainable • the biodiversity values to be added by removal of weed species • the need to consider bird nesting/ breeding cycles • the need to minimise effects of wind erosion • that the method used must be sustainable to minimise any adverse environmental effects on the beach or surrounds • the importance of dunes as buffers
Earthworks and vegetation disturbance or clearance on dunes that does not meet the conditions of the above controlled rule *(NB: in some instances a consent may also be required from the GWRC)*	Discretionary *(any criteria to aid decisions should include the bulleted points associated with the controlled rule)*	

NB: It is assumed all other activities would be permitted, or if they cannot meet the conditions of the above rules would be non-complying.

3.10.3 OTHER METHODS

Other methods which would support the policy approach could include:

Other Method	*Reasons*
Develop guidelines for: • the management of erosion • the use and design of coastal hazard protection works • dune management and restoration approaches • triggers for the removal of inappropriate structures	Recognises that there are a variety of walls and techniques currently being used, some of which are ineffective and impact on the beach amenity and natural character Recognises the need to ensure any maintenance works undertaken on structures are appropriate for the area being managed Recognises that in the long term some of the walls are not sustainable or effective Provides clarity to property owners and would clarify best practice and what would be acceptable to Council (especially in regard of design and location of structures) Complements rule on coastal protection structures Supports natural character, biodiversity and landscape objectives Recognises that many areas of the coast currently lack a naturally functioning dune buffer.
Liaison with GWRC re: • support for managing existing use rights • ensuring compatible controls in the RCP (i.e. to facilitate dune management and avoid hard protection structures)	Recognises risk reduction can be undermined by existing use rights and that only GWRC can control this through rules in regional plans. Promotes integrated management of the coastal environment Aims to ensure that the plan provisions of the DP and RCP are aligned
Dune protection and restoration works, including care groups	Enables dunes to be managed more effectively due to community involvement and understanding of the importance of dunes Supports existing groups Provides for natural character, biodiversity and landscape outcomes Recognises that dunes are a natural coastal hazard buffer and that they will need to migrate inland if a long-term erosion trend occurs

Ensure Reserves Plans take into account the implications of the proposed coastal hazard management zones	Ensures the management of reserves is undertaken in accordance with the zone policy
Develop infrastructure adaptation plans	Avoids location of any new infrastructure in hazard risk area Encourages anticipatory adaptation for existing infrastructure in hazard management zones.
Ongoing community consultation and participation	Recognises need for ongoing conversations with community about managed retreat Ensures individuals and communities are informed of likely impacts and implications of climate change and erosion processes for the Kapiti coast Increases awareness of and participation in decision making regarding realistic options to address future hazard risk
Building Act provisions - use of annotations on land titles that identify the coastal hazard risk	Makes future owners aware of the information held by Council on hazard risk and on the risk associated with the property.
Develop a background document on issues associated with transitioning to managed retreat and abandonment of properties or hard protection structures, including: • who pays/distribution of costs • timelines/triggers for retreat/abandonment • appropriate monitoring.	Recognises that managed retreat may be required. Recognises that there is presently little guidance and practical experience on managed retreat Recognises the need to adequately provide for both property rights and coastal values.
Develop Council guidelines on use of emergency works provisions of the RMA	Provides certainty on how these provisions would be used for managing coastal hazard risk, given that it is an identified and known risk

3.11 Performance Standard

An area specific coastal hazard adaptation strategy shall include as a minimum:

- identification of the area being covered by the strategy
- consideration of the hazards posed to the specific area, including potential climate change impacts over a 100 year planning period and the likely implications
- detailed assessment of all hazard management options, including environmental, economic, social, cultural costs and benefits and long-term sustainability considerations
- integration of preferred options into a strategy that will enable a transition over time away from a reliance on shoreline armouring, including an agreement on cost sharing
- where relocation and/or retreat are elements of the strategy, details of relocatability standards (e.g. building design standards, access for building removal) and relocation destinations shall be provided
- timelines and/or triggers for implementation of the various elements of the strategy
- monitoring, as required by triggers (including triggers will be used to require relocation of any buildings)
- legal agreements noted on property titles for all properties covered by the strategy
- quantity and nature of bond or equivalent held in interest of Council to remediate the effects should the building be destroyed by a coastal hazards event, or not removed as required by a site specific coastal hazards adaptation strategy as agreed between the property owner and Council

3.12 Environmental Results Anticipated

It is proposed that Environmental Results Anticipated could include:

- Community understanding and acknowledging short-term and long-term risk.
- Community adjusting over time to coastal erosion hazard.
- No increase in existing risk
- Vulnerability reduced over time.
- Progressively less reliance on hard protection structures.
- Natural and amenity beach values protected and restored, including restoration of a dune buffer along most of the Kapiti coast.
- More resilient communities.

3.13 Monitoring and Indicators

It is proposed that the following monitoring is considered:

- monitoring of short-term and long-term erosion and accretion as required enabling future review and update of hazard lines.
- climate change projections so that hazard lines can be updated as required.
- monitoring required for coastal hazard strategies.

Monitoring change over time within coastal hazard zones could include:

- no. dwellings/lots/critical service buildings in hazard zones
- housing density (including lot coverage, intensification etc.)
- infrastructure at risk from coastal hazards
- community awareness and participation in adaptation actions
- length of coast with naturally functioning dune
- total length of coastal protection structures

3.14 Definitions

It is proposed that in addition to the relevant terms already defined in the Operative District Plan, the following definitions be included:

Building: as per operative District Plan

Coastal hazards: Coastal processes that have the potential to adversely affect human life, property or infrastructure including erosion, sedimentation, storm surge, inundation, tsunami. *(Source: GW Proposed RPS)*

Coastal processes: Dynamic natural, physical and ecological relationships and events, that are characteristically coastal in their occurrence, nature and effects, that act to shape a coastline, its landforms and features - such as, beaches, wave cut platforms – and including processes of: wave formation, breaking and dissipation; swash run-up; nearshore currents; sediment transport, erosion and deposition. *(Source: GW Proposed RPS)*

Coastal retaining wall: Any wall or similar structure which is more or less parallel to the shore, built to protect land or buildings from coastal erosion.

Infrastructure: as per operative District Plan.

Coastal hard protection structure: Any seawall, rock revetment, stop bank, retaining wall or comparable structure that would modify the seabed, foreshore or coastal land, which has the purpose or effect of protecting land above MHWS from a coastal hazard, including erosion. This includes any structure within 30 m of the shoreline that could act as a seawall should it become exposed to wave action (i.e. any wall or structure that extends below an elevation of RL 0.75 m above MSL along all or most of its length).

Natural hazard: Any natural process that can adversely affect human life, property or valued aspects of the natural environment including: earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire or flooding. *(Source: GW Proposed RPS)*

Risk: A combination of the probability of a natural hazard and the consequences that would result from an event of a given magnitude. Commonly expressed by the formula: risk = hazard x vulnerability. *(Source: GW Proposed RPS)*

Soft engineering: Works such as beach nourishment and dune rebuilding that use non-structural materials (e.g. sand, gravel, native plants) to mimic natural coastal features that can act to mitigate the impacts from natural hazards. *(Source: GW Proposed RPS).*

Vulnerability: The exposure or susceptibility of a development, building, business or community to the effects from a natural hazard event. *(Source: GW Proposed RPS)*

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APPENDIX A: EXTRACTS FROM THE NZCPS

Objective 5

To ensure that coastal hazard risks taking account of climate change, are managed by:

- locating new development away from areas prone to such risks;
- considering responses, including managed retreat, for existing development in this situation; and
- protecting or restoring natural defences to coastal hazards.

Policy 3 Precautionary approach

(1) Adopt a precautionary approach towards proposed activities whose effects on the coastal environment are uncertain, unknown, or little understood, but potentially significantly adverse.

(2) In particular, adopt a precautionary approach to use and management of coastal resources potentially vulnerable to effects from climate change, so that:

(a) avoidable social and economic loss and harm to communities does not occur;

(b) natural adjustments for coastal processes, natural defences, ecosystems, habitat and species are allowed to occur; and

(c) the natural character, public access, amenity and other values of the coastal environment meet the needs of future generations.

Policy 7 Strategic planning

(1) In preparing regional policy statements, and plans:

(a) consider where, how and when to provide for future residential, rural residential, settlement, urban development and other activities in the coastal environment at a regional and district level, and:

(b) identify areas of the coastal environment where particular activities and forms of subdivision, use and development:

(i) are inappropriate; and

(ii) may be inappropriate without the consideration of effects through a resource consent application, notice of requirement for designation or Schedule 1 of the Act process;

and provide protection from inappropriate subdivision, use, and development in these areas through objectives, policies and rules.

(2) Identify in regional policy statements, and plans, coastal processes, resources or values that are under threat or at significant risk from adverse cumulative effects. Include provisions in plans to manage these effects. Where practicable, in plans, set thresholds (including zones, standards or targets), or specify acceptable limits to change, to assist in determining when activities causing adverse cumulative effects are to be avoided.

Policy 24 Identification of coastal hazards

(1) Identify areas in the coastal environment that are potentially affected by coastal hazards (including tsunami), giving priority to the identification of areas at high risk of being affected. Hazard risks, over at least 100 years, are to be assessed having regard to:

(a) physical drivers and processes that cause coastal change including sea level rise;

(b) short-term and long-term natural dynamic fluctuations of erosion and accretion;

(c) geomorphological character;

(d) the potential for inundation of the coastal environment, taking into account potential sources, inundation pathways and overland extent;

(e) cumulative effects of sea level rise, storm surge and wave height under storm conditions;

(f) influences that humans have had or are having on the coast;

(g) the extent and permanence of built development; and

(h) the effects of climate change on:

(i) matters (a) to (g) above;

(ii) storm frequency, intensity and surges; and

(iii) coastal sediment dynamics;

taking into account national guidance and the best available information on the likely effects of climate change on the region or district.

Policy 25 Subdivision, use, and development in areas of coastal hazard risk

In areas potentially affected by coastal hazards over at least the next 100 years:

(a) avoid increasing the risk of social, environmental and economic harm from coastal hazards;

(b) avoid redevelopment, or change in land use, that would increase the risk of adverse effects from coastal hazards;

(c) encourage redevelopment, or change in land use, where that would reduce the risk of adverse effects from coastal hazards, including managed retreat by relocation or removal of existing structures or their abandonment in extreme circumstances, and designing for relocatability or recoverability from hazard events;

(d) encourage the location of infrastructure away from areas of hazard risk where practicable;

(e) discourage hard protection structures and promote the use of alternatives to them, including natural defences; and

(f) consider the potential effects of tsunami and how to avoid or mitigate them.

Policy 26 Natural defences against coastal hazards

(1) Provide where appropriate for the protection, restoration or enhancement of natural defences that protect coastal land uses, or sites of significant biodiversity, cultural or historic heritage or geological value, from coastal hazards.

(2) Recognise that such natural defences include beaches, estuaries, wetlands, intertidal areas, coastal vegetation, dunes and barrier islands.

Policy 27 Strategies for protecting significant existing development from coastal hazard risk

(1) In areas of significant existing development likely to be affected by coastal hazards, the range of options for reducing coastal hazard risk that should be assessed includes:

(a) promoting and identifying long-term sustainable risk reduction approaches including the relocation or removal of existing development or structures at risk;

(b) identifying the consequences of potential strategic options relative to the option of 'do-nothing';

(c) recognising that hard protection structures may be the only practical means to protect existing infrastructure of national or regional importance, to sustain the potential of built physical resources to meet the reasonably foreseeable needs of future generations;

(d) recognising and considering the environmental and social costs of permitting hard protection structures to protect private property; and

(e) identifying and planning for transition mechanisms and timeframes for moving to more sustainable approaches.

(2) In evaluating options under (1):

(a) focus on approaches to risk management that reduce the need for hard protection structures and similar engineering interventions;

(b) take into account the nature of the coastal hazard risk and how it might change over at least a 100-year timeframe, including the expected effects of climate change; and

(c) evaluate the likely costs and benefits of any proposed coastal hazard risk reduction options.

(3) Where hard protection structures are considered to be necessary, ensure that the form and location of any structures are designed to minimise adverse effects on the coastal environment.

(4) Hard protection structures, where considered necessary to protect private assets, should not be located on public land if there is no significant public or environmental benefit in doing so.

APPENDIX B: EXTRACTS FROM THE PROPOSED RPS

Policy 28: Avoiding subdivision and inappropriate development in areas at high risk from natural hazards – district and regional plans

Regional and District plans shall:
(a) identify areas at high risk from natural hazards; and
(b) include policies and rules to avoid subdivision; and
(c) include polices and rules to avoid inappropriate development in those areas.

Policy 50: Minimising the risks and consequences of natural hazards - consideration

When considering an application for a resource consent, notice of requirement, or a change, variation or replacement review to a district or regional plan, the risk and consequences of natural hazards on people, communities, their property and infrastructure shall be minimised, and/or in determining whether an activity is inappropriate having particular regard shall be given to:
(a) the frequency and magnitude of the range of natural hazards that may adversely affect the proposal or development, including residual risk;
(b) the potential for climate change and sea level rise to increase the frequency or magnitude of a hazard event;
(c) whether the location of the development will foreseeably require hazard mitigation works in the future;
(d) the potential for injury or loss of life, social disruption and emergency management and civil defence implications - such as access routes to and from the site;
(e) any risks and consequences beyond the development site;
(f) the impact of the proposed development on any natural features that act as a buffer, and where development should not interfere with their ability to reduce the risks of natural hazards;
(g) avoiding inappropriate development in areas at high risk from natural hazards;
(h) the potential need for hazard adaptation and mitigation measures in moderate risk areas; and
(i) the need to locate habitable floor areas and access routes above the 1:100 year flood level, in identified flood hazard areas.

Policy 51: Minimising adverse effects of hazard mitigation measures - consideration

When considering an application for a resource consent, notice of requirement, or a change, variation or replacement review of to a district or regional plan, for hazard mitigation measures, particular regard shall be given to:
(a) the need for structural protection works or hard engineering methods;
(b) whether non-structural or soft engineering methods are a more appropriate option;
(c) avoiding structural protection works or hard engineering methods unless it is necessary to protect existing development or property from unacceptable risk and the works form part of a long-term hazard management strategy that represents the best practicable option for the future;
(d) the cumulative effects of isolated structural protection works; and
(e) residual risk remaining after mitigation works are in place, so that they reduce and do not increase the risks of natural hazards.

APPENDIX C: EXTRACTS FROM THE OPERATIVE DISTRICT PLAN

Note: this chapter applies to all Natural Hazards and not just coastal hazards

OBJECTIVE 1.0
TO MANAGE ACTIVITIES AND DEVELOPMENT WITHIN NATURAL HAZARD PRONE AREAS SO AS TO AVOID OR MITIGATE THE ADVERSE EFFECTS OF NATURAL HAZARDS.

POLICY 1
Permit subdivision and development where the effects of natural hazards can be avoided, remedied or mitigated.

POLICY 2
Ensure services are designed to resist natural hazard events.

POLICY 3
Ensure appropriate uses, zones and performance standards are developed for areas known to be liable to flooding and erosion, coastal erosion and ground rupture from faults.

POLICY 4
Ensure there are flood and erosion free building sites within newly created allotments.

POLICY 5
Promote awareness of natural hazards encouraging the community to mitigate and avoid the adverse effects of hazards ~ through emergency management programmes and procedures and voluntary actions.

POLICY 7
Avoid and/or mitigate the potential adverse effects of flooding and erosion from major rivers and the sea on:

human life, health and safety,
private or community property,
flood mitigation works, and
other natural and physical resources

when planning for and making decisions on new subdivision, use and development within river corridors and adjacent to the sea.

POLICY 8
Recognise the ability of natural features (such as sand dunes and river berms) to buffer development from natural hazards through performance standards including minimum setbacks for new and relocatable buildings.

POLICY 9
When assessing discretionary activities within a river corridor, ponding area, overflow path, flood erosion area or flood storage area consider the following:

• The effects of the development on existing flood mitigation structures.
• The effects of the development on the flood hazard - in particular flood levels and flow.
• Whether the development redirects floodwater onto adjoining sites or other parts of the floodplain.
• Whether the development reduces storage capacity and causes adverse effects on adjoining sites or other parts of the floodplain.
• Whether access to the site/development will adversely effect the flood hazard.

POLICY 10
Apply a higher level of control to subdivision and development in direct risk flooding areas, with a generally lesser level of restriction in residual overflow risk areas and no controls within residual ponding risk areas.

Anticipated Environmental Outcomes

(i) Subdivision, use and development does not increase the scale of the existing natural hazard.

(ii) The reduction of the effects of natural hazards where possible to minimise damage to property, land and life in areas exposed to the hazard.

(iii) People within the District are better prepared to cope with the occurrence of natural hazard events.