Section 32 report:
Natural hazards

for the Proposed Natural Resources Plan for the Wellington Region

greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

Issues and Evaluation Report

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Section 32 report: Natural hazards

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GW/EP-G-15/53
#1393138

July 2015

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1. Overview and purpose

This evaluation report provides an analysis of the appropriateness, costs and benefits of the natural hazards objectives, polices and methods to be included in the Proposed Natural Resources Plan (referred to as the proposed Plan or the PNRP) as required under section 32 of the Resource Management Act 1991 (RMA).

The report starts by discussing what a natural hazard is and introducing the hazardscape of the region. It outlines the statutory regulations that the Wellington Regional Council (WRC) must give effect to for the management of natural hazards and the non-regulatory documents that are available to guide the development of provisions and decision making. The report then moves onto a review of the provisions in the current suite of operative regional plans and evaluates their efficiency and effectiveness. This forms the basis for identifying the significant natural hazard issues and objectives. The discussion then focusses on how the natural hazard provisions (policies, rules and other methods) are the most appropriate way to achieve the purpose of the RMA. It outlines the extent to which the provisions are the most appropriate way to achieve the natural hazards objectives, assesses the efficiency and effectiveness of the provisions and summarises the reasons for choosing the proposed provisions.

This report should be read in conjunction with the introduction to understand the context and approach of the evaluation undertaken in the development of the proposed Plan.

1.1 Section 32 Resource Management Act 1991 requirements

Section 32 of the RMA states the requirements for preparing and publishing evaluation reports. The evaluation report must examine the extent to which the objectives are the most appropriate way to achieve the purpose of the Act and examine whether the provisions are the most appropriate way to achieve the objectives. Section 32(2) of the RMA states that when preparing a proposed plan, local authorities must make an assessment of the benefits and costs of the provisions. Specifically, the assessment under subsection 32(1)(b)(ii) must:

> *(a) identify and assess the benefits and costs of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions, including the opportunities for—*
>
> *(i) economic growth that are anticipated to be provided or reduced; and*
>
> *(ii) employment that are anticipated to be provided or reduced; and*
>
> *(b) if practicable, quantify the benefits and costs referred to in paragraph (a); and*
>
> *(c) assess the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the provisions.*

1.2 Natural hazards and planning challenges

Natural phenomena such as coastal erosion, river floods or landslides do not, on their own, constitute a natural hazard. They become *natural hazards* when they have the potential to adversely affect our communities and lives. Thus, the concept of a natural hazard embodies both the natural process and human behaviour and interaction with the natural environment. When we choose to build and locate our developments in areas subject to these natural processes, often unavoidably, we expose ourselves to natural hazards.

A natural hazard is defined in the RMA as:

> *"…any atmospheric or earth or water-related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire or flooding) the action of which adversely affects or may adversely affect human life, property or other aspects of the environment".*

This definition of natural hazards includes events that "adversely affect or *may* adversely affect human life, property or other aspects of the environment". Thus, it not only encompasses events that have occurred, but embodies the concept of potential. This has implications for natural resource management and hazards planning, because it directs local authorities to consider events that may occur in future. It is especially important considering the impacts that climate change will bring to bear on the natural environment and communities of the Wellington Region.

When considering the long-term impacts from natural hazards, the magnitude to frequency relationship for many events, such as earthquakes or tsunami, mean that low probability, large impact events are often not represented within a 10 or even 100 year time frame. This creates planning challenges in how we can reasonably manage the impacts from future hazard events without being overly restrictive in allowing development to occur.

It is an important to distinguish the difference between the *hazard* and the *risk.* Hazard risk is a combination of both the *likelihood* and *consequences* of a hazard event. The consequences of a hazard event depend on how many people and assets are exposed and the vulnerability of those people and assets. As the frequency or magnitude or the potential effects of a hazard increases, so too does the risk. This is a concept that is embodied in the *risk based* approach to hazards management.

Taking a risk based approach to hazards management means that some types of development may be acceptable in hazard prone areas because the risk of damage from a natural disaster is considered low. Conversely, some types of development, such as critical lifelines or emergency services that are more sensitive to disruption, may be more suitably located in areas considered less hazard prone. Hazard management and planning rarely eliminates the risk, but it may significantly reduce the impacts of an event. The risk that remains after hazard planning and mitigation measures are put in place is called the residual risk.

Comprehensive risk management encompasses the '4Rs' of hazard management: Reduction, Readiness, Response and Recovery. Good hazard management requires integrated action across these four components to effectively reduce the risk from natural hazards. Resource management is embodied in the first R – reduction. Where reduction and readiness fail to prevent losses during a hazard event, a civil defence and emergency management and post-event recovery response is required. Ideally, hazard risk management is responsive to local conditions. It should be based on good information and sound decision making by local authorities in partnership with a community informed and aware of the risks.

Management options to reduce hazard risk include:

- Policy and planning measures that seek to control land use and activities in areas that are subject to natural hazards
- Mitigation measures that seek to control natural processes, either through natural or engineering methods
- Designing and adapting infrastructure to withstand hazard events
- Emergency management planning to enable communities to respond to and recover from hazard events

Often a mixture of options is used to manage hazard risk in an area. This means using measures to control hazards, as well as managing people and assets to reduce a community's vulnerability to natural disasters. Decisions are often made within a political environment that seeks to balance competing needs and resources and these decisions can be either positive or detrimental. Thus, it is important that all matters relating to hazards management are carefully considered, taking into consideration the longer term implications for allowing development in hazard prone areas.

1.3 Natural hazards in the Wellington Region

The Wellington Region has one of the most physically diverse environments in New Zealand with a mix of hill country areas and lowlands, large flood plains and 500 km of coastline all of which is bisected by faults. It is also one of the most populous regions with over 470,000 residents. With the exception of geothermal activity, the Wellington Region is subject to all of the natural hazards included in the RMA definition. Consequently, our communities are affected by a wide range of natural hazards.

For the purposes of the proposed Plan, the regulatory focus is limited to use and development in the beds of lakes and rivers and the coastal marine area and hazards associated with soil erosion, rivers, lakes and the coast. Land use decision making is the responsibility of the territorial authorities and rules addressing natural hazards in areas outside of beds of lakes and rivers and the coastal marine area are contained within city and district plans. Most seismic hazard considerations are the responsibility of territorial authorities, but there are situations where faults pass through the CMA or river beds. More detail

about the issues can be found in the proposed Plan review natural hazards issues and topic reports.

People's actions, including ongoing development in areas at high risk from natural hazards and in some cases mitigation measures, can cause or increase the risk from natural hazards. For example, seawalls or groynes can cause localised erosion of the adjacent shoreline. Stopbanks and seawalls can also create a sense of security and encourage further development, increasing the extent and value of the assets at risk.

Much of the development in the Wellington Region has occurred in coastal areas and on floodplains. Some of this development has been located in places that are vulnerable to flooding, coastal erosion and/or inundation. Flood management is currently the most costly hazard that the Wellington Regional Council must deal with, both in terms of direct impacts from flood events and in the provision of mitigation measures. In recent years, coastal development and associated infrastructure has intensified, and property values have increased rapidly. As development and property values increase, the potential impacts and consequences (cost of property damage) of natural hazards also increase. This places pressure on local government agencies to allow the construction of hazard mitigation structures such as seawalls and stopbanks that can have adverse effects on the natural environmental.

Climate change effects have the potential to increase both the frequency and magnitude of natural hazard events that already occur in the region. Changes in regional climate are expected to increase the intensity and duration of westerly weather systems and reduce easterly conditions. This will exacerbate differences in the regional climate, by bringing higher rainfall to the west and reducing coastal rains in the east, heightening the drought risk in the Wairarapa. It will also bring longer periods of northerly gales to the entire region, particularly in the spring months. Western and southern areas of the region may also have higher rainfall in the winter, increasing the landslide risk during wet winters, particularly in extreme rainfall events. This will put pressure on stormwater systems and flood protection works. Higher rainfall may also result in higher rates of sedimentation at river mouths and in estuaries, increasing the flood risk in those areas by raising the base level of the river bed. Droughts will occur more frequently and persist for longer periods. Research suggests that winter rainfall will decline in the long term, which may lead to a reduction in groundwater recharge rates and put pressure on water resources. Dry conditions result in a heightened risk of wild fire.

A major consequence of climate change is sea level rise. An analysis of the long term trends of local sea level using the tide gauge in Lambton Harbour shows that since the late 19th Century, sea level has been rising at 2.1 mm/yr. This amounts to over 0.26 m of sea level rise since records began. Considering that the tide range for much of the region is around 1.0 m or less, this amounts to a significant increase in the tide range over the past 125 years.

Sea level has the potential to rise by around 1.0 m by 2115. The main natural hazards associated with a rise in sea levels are coastal erosion and inundation. Sea level rise will put increasing pressure on the beaches to absorb the impacts

of storm events. If a beach is unable to retreat landward in response to sea level rise, due to development such as roads and houses, it will eventually result in the loss of the beach. As the shoreline adjusts, sediment will be redistributed around the coast and may cause shorelines to form new orientations. Beaches that are currently stable may begin to erode as the shoreline adjusts to a higher water level, while those that are currently eroding may experience an increased rate of retreat.

Other impacts we may expect with a rise in sea level include, impeded stormwater drainage; longer periods of surface flooding in low lying coastal areas due to sea levels pushing up groundwater levels; increased river flooding due to higher water levels at river mouths restricting flood outflows. Dealing with the larger costs associated with risks of coastal hazards and increased flooding caused by climate change presents a significant challenge for the region and Wellington Regional Council over the coming decades.

Commonly, there are two or more hazards associated with a given event. For example, a storm may cause river flooding, landslips and coastal inundation from storm surge and high waves. This means that hazards management needs to be all-hazards focussed and integrated to deal with the range of hazards that may occur simultaneously.

2. Regulatory and policy context

There are a number of statutes and policy statements, both national and regional, which have relevance to managing natural hazards and to which the proposed Plan has to give effect. There are also a range of guidance documents, that have no legal effect, but which provide useful information to assist managing natural hazards in a resource management context.

2.1 National statutory requirements

2.1.1 Resource Management Act 1991

The RMA provides a mandate for Regional Councils to manage natural hazards, climate change impacts and the effects of hazard mitigation measures on the environment. It is the primary statute driving the development of a regional plan and hazards provisions within the proposed Plan. There are two main Parts in the Act that address natural hazards and the resource management related impacts associated with hazards management. Part 2 – Purpose and principles, addresses the adverse impacts that the management of natural hazards can have on the environment and; Part 4 – Functions, powers, and duties of central and local government that deals more directly with natural hazards.

Part 2 matters of the Act relevant to natural hazards can be found in sections 5 – Purpose and 7 – Other matters, that address the effects that natural hazards can have on a community and the impacts that human activities can have on the natural environment whilst attempting to mitigate natural hazards: Section 5(2) states that "…sustainable management means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural well-being and for their health and safety while; (a) sustaining the

potential of natural and physical resources to meet the reasonably foreseeable needs of future generations; (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment." And, Section 7 "…all persons exercising functions and powers… in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to; (b) the efficient use and development of natural and physical resources; (g) any finite characteristics of natural and physical resources and; (i) the effects of climate change."

Whilst these two sections do not explicitly mention natural hazards, there are many activities involved in the mitigation of natural hazards that may be considered under section 5 and 7 matters. For example, building a seawall can have adverse effects on a beach, thus, there is a requirement to avoid, remedy or mitigate these effects. Similarly, development that occurs in the back dunes of a beach may not be considered an efficient use of those resources if it involves destroying a natural buffer to coastal erosion that subsequently requires expensive mitigation structures to control. Currently, there is discussion of expressly including natural hazards in section 7 as a matter for consideration, but no decision regarding this had been made at the time the proposed Plan was released.

Natural features such as dunes and wetlands are finite resources that have been heavily utilised and degraded in many places. The future use and impacts that development has on these areas requires special consideration.

The 2004 amendments to the RMA required that climate change effects be taken into consideration in Part 2(7) matters. This is especially important in managing the impacts from natural hazards, as climate change has the potential to exacerbate many of the natural hazards that already occur in the region, such as flooding and landslips from increased rainfall intensity and coastal erosion and inundation from storm surge events.

Part 4 of the Act has a number of sections and subsections that directly require regional and district councils to manage the effects of natural hazards. Section 30(1) states "Every regional council shall have the following functions for the purpose of giving effect to this Act in its region; (c) the control of the use of land for the purpose of (iv) the avoidance or mitigation of *natural hazards*; (d) in respect of any coastal marine area in the region (v) any actual or potential effects of the use, development, or protection of land, including the avoidance or mitigation of *natural hazards* and the prevention or mitigation of any adverse effects of the storage, use, disposal, or transportation of hazardous substances and; (g) in relation to any bed of a water body, the control of the introduction or planting of any plant in, on, or under that land, for the purpose of (iv) the avoidance or mitigation of *natural hazards*.

Section 35(1) and 35(5)(j) both state that local authorities have a duty to gather information, undertake or commission research and keep records of natural hazards, as is necessary to carry out its functions under the RMA. This provides a mandate for the Wellington Regional Council to conduct natural

hazards research and maintain information on the effects of natural hazard events.

In addition to the general requirements to manage natural hazards and hazard related impacts in Part 2 and 4 of the Act, Part 6 – Resources consents and Part 10 – Subdivisions and reclamations also contain some relevant sections for managing the effects of natural hazards. The RMA grants local authorities powers under Part 6 section 106 and Part 10 section 220 to refuse subdivision if it considers that: section 106 (a) the land in respect of which a consent is sought, or any structure on the land, is or is likely to be subject to material damage by erosion, falling debris, subsidence, slippage, or inundation from any source; or (b) any subsequent use that is likely to be made of the land is likely to accelerate, worsen, or result in material damage to the land, other land, or structure by erosion, falling debris, subsidence, slippage, or inundation from any source. Section 220(1) provides that a council may impose a condition on a subdivision consent for the (d) protection of the land or any part thereof, or of any land not forming part of the subdivision, against erosion, subsidence, slippage, or inundation from any source.

Whilst these provisions will be more commonly used by a territorial authority, the regional council may be party to Environment Court proceedings under Part 11 section 274, where a development or subdivision is proposed adjacent the coastal marine area or the bed of a lake or river, which may be affected by natural hazards due to the proximity of its location to those areas.

2.1.2 Soil Conservation and Rivers Control Act 1941

Regional councils also manage rivers and catchments under the Soil Conservation and Rivers Control Act 1941 (SCRCA) which includes provisions for "the prevention of damage by erosion" and "the protection of property from damage by floods". The SCRCA provides a mandate for the maintenance and control of waterways for the purposes of flood hazard mitigation. Within the general powers (section 126) of the Act, the principal function of the regional council is to minimise and prevent damage within its region from flooding and erosion. It allows regional councils to maintain and improve watercourses to avoid flooding and erosion. Many parts of this Act have been repealed, updated and included into sections of other legislation and there are moves to completely repeal the Act and append the remaining functions into the RMA.

2.1.3 Civil Defence Emergency Management Act 2002

The purpose of the Civil Defence Emergency Management Act 2002 (CDEMA) is to improve and promote the sustainable management of hazards in a way that contributes to the social, economic, cultural and environmental well-being and safety of the public and the protection of property.

It provides for planning and preparation for emergencies and for response and recovery in the event of an emergency. It requires local authorities to co-ordinate, through regional groups, planning, programmes and activities related to civil defence emergency management across the areas of reduction, readiness, response and recovery (the 4 R's) and encourages co-operation and

joint action within those regional groups. In this regard, local resource management planning, in relation to natural hazards, has a clear direction from the CDEMA to integrate planning and management of natural hazards across the range of agencies that implement and give effect to the RMA and can contribute to the 'reduction' principle of hazards management.

The CDEMA requires regional councils to produce a civil defence emergency management group plan. The purpose of the Wellington Region Civil Defence Emergency Management Group Plan 2014-2018 (the Group Plan) is to enable the effective and efficient management of natural, biological and technological hazards for which a coordinated approach would be required to manage an incident. It provides a strategic direction for the civil defence emergency management group and contains a framework for the management of emergencies.

The Regional Policy Statement for the Wellington Region (RPS) is required to take the civil defence emergency management group plan into consideration, which consequently informs the regional plan.

The first Group Plan was approved in 2005. This was reviewed in 2011-2012 and the second generation Group Plan was made operative in 2013. The Group Plan analyses all the hazards the affect the region and ranks them according to their effects and the vulnerability of the community and it contains operating procedures for the response to these hazard events. One of the aims of the review was to put a greater focus on hazard planning for the 'reduction' principle of hazard management that was lacking in the first plan.

More about the group plan will be discussed in Section 3.2.

2.1.4 Local Government Act 2002

The avoidance or mitigation of natural hazards is a 'core service' to be provided by local government under section 11A of the Local Government Act 2002 (LGA).

Section 101A of the LGA states that local authorities must prepare long term plans (LTPs) outlining council expenditure over a 10 year period. As part of the LTP process local authorities must prepare asset management plans for network infrastructure, flood protection and flood control works outlining what the expected capital expenditure will be in order to maintain existing levels of service. Through the LTP and asset management planning process, local authorities must make decisions about what level of natural hazard protection their assets are to provide (in the case of flood protection works) or what level of event they are to withstand (in the case of network infrastructure).

An amendment to the LGA has amended section 101A to require a separate infrastructure strategy with a 30-year planning horizon. It also explicitly requires consideration of the resilience of infrastructure to natural disasters and the identification and management of risks relating to such hazards in order to ensure appropriate financial provision is made to manage the risks posed by natural hazards.

Hazard management planning, as provided through the regional policy statement and the regional plan, is intimately connected to the LTP process and its attendant asset and infrastructure management plans. The regional plan can control where development should or should not occur in the coastal marine area and the beds of lakes and rivers and can set the over-arching direction for the scale and pattern of development in areas that may be used for asset and infrastructure development. In this way it can help the development of more resilient infrastructure and has an important role to reduce the risks posed from natural hazards.

2.1.5 Building Act 2004

The Building Act 2004 (BA) is the legislation that governs the building industry in New Zealand. The Building Act aims to improve control of, and encourage better practices in, building design and construction. It is used by territorial authorities in the issuing of building consents. It usually only needs to be taken into consideration if the regional council is involved in a joint consent with a territorial authority or as a section 274 RMA party in a hearing for a development in the coastal marine area or in the bed of a lake or river.

The relevant sections of the Building Act are sections 71 to 74 which relate to the approval of building consents where land on which the building is to be located is subject to a natural hazard. For the purposes of this Act a natural hazard is defined as erosion, falling debris, subsidence, inundation and slippage. Section 71 states that a building consent authority must refuse building consent if the land on which the work is to proceed is likely to be subject to one or more natural hazards or is likely to accelerate, worsen or result in a natural hazard on land or any other property. However, under section 72, consent must be granted if appropriate remedial measures are put in place.

2.2 National policy statements

2.2.1 New Zealand Coastal Policy Statement 2010

There are a number of policies in the New Zealand Coastal Policy Statement 2010 (NZCPS) that are relevant to managing natural hazards. The NZCPS is a policy document mandated under the RMA that provides direction on how local authorities and decision makers should approach the management and protection of coastal resources in planning documents (regional plans, district plans, and regional policy statements). Resource management plans must ‘give effect’ to relevant provisions of the statement. Consent officers, hearing commissioners and other authorities making decisions on resource consents must ‘have regard’ to relevant provisions within the statement. It applies to the coastal marine area, from the mean high water springs out to 12 nautical miles offshore.

A key issue identified in the NZCPS in relation to coastal hazards is; “the continuing coastal erosion and other natural hazards that will be exacerbated by climate change and which will increasingly threaten existing infrastructure, public access and other coastal values as well as private property”.

Addressing this is 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

There are four main policies that address the management of coastal hazards in the NZCPS. The natural hazards provisions in the RPS are consistent with the NZCPS policies.

(i) Policy 24

Policy 24, requires councils to; "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 by having regard to a range of factors including physical processes, short and long term erosion cycles, climate change impacts and sea level rise.

The 100 year planning horizon is an important inclusion, as the Building Act 2004 only requires a 50 year planning timeframe and this is becoming increasingly at odds with the best practice for hazards planning of using the 1:100 year or 1% annual exceedance probability (AEP) event. This is important when considering future impacts of natural hazards. The RMA explicitly includes *potential* impacts in the definition of natural hazards.

Climate change is becoming increasingly important as estimates of future sea level rise are revised upwards in light of current research and ongoing measurements that indicate that sea level rise is accelerating.

There is a method in the RPS for research to be conducted into identifying hazard areas and to provide information for regional and district plan purposes. Currently, a region wide storm surge and coastal inundation project is underway to identify vulnerable coastal locations.

(ii) Policy 25

Policy 25 addresses subdivision, use and development in areas of coastal hazard risk and requires that; "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". The policy includes managed retreat as a possible management strategy. Managed retreat has been a politically and socially charged issue in coastal areas, but with the forecasts of sea level rise it will become an option that requires genuine consideration.

The policy also discourages the use of hard protection structures by recognising that hazard protection works can have an adverse impact on the coastal environment and that the capital outlay and maintenance cost of these works is expensive for the community. Hard engineered structures encourage

ongoing development behind the works, thereby increasing the residual risk and heightening the cost of damages if the protection works fail.

(iii) Policy 26

Policy 26 encourages the use of natural defences against coastal hazards by; "providing 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 and to; (2) recognise that such natural defences include beaches, estuaries, wetlands, intertidal areas, coastal vegetation, dunes and barrier islands." These features can provide natural protection from coastal hazards and should be preserved, maintained and protected from development that acts to diminish this capacity. This is supported by policies 11, 14 and 15 that address indigenous biodiversity, restoration of natural character and the protection of natural features and landscapes.

(iv) Policy 27

Policy 27 outlines strategies for protecting existing development from coastal hazard risk by; "promoting and identifying long-term sustainable risk reduction approaches including the relocation or removal of existing development or structures at risk." It also recognises that hard protection structures may be the only practical means to protect existing infrastructure but that approaches should focus on risk management that reduce the need for hard protection structures and similar engineering interventions.

There are also other policies in the NZCPS that support coastal hazard management.

Policy 1 considers the extent and characteristics of the coastal environment, and recognises that this also includes (d) "areas at risk from natural hazards". Natural hazards are seen as a natural part of the functioning coastal environment. This is an important concept because in the past it has been common to view natural hazards and the processes that drive them as unnatural and something to be prevented. In order to manage the effects of coastal hazards, we need to understand the natural processes of the coastal system and work with these rather than trying to fight against them.

This approach is akin to the Māori worldview of natural resources management. Policy two, that addresses Treaty issues and Māori heritage states that when taking account of the principles of Te Tiriti o Waitangi/Treaty of Waitangi and kaitiakitanga in relation to the coastal environment we must (f) "provide for opportunities for tangata whenua to exercise kaitiakitanga over waters, forests, lands, and fisheries in the coastal environment through such measures as, (i) bringing cultural understanding to monitoring of natural resources". There will be instances when this applies to natural hazards management, particularly in situations where the need for hazard mitigation measures are being considered and the options involve either hard engineered structures or natural restoration. In this instance one worldview is to fight against nature, and the other is to work with the natural environment and allow

coastal processes room to operate, even if this involves natural fluctuations of the shoreline.

Policy 3 outlines the precautionary approach and states that a precautionary approach must be adopted towards proposed activities whose effects on the coastal environment are uncertain, unknown, or little understood, but potentially significantly adverse. This applies particularly around the use and management of coastal resources potentially vulnerable to effects from climate change, so that:

1. Avoidable social and economic loss and harm to communities does not occur, and

2. Natural adjustments for coastal processes, natural defences, ecosystems, habitat and species are allowed to occur

Policy 4 addresses the need for integration across administrative boundaries, recognising that particular consideration must be given to situations where (i) "subdivision, use or development and its effects above or below the line of mean high water springs will require, or is likely to result in, associated use or development that crosses the line of mean high water springs" and (v) "significant adverse cumulative effects are occurring, or can be anticipated". In other words, activities above the mean water springs can have an impact on the coastal marine area and decision makers need to be aware of this and plan to minimise this happening. An example is the effect that stormwater outfalls draining above the mean high water springs have on the foreshore by increasing the erosion risk.

2.3 National guidance documents

A number of guidance manuals published by Ministry for the Environment address hazards management and provide guidance for local authorities in the planning and decision making process. Many of these provide specific advice and hazard management principles that can be incorporated into the proposed natural hazard provisions.

2.3.1 Coastal hazards

A lot of development in the Wellington Region has occurred in coastal areas. Some of this development has been located in places that are vulnerable to coastal erosion and inundation. In recent years, coastal development and associated infrastructure has intensified, and property values have increased enormously. As development and property values in coastal margins increase, the potential impacts and consequences of coastal hazards also increase. Managing this escalating risk over the coming decades now presents a significant challenge for local authorities. Moreover, climate change will exacerbate existing coastal hazards.

Many land use planning decisions have long term implications because of the permanency of built infrastructure. Whilst it is a requirement under the RMA to manage the effects of climate change and coastal hazards, it is also good practice to consider climate change and longer term coastal change in coastal

planning. Three guidance manuals that are relevant for coastal hazards management are:

- "Planning for Climate Change Effects on Coastal Margins." *Ministry for the Environment* (2001)

- "Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand, 2nd edition." *Ministry for the Environment* (2008)

- "Preparing for Coastal Change: A Guide for Local Government in New Zealand." *Ministry for the Environment* (2009)

These documents are designed to support local authorities in managing coastal hazards and the increased pressures that climate change will bring to bear on coastal margins. They contain a lot of guidance that is relevant to policy development for regional plans. They contain specific examples about the effects of climate change on coastal hazards and provide best practice guidance to strengthen the integration of coastal hazards into the land use planning and consent decision process. In particular, they outline risk assessment frameworks for incorporating coastal hazards and climate change considerations into the decision making process and promote the development of long term adaptation strategies for managing coastal hazard risk.

2.3.2 Flood hazards

Flooding is the most costly hazard that the Wellington Regional Council must manage and inflicts the greatest cost on the community in terms of direct impacts from flood events and mitigation measures. Climate change is expected to increase the hazards associated with flooding through increased intensity rainfall events.

In 2008, the Ministry for the Environment and the flood risk management and river control review steering group released a report entitled "Meeting the Challenges of Future Flooding in New Zealand". The report presented a vision for flood risk management in New Zealand to reduce the consequences of flooding. The findings from this report were incorporated into the guidance document:

- "Preparing for Future Flooding: A Guide for Local Government in New Zealand." *Ministry for the Environment* (2009).

The principles to guide future flood risk management policy can be summarised as:

- Take a precautionary approach to decision-making taking into account the level of risk, residual risk, existing knowledge and accounting for uncertainties

- Use progressive risk reduction; new developments should not be exposed to, nor increase, flood risk over their intended lifetime. for existing developments the level of risk should be progressively reduced

- Respect environmental limits and natural processes, including river and catchment processes, and protecting the life-supporting capacity of water, soil and ecosystems

- Integrate flood risk management with sustainable land management and catchment management policies and decisions that affect the magnitude of flooding and/or the consequences of flooding

- Consider the consequences of flooding, including the resilience and vulnerability of communities and infrastructure as well as the risk to life and property

- Ensure individuals and communities take primary responsibility for their safety and livelihoods and include communities as part of the decision making about levels of acceptable risk and mitigation measures for those communities

- Take a partnership approach with, and between, central government, local authorities, communities and Māori

- Take an adaptive management approach that is responsive to change over time and that optimises sustainable structural, non-structural and emergency management solutions

2.3.3 Climate change hazards

Regional councils are responsible for a range of functions that may be affected by climate change, under both the LGA and the RMA, including management of water resources and natural hazards. Two manuals that provide guidance for the inclusion of climate change effects in the proposed Plan are:

- "Climate Change Effects and Impacts Assessment: A Guidance Manual for Local Government in New Zealand, 2nd Edition." *Ministry for the Environment* (2008)

- "Preparing for Climate Change: A Guide for Local Government in New Zealand." *Ministry for the Environment* (2008).

These manuals are designed to help local authorities identify and understand opportunities and hazards that climate change poses for their functions, responsibilities and infrastructure.

Specifically, the manuals provide projections of future climate change around New Zealand and compare these projections with present climate extremes and variations. They identify potential effects on local government functions and services and outline methods for assessing the likely magnitude of such effects. They also explain how this information can be applied to assess the risk associated with various climate change impacts and provide guidance on incorporating climate risk assessments into local government regulatory and planning processes. Thus, they will have relevance to the development of climate change policies in the regional plans.

2.3.4 Seismic hazards

In March 2001, the Parliamentary Commissioner for the Environment released the report "*Building on the Edge – The Use and Development of Land On or Close to Fault Lines*." The Commissioner's investigation arose following public concern that local authorities were not able to adequately manage the use and development of land on or close to active faults. The PCE report focused on the Building Act 2004 and the Resource Management Act 1991. One of the key conclusions of the report was that few local authorities identify and plan for seismic hazards, despite their responsibilities for subdivision and land use.

The Wellington Region is seismically active. Faults cross through many bodies of water in the region including Cook Strait, Wellington Harbour (Port Nicholson), Te Awarua-o-Porirua Harbour and along the Kāpiti Coast. They also run along or close to lakes and rivers, such as the Hutt Valley and Lake Wairarapa Moana. There are frequently activities and developments that are proposed in fault zones, for example, when planning flood protection works or redeveloping a wharf. Controlling the development of land on or close to active faults is a RMA issue. Thus, there are seismic hazards to consider in use and development in these areas. A guidance manual that addresses planning and management around active faults is:

- "Planning for Development of Land on or Close to Active Faults." *Ministry for the Environment* (2003).

This document provides planning guidelines to consider when planning development close to faults that will have relevance to hazards policy development in regional plans. The guideline encourages local authorities to minimise the hazard risk and the time it takes for individuals, communities, and the government to recover from fault rupture events. It aims to assist planners and emergency managers to avoid or mitigate the fault rupture hazard. The guidelines propose a risk-based approach, based on risk management standard AS/NZS 4360:1999 (latterly AS/NZS ISO 31000:2009).

The guide is based on four over-arching principles of hazard management:

1. Gather accurate active fault hazard Information
2. Plan to avoid fault rupture hazard before development and subdivision
3. Take a risk-based approach in areas already developed or subdivided
4. Communicate risk in built up areas subject to fault rupture

It recommends that councils:

- Identify active faults in their district, with maps that are at the right scale for the purpose
- Create fault hazard avoidance zones on their district planning maps

- Evaluate the fault rupture hazard risk within each fault avoidance zone
- Avoid building within fault hazard avoidance zones where possible
- Mitigate the fault rupture hazard when building has taken place or will take place within a fault hazard avoidance zone

2.3.5 Landslide hazards

There are also documents that address land use based activities that have relevance to hazards management. Activities involved in soil conservation may also assist in stabilizing slopes and mitigating landslide hazard. A guidance manual has been produced by GNS Science that addresses the management of landslide prone land that will be useful in the development of the regional plans:

- "Guidelines for Assessing Planning Policy and Consent Requirements for Landslide Prone Land." *Geological and Nuclear Sciences* (2007).

This guideline has been written primarily to assist decision makers in determining whether policy and planning documents and resource consent applications at regional and district levels incorporate appropriate information on slope instability hazards. It provides information on the criteria used to assess landslide hazards at the consent stage, and examples of issues, objectives, policies, rules, and assessment criteria. Basic landslide concepts are outlined to assist in understanding landslide processes, hazards and risk assessment. It includes examples of how landslides and slope instability issues can be incorporated into hazard planning documents, to assist in formulating policy and justifying resource consent decisions.

2.3.6 Natural hazards guidance principles

There are four main planning principles that can be boiled down from these national guidance documents. These principles have influenced the development of the natural hazards objectives and policies in the proposed Plan.

1. *Precautionary approach:* A precautionary approach is adopted when making planning decisions relating to new development, and to changes to existing development. Decision making takes account of the level of risk, utilises existing scientific knowledge and accounts for scientific uncertainties

2. *Progressive risk reduction:* New development is not exposed to, and does not increase the levels of, natural hazard risks over their intended lifetime. Progressively, the levels of risk to existing development are reduced over time

3. *Importance of natural features:* The dual role of the natural environment as the fundamental form of defence and as an environmental, social and cultural resource is recognised in the decision making processes and, consequently, the margins of coasts, rivers and lakes are protected and/or restored to provide a buffer from natural hazards

4. *Integrated, sustainable approach:* An integrated and sustainable approach to the management of development and natural hazard risk is adopted, which contributes to the cultural, social and economic well-being of people and communities.

To achieve these principles the Wellington Regional Council will need to:

- Identify and effectively account for natural hazards, vulnerabilities and potential consequences in coastal areas and on floodplains

- Communicate effectively to build community awareness, and public and political support for activities associated with hazard risk planning

- Engage the community in consultation and participation in achieving effective community planning outcomes

- Take an adaptive management approach that is responsive to change over time and that balances sustainable structural, non-structural approaches

2.4 Regional policy

2.4.1 Regional Policy Statement for the Wellington Region

The Regional Policy Statement for the Wellington Region (RPS) contains policies to which the proposed Plan must give effect. The RPS identifies three regionally significant resource management issues for natural hazards:

1. *Effects of natural hazards*

    - Natural hazard events in the Wellington Region have an adverse impact on people and communities, businesses, property and infrastructure

2. *Human actions can increase risk and consequences from natural hazards*

    - People's actions including mitigation measures and ongoing development in areas at risk from natural hazards can cause, or increase, the risk and consequences from natural hazards

3. *Climate change will increase both the magnitude and frequency of natural hazard events*

    - Climate change will increase the risks from natural hazard events that already occur within the region, particularly:

        a) sea level rise, exacerbating the effects of coastal erosion and inundation and river flooding in low lying areas, especially during storm surge

        b) increased frequency and intensity of storm events, adding to the risk from floods, landslides, severe wind, storm surge, coastal erosion and inundation

c) increased frequency of drought, placing pressure on water resources and increasing the wild fire risk

Three policies deal with these issues that will have implications for the regional plans hazard policies and rules and a fourth policy allocates responsibility among local authorities for managing natural hazards in the Wellington Region.

(i) Policy 28

Policy 28 directs regional, city and district councils to avoiding inappropriate subdivision and development in areas at high risk from natural hazards. Plans are required to: 1. identify areas at high risk from natural hazards; and 2. include policies and rules to avoid inappropriate subdivision and development in those areas.

(ii) Policy 50

Policy 50 directs regional, city and district councils to minimise the risks and consequences of natural hazards when considering resource consent applications, a notice of requirement or district or regional plan reviews. The policy requires that the risk and consequences of natural hazards on people, communities, their property and infrastructure shall be minimised by considering a range of factors including; the frequency and magnitude of natural hazards; climate change and sea level rise; potential future need for hazard mitigation works; potential for injury or loss of life and; any civil defence emergency management implications.

(iii) Policy 51

Policy 51 directs regional, city and district councils to minimise the adverse effects of hazard mitigation measures when considering an application for a resource consent, a notice of requirement, or a plan review. The policy requires a range of factors to be considered so that mitigation works do not increase the risks of natural hazards, including; the need for structural protection; whether soft engineering methods are more appropriate; avoiding structural protection works unless it is necessary to protect existing development from unacceptable risk; cumulative effects and; residual risk.

(iv) Policy 62

In accordance with Part 5, section 62 of the RMA, Policy 62 allocates responsibilities for land use controls for natural hazards. It specifies the local authorities in the Wellington region responsible for developing objectives policies, and methods, including rules for the control of the use of land to avoid or mitigate natural hazards or any group of hazards.

The responsibilities for developing natural hazards objectives, policies, rules and other methods in the CMA and the beds of lakes and rivers sits with the Wellington Regional Council. For other land, outside the CMA and the beds of lakes and rivers, the responsibility for developing natural hazards objectives, policies and other methods sits with district and city councils and the Wellington Regional Council. The responsibility for developing rules in these areas sits primarily with the city and district councils.

This means the proposed Plan can include objectives, policies and other methods for the management of natural hazards, but any natural hazard rules only apply in the CMA and the beds of lakes and rivers and not to land use.

2.4.2 Natural hazard methods in the Regional Policy Statement

There are a number of non-regulatory methods in the RPS that will assist in managing natural hazards, both explicitly and indirectly in the regional plan. These methods relate to the sharing and collection of hazards information, integrating management across administrative boundaries and assisting with biodiversity restoration projects.

Methods 22 and 23 deal direct councils to collect information about areas at high risk from natural hazards and disseminate information about how to identify areas at high risk from natural hazards, as relevant to the development of hazard management strategies to guide decision-making. Hazards awareness and education is a key principle of hazards management.

Method 27 directs councils to integrate management across mean high water springs and clarify local authority management across mean high water springs. Managing cross-boundary effects will be critical to making natural hazard policies and management effective. For example, the mean high water springs, which represents the jurisdictional boundary between regional and local authorities, is usually a line that bisects the foreshore half way up the beach. Activities above this line, for example, seawall construction, can have an adverse effect on the beach and on the adjacent coastline by causing erosion and scouring. Decisions to build structures like these need to involve all local authorities so that the best outcomes can be achieved for hazards management, the environment and the community.

Method 52 directs councils to provide practical support for community restoration initiatives for the coastal environment, rivers, lakes and wetlands and assist landowners to maintain, enhance and/or restore indigenous ecosystems and protect erosion prone land. These initiatives all have co-benefits for hazard resilience and mitigation and should be encouraged and incorporated into the hazard provisions.

2.5 Operative regional plans

There is no regional plan for natural hazards, but there are hazard related policies in the operative coastal, freshwater and soil plans. The coastal plan has hazard policies relating to occupation, use and disturbance of the foreshore, the freshwater plan to flood hazards and mitigation and the soils plan policies relating to soil erosion.

In general, the way in which natural hazards have been addressed in the operative plans has been patchy. In some plans there has been good identification of the issues but a lack of rules to support them. In other plans the policies have been hard to implement – especially the precautionary approach and limiting new development in flood hazard areas. This has led to a situation where the impacts of natural hazards, and the potential for development to exacerbate the risks posed by natural hazards, have been considered not in a strategic or methodical manner, but on a consent-by-

consent basis resulting in some ad hoc decision making. Feedback provided by consents officers was that the status of natural hazard management in the operative plans was not sufficiently prominent or well formulated to enable thoroughgoing consideration of natural hazard risks in the assessment of resource consent applications.

The main changes recommended centre around the need for:

- More directive or guiding policy for natural hazard management
- More explicit rules for addressing natural hazards, especially the coastal marine area
- The need to account for climate change in the objectives and policies and rules where appropriate

2.5.1 Regional Coastal Plan for the Wellington Region

The Regional Coastal Plan for the Wellington Region (Coastal Plan) encourages the consideration of natural hazards when assessing consent applications for coastal activities. It promotes the use of soft engineering options such as beach nourishment to manage coastal erosion. Natural hazards in this instance referred to erosion, sedimentation, inundation, tsunami, and earthquake, but should also include storm surge and exacerbating impacts from sea level rise and climate change.

The general objectives and policies in the Coastal Plan relate to reducing adverse effects from natural hazards to an acceptable level; recognising the impact of cumulative effects; the need to adopt a precautionary approach and; the need for use and development to take account of natural hazards. It also has an objective that the location of structures and/or activities in the coastal marine area should not increase the risk from natural hazards beyond an acceptable level.

The direction in the RPS is to ‘minimise’ the risk from natural hazards, which is a stronger directive than ‘reduced to an acceptable level’ or ‘should not increase’. This change in emphasis is being incorporated into the natural hazard objectives and policies in the proposed Plan. However, impacts related to cumulative effects remain an issue in the region, especially in relation to ongoing stopbank and seawall construction which are slowly hardening coastlines and channelising rivers.

Human activities can cause or exacerbate coastal hazards. This fact is an issue which needs to be addressed in the natural hazard objectives and policies. An objective recognising this needs to be linked to a policy that stipulates conditions to avoid, remedy or mitigate these potential effects in resource consents. Projected sea level rise and climate change effects also need to be taken into account when addressing these effects because they will exacerbate the impacts of natural hazards that are already occurring.

The Coastal Plan talks of the need to adopt a precautionary approach to resource management decisions in the coastal marine area, particularly in those situations where it is difficult to predict adverse effects with any certainty. This

is a core principle of hazards management that will remain in the proposed natural hazards policies.

The Coastal Plan has a series of policies addressing reclamation and draining of the foreshore and seabed, coastal structures, destruction or disturbance and deposition of substances on the foreshore or seabed and management of native and introduced vegetation, including:

- Reclamation and draining of foreshore and seabed policies and rules
- Coastal structures policies and rules
- Destruction, damage or disturbance of foreshore or seabed objectives, policies and rules
- Deposition of substances on foreshore or seabed objectives, policies and rules
- Exotic or introduced plants objectives, policies and rules
- Discharges to land and water objectives, policies and rules

In general, activities are allowed to occur in the coastal marine area if their effects are short term, reversible and no more than minor or the effects can be avoided, remedied or mitigated. As a guide, a set of criteria must be complied with before an activity is deemed to have minor adverse effects. Two of these criteria partly relate to coastal hazards:

- The activity will not have any offsite adverse effects
- The activity will not adversely affect shoreline stability

Offsite effects refer to changes that occur away from the site as a result of the activity. An example would be sediment extraction activities or seawall construction that causes down coast or ‘end-effects’ erosion.

Specifically, there are policies to ensure that the following factors are taken into account when designing any reclamation or structure which is to be used for major public works:

- Rising sea levels
- Waves and currents
- Storm surge
- Major earthquake events

These policies are one of the few places where sea level rise is taken into account. However, they need to apply to any reclamation or structure, not just those to be used for major public works.

There are also policies 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 to not allow the use or development of structures in the coastal marine area where there will be adverse effects on:

- The risk from natural hazards
- Coastal processes, including waves, tidal currents and sediment transport

These policies are consistent with Policy 51 of the RPS and the concepts will remain in the proposed Plan. However, added weight will be given to considering other alternatives including soft engineering or coastal restoration as means to provide protection from coastal hazards.

The consenting processes in the Coastal Plan set out a series of criteria that need to be considered in the consent making decision. In summary, the criteria that relate to hazards are:

- A statement that the activity has been designed using current engineering practices, and appropriate allowance has been made for the effects of sea level rise, waves and currents, and earthquakes

- An assessment of any actual or potential effects that the activity may have on the environment, and the ways in which any adverse effects may be mitigated

- In respect of a shore protection structure, an evaluation of alternative means of mitigating the hazard

In this regard, the consent process is one way of incorporating hazard mitigation measures and resilience into the design and location of a development. This may be a more appropriate way to achieve this rather than having individual hazard rules. Because hazard management is inextricably linked to the entire process from initial planning, through to the design and location of a development; it is an over-arching and guiding principle that needs to be incorporated into the entire process.

(a) Regional Coastal Plan effectiveness

The regional coastal plan identified natural hazards as an issue and there were some provisions that addressed hazards. However, there are still strong pressures to continue developing in and near the coastal marine area (CMA). As our understanding of the coastal environment has increased over the past 10 years, especially in light of sea level rise, there is scope to introduce more targeted natural hazard objectives and policies.

There is a lot of discussion around natural hazards in the coastal plan in the issues and objectives, but not a lot of substance in the rules. Also, there are many sections that have policies that deal indirectly with managing natural hazards and this could be made more explicit. Other regional coastal plans have natural hazard sections and the proposed Plan will benefit from having a coordinated group of natural hazard policies. The policies can then influence and direct rules throughout the proposed Plan that are related to specific

activities. This is an effective and efficient way of ensuring hazards are managed in an integrated fashion throughout the whole proposed Plan.

Coastal structures can have major impacts on a shoreline and these impacts need to be fully taken into account to minimise any increase in the risk from natural hazards. Consent assessments should take into account the potential of an activity to increase the hazard risk and discuss methods to minimise this risk. Natural hazards that should be added to list of considerations are storm surge and inundation, tsunami, climate change effects and liquefaction.

Unless otherwise stated in a rule, an application for a resource consent for any activity involving the destruction, damage, or disturbance of foreshore or seabed is required. This requires a series of conditions to be considered in the application and decision making process. These considerations do not always explicitly mention natural hazards but hazards are, by proxy, part of the consideration, insofar as natural processes are required to be examined. There is scope for natural hazards to be considered as part of these criteria, and in particular, any ways in which the activities may increase the hazard risk on and off the site and ways in which this may be minimised.

One of the issues currently absent from the Coastal Plan is the effect that water discharges from stormwater outfalls have on a beach by scouring sediments from the foreshore, saturating beach sediments and exacerbating erosion of the foreshore. Another common material that is discharged into the CMA from stormwater outfalls is silt and clay particles. Fine materials act to block pore spaces in beach sediments and can enhance erosion of the foreshore in storm conditions. By integrating the current five plans into the proposed Plan will go some way to addressing this issue through objectives that address storm water and aquatic health.

Another issue that is absent from the Coastal Plan is value of coastal restoration projects. The benefits of restoration programmes have been demonstrated in many parts of New Zealand and the Wellington Region. Restoration of coastal ecosystems brings ecological, amenity and hazard mitigation benefits. The proposed Plan includes policies that encourage restoration and the eradication of invasive weed species and this will help create more resilient natural environments that are capable of responding to natural events and act a as a buffer to existing development.

2.5.2 Regional Freshwater Plan for the Wellington Region

The Regional Freshwater Plan for the Wellington Region (Freshwater Plan) contains provisions to mitigate flooding and erosion hazards. Of all the operative plans it is the most comprehensive in its treatment of natural hazards and risks, however there is a focus on the need for flood protection works and the maintenance of those structures. The proposed Plan has an equal focus on objectives and policies that encourage hazard planning and avoiding development in high hazard flood areas, in addition to soft engineering methods.

The general objectives of the Freshwater Plan, as they relate to hazards, are to reduce the risk of flooding to an acceptable level and that the adverse effects of

the use and development of freshwater resources are avoided, remedied, or mitigated. There is also an objective that the risk of flooding or erosion is not increased by locating structures or carrying out activities in the beds of rivers and lakes or on a floodplain.

There are policies to promote the avoidance or mitigation of the adverse effects of flooding; maintenance of flood mitigation works; provision of information; restoration of freshwater resources; and to adopt a precautionary approach to flood planning when there is limited information. These are all good principles that will be retained in the hazard objectives and policies of the proposed Plan.

There are a number of policies and rules related to the maintenance of flood protection structures, mitigation works and activities that protect the community. Whilst there is a continuing need for this in the proposed Plan, there should be an emphasis on avoiding high hazard flood areas for new development, rather than just avoiding the adverse effects of flooding.

There are some rules to encourage the restoration or rehabilitation of freshwater resources in the region, including the establishment of wetlands, where appropriate. This concept is a principle within the NZCPS and will be brought through into the hazard policies of proposed Plan.

Another group of policies in the Freshwater Plan concern the provision of information and community awareness and education. This is an important part of hazard management and there is a need to ensure that information about flooding and natural hazards continues to be updated and analysed so good decisions can be made regarding hazard mitigation.

(a) Regional Freshwater Plan effectiveness

The objectives, policies and rules in the Freshwater Plan have been effective for allowing the work of flood protection. But, there is a growing awareness of the need to strengthen the flood planning policies to allow greater emphasis on non-structural controls of flood hazard mitigation. There is recognition that flood mitigation measures have been overly structural and that ongoing development in high flood hazard areas may be unsustainable in the long-term. This has been recognised in the RPS which contains a directive approach to avoid high hazard areas and will flow through into the policies of the proposed Plan.

One result of the current method of flood mitigation is a legacy of development on floodplains and in flood hazard areas that means we are locked into a cycle of continual upgrading of flood protection works. There are a number of places in the region for which flood protection works are required to protect significant infrastructure, for example in the Hutt Valley. The Freshwater Plan states that in some cases structural flood mitigation works may be more appropriate than non-structural options. This may be applicable to areas that already have a high level of development, but it is no longer suitable for new development. Flood mitigation works that involve the use of engineered structures such as stopbanks, groynes or training walls at river mouths are costly to the community and whilst they will continue to be a feature of flood management, they can be complimented by non-structural approaches.

Some activities in river and lake beds involving disturbance, deposition, reclamation or planting, can alter water flows, cause erosion and increase the flood risk. Building new structures or carrying out other activities within river and lake beds, and on the floodplain, can increase the risk of flooding. New development on a floodplain has the potential to cause a diversion or retention of flood flows with consequent effects in other locations, and needs to be carefully managed. The proposed Plan will focus more on risk management and flood planning to avoid the need for hard engineering structures as a method to mitigate flood hazard. The hazard objectives will also contain a statement about 'minimising' the adverse effects for new developments, to be consistent with the new direction of the RPS.

Restored and naturally functioning systems like wetlands can provide significant protection from flooding and erosion and should be strongly encouraged. It is acknowledged that non-structural options for flood mitigation have less potential to alter the natural character of a water body than structural flood mitigation options. Non-structural options may involve hazard planning, development restrictions, community preparedness, flood warning systems and emergency planning. These options can also include restoration of wetlands, lakes and rivers and current thinking is that such options offer a cost effective and environmentally more sympathetic approach in some circumstances. For these reasons the proposed Plan will contain a number of policy approaches to support ecosystem restoration. The co-benefits of this are that it provides a more resilient natural environment that can act as a buffer to new and existing development.

There is often inadequate knowledge of the risks associated with flooding. Flooding is a natural process that is largely controlled by rainfall and this can be extremely variable over time. As such, a precautionary approach will be advocated in the proposed Plan when planning and developing in flood risk areas where records are not sufficient to provide future flood probabilities.

2.5.3 Regional Soil Plan for the Wellington Region

The Regional Soil Plan for the Wellington Region (Soil Plan) does not have hazard specific policies or rules that mention for example, landslip hazards, but some of the objectives, policies and rules address natural hazards indirectly.

The Soil Plan contains provisions to mitigate hillslope erosion, and by default landslides. It allows most soil and vegetation disturbance activities to be carried out without a resource consent. Only large scale soil and vegetation disturbance activities on steep, erosion prone land are controlled.

Enhanced erosion and sediment runoff from hillslopes or riverbanks following vegetation clearance can cause aggradation of river and stream beds, which may increase the flood hazard and reduce the effectiveness of flood protection works. Objectives, policies and rules in the soils plan direct activities to avoid, remedy or mitigate the adverse effects of accelerated erosion and to maintain vegetative cover in erosion prone areas, or where this is not practical, to employ other slope/bank stabilisation methods. These concepts will be carried through into the proposed Plan that will have policies and rules to address sediment discharges and soil erosion.

There are a group of policies that recognise that land is susceptible to erosion following vegetation disturbance and that this can cause other effects within the catchment. Some of these effects can be mitigated by ensuring long-term vegetation cover on land and adhering to recognised standards for land clearance. By default, these policies also help address potential landslip hazards and these principles will be included in the proposed hazard provisions.

In addition to the provisions of the Soil Plan, the Wellington Regional Council's land management group provides advice and funding for hillslope planting, slope stabilisation and the reduction of sediment runoff. These activities also serve to reduce the landslide risk on slopes prone to landslips. This co-benefit will be recognised in the proposed Plan through other methods and policies that promote sustainable land use practices.

(a) Regional Soil Plan effectiveness

The Soil Plan has been reasonably effective at ensuring hillslopes are managed in a way to reduce the effects of soil disturbance and vegetation clearance, but the proposed Plan it could benefit by integrating concepts of natural hazards management into the principles guiding the earthworks policies and rules. This is because many of the issues, objectives and rules in the soils plan also help mitigate landslip hazards.

Currently the Soil Plan does not recognise the long-term effects that climate change may have on catchments by altering patterns of rainfall and increasing the potential for extreme rainfall events that may lead to accelerated erosion and landslide events. There is a need in the hazards policies to highlight the impacts that changes in rainfall patterns induced by climate change, will have on slope stability in the region.

2.5.4 Discussion of regional plans natural hazard provisions

The Wellington Regional Council is required to have policies and rules in the proposed Plan to address hazard management. Natural disasters are costly to the community and require enormous resources to respond and recover from. It is often more cost effective to use sound hazard planning than to rely on expensive mitigation works, although it is acknowledged that this is unavoidable in places. There are now a number of central government statues and guidance documents that are providing a clear directive for stronger hazard management policies. The most important of these have been discussed in this paper. This direction has been picked up by the RPS, which regional and district plans must give effect to.

Overall, the way in which natural hazards have been addressed in the operative plans has been reasonable. There has been good identification of the issues backed up with objectives and policies that aim to reduce the impacts of natural hazards. Often however, the policies in the regional plans have been more 'aspirational' than instructive. This is partly due to policies having a general weighting towards mitigation rather than a precautionary approach, limited tools to manage cumulative effects and ongoing development in hazard prone areas. Another reason is that natural hazard management is a multi-

jurisdictional issue and it can be difficult to manage responses across multiple agencies.

There is a perception that hazard mitigation measures have been overly focussed on structural methods, despite the policies and rules in the Freshwater Plan and the Coastal Plan to discourage this approach. This was also an issue identified in the review of the RPS and as a result the hazard policies were developed to be more directive in the RPS. This provides more weight to develop stronger hazard provisions in the proposed Plan to address these issues.

There are many policies in the operative plans that deal indirectly with managing natural hazards and these can be made more explicit in the proposed Plan. Some of the policies and rules produce additional benefits in managing two issues through the one measure, a clear efficiency. In this way it provides additional strength to the policy. For example, slope planting for erosion control, also helps reduce the landslide hazard; biodiversity restoration projects frequently help natural hazards mitigation.

In light of the growing awareness of climate change and sea level rise, there is an urgent need for the proposed Plan to take this into account and include policies and rules to address the effects that will come to bear on the region over the next decade.

The issues centre on the need for:

- Clearer explanations in the issues and objectives around the adverse impacts of natural hazards
- More directive policy and rules for natural hazard management
- More explicit rules for hazard mitigation
- The need to include climate change and sea level rise impacts across all issues, policies and rules
- Clarity of jurisdictional and cross boundary issues
- The need for ongoing research to back up stronger policies and identify high hazard areas, especially with a climate change focus

3. Resource management issues analysis

Based on the issues and options discussed in sections 1.3 and 2 above it is clear that the Wellington Regional Council needs to take a proactive, long-term approach to managing natural hazards for both new and existing development. This will require a set of general or overarching natural hazards provisions that set up a framework for natural hazards management that influences all relevant parts of the decision making processes directed by the proposed Plan. The issues identified in managing the effects and impacts of natural hazards in the Wellington Region have helped frame the objectives and policies.

There are four significant regional resource management natural hazard issues that arise from public feedback, consultation with mana whenua, and an analysis of the statutory documents and the regional plans:

1. Natural hazards adversely affect our communities and people, property, infrastructure, businesses, taonga raranga and wāhi tapu

2. Use and development activities, including hazard mitigation measures, cause or exacerbate the effects from natural hazards and increase the risk from hazard events

3. Structural engineering works for hazard mitigation purposes interfere with natural processes and have an adverse effect on the environment

4. Climate change and sea level rise will exacerbate the risk from natural hazards requiring comprehensive risk management planning

There are many activity based issues that fall under these overarching issues related to:

- Destruction, damage or disturbance of the foreshore and seabed and of beds of lakes and rivers

- Reclamation and draining

- Deposition of materials on the foreshore and seabed or on beds of lakes and rivers

- Hazard mitigation works (including coastal, river and hillslope stabilisation)

- Mitigation works in the coastal marine area and in the beds of lakes and rivers

- Discharges (including stormwater and sewerage outfalls) to rivers and the coastal marine area

- Introduction of exotic plants and weed species

All of these activities can alter natural processes; have adverse effects on the environment and; cause or exacerbate the risk, vulnerability and effects from natural hazards. Consequently these activities require managing under the RMA Part 2 matters and under sections 30 and 35.

3.1 Public engagement workshops

As part of the regional plans review, Wellington Regional Council undertook comprehensive community engagement in order to gain an understanding of community views of natural hazard issues and how we might address them in the proposed Plan. Natural hazards were highlighted as a concern by a number of the public workshop groups. Flooding was the natural hazard that caused the

greatest worry, followed by coastal erosion and inundation, climate change and sea level.

The effect of natural hazard events on the community, in terms of the social and economic impacts, was also raised as an issue. Respondents recognised the need for social change in the way we as a community need to respond to natural hazard events and climate change and the cost that disasters impose on society.

The workshop attendees supported the identification of the natural hazard issues, objectives and policies in the RPS and a number of people provided comments on the type of policy approaches to natural hazards they would like to see incorporated in the proposed Plan. The feedback from the workshops has been used to help frame the issue and objectives identification.

More information on the public workshops can be found in the report

- "Your View About Our Environment – Public Engagement (2010) for the Natural Resource Regional Plan Review for the Wellington Region". Terry Parminter, *Wellington Regional Council* (2010).

3.2 Evaluation of Māori values and natural hazard issues

Section 6 – matters of national importance – of the RMA states that all persons exercising functions and powers under it, shall recognise and provide for the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga.

There are a number of activities that exacerbate natural hazards and degrade the environment such that it is a concern for mana whenua. For example, storm water outfalls that drain water to help prevent flooding may degrade coastal or freshwater quality, which in turn contaminates kai moana resources. These same outfalls may also cause or exacerbate coastal erosion. Some of these activities are directly associated with natural hazards management. For example, mitigation structures such as groynes or seawalls can affect the natural process of rivers and beaches and cause deterioration of adjacent sites that contain an urupā or similarly valued wāhi tapu.

In the community engagement workshops, natural hazard events including flooding, coastal erosion and inundation, seismic hazards and climate change, were identified as a concern by seven mana whenua iwi workshop groups. The point was made that they can provide valuable information about historical hazard events.

Mana whenua iwi identified two aspects of the landscape of particular importance: their turangawaewae and wāhi tapu sites including urupā that provide an ancestral connection to the land. Mana whenua iwi examined natural resource management within its historical context and as a system linking the sea with the mountains. They considered that the cumulative effect of many land use changes has negatively affected the natural environment.

Freshwater is seen by mana whenua iwi across the region as taonga. Iwi groups consider that the hydrology of the region's water ways had changed over time, due to a variety of reasons including deforestation, the increased number of takes of both groundwater and rivers and runoff from urban and rural land. Stormwater was directly related to urban development by a number of groups. This included run-off from industrial areas that had polluted streams such as the Waiwhetu causing losses to the ecosystem. Mana whenua iwi groups want to see rivers being allowed to wander, and more restoration works be commenced in the headwaters. Flooding and flood control activities concerned a number of groups. River control activities to reduce the likelihood of flooding had removed natural processes from the river and changed the channel morphology.

All the groups were concerned about aspects of biodiversity and felt that native bush cover on the hills and plains had been significantly reduced in area. As a consequence of the loss in bush cover in the catchments, there has been increased siltation of waterways and harbours, which has destroyed valued habitat. The workshop groups wanted Greater Wellington to work with local communities to restore native forests. Restoring native vegetation also has the co-benefit of reducing hillslope erosion, landslips and flood hazards.

The coastal environment has long been regarded as an important source of kai moana for mana whenua iwi. All the groups were concerned at the loss of fishing in fresh water, estuaries and in the sea. Participants considered that threats to coastal areas include dredging, sand mining, vehicles driving over sand dunes and coastal erosion. Many of these activities cause or exacerbate coastal hazards and need to be controlled to minimise their adverse effects.

Altogether, these impacts can be seen to degrade the mauri of the natural environment, which must provide for the well-being of the community. In particular, adverse interference with the natural environment can increase the risk from natural hazards and at same time affect the physical and economic values of mahinga mātaitai or taonga raranga and spiritual values of wāhi tapu and other characteristics of significance to mana whenua. An example of where this is occurring is Ngāti Toa domain beach. Coastal reclamation for the rail and road, modification of Te Awarua-o-Porirua Harbour for the Mana marina and destruction of the native vegetation and replacement with weed species is affecting beach sedimentation and dune processes, causing erosion of the foreshore and iwi land.

In general mana whenua iwi see themselves as part of the natural environment, rather than separate from it. In this way, mana whenua iwi look to understand natural processes so they can work within its natural rhythms, rather than to overtly constrain and control natural environmental process. Thus, it can be argued from a Māori natural resources management point of view, that minimising or avoiding the adverse effects of inappropriate development to reduce the risk from natural hazards, can also enhance the mauri of the natural environment.

The precautionary and risk management approach to managing natural hazards (that looks to work sustainably with the natural environment) is very much in

keeping with the concepts embodied within mātauranga Māori and kaitiakitanga. This belief and approach is a sustainable way to manage the natural environment for all purposes, including to minimise the impacts from natural hazards. In this respect, the Wellington Regional Council is in a partnership role with mana whenua iwi as kaitiaki of the natural environment.

3.3 Issue 1: Natural hazards impacts

Natural hazards adversely affect our communities and people, property, infrastructure, businesses and wāhi taonga.

The cities, towns, rural areas and infrastructure of the Wellington Region have been built within a physically diverse and dynamic natural environment. As a consequence, our communities are affected by a wide range of natural hazards. Flooding and erosion are the most frequently occurring and expensive natural hazard to manage on an annual basis in the region. However, a large earthquake, tsunami or region wide storm has the potential for widespread social and economic disruption. Natural events rarely have a singular effect. Commonly, there are two or more hazards associated with a given event. For example, a rainstorm may cause flooding and landslips; an earthquake can cause liquefaction, subsidence and rock falls; a drought usually increases the fire hazard.

Natural hazard events are costly to the community and require a lot of resources for both the response and recovery effort. Avoiding and mitigating the adverse effects of natural hazards has significant social and economic benefits. It is often more cost effective to use sound hazard planning than to rely on insurance or expensive mitigation works.

Communities rely on Wellington Regional Council implementing its statutory roles under the Rivers Control and Soil Conservation Act 1941, the Resource Management Act 1991 and the Local Government Act 2002 to manage the natural hazards of flooding and erosion on a catchment scale.

3.4 Issue 2: Natural hazards and development

Use and development activities, including hazard mitigation measures, cause or exacerbate the effects from natural hazards and increase the risk from hazard events.

Development and ongoing expansion in areas at high risk from natural hazards, building hazard mitigation structures, and other activities can cause or increase the risk from natural hazards. For example, cutting roads and building platforms into landslip prone slopes, clearing sand dunes for subdivision, draining wetlands for development or building houses on flood plains. These activities can adversely interfere with or alter natural processes to the point where they cause or exacerbate a natural hazard.

In assessing the level of risk to a site or development it is necessary to consider the potential natural hazard events that may affect an area and the vulnerability of existing and/or foreseeable development. Any assessment must include the potential for climate change, sea level rise and any consequential effects these may have on the frequency or magnitude of related hazard events. An area

would be considered high risk if there is the potential for moderate to high levels of damage to the development, including the buildings, infrastructure, or land on which it is situated.

Examples of the types of natural hazards or hazard events that may cause an area or development to be considered high risk include – but are not limited to – fault rupture zones, beaches that experience cyclical or long term erosion, failure prone hill slopes, or areas that are subject to serious flooding. For the purposes of this plan, the coastal marine area and the beds of lakes and rivers are all considered high hazard.

3.5 Issue 3: Hazard mitigation measures

Structural engineering works for hazard mitigation purposes interfere with natural processes, have an adverse effect on the environment and leave a residual risk.

Structural measures or hard engineering methods can have significant environmental effects. For example; seawalls and groynes can cause localised erosion of the adjacent shoreline, interfere with shell fish beds and reduce visual amenity; modifying dunes can remove sand from the beach system and create an erosion hazard as well as destroy natural habitats and reduce the landscape amenity; works in the beds of lakes and rivers can disrupt natural habitats. Thus, engineering works can affect both natural processes and the ecosystem. However, when considering the localised effects of physical works in the beds of lakes and rivers for hazard management purposes, it is important that the catchment wide social and economic benefits are recognised and adverse environmental effects are minimised.

Stopbanks, seawalls, revetments and other structural engineered hazard treatment works leave a residual risk to the community and developments they are designed to protect. In addition, hazard mitigation structures generate a sense of security that encourages ongoing development. This further increases the extent and value of assets that could be damaged if the protection works fail or an extreme event exceeds the structural design parameters of the treatment works.

3.6 Issue 4: Climate change

Climate change and sea level rise will exacerbate the risk from natural hazards requiring comprehensive risk management planning.

Climate change is altering regional patterns and distribution of rainfall, causing a rise in sea level and in the medium to long term, will increase both the frequency and magnitude of natural hazard events. Climate change is expected to exacerbate differences in the regional climate, by bringing higher rainfall to the west and reducing coastal rains in the east. Droughts and wildfires will occur more frequently and persist for longer periods. It is expected that rainfall events will become more sporadic and intense, increasing the risk from flooding and landslips. Increased rainfall and intensity of storm events will also put pressure on stormwater systems and hazard mitigation structures such as stopbanks and seawalls, especially as drainage becomes impeded due to rising sea level and higher groundwater tables. As sea level continues to rise, storm

tides, coastal erosion and inundation may become more frequent and result in persistent or repeated episodes of coastal flooding and erosion in vulnerable areas.

Climate change won't generate any new hazards but it will may increase the impacts from existing hazards and have implications for flood and catchment management, coastal hazards, stormwater, water supply and agriculture. This will impact the community both socially and economically. Managing these impacts will require coordinated long term planning and a total catchment management approach. Managing the effects of climate change needs to be integrated within the proposed Plan and across decision making spectrum.

4. Proposed natural hazard objectives and provisions

Section 32(1)(a) of the RMA requires that an evaluation report must examine the extent to which the proposed objectives are the most appropriate way to achieve the purpose of the Act. Section 32(1)(b) goes on to say that the provisions (policies, rules and methods) must be examined to assess whether they are most appropriate way to achieve the objectives. The appropriateness test applied consists of four standard criteria: relevance, usefulness, reasonableness and achievability. These criteria can be summarised as follows:

- *Relevance* – is the objective related to addressing resource management issues and will it achieve one or more aspects of the purpose and principles of the RMA?

- *Usefulness* – will the objective guide decision-making? Does it meet sound principles for writing objectives?

- *Reasonableness* – what is the extent of the regulatory impact imposed on individuals, businesses or the wider community?

- *Achievability* – can the objective be achieved with tools and resources available, or likely to be available, to the local authority?

The natural hazard provisions in the operative regional plans were analysed in Section 3 to provide guidance on the degree to which they achieve the purpose of the RMA, address the identified issues and give effect to relevant statutory documents. As a result of this assessment, a new set of natural hazard provisions are being proposed.

The following sections and the accompanying summary in Tables A1 and A2 in the Appendix, provide an assessment of the degree to which the proposed provisions address the issues and achieve the requirements of the RMA using the criteria above. Sections 5.1 and 5.2 present a general analysis of the implications of not including any natural hazard provisions in the proposed Plan or of maintaining the status quo and not making any changes from the operative provisions.

4.1 Costs of no objectives or provisions in the proposed Plan

If the proposed Plan were to exclude any provisions for natural hazards it would be a dereliction of duty under the Resource Management Act 1991, the New Zealand Coastal Policy Statement 2010, the Civil Defence Emergency Management Act 2002, the Soil Conservation and Rivers Control Act 1941, and the Local Government Act 2002. The potential outcomes would be:

- Escalating risk from natural hazards to both new and existing development
- Inappropriate development in high hazard areas and/or lack of sufficient mitigation measures
- Increasing incidences of natural disasters resulting in damage and destruction to property, land, infrastructure and utilities, both in private and public ownership
- Potential harm to, injuries and/or loss of life
- Economic losses to the community, people and businesses and local and central government
- Reduction in revenue from tourism
- Increases in rates and insurance to cover losses from natural disasters or alternately a complete withdrawal of the insurance industry from certain areas at high risk from natural hazards
- Potential loss of amenity, cultural heritage, wāhi tapu and degradation of mauri
- Harmful and irreversible adverse effects on the environment from inappropriate mitigation measures
- Increasing and ongoing impacts from climate change and sea level rise
- These outcomes mean that this option would not satisfy the tests above for the appropriateness of the option to achieve the purpose of the RMA.

4.2 Costs of no change from operative plans – status quo

The discussion of the effectiveness of the regional plans issues, objectives policies and rules highlighted the need to strengthen management of natural hazards. Every part of the Wellington Region is subject to natural hazards, and usually multiple hazards, to a greater or lesser degree. The effects of hazard events are tied to the natural environment and to patterns of human development, both of which will remain extant and ongoing for as long as we continue to live in the region. Thus, the resources management hazard issues included in the operative regional plans, will remain as issues (by and large) in the proposed Plan.

A major change that has occurred since the current regional plans were made operative is the advancing understanding of climate change. The effects from

climate change and sea level rise are now coming to bear on the region and will have an ongoing and increasing effect in exacerbating natural hazard events. This is becoming a matter of urgency that must be addressed in the proposed Plan. As the region continues to grow, more assets and people are at risk from natural hazards than ever before.

The Wellington Regional Council is legally required to address issues arising from the effects of natural hazards. The question is the degree to which the Wellington Regional Council should or can help in managing these effects. Considering the central government direction to take a more proactive stance in natural hazards planning and management, the increasing impacts from climate change and the ongoing development and growth in the region, it is not acceptable to maintain a status quo approach to managing natural hazards. To a lesser degree, the outcomes of maintaining the status quo are similar to doing nothing. The potential outcomes would be:

- Increasing incidences of natural hazard events from inappropriate subdivision, use and development in hazard prone areas
- Increasing destruction and damage to property, land and infrastructure and utilities
- Potential harm to or loss of life
- Economic losses to the community, people and businesses, local and central government
- Increases in rates and insurance to cover losses from natural disasters
- Potential loss of amenity, cultural heritage, wāhi tapu and degradation of mauri
- Harmful and irreversible adverse effects on the environment from inappropriate mitigation measures
- Increasing and ongoing impacts from climate change and sea level rise
- The appropriateness of the status quo existing objectives is analysed in Table A1 in the Appendix

4.3 Possible objectives to address issue 1

Natural hazards adversely affect our communities and people, property, infrastructure, businesses and wāhi tapu.

- Do nothing
- Status quo
- The risk, residual risk, and adverse effects from natural hazards and climate change on people, the community and infrastructure are minimised /reduced/acceptable

- The benefits to people and communities of catchment based flood and erosion risk management activities, including structural works, are recognised

- Inappropriate use and development in high hazard areas is avoided

- Natural hazards are managed with a precautionary, risk based approach

Natural hazard events are costly to the community and have ongoing social and economic impacts requiring a lot of human and economic resources for both the response and recovery. Avoiding, minimising and/or mitigating the adverse effects of natural hazards have significant social and economic benefits, both at a personal or family level through to a broader community scale.

Communities of the Wellington Region are affected by a wide range of natural hazards. Flooding and erosion are the most frequently occurring and expensive natural hazard to manage on an annual basis. However, coastal hazard events, such as storm surges that cause erosion and inundation are causing increasingly expensive impacts to coastal infrastructure such as roads, rail corridors, protection structures, commercial and private property and houses. Long term coastal erosion is threatening houses and roads in a number of localities around the region, for example, Te Kopi and Whatarangi in the Wairarapa, Lyall Bay in Wellington and Paekākāriki, Raumati South and Raumati Beach on the Kāpiti Coast. The potential for a region wide storm that could trigger all of these impacts in a singular event has the potential for widespread social and economic disruption, such as occurred in the 2004 storm and flood event. These effects are all being exacerbated by sea level rise, which is increasing at a rate of 2.1 mm/yr, faster than any of the other main centres in New Zealand.

A large winter storm in June 2013 caused widespread damage to coastal communities and infrastructure. The MetService reported that it was not as severe as the Wahine Storm of 1968, but it was widely believed to have been much more destructive. Around $3,000,000 of damage alone was done to coastal seawalls and roads around the Wellington south coast and Harbour. There were multiple road closures and the Wellington-Hutt railway line was severely damaged and had to close for over a week for emergency repairs that cost $100,000s and resulted in economic disruption to freight transport and commuter trains and chaos on the roads that struggled with increased traffic. Over the following months, additional costs were incurred to upgrade the repairs to more permanent works. Every boatshed and surf club building around the outer Wellington Harbour (Port Nicholson) and south coast was either damaged or destroyed. Numerous homes were damaged along the coast from wave overtopping and debris including at; Owhiro and Island Bay; Lyall Bay, where up to $50,000 damage was done to some properties; Moa Point; Palmer to Breaker Bay; Worser to Karaka Bay and; Eastbourne, where 4 houses were seriously damaged or destroyed, including the historic Mansfield summer house. The Insurance Council reported it was the biggest weather event in the region since the 2004 floods. This event was followed up by similar events in October the same year and March 2014 that caused further damage to coastal infrastructure and property.

One of reasons this event was so destructive compared to the Wahine storm, is that sea level has risen considerably since 1968 – in the order of 0.15 m. The Wellington Region has a very small tidal range and even small rises in sea level have a noticeable impact. Work by NIWA shows events that have a 1% AEP (i.e. 1:100 yr) may well become annual events by the end of century due to elevated sea levels. Another reason it was so costly is because investment in coastal areas has increased dramatically over the past few decades and this naturally places more assets in high hazard areas at risk of economic damage.

Flooding, whether small or large, has the potential to cause damage, loss of life and significant economic and social disruption. Flooding causes ongoing wide spread damage in the region and continues to be the most costly natural hazard to manage, in terms of damages, insurance pay-outs and mitigation works. Considering the number of people that can be affected by flooding and the potential damage to infrastructure, agricultural land, business's and private dwellings, it is important that this hazard continues to be managed. Intense and/or prolonged rainfall cannot be avoided. However, vulnerability to flooding can be reduced by avoiding high risk areas prone to repeated flooding, by providing information on minimum floor levels on floodplains or by containing the flood with stopbanks.

Often the wider community ends up bearing the cost to recover from natural disasters through higher rates or taxes, additional burden on the health system, loss of business continuity and associated economic impacts and long term harm on the environment. It is more cost effective in the long term to use sound hazard planning that employs a range of tools for reducing hazards impacts and increasing the resilience of development than to rely on insurance or expensive hard engineering works. This in turn builds greater resilience into the community and its institutions of governance. Planning and regulatory measures can help in this goal by encouraging the location of development in areas with a lower hazard risk, ensuring that buildings and developments employ resilient designs that take account of the full range of hazards to which it may be exposed, or to employ mitigation measures that are sensitive to the natural environment.

4.3.1 Most appropriate objectives to address Issue 1

On the basis of the discussion above it is considered that the following objectives are the most appropriate to address the issue and achieve the purposes of the RMA:

Objective O20

The risk, residual risk, and adverse effects from natural hazards and climate change on people, the community and infrastructure are acceptable.

Objective O21

Inappropriate use and development in high hazard areas is avoided.

Doing nothing to address the issue of natural hazard impacts on the community would be both legally and morally untenable. Maintaining the status quo would be better than doing nothing, but provisions in the first generation plans have

been more passive than instructive and lacked an overall structure. There are many provisions in the operative plans that deal *indirectly* with managing natural hazards. The new provisions are more explicit and therefore relevant as they guide decision making to address the resource management issue. This was also an issue identified in the review of the regional policy statement which now has much clearer and more directive suite of hazard policies.

Objective O20 acknowledges that it is important to address the risk from natural hazards that our communities face, including the risk that remains after hazard treatment works are implemented. The objective also acknowledges that the potential effects of climate change need to be taken into consideration as they may exacerbate the effects of existing hazards. Based on consultation and feedback on the draft plan it was decided that the aim for the level of risk from natural hazards should be acceptable, rather than minimised or reduced. Minimising the risk from natural hazards would be an unreasonably difficult objective to achieve. Similarly, reducing the risk would place a high and unreasonable burden on agencies, councils and businesses to reduce the risk to existing infrastructure and development, regardless of its current exposure. The policy direction of acceptable allows assessments to be made to existing infrastructure, and a decision to be made on whether it faces an acceptable risk to natural hazards or not and therefore is reasonable and achievable

Objective O21 recognises that a lot of past development has occurred in hazard prone areas without a proper understanding or assessment of the effects of natural hazards. The objective embodies aspects of the risk based approach in that it allows for an assessment of the appropriateness of an activity in a high hazard area but sends a clear message to guide decision making that any development in these areas must have sound reason for being so located.

It was chosen not to have an objective that explicitly stated that natural hazards are managed with a precautionary, risk based approach The precautionary and risk based approaches will be incorporated into the policies, rather than setting them as objectives. This is seen as a far more effective way to give effect to these particular approaches as they will become directly embedded into the decision making process.

It is considered that Objective O20 and the risk based approach recognise the benefits to people and communities of catchment based flood and erosion risk management activities. In addition two separate policies (Policy P15 and P16) recognise the social, cultural, economic and environmental benefits of both existing and new flood risk management activities.

Table A1 in the Appendix contains a summary evaluation of the appropriateness of the proposed objectives.

4.3.2 Most appropriate policies or methods to address Issue 1 objectives

The following policies and methods are proposed as the most appropriate way to achieve the objectives. Table A2 in the Appendix contains an evaluation of the effectiveness and efficiency of the proposed provisions against the status quo and concludes that it is appropriate for the following provisions to be included in the proposed Plan.

Policy P27: High hazard areas

Use and development, including hazard mitigation methods, in high hazard areas shall be avoided except where:

(a) They have a functional need or operational requirement or there is no practicable alternative to be so located, and

(b) The risk to the development and/or residual risk after hazard mitigation measures, assessed using a risk based approach, is low, and

(c) The development does not cause or exacerbate natural hazards in other areas, and

(d) Interference with natural processes (coastal, fluvial and lacustrine processes) is minimised, and

(e) Natural cycles of erosion and accretion and the potential for natural features to fluctuate in position over time, including movements due to climate change and sea level rise, are taken into account

Policy P29: Climate change

Particular regard shall be given to the potential for climate change to cause or exacerbate natural hazard events that could adversely affect use and development including:

(a) Coastal erosion and inundation (storm surge), and

(b) River and lake flooding and erosion or aggradation, and

(c) Stormwater ponding and impeded drainage, and

(d) Sea level rise, using the best available guidance for the wellington region

Method M3: Wellington regional hazards management strategy

Wellington Regional Council will work in partnership with city and district councils and key stakeholders to develop and implement a Wellington regional hazards management strategy. The purpose of the strategy is to facilitate a consistent approach to managing natural hazards between local authorities in the region.

Method M4: Sea level rise

Wellington Regional Council will develop regional guidance for managing the impacts from sea level rise. This will include providing the best available information on the local rates of change using both tide gauge records and continuous GPS records to understand relative sea level change and forecast estimates using the latest internationally peer-reviewed science and measurements. Forecasts of sea level rise will be reviewed after each International Panel of Climate Change report and a re-analysis of the local rates of sea level change will be undertaken at least every 10 years. The purpose of

this is to enable a consistent approach to managing climate change related coastal hazards between local authorities.

For the purposes of the proposed Plan, all areas in the coastal marine area and the beds of lakes and rivers are defined to be high hazard areas. Including a definition that specifically defines high hazard areas is intended to enable efficient and effective implementation of related policies. Taking this approach provides strong direction to consents staff, applicants and resource users. Importantly, it reduces ambiguity in determining where the high hazard areas are in the region (in relation to WRC's jurisdiction) and allows effort to be concentrated the matters that will contribute to achieving the objective.

Wellington Regional Council considered not defining high hazard areas in the proposed Plan. However, consultation with WRC staff revealed a requirement for greater clarity to enable more effective implementation of policy. Lack of clarity regarding where high hazard areas are located and what they include has the potential to lead to costly, drawn-out discussions as to whether an area is considered 'high hazard'. A more directive approach using a definition to specifically describe Council's expectations in respect of high hazard areas has the potential to contribute to more effective and efficient decision making.

This policy sets out five criteria by which development is to be considered appropriate within high hazard areas. The first gateway test is that the activity needs to have a functional need or operational requirement or there is no other alternative in order to be located in a high hazard area. This provides a clear direction to consents staff and resource consent applicants about the type of development that is intended to be allowed in these areas. This approach is efficient as it reduces ambiguity to save time and effort, which allows work to focus on reducing the hazard risk. This approach is also taken in the primary coastal Policy P132 regarding the functional need and efficient use of use and development in the coastal marine area.

The second gateway test is that the risk is considered low, as determined by applying the risk based approach. The risk based approach is defined in the proposed Plan as an approach that takes account of the intended purpose of a development, the likelihood of natural hazard events occurring, the vulnerability and exposure of the site, use or development, the severity and consequences of potential hazard events and the costs and benefits of acting or not acting. The assessment needs to be commensurate with the size and scale of the use or development. The risk can be evaluated on a scale from low to high or acceptable to intolerable assessed on the basis of:

(a) The scale, engineering design and intended life and use for the development, and

(b) The likelihood, frequency and magnitude of natural hazard events that could potentially affect the site or development, and

(c) The vulnerability and exposure of the development to natural hazards, and

(d) The severity of any physical, social, economic and environmental consequences that could arise from natural hazard events affecting the site or development.

The establishment of the principles of a robust and recognised risk based assessment fundamentally strengthens the proposed policy, and establishes a technical 'bottom line' from which other considerations can be taken into account. It provides certainly for resource users and decision-makers and therefore reduces costs.

Effects from climate change have the potential to increase the costs of natural hazards and the impacts they have on our communities, businesses and infrastructure. Policy P29 is integrally related to Policy P27 in its aims to reduce the impacts from natural hazards. Policy P29 outlines minimum criteria against which the potential for climate change to cause or exacerbate natural hazard events that may adversely affect a site or development in hazard prone areas are assessed. The criteria are based on observations of hazard events in the region that have the potential to become worse under a range of climate change scenarios. The policy, and associated method to assess the impact of sea level rise, seeks to ensure that the effects of climate change on the natural hazard profile of a site are genuinely taken into consideration, and provides a clear means by which a reasonable and thorough assessment can be made.

Other policies relevant to the fulfilment of these objectives include Policy P1 that states that resources should be managed recognising ki uta ki tai by using the principles of integrated catchment management. This includes a statement that management shall take into account the connected nature of the resources and natural processes within a catchment and that links between environmental, social, cultural and economic sustainability of the catchment shall be recognised. Managing natural resources in a sustainable manner that takes into account environmental and social relationships, must also consider natural hazards, as natural hazards result from the interaction of people with the natural environment. The proposed Plan is a document that brings together 5 regional plans under this integrated catchment management approach. The natural hazard policies sit at the front of the proposed Plan with the general policies that guide and influence many other provisions. Thus, the hazard policies have links across the breadth of the proposed Plan from flood protection and coastal management to biodiversity, water allocation and earthworks.

Policy P2 directs the Wellington Regional Council to consider the effects of activities that cross mean high water springs or the beds of lakes and rivers. This is particularly important when considering the effects of activities, such as building seawalls that occur close to the MHWS because this boundary cuts through beaches and river mouths that are one contiguous geomorphic unit. Activities above or below the MHWS line, usually have an impact on the whole beach and do not just stop at the MHWS boundary.

Not uncommonly, when making decisions regarding the natural environment and natural hazards, there are knowledge gaps that create uncertainty and complicate decision making. Policy P3 prescribes the application of the

precautionary approach when there is limited information to guide decision making. The aim of this is to reduce the unforeseen adverse effects that can occur when decisions are made in the absence of a robust understanding of natural processes.

Policy P4 directs that where minimisation of adverse effects is required by policies in the proposed Plan, in this case Policy P27(d), minimisation means reducing interference with natural processes to the smallest amount practicable including considerations of other locations, employing good management practices and using the smallest footprint for the activity as possible.

Policy P79 concerns stormwater management that has some relevance to Objective O20. The policy states that land use, subdivision and development, including stormwater discharges, shall be managed so that runoff volumes and peak flows avoid or minimise scour and erosion of stream beds, banks and coastal margins, and do not cause new or exacerbate existing risk to human health or safety, or exacerbate the risk of inundation, erosion or damage to property or infrastructure.

Policy P104 concerns the effects on catchment-based flood and erosion control activities and adverse effects on structures that are part of catchment-based flood and erosion risk management activities shall be avoided. This is another related policy area that contributes to the overall aim of the objective to ensure the risk from natural hazards is acceptable.

In times of drought, the fire risk is usually elevated, particularly in the Wairarapa. Policy P112 sets priorities during drought and serious water shortages and includes an allowance that when river flows or water levels fall below the minimums outlined in the whaitua chapters of the proposed Plan (chapters 7-11), water takes will still be allowed for firefighting purposes.

Method M3 has been introduced to ensure the development of a regional hazards management strategy for the Wellington Region. It follows stakeholder feedback in the drafting of the policies that there needed to be a regionally coordinated approach to managing natural hazards. The aim of the strategy is to facilitate a consistent approach to managing natural hazards between local authorities in the region. The Wellington Regional Council will work in partnership with city and district councils and key stakeholders to develop and implement the strategy. This will also give effect to the cross boundary matters in Policy P2. It is anticipated that the hazards strategy will implement a programme of research that will help identify appropriate areas for development.

Method M4 has been developed to help consistency in decision making regarding sea level rise in the region. The mean level of the sea in an area results from a complex interaction of short, medium and long term variables including the weather, climate, local tectonics and astronomical interactions between the sun and the moon. Therefore it is important to have a local understanding of sea level, rather than rely on a global mean rate. Method M4 will help with Policy P27(e) and P29(d) requirements by providing regional guidance on sea level rise.

In the short term, the Council's preferred approach is intended to ensure that development is more robust and resilient to natural hazard events than has been expected or evidenced in the past. In the long-term it is anticipated that this approach will more strongly influence where development occurs, and encourage development in locations with a lower risk from natural hazards.

There are no specific rules for natural hazards in the proposed Plan, but the overall hazard management approach and hazard policies are given effect to in a range of rules in the coastal management, earthworks and vegetation and beds of lakes and rivers sections of the proposed Plan. A summary of these can be seen in section 6.5 and the related Section 32 issues and evaluation reports.

The coastal management section of the proposed Plan has sections related to Policy P27 and P29 with regards to the construction, maintenance and repair of structures, (including heritage structures, structures in the commercial port area, boatsheds and seawalls), activities in the foreshore, (including stormwater pipes, beach recontouring and river mouth cutting) and activities that result in disturbance, damage or destruction of the CMA, deposition and dumping of material, dredging, reclamation and planting. Activity status's range from permitted to non-complying. Many of the permitted activities have a condition requiring that the general conditions must be satisfied for the activity to be permitted. The general conditions contain requirements related to natural hazards including minimum disturbances, erosion and scouring, diversion of water and design and maintenance of structures.

The activities in beds of lakes and rivers section has relevant rules controlling the use, maintenance or replacement of existing flood protection structures, diversion of floodwaters, culverts, clearing of flood debris, sand and gravel extraction, planting and reclamation.

The earthworks and vegetation clearance section has relevant rules controlling appropriate vegetation clearance on erosion prone land.

4.3.3 Benefits and costs of implementing most appropriate policies and other methods

- Better integration of hazard planning and management into the wider community benefits businesses, regionally significant infrastructure, local authorities and institutions of governance

- Stronger, more resilient communities able to cope and recover more quickly from hazard events and natural disasters

- Reduction in long term from economic losses and social costs due to natural disasters, leading to less money being spent from general taxes and rates to fund response and recovery efforts

- Insurance premiums remain more affordable over time as development is situated out of high hazard areas and is designed and built to withstand the range of hazards it be exposed to over the course of its design life

- Communities living in flood prone areas benefit from ongoing flood protection works

- Construction and mining companies benefit economically from dredging activities, gravel and sand extraction and from flood protection works construction and maintenance

- Developers and authorities interested in developing or undertaking activities in the beds of lakes and rivers or the coastal marine area, may face higher hazard assessment or investigation costs from consenting requirements for a more thorough consideration of natural hazards

- Development proposals may need to be modified to be more resilient to natural hazards impacts which may increase costs to the development

4.4 Possible objectives to address Issue 2

Use and development activities, including hazard mitigation measures, cause or exacerbate the effects from natural hazards and increase the risk from hazard events.

- Do nothing

- Status quo

- Hard engineering mitigation and protection methods are only used as a last practicable option

- The adverse impacts of use and development activities that may cause or exacerbate effects from natural hazards are avoided, remedied or mitigated

- The risk, residual risk, and adverse effects from natural hazards and climate change on people, the community and infrastructure are minimised/reduced/acceptable

- Inappropriate use and development in high hazard areas is avoided

Development and ongoing expansion in areas at high risk from natural hazards, building hazard mitigation structures and other activities can cause or increase the risk from natural hazards. The pattern and scale of a development can expose it or adjacent areas unnecessarily to natural hazards. For example; cutting roads and building platforms into landslip prone slopes can increase the landslide hazard by mass loading and over-steepening the slope; cutting and building over sand dunes for subdivision can cause an erosion hazard by removing the sand buffer from the beach system; draining wetlands for development removes the storage capacity of the feature to absorb flood waters; seawalls can cause ‘end effects’ erosion from the end of the structure and further along the coast. These activities can adversely interfere with or alter natural processes to the point where they cause or exacerbate a natural hazard.

The costs of dealing with these effects can be avoided or minimised with thorough investigations at the development planning stage to reduce effects on the natural environment and limit the necessity for expensive hazard mitigation works.

Natural landforms such as beaches, sand dunes and wetlands are able to respond to events such as erosion and flooding if they are protected and left to function with minimal interference. By doing so, they are capable of providing natural hazard mitigation functions.

Seawalls and groynes have well documented effects on a beach, interfering with the sediment transport process and causing enhanced scouring and erosion adjacent the structure. Remediating this damage is costly in economic terms, especially if it is affecting property and infrastructure. The Kapiti Coast District Council has spent $100,000s remediating end effects erosion, that could have been avoided had different measures been employed in the first instance.

Hard protection structures on a beach do nothing to address the actual cause of the erosion. Seawalls 'hold a line' whilst the beach continues to erode. This is best illustrated at Paekākāriki and Raumati South, where there is now no substantial beach at high tide. This reducing the amenity and affects property values, reduces people ability to use and enjoy the beach, and impacts on biodiversity, such as shell fish. In some instances, the cause of the erosion may be due to human activities and therefore able to be addressed through other methods.

Once a hard structure is built, it must be maintained in perpetuity because of the consequences to the development it is protecting. As a sense of security develops, people are encouraged to continue developing and investing behind the structure and the consequences, if the structure fails, rise. Thus over time, the risk increases and it becomes necessary to spend increasing amounts of money to continue maintaining and enhancing the structure. Hard protection structures can cost $1000s per lineal meter and councils have budgets in the long term plans than run into millions of dollars for hazard mitigation schemes. Greater Wellington Regional Council is preparing to spend over $50 million in flood protection over the next 10 years alone.

When development is locked into this pattern, it becomes extremely difficult to affect a managed retreat and extricate the community from the situation if conditions change and the hazard risk becomes unmanageable or too expensive to mitigate. Where development has been poorly located and not designed to effectively mitigate the hazard, the situation may not resolve itself until a natural disaster occurs and change is forced upon the community; such as happened in Christchurch after the earthquakes and such as is happening along the South Wairarapa coast at Whatarangi where houses are falling into the sea.

4.4.1 Most appropriate objectives to address Issue 2

On the basis of the discussion above it is considered that the following objectives are the most appropriate to address the issue and achieve the purposes of the RMA:

Objective O20

The risk, residual risk, and adverse effects from natural hazards and climate change on people, the community and infrastructure are acceptable.

Objective O21

Inappropriate use and development in high hazard areas is avoided.

Objective O22:

Hard engineering mitigation and protection methods are only used as a last practicable option.

Doing nothing to prevent activities that exacerbate the risk from natural hazards is untenable and maintaining the status quo means that this issue is dealt with, at best, in a de-facto manner by general considerations in consent requirements or by the Building Act, or at worst, not at all with no guidance for decision-makers. This passive approach is not an effective or efficient way to manage the issue, which requires better coordinated policies and methods than those in the current operative plans.

Objective O21 is relevant to this issue because inappropriate development in high hazard areas often leads to construction of mitigation measures that have unintended consequences at the site or nearby, such as end effects erosion from seawalls. The objective allows for an assessment of the appropriateness of an activity in a high hazard area but sends a clear message that any development in these areas must have a sound reason for being so located.

Objective O22 recognises that when development has occurred in hazard prone areas, hard structures have been used in an attempt to mitigate the hazard without a proper understanding or assessment of the harmful effects these structures can have on the environment. Therefore, hard engineering mitigation structures should only be built if absolutely necessary.

Objective O20 is also relevant because it addresses the need to reduce the risk from natural hazards, which as discussed, we can unintentionally exacerbate with particular types of development in hazard prone locations. It also speaks to the need to reduce the residual risk from hazard mitigation works as discussed above.

An objective to avoid, remedy or mitigate the adverse impacts of use and development activities that may cause or exacerbate effects from natural hazards is not needed as it is already a mandate under Part 2 of the RMA and incorporated into Objective O20.

Table A1 in the Appendix contains a summary evaluation of the appropriateness of the proposed objectives.

4.4.2 Most appropriate policies or methods to address Issue 2 objectives

The following policies are proposed as the most appropriate way to achieve the objectives. Table A2 in the Appendix contains an evaluation of the effectiveness and efficiency of the proposed provisions against the status quo

and concludes that it is appropriate for the following provisions to be included in the proposed Plan.

Policy P27: High hazard areas

Use and development, including hazard mitigation methods, in high hazard areas shall be avoided except where:

(a) They have a functional need or operational requirement or there is no practicable alternative to be so located, and

(b) The risk to the development and/or residual risk after hazard mitigation measures, assessed using a risk based approach, is low, and

(c) The development does not cause or exacerbate natural hazards in other areas, and

(d) Interference with natural processes (coastal, fluvial and lacustrine processes) is minimised, and

(e) Natural cycles of erosion and accretion and the potential for natural features to fluctuate in position over time, including movements due to climate change and sea level rise, are taken into account

Policy P28: Hazard mitigation measures

Hard engineering mitigation and protection methods shall be avoided except where it is necessary to protect existing development from unacceptable risk, assessed using the risk-based approach, and the works either form part of a hazard management strategy or the environmental effects are considered to be no more than minor.

Policy P27 sets out five criteria by which development is to be considered appropriate within high hazard areas. It includes two clauses P27(c) and (d) that are relevant to addressing the issue and achieving the objectives. In particular, the risk to the development and/or residual risk after hazard mitigation measures must be low, and the development must not cause or exacerbate natural hazards in other areas.

The two gateway tests P27(a) and (b) help achieve Objectives O20 and O21 by only allowing appropriate hazard treatment works in high hazard areas. The first gateway test is that the activity needs to have a functional need or operational requirement or there is no other alternative in order to be located in a high hazard area. This provides a clear direction to consents staff and resource consent applicants about the type of development that is intended to be allowed in these areas. The aim is to reduce ambiguity to save time and effort, which allows work to focus on reducing the hazard risk.

The second gateway test in particular applies the risk based approach and considers that it must be low in order to be considered appropriate. Any hazard treatment works that cause or exacerbate natural hazards would have to ensure to the effects are considered to cause a low risk. The risk based approach as defined in the proposed Plan includes a consideration of the the likelihood,

frequency and magnitude of natural hazard events that could potentially affect the site or development.

Policy P28 addresses this issue and objectives by setting a strong direction that hard engineering mitigation and protection structures are a last option because they often have the unintended effect of increasing the risk from natural hazards in other locations.

Other policies relevant to the fulfilment of these objectives include Policy P1 that states that resources should be managed recognising ki uta ki tai by using the principles of integrated catchment management. This includes a statement that management shall take into account the connected nature of the resources and natural processes within a catchment and that links between environmental, social, cultural and economic sustainability of the catchment shall be recognised. Managing natural resources in a sustainable manner that takes into account environmental and social relationships, must also consider the effects of activities that may cause natural hazards or construction of hazard mitigation structures that have adverse environmental effects.

Policy P2 directs the Wellington Regional Council to consider the effects of activities that cross mean high water springs or the beds of lakes and rivers. This is particularly important when considering the effects of activities, such as flood protection activities that can have an effect downstream changes or building seawalls that may cause erosion in adjacent areas.

Not uncommonly, when making decisions regarding the natural environment and natural hazards, there are knowledge gaps that create uncertainty and complicate decision making. Policy P3 prescribes the application of the precautionary approach when there is limited information to guide decision making. The aim of this is to reduce the unforeseen adverse effects that can occur when decisions are made in the absence of a robust understanding of natural processes.

Policy P4 states that where minimisation of adverse effects is required by policies in the proposed Plan, in this case Policy P27(d), minimisation means reducing interference with natural processes to the smallest amount practicable including considerations of other locations, employing good management practices and using the smallest footprint for the activity as possible.

Earthworks, vegetation clearance and plantation forestry harvesting activities have the potential to result in significant accelerated soil erosion, that in turn can increase the landslip risk or to lead to discharges of silt and sediment water bodies that increase the flood risk by causing aggradation of the bed of the watercourse. Policy P98 states that these activities shall employ good management practices and measures to minimise the risk of accelerated soil erosion and control silt runoff.

Policies P102 and P145 direct that reclamation, drainage and destruction of the coastal marine area and beds of lakes and rivers should generally be avoided. This recognises that reclamation and drainage often creates land that is highly exposed to natural hazards and has downstream effects by exacerbating hazards

in other areas. One exception is where it may be required in the bed of a river for flood prevention or erosion control purposes – for example stopbank construction.

There are no specific rules for natural hazards in the proposed Plan, but the overall hazard management approach and hazard policies are given effect to in a range of rules in the coastal management, earthworks and vegetation and beds of lakes and rivers sections of the proposed Plan. A summary of these can be seen in section 6.5 and the related Section 32 issues and evaluation reports.

4.4.3 Benefits and costs of implementing most appropriate policies and other methods

- The wider community, businesses, regionally significant infrastructure and local authorities benefit from better designed and planned development and more effective hazard mitigation measures that are designed to reduce effects on adjacent developments

- Development plans may be have to be modified to account for a better understanding of hazards and climate change impacts that may result in additional upfront costs

- Long term savings from reduced natural hazard impacts with consequent flow on cost savings in private and public insurance, local government rates and general taxes

- Better integration of hazard planning and management into the wider community benefits businesses, regionally significant infrastructure, local authorities and institutions of governance leading to more resilient communities

- Developers and authorities interested in developing or undertaking activities in the beds of lakes and rivers or the coastal marine area, may face higher hazard assessment or investigation costs from consenting requirements for a more thorough consideration of natural hazards and climate change effects

- Amenity benefits from better planned and designed developments

- Environmental benefits from more sensitive hazard mitigation designs

4.5 Possible objectives to address Issue 3

Structural engineering works for hazard mitigation purposes interfere with natural processes, have an adverse effect on the environment and leave a residual risk.

- Do nothing

- Status quo

- Inappropriate structural engineered hazard protection works are avoided

- The adverse effects on the environment of hazard mitigation measures are avoided, remedied or mitigated

- Hard engineering mitigation and protection methods are only used as a last practicable option

- Inappropriate use and development in high hazard areas is avoided

- The risk, residual risk, and adverse effects from natural hazards and climate change on people, the community and infrastructure are minimised/reduced/acceptable

Structural measures or hard engineering methods can have significant environmental effects. For example, seawalls and groynes can cause localised erosion of the adjacent shoreline, interfere with shell fish beds and bird nesting sites and reduce visual amenity. Modifying dunes can remove sand from the beach system and create an erosion hazard as well as destroy natural habitats, reducing biodiversity and the landscape amenity. Works in the beds of lakes and rivers can disrupt natural habitats and bird nest sites. Thus, engineering works can affect both natural processes and the ecosystem.

It is difficult to cost out the loss of features like beaches and wetlands, but it is likely to be substantial. Effectively, structures designed to protect private property can destroy or heavily modify an ecosystem or cause the loss of an amenity for the whole community. This can affect people's quality of life, reduce land values or cause a loss of tourism revenue.

Stopbanks, seawalls, revetments and other engineered protection works create a residual risk, in the event of a failure, that remains after they are put in place. In addition, hazard mitigation structures generate a sense of security that encourages more development. This further increases the extent and value of assets that could be damaged if the protection works fail or an extreme event exceeds the structural design parameters.

There are multiple benefits to enhancing or protecting natural features and ecosystems that also provide hazard mitigation, such as; tree planting in upper catchments that help reduce runoff and erosion, conserve soil and reduce the slip hazard; dune restoration projects that increase erosion resilience, enhance natural biodiversity and create public amenity; wetland restoration that help absorb surface flooding, purify water and increase local biodiversity and has a raft of positive environmental outcomes. These types of restoration schemes require time, community acceptance, human resources and funding to undertake, but the benefits far outweigh the costs, in the order of 10-100:1. It might cost $10,000-100,000 in planting and time to help restore a wetland or a dune system, but in turn that investment may easily provide $1,000,000 in flood and erosion protection and ecosystem services on an annual basis.

When considering the localised effects of physical works, such as in river and lake beds, it is important that the catchment wide social and economic benefits are recognised and adverse environmental effects are minimised.

There are situations where the existing capital investment is so high and the level of integration into the local or national economy is such that it outweighs the long term costs of building and maintaining engineered mitigation works and the associated impacts if the mitigation works fail. For example, it is estimated that if Te Awa Kairangi/Hutt River breached the stopbanks it would cause an estimated $1.7 billion in physical damages alone, not counting economic and social disruption.

4.5.1 Most appropriate objectives to address Issue 3

On the basis of the discussion above it is considered that the following objectives are the most appropriate to address the issue and achieve the purposes of the RMA:

Objective O20

The risk, residual risk, and adverse effects from natural hazards and climate change on people, the community and infrastructure are acceptable.

Objective O21

Inappropriate use and development in high hazard areas is avoided.

Objective O22:

Hard engineering mitigation and protection methods are only used as a last practicable option.

Doing nothing to address this issue will result in ongoing environmental degradation, loss of amenity and biodiversity. This is not an acceptable outcome and under Part 2 of the RMA, the council is obligated to avoid, remedy or mitigate these adverse environmental impacts.

Maintaining the status quo will only be partially effective and is not at all efficient. Hazard mitigation measures have been overly focussed on structural methods, despite the policies and rules in the operative freshwater and coastal plan to discourage this approach. This is because of the passive approach employed in the current plans and the reliance on consenting considerations to manage these effects. Staff employ a lot of time to assess these considerations and lack strong guidance in the operative plans. One of the possible objectives to address this issue was that the adverse effects on the environment of hazard mitigation measures are avoided, remedied or mitigated. This objective was not chosen because it replicates Part 2 of the RMA and is a similar passive approach to the status quo.

Objective O2O includes the concept of residual risk that is appropriate to this issue. The residual risk is defined in the proposed Plan as: The risk to a subdivision or development that remains after implementation of risk treatment or hazard mitigation works. A continual reliance on hard engineered mitigation structures leads to a sense of security and encourages further development in these areas. As the investment increases, so too does the need to upgrade the structural measures to match the level of infrastructure investment. This leads to a spiralling residual risk, especially as when development reaches a critical mass it is unlikely to be pulled back, and so the community and councils

remain locked into a location that they are forced to defend. If and when the hazard treatment works are breached by an extreme event, the effects can be catastrophic. This objective aims to reduce the residual risk that can occur by the construction of hazard mitigation works.

Objective O21 is relevant to this issue because inappropriate development in high hazard areas often leads to the construction of mitigation measures that have a harmful effect on the environment. The objective allows for an assessment of the appropriateness of an activity in a high hazard area but sends a clear message that any development in these areas must have sound reason for being so located. The possible objective inappropriate structural engineered hazard protection works are avoided was rejected because the term 'development' Objective O21 also covers structural works.

Objective O22 recognises that when development has occurred in hazard prone areas, hard structures have been used in an attempt to mitigate the hazard without a proper understanding or assessment of the harmful effects these structures can have on the environment. Therefore, hard engineering mitigation structures should only be built if absolutely necessary.

Table A1 in the Appendix contains a summary evaluation of the appropriateness of the proposed objectives.

4.5.2 Most appropriate policies or methods to address Issue 3 objectives

The following policies are proposed as the most appropriate way to achieve the objectives. Table A2 in the Appendix contains an evaluation of the effectiveness and efficiency of the proposed provisions against the status quo and concludes that it is appropriate for the following provisions to be included in the proposed Plan.

Policy P28: Hazard mitigation measures

Hard engineering mitigation and protection methods shall be avoided except where it is necessary to protect existing development from unacceptable risk, assessed using the risk-based approach, and the works either form part of a hazard management strategy or the environmental effects are considered to be no more than minor.

Policy P30: Natural buffers

The adverse effects of use and development on natural features such as beaches, dunes or wetlands that buffer development from natural hazards shall be minimised.

Policy P28 addresses this issue and the objectives by setting a strong direction that hard engineering mitigation and protection structures are a last option because they often have the unintended effect of increasing the risk from natural hazards in other locations and can have a harmful effect on the natural environment. The costs on the natural environment are often overlooked and a difficult to measure, especially as it is often a cumulative effect of building lots of small structures over time that eventually leads to whole scale modification or loss of a coastal or riparian environment.

Policy P30 is a companion policy because there may be low impact, soft engineering hazard treatment alternatives to hard engineering works. This policy encourages the use of alternate approaches to hazard mitigation that contribute to the sustainable management of the environment. The policy also gives effect to the New Zealand Coastal Policy Statement.

Another policy relevant to the fulfilment of these objectives is Policy P1 that directs that resources will be managed recognising ki uta ki tai by using the principles of integrated catchment management. This includes a statement that management shall take into account the connected nature of the resources and natural processes within a catchment.

Policy P2 addresses cross-boundary cooperation that is relevant here because hazard mitigation structures are often built just outside the CMA, and hence the jurisdiction of the proposed Plan. However, the effects are no different and this requires councils to work together to address common issues associated with development that is situated next to waterbodies.

The application of the precautionary approach in Policy P3 is also relevant. If there is limited information about the effects that a particular development may have on the environment, a precautionary approach shall be applied to the decision making process. The RPS Policy 28 states that a precautionary approach should be applied to natural hazards decision making.

Policy P4 directs that where minimisation of adverse effects is required by policies in the proposed Plan, in this case Policy P30, minimisation means reducing the adverse effects of the activity to the smallest amount practicable.

Policy P19 states that the cultural relationship of Māori with air, land and water shall be recognised and the adverse effects on this relationship and their values shall be minimised. Policy P28 and P30 policies help fulfil this aim. Many of the issues raised in consultation with mana whenua of the region touched on the adverse impacts that inappropriate development had caused on treasured natural resources. Method M26 encourages the involvement of mana whenua kaitiaki in resource consent processes when their relationship with air, land and water or their values is adversely affected, particularly for sites with significant mana whenua values and within Ngā Taonga Nui a Kiwa. There may be situations where proposals to build hazard mitigation structures occur in areas of significance to mana whenua. This method will help in involving affected iwi groups and address issues raised in consultation discussed in section 4.2.

Hard engineered structures are often considered by people to have an impact on the visual amenity and character of beaches and rivers. Policy 25 directs that use and development shall avoid significant adverse effects on natural character in the coastal marine area and in the beds of lakes and rivers. Policy P28 helps with this approach by providing a strong direction to only use hard structures as a last resort.

Similarly, Policy P26 states that use and development will be managed to minimise effects on the integrity and functioning of natural processes and Policy P37 recognises the benefits of wetlands for flood protection and Policy

P38 encourages wetland restoration. Policies P28 and P30 contribute to both these policies by providing a strong direction to only use hard structures as a last resort and to encourage soft engineering approaches where possible. Wetland restoration can be employed as part of a flood mitigation scheme by using as a retention and storage area for flood water.

This policy direction in Policy P28 is supported by Policy P139 that states that the construction of new seawalls is inappropriate except where there are no reasonable alternatives and that where possible it incorporate soft engineering designs. There are a number of coastal management rules that support this approach and allow for beach nourishment and restoration and similar soft engineering methods as a permitted or controlled activity.

Method M22 will assist in the integrated management of the coastal hazards. The method states that Wellington Regional Council will advocate for the integrated management of the coastal marine area by cooperating with mana whenua and other agencies with governance responsibilities in the CMA to share information, help in the restoration of natural character, protect sites with significant indigenous biodiversity and improve public access to the coast. Many of these aims have related co-benefits with the natural hazard objectives and policies. For example, in directing hard engineered structures to be built as a last resort and encouraging soft engineering approaches, there are co-benefits for biodiversity, natural character and public access.

There are no specific rules for natural hazards in the proposed Plan, but the overall hazard management approach and hazard policies are given effect to in a range of rules in the coastal management, earthworks and vegetation and beds of lakes and rivers sections of the proposed Plan. A summary of these can be seen in section 6.5 and the related Section 32 issues and evaluation reports.

4.5.3 Benefits and costs of implementing most appropriate policies and other methods

Table A2 in the Appendix contains an evaluation of the effectiveness and efficiency of the proposed provisions against the status quo and concludes that the proposed approach is the most appropriate to achieve the objectives.

- The broader community, businesses, regionally significant infrastructure and local authorities benefit from improved environmental outcomes and more effective hazard and mitigation measures

- Fragile wetland and coastal dune ecosystems benefit from enhanced biodiversity gains

- Strengthened partnerships with mana whenua as authorities work to enhance receiving environments that will have co-benefits for aquatic and marine ecosystems

- Environmental and amenity benefits from employing soft engineering approaches

- People and organisations looking to employ hazard mitigation measures in the beds and lakes rivers or the coastal marine area, may face additional upfront costs from requirements for more thorough considerations of the impacts from the hazard mitigation measures

- Mitigation measures may be have to be modified to account for a better understanding of their impacts on the environment and surrounding areas

- The wider community, businesses, regionally significant infrastructure and local authorities benefit from better designed and planned development and more effective hazard mitigation measures that are designed to reduce effects on adjacent developments

- Long term savings from reduced natural hazard and environmental impacts and with consequent flow on cost savings in private and public insurance, local government rates and general taxes

- Better integration of hazard planning and management into the wider community benefits businesses, regionally significant infrastructure, local authorities and institutions of governance leading to more resilient communities

4.6 Possible objectives to address Issue 4

Climate change and sea level rise will exacerbate the risk from natural hazards requiring comprehensive risk management planning.

- Do nothing

- Status quo

- Climate change effects are taken into account in planning and decision making

- Long term hazard risk management plans and strategies are used to minimise adverse effects on people and communities

- Inappropriate use and development in high hazard areas is avoided

- The risk, residual risk, and adverse effects from natural hazards and climate change on people, the community and infrastructure are acceptable

In the medium to long term, climate change effects have the potential to increase both the frequency and magnitude of natural hazard events that already occur in the region. Climate change is expected to exacerbate differences in the regional climate, by bringing higher rainfall to the west and reducing coastal rains in the east. The major consequences will be sea level rise that is likely to be 1.0m over the next 100 years, changes in regional rainfall patterns and increasing intensity of storm events. This will lead to more severe droughts and wildfires, increased flooding, landslips, storm surges and coastal erosion and inundation. Increased rainfall and intensity of storm events will put

pressure on stormwater systems and hazard mitigation structures such as stopbanks and seawalls.

General global climate change modelling suggests that meteorological hazards will increase over time, due mainly in part to increased sea surface and air temperatures. This produces conditions more conducive to the development of rain storms and storm surges. New Zealand is insulated from extreme climate shifts from the Pacific Ocean and this may dampen down the potential increase in frequency of storm events. However, there are indications that the intensity of some of storms that we normally receive every year will increase. This modelling also indicates that there will be an increase in the incidence and strength of the westerly airflow over the region. If this occurs, it is likely that there will be increase in rainfall on the Kapiti Coast and Wellington in addition to an increased risk of heavy rainfall events across the region. It is also possible that natural climate cycles, such as the El Niño Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO), that have a measurable impact on local weather patterns will intensify with climate change. Hence, there is the potential for the return periods for flood events to reduce over the next 100 years.

A combination of floodplain development, climate change and catchment modification means that the risk to many communities in the region from flood events has been increasing over time. As many as 70% of new subdivisions in the Wairarapa are at risk of flooding. In the Hutt Valley, despite the flood protection works, a residual flood risk still exists. Land at risk of residual flooding continues to be developed, with new subdivisions, in-fill housing and industrial/commercial estate.

There are a range of impacts that a rising sea level has on the coastal margin. The way in which a coastline responds depends upon its geomorphology, sediments and its exposure to tide and wave and current conditions. The most serious physical impacts of sea level rise on coastal areas will be:

- Coastal inundation causing landward movement of estuaries, inlets, lagoons and wetlands
- Coastal erosion and shoreline changes due to alteration of sediment transport systems
- Increased vulnerability to coastal storm damage
- Increased coastal flooding on extreme high tides, during high wave conditions and storm surge events
- Increased difficulty in river drainage, especially during flood events that may increase flood duration around low lying delta areas
- Increased tidal prisms of tidal inlets, estuaries and lagoons leading to possible scouring and erosion around inlet entrances and adjacent beaches

- Salt water intrusion into coastal aquifers and increased saline penetration up rivers

- Impeded stormwater drainage at coastal outfalls

- Increased surface flooding from higher water tables impeding drainage

The economic costs of dealing with these impacts over the coming decades will run into the $100s of millions, which is why it is so important to start planning for these now. Continuing to invest in areas at risk from sea level rise flooding and erosion will lead to serious consequences. It becomes extremely difficult to extricate development from areas at risk from natural hazards once it has been built.

Because this is a long term problem that will creep up on development over the coming decades, it will require long term strategies to manage. However, because there is a reasonable expectation that development occurring today will have a lifetime of 50 years or more, it is important the new development considers the long term effects that may come to bear on the site. An efficient way to achieve this is through spatial or structure planning that identifies areas at current and future and manages development appropriately in those areas. One way to implement this approach is through the development of a regional hazards strategy through which all local authorities and associated communities can participate and agree on a coordinated plan.

4.6.1 Most appropriate objective to address Issue 4

On the basis of the discussion above it is considered that the following objectives are the most appropriate to address the issue and achieve the purposes of the RMA:

Objective O20

The risk, residual risk, and adverse effects from natural hazards and climate change on people, the community and infrastructure are acceptable.

Objective O21

Inappropriate use and development in high hazard areas is avoided.

Currently there is nothing in the regional plans to deal with this issue. Since the current plans were made operative, an amendment has been made to Part 2 s7 of the RMA to include climate change as a matter of national importance. Thus maintaining status quo, which is the same as doing nothing is unacceptable and would be negligent of the Council.

Objective O20 includes climate change as a consideration in the risk from natural hazards. This recognises that climate change has the potential to exacerbate natural hazard events that already occur in the Wellington Region. Taking a general risk based approach to climate change is an appropriate response because the risk will vary depending on the type of development and between different parts of the region. Taking this approach means that climate change considerations become incorporated into all parts of the decision

making process. The possible objective that climate change effects are taken into account in planning and decision making is covered by this objective.

Objective O21 is appropriate because it recognises many natural hazard events will become more severe in high hazard areas due to climate change, for example, increased incidences of coastal flooding due to sea level rise or river flooding due to extreme rainfall events.

One possible object that long term hazard risk management plans and strategies are used to minimise adverse effects on people and communities, has been developed into a method, as discussed below.

Table A1 in the Appendix contains a summary evaluation of the appropriateness of the proposed objectives.

4.6.2 Most appropriate policies or methods to address Issue 4 objectives

The following policies are proposed as the most appropriate way to achieve the objectives. Table A2 in the Appendix contains an evaluation of the effectiveness and efficiency of the proposed provisions against the status quo and concludes that it is appropriate for the following provisions to be included in the proposed Plan.

Policy P27: High hazard areas

Use and development, including hazard mitigation methods, in high hazard areas shall be avoided except where:

(a) They have a functional need or operational requirement or there is no practicable alternative to be so located, and

(b) The risk to the development and/or residual risk after hazard mitigation measures, assessed using a risk based approach, is low, and

(c) The development does not cause or exacerbate natural hazards in other areas, and

(d) Interference with natural processes (coastal, fluvial and lacustrine processes) is minimised, and

(e) Natural cycles of erosion and accretion and the potential for natural features to fluctuate in position over time, including movements due to climate change and sea level rise, are taken into account

Policy P29: Climate change

Particular regard shall be given to the potential for climate change to cause or exacerbate natural hazard events that could adversely affect use and development including:

(a) Coastal erosion and inundation (storm surge), and

(b) River and lake flooding and erosion or aggradation, and

(c) Stormwater ponding and impeded drainage, and

(d) Sea level rise, using the best available guidance for the wellington region.

Policy P30: Natural buffers

The adverse effects of use and development on natural features such as beaches, dunes or wetlands that buffer development from natural hazards shall be minimised.

Method M3: Wellington regional hazards management strategy

Wellington Regional Council will work in partnership with city and district councils and key stakeholders to develop and implement a Wellington regional hazards management strategy. The purpose of the strategy is to facilitate a consistent approach to managing natural hazards between local authorities in the region.

Method M4: Sea level rise

Wellington Regional Council will develop regional guidance for managing the impacts from sea level rise. This will include providing the best available information on the local rates of change using both tide gauge records and continuous GPS records to understand relative sea level change and forecast estimates using the latest internationally peer-reviewed science and measurements. Forecasts of sea level rise will be reviewed after each International Panel of Climate Change report and a re-analysis of the local rates of sea level change will be undertaken at least every 10 years. The purpose of this is to enable a consistent approach to managing climate change related coastal hazards between local authorities.

Policy P29 outlines minimum criteria against which the potential for climate change to cause or exacerbate natural hazard events that may adversely affect a site or development in hazard prone areas are assessed. The criteria are based on observations of hazard events in the region that have the potential to become worse under a range of climate change scenarios. The policy, and associated method to assess the impact of sea level rise, seeks to ensure that the effects of climate change on the natural hazard profile of a site are genuinely taken into consideration, and provides a clear means by which a reasonable and thorough assessment can be made.

Policy P27 is relevant here because climate change has the potential to cause changes in river and coastal sedimentation. Over time natural features will respond to drivers such as sea level rise or increased frequency of extreme rainfall events that may cause them to migrate or fluctuate in position over time. Policy P27(e) states that this possibility must be taken into account when considering development in high hazard areas.

Policy P30 also recognises that natural features may migrate over time in response to climate change and sets a long term strategic direction that encourages soft engineering approaches and restoration of natural features that can act a natural buffer to development. The use of alternate approaches to hazard mitigation can allow for natural fluctuations and contribute to the

sustainable management of the environment. The policy gives effect to the New Zealand Coastal Policy Statement.

Method M3 has been introduced to ensure the development of a regional hazards management strategy for the Wellington Region. It follows stakeholder feedback in the drafting of the policies that there needed to be a regionally coordinated approach to managing natural hazards. The aim of the strategy is to facilitate a consistent approach to managing natural hazards between local authorities in the region. The Wellington Regional Council will work in partnership with city and district councils and key stakeholders to develop and implement the strategy. It is anticipated that the hazards strategy will incorporate the latest scientific understanding of climate change and its potential effects on the region.

Method M4 has been developed to help consistency in decision making regarding sea level rise in the region. The mean level of the sea in an area results from a complex interaction of short, medium and long term variables including the weather, climate, local tectonics and astronomical interactions between the sun and the moon. Therefore it is important to have a local understanding of sea level, rather than rely on a global mean rate. Method M4 will help with Policy P29(d) requirements by providing regional guidance on sea level rise.

Method M22 will assist in the integrated management of the coastal hazards. The method states that Wellington Regional Council will advocate for the integrated management of the coastal marine area by cooperating with mana whenua and other agencies with governance responsibilities in the CMA.

It is anticipated that these policies and methods will strengthen decision-making throughout the resource management process, and better ensure that future investment and development is appropriately located to be robust and resilient against natural hazards caused or exacerbated by climate change. These provisions reinforce the strategic approach embedded the proposed Plan that effective natural hazards management is predicated upon an understanding and consideration of the natural environment, which necessarily includes the climate and any changes that are occurring as a result of climate change.

There are no specific rules for natural hazards in the proposed Plan, but the overall hazard management approach and hazard policies are given effect to in a range of rules in the coastal management, earthworks and vegetation and beds of lakes and rivers sections of the proposed Plan. A summary of these can be seen in section 6.5 and the related Section 32 issues and evaluation reports.

4.6.3 Benefits and costs of implementing most appropriate policies and other methods

Table A2 in the Appendix contains an evaluation of the effectiveness and efficiency of the proposed provisions against the status quo and concludes that the proposed approach is the most appropriate to achieve the objectives.

- Communities living in hazard prone areas that benefit from long term planning for the hazards due to climate change

- The broader community, businesses, regionally significant infrastructure and local authorities benefit from long term hazard management strategies

- Local authorities can have regionally consistent numbers for sea level rise and align planning for sea level rise across territorial boundaries

- Strengthened partnerships amongst local authorities in the region as they work together to develop regional consistency for planning and management of natural hazards

- Developers and authorities interested in investing in activities in the beds of lakes and rivers or the coastal marine area, may face costs from requirements for more thorough considerations of climate change. Ultimately, development may be have to be modified to account for a better understanding of hazard and climate change impacts

- Consents could be declined in areas considered to have an extreme current or future risk from natural hazards or climate change related natural hazards

5. Summary of objectives and provisions assessment

Due to the range of natural hazards communities are exposed to in the region and the potential impacts on people, property and the natural environment, the proposed Plan, taking its lead from the RPS, is setting appropriate statutory mechanisms for effective management of the risks. Elevating natural hazards considerations in the proposed Plan will also play an important role in raising hazard awareness within all sectors of the community, ensuring that it remains a fundamental consideration in the region's continued development.

The assessment of the operative objectives and provisions in Section 3 shows that the operative objectives and provisions are either not *relevant* and/or *not useful* in that they:

- Do not give effect to the Regional Policy Statement

- Do not give effects to the New Zealand Coastal Policy Statement 2010

- Fail to take into account Ministry for Environment guidance on managing coastal hazards, climate change hazards and flood hazards

The alternative objectives and provisions seek to address the shortcomings of the operative provisions and create a clear and efficient policy tool with which decision makers and plan users can assess proposals for the risks from natural hazards. The analysis and accompanying summary tables in Appendix 1 and 2, seek to provide an assessment against relevant sections of the RMA. The assessment of the proposed '*alternative objectives and provisions*' shows the following:

The proposed alternative objectives and provisions are *relevant* as they:

- Give appropriate effect to the New Zealand Coastal Policy Statement 2010
- Give appropriate effect to the Regional Policy Statement
- Give effect to the Wellington Region Civil Defence Emergency Management Group Plan 2013-2018
- Reflect current planning best practice and scientific understanding of natural hazards management

The proposed alternative objectives are *useful* in achieving the purpose of the RMA as they are:

- Consistent with the guidance and direction provided in the regional policy statement and national guidance documents for managing natural hazards
- Provide decision makers with a suite of assessment tools that will enable consistent and comprehensive consideration of the risks from natural hazards and climate change and the full range of environmental effects associated with hard engineered hazard mitigation works

The proposed alternative objectives are *reasonable* as:

- The costs of assessing and mitigating hazards are assessed by the persons undertaking the activity and impacts on the wider community are reduced
- The WRC continues to employ experts and staff who are available to provide support to consent applicants on how to assess the risk from natural hazards

The proposed alternative objectives are *achievable* as:

- The council has the authority to require consents in its jurisdiction
- Information on natural hazards has increased considerably, meaning that it is easier for people undertaking activities to undertake assessments
- Information is more readily available than it has been and the WRC is continuing to fund research into natural hazards
- Risk assessment techniques and tools have been developed to the degree that they can be applied to resource management decision making

5.1 Summary of proposed objectives and policies and other methods

The assessment shows that the proposed alternative objectives and provisions incorporate the relevant considerations of the operative objectives and policies, but in a manner that is more efficient and effective. The proposed objectives O20, O21 and O22 and, policies P27, P28, P29 and P30, are more relevant and useful in achieving the purpose of the RMA than the operative objectives.

The assessment is summarised in Appendices 1 and 2, Sections 8.1 and 9.1. The proposed objectives and policies are provided below.

5.2 Proposed Objectives

Objective O20

The risk, residual risk, and adverse effects from natural hazards and climate change on people, the community and infrastructure are acceptable.

Objective O21

Inappropriate use and development in high hazard areas is avoided.

Objective O22

Hard engineering mitigation and protection methods are only used as a last practicable option.

5.3 Proposed Policies

5.3.1 Policy P28: High hazard areas

Use and development, including hazard mitigation methods, in high hazard areas shall be avoided except where:

(a) They have a functional need or operational requirement or there is no practicable alternative to be so located, and

(b) The risk to the development and/or residual risk after hazard mitigation measures, assessed using a risk based approach, is low, and

(c) The development does not cause or exacerbate natural hazards in other areas, and

(d) Interference with natural processes (coastal, fluvial and lacustrine processes) is minimised, and

(e) Natural cycles of erosion and accretion and the potential for natural features to fluctuate in position over time, including movements due to climate change and sea level rise, are taken into account

5.3.2 Policy P28: Hazard mitigation measures

Hard engineering mitigation and protection methods shall be avoided except where it is necessary to protect existing development from unacceptable risk, assessed using the risk-based approach, and the works either form part of a hazard management strategy or the environmental effects are considered to be no more than minor.

5.3.3 Policy P29: Climate change

Particular regard shall be given to the potential for climate change to cause or exacerbate natural hazard events that could adversely affect use and development including:

(a) Coastal erosion and inundation (storm surge), and

(b) River and lake flooding and erosion or aggradation, and

(c) Stormwater ponding and impeded drainage, and

(d) Sea level rise, using the best available guidance for the wellington region

5.3.4 Policy P30: Natural buffers

The adverse effects of use and development on natural features such as beaches, dunes or wetlands that buffer development from natural hazards shall be minimised.

5.4 Proposed methods

5.4.1 Method M3: Wellington regional hazards management strategy

Wellington Regional Council will work in partnership with city and district councils and key stakeholders to develop and implement a Wellington regional hazards management strategy. The purpose of the strategy is to facilitate a consistent approach to managing natural hazards between local authorities in the region.

5.4.2 Method M4: Sea level rise

Wellington Regional Council will develop regional guidance for managing the impacts from sea level rise. This will include providing the best available information on the local rates of change using both tide gauge records and continuous GPS records to understand relative sea level change and forecast estimates using the latest internationally peer-reviewed science and measurements.

Forecasts of sea level rise will be reviewed after each International Panel of Climate Change report and a re-analysis of the local rates of sea level change will be undertaken at least every 10 years.

The purpose of this is to enable a consistent approach to managing climate change related coastal hazards between local authorities.

5.5 Summary tables

The following tables show the links from Objectives O20, O21 and O22 to the relevant policies, rules and methods across all areas of the proposed Plan.

5.5.1 Objective O20 summary

Table 1: Summary of provisions related to Objective O20

Objective:	Objective O20: The risk, residual risk, and adverse effects from natural hazards and climate change on people, the community and infrastructure are acceptable
Policies:	Policy P27: High hazard areas Policy P28: Hazard mitigation measures Policy P29: Climate change Policy P1: Ki uta ki tai and integrated catchment management Policy P2: Cross-boundary matters

	Policy P3: Precautionary approach Policy P4: Minimising adverse effects Policy P37: Values of wetlands Policy P38: Restoration of wetlands Policy P79: Managing land use impacts on stormwater Policy P98: Accelerated soil erosion Policy P102: Reclamation or drainage of the beds of lakes and rivers Policy P103: Management of gravel extraction Policy P104: Effects on catchment-based flood and erosion control activities Policy P106: Management of plants in the beds of lakes and rivers Policy P112: Priorities in drought and serious water shortage Policy P132: Functional need and efficient use Policy P139: Seawalls Policy P143: Deposition in a site of significance Policy P145: Reclamation, drainage and destruction
Rules:	Rule R99: Earthworks– permitted activity Rule R100: Vegetation clearance on erosion prone land – permitted activity Rule R101: Earthworks and vegetation clearance not permitted – discretionary activity Rule R102: Plantation forestry harvesting on erosion prone land – permitted activity Rule R103: Plantation forestry harvesting not permitted – controlled activity Rule R112: Maintenance, repair, replacement, upgrade or use of existing structures (excluding the Barrage Gates) – permitted activity Rule R113: Diversion of flood water by existing structures – permitted activity Rule R115: Culverts – permitted activity Rule R117: New structures – permitted activity Rule R119: Clearing flood debris and beach recontouring – permitted activity Rule R120: Minor sand and gravel extraction – permitted activity Rule R122: Removing vegetation – permitted activity Rule R123: Planting – permitted activity Rule R127: Reclamation of the beds of rivers or lakes – non-complying activity Rule R129: All other activities in river and lake beds – discretionary activity Rule R151: Additions or alterations to structures – controlled activity Rule R152: Removal or demolition of structures or part of a structure – permitted activity Rule R153: Removal or demolition of a structure or part of a structure – restricted discretionary activity Rule R154: New temporary structures outside sites of significance – permitted activity Rule R155: New temporary structures – restricted discretionary activity Rule R156: New or replacement navigation aids – permitted activity Rule R157: New or replacement structures for special purposes –

	controlled activity Rule R158: Structures in airport height restriction areas or navigation protection areas for airport/navigation purposes – discretionary activity Rule R160: New structures and disturbance associated with motor vehicles inside the Cook Strait Cable Protection Zone and mana whenua sites of significance – discretionary activity Rule R163: Replacement of a structure or part of a structure – permitted activity Rule R164: Replacement of a structure – restricted discretionary activity
Rules continued	Rule R164: Replacement of a structure – restricted discretionary activity Rule R165: Additions or alterations to existing seawalls – controlled activity Rule R166: Seawalls outside sites of significance – discretionary activity Rule R167: Seawalls inside sites of significance – non-complying activity Rule R168: Alteration of structures identified in Schedule E2 or Schedule E3 – permitted activity Rule R169: Additions or alterations to structures identified in Schedule E1 or Schedule E2 – restricted discretionary activity Rule R170: Additions to structures identified in Schedule E3 – permitted activity Rule R171: Additions or alterations to structures identified in Schedule E1, Schedule E2 or Schedule E3 – discretionary activity Rule R172: Removal, demolition or replacement of a structure or part of a structure identified in Schedule E1, Schedule E2 or Schedule E3 – discretionary activity Rule R173: Additions or alterations to structures inside the Commercial Port Area – permitted activity Rule R174: Additions or alterations to structures inside the Commercial Port Area – controlled activity Rule R175: New structures associated with passenger and cargo handling inside the Commercial Port Area – permitted activity Rule R176: Use of boatsheds – permitted activity Rule R179: New boatsheds outside Boatshed Management Areas – non-complying activity Rule R180: New swing moorings inside Mooring Areas – permitted activity Rule R181: New swing moorings outside Mooring Areas – non complying activity Rule R185: General surface water and foreshore activities – permitted activity Rule R186: General surface water and foreshore activities – restricted discretionary Rule R187: General surface water and foreshore activities – discretionary activity Rule R189: Clearance of stormwater pipes – permitted activity Rule R192: Beach recontouring for coastal restoration purposes – controlled activity Rule R193: River and stream mouth cutting – permitted activity Rule R194: Disturbance or damage – discretionary activity Rule R195: Disturbance or damage inside sites of significance – non complying activity Rule R200: Dredging for flood protection purposes or erosion mitigation

	– controlled activity
Rules continued	Rule R202: Maintenance dredging outside the Commercial Port Area and navigation protection areas – controlled activity Rule R204: Destruction, damage or disturbance outside sites of significance – discretionary activity Rule R205: Destruction, damage or disturbance inside sites of significance – non-complying activity Rule R206: Re-deposition of wind-blown sand – permitted activity Rule R207: Deposition for beach renourishment – controlled activity Rule R208: Deposition outside sites of significance – discretionary activity Rule R210: Dumping of waste or other matter outside sites of significance – discretionary activity Rule R211: Dumping or storage of waste or other matter – discretionary activity Rule R212: Dumping of waste or other matter inside sites of significance – non-complying activity Rule R214: Reclamation and drainage for regionally significant infrastructure outside of sites of significance – discretionary activity Rule R215: Reclamation and drainage – non-complying activity Rule R216: Destruction – non-complying activity Rule R217: Planting – permitted activity Rule R218: Planting – discretionary activity
Method:	Method M3: Wellington regional hazards management strategy Method M4: Sea level

5.5.2 Objective O21 summary

Table 2: Summary of provisions related to Objective O21

Objective:	Objective O21: Inappropriate use and development in high hazard areas is avoided
Policies:	Policy P27: High hazard areas Policy P28: Hazard mitigation measures Policy P29: Climate change Policy P30: Natural buffers Policy P2: Cross-boundary matters Policy P3: Precautionary approach Policy P4: Minimising adverse effects Policy P19: Māori values Policy P25: Natural character Policy P26: Natural processes Policy P37: Values of wetlands Policy P38: Restoration of wetlands Policy P102: Reclamation or drainage of the beds of lakes and rivers Policy P139: Seawalls Policy P145: Reclamation, drainage and destruction

Rules:	Rule R127: Reclamation of the beds of rivers or lakes – non-complying activity Rule R129: All other activities in river and lake beds – discretionary activity Rule R161: New structures, additions or alterations to structures outside sites of significance – discretionary activity Rule R162: New structures, additions or alterations to structures inside sites of significance – non-complying activity Rule R166: Seawalls outside sites of significance – discretionary activity Rule R167: Seawalls inside sites of significance – non-complying activity Rule R187: General surface water and foreshore activities – discretionary activity Rule R194: Disturbance or damage – discretionary activity Rule R195: Disturbance or damage inside sites of significance – non complying activity Rule R214: Reclamation and drainage for regionally significant infrastructure outside of sites of significance – discretionary activity Rule R215: Reclamation and drainage – non-complying activity
Method:	Method M3: Wellington regional hazards management strategy Method M4: Sea level rise

5.5.3 Objective O22 summary

Table 3: Summary of provisions related to Objective O22

Objective:	Objective O22: Hard engineering mitigation and protection methods are only used as a last practicable option
Policies:	Policy P28: High mitigation measures Policy P30: Natural buffers Policy P15: Flood protection activities Policy P16: New flood protection and erosion control Policy P3: Precautionary approach Policy P19: Māori values Policy P25: Natural character Policy P26: Natural processes Policy P37: Values of wetlands Policy P38: Restoration of wetlands Policy P102: Reclamation or drainage of the beds of lakes and rivers Policy P132: Functional need and efficient use Policy P139: Seawalls Policy P145: Reclamation, drainage and destruction

Rules:	Rule R117: New structures – permitted activity Rule R127: Reclamation of the beds of rivers or lakes – non-complying activity Rule R129: All other activities in river and lake beds – discretionary activity Rule R161: New structures, additions or alterations to structures outside sites of significance – discretionary activity Rule R162: New structures, additions or alterations to structures inside sites of significance – non-complying activity Rule R163: Replacement of a structure or part of a structure – permitted activity Rule R164: Replacement of a structure – restricted discretionary activity Rule R165: Additions or alterations to existing seawalls – controlled activity Rule R166: Seawalls outside sites of significance – discretionary activity Rule R167: Seawalls inside sites of significance – non-complying activity Rule R214: Reclamation and drainage for regionally significant infrastructure outside of sites of significance – discretionary activity Rule R215: Reclamation and drainage – non-complying activity
Method:	Method M20: Wetlands Method M22: Integrated management of the coast Method M26: Encouraging the involvement of kaitiaki

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Appendix

Table A1: Summary of assessment of the appropriateness of hazard Objectives O20, O21 and O22

Objective O20	The risk, residual risk, and adverse effects from natural hazards and climate change on people, the community and infrastructure are acceptable.
Relevance	
Directly related to resource management issue?	Relates to natural hazard issues 1, 2, 3 and 4.
Will achieve one or more aspects of the purpose and principles of the RMA?	Directly related to s5, 7(i), 30(1)(c)(iv), 30(1)(c)(v), 30(1)(g)(iv), 35(1), 35(5)(j)
Relevant to Māori environmental issues? (sections 6(e),6(g),7(aa),8)	Indirectly, through managing hazard risk to development that may have co-benefits for sites of significance for mana whenua.
Relevant to statutory functions or to give effect to another plan or policy (i.e. NPS, RPS)?	Gives effect to Policies 28 and 50 of the RPS; s11A of the LGA; s126 Soil Con Act; policies 24, 25, 27 of the NZCPS
Usefulness	
Will effectively guide decision-making?	Yes, the objective sets up an over-arching principle to guide policies and rules throughout the proposed Plan and will assist decision makers when assessing consents. The objective is similar to the RPS objective 19.
Meets sound principles for writing objectives? (specific; state what is to be achieved where and when; relate to the issue; able to be assessed)	The objective is a clear mandate related to the natural hazard resources issues highlighted in Section 4 of this report. Because reducing the effects from natural hazards is a long term aim, it will deliver benefits over time and have relevance for the lifetime of the proposed Plan and any future plans.
Consistent with other objectives?	Yes, the objectives have been assessed, and work together to achieve sustainable management of natural resources in the Wellington Region.
Achievability	
Will it be clear when the objective has been achieved in the future? Is the objective measureable and how would its achievement be measured?	Yes, the objective is achievable, especially for new development but is slightly more difficult to measure for existing development. Two reports that can provide a degree of monitoring and assessment of this objective are: State of the environment monitoring Regional civil defence and emergency management group plan

Is it expected that the objective will be achieved within the life of the proposed Plan or is it an aspirational objective that will be achieved sometime in the future?	The achievement of the objective will become more apparent over time as communities become more resilient to natural hazards through a mix of planning zones, spatial location of development and engineering design.
Does the council have the functions, powers, and policy tools to ensure that they can be achieved? Can you describe them?	Yes, relevant statutory powers are: Section 11A of the LGA makes natural hazards management a core function for regional councils. Section 126 of the Soil Con Act directs regional councils to maintain and control waterways for the purposes of flood protection. Sections 30(1)(c)(iv) and 30(1)(g)(iv) of the RMA grant regional councils powers to control the use of land and beds of waterbodies to avoid or mitigate natural hazards. Relevant policies are contained within the RPS and NZCPS. RPS Policy 28 directs LAs to identify high hazard areas and avoid inappropriate development in those areas. RPS Policy 50 outlines a number of natural hazard considerations that need to be given regard to for consents, notice of requirements and changes, variations or reviews of regional or district plans. NZCPS Policy 24 directs LAs to identify coastal hazards. NZCPS Policy 25 directs LAs to avoid increasing the risk from coastal hazards. NZCPS Policy 27 directs LAs to develop long term strategies to reduce the risk from coastal hazards to existing development.
What other parties can the Council realistically expect to influence to contribute to this outcome?	Wellington Regional Council will work with a number of agencies to achieve this objective: • Land owners • Resource users • Territorial authorities • Government agencies
What risks have been identified in respect of outcomes?	The Wellington Region is geologically dynamic and subject to the full range of natural hazards. The risks to the community of not managing natural hazards is extreme. By acting to manage the risk we are helping to develop resilience to natural hazards.

Reasonableness	
Does the objective seek an outcome that would have greater benefits either environmentally or economically/socially compared with the costs necessary to achieve it?	Yes, the costs to the community and New Zealand from natural disasters is extremely high. This objective will have a greater overall benefit than the costs necessary to achieve it.
Who is likely to be most affected by achieving the objective and what are the implications for them?	Natural hazards affect the whole community. Anyone who is looking to undertake use and development activities in the coastal marine area or in the beds and lakes rivers will have to consider the effects of natural hazards. This may include developers, land owners, councils, government agencies or iwi organisations. The implications for these groups are that they may be required to undertake more rigorous assessments of the impacts from hazards and incorporate appropriate designs to reduce the impacts from hazard events or locate development and structures in a way that minimises potential harm.
Existing objectives	
Are the existing objectives (include a list of objectives or relevant objective to the one being compared) still relevant or useful?	This objective is consistent with objectives 4.1.11 and 4.1.12 of the coastal plan and 4.1.9 and 4.1.10 of the freshwater plan. These objectives talk of reducing hazards to an acceptable level. The direction of the RPS and NZCPS is to avoid or minimise the impacts from natural hazards and this objective has been updated to allow stronger policies and rules to be included in the proposed Plan.

Objective O21	Inappropriate use and development in high hazard areas is avoided
Relevance	
Directly related to resource management issue?	Directly related to Issues 1,2, 3 and 4.
Will achieve one or more aspects of the purpose and principles of the RMA?	Directly related to s5, 7(i), 30(1)(c)(iv), 30(1)(c)(v), 30(1)(g)(iv), 35(1), 35(5)(j)
Relevant to Māori environmental issues? (sections 6(e),6(g),7(aa),8)	Yes, many sites of significance are situated in or adjacent water.
Relevant to statutory functions or to give effect to another plan or policy (i.e. NPS, RPS)?	Gives effect to Policies 28 and 50 of the RPS; s11A of the LGA; s126 Soil Con Act; policies 25, 27 of the NZCPS
Usefulness	
Will effectively guide decision-making?	Yes, the objective sets up an over-arching principle to guide policies and rules throughout the proposed Plan and will assist decision makers when assessing consents. The objective is consistent with RPS objectives 19 and 21.

Meets sound principles for writing objectives? (specific; state what is to be achieved where and when; relate to the issue; able to be assessed)	The objective is a clear mandate related to the natural hazard resources issues highlighted in Section 4 of this report. Because reducing the effects from natural hazards is a long term aim, it will deliver benefits over time and have relevance for the lifetime of the proposed Plan and any future plans.
Consistent with other objectives?	Yes, the objectives have been assessed, and work together to achieve sustainable management of natural resources in the Wellington Region.
Achievability	
Will it be clear when the objective has been achieved in the future? Is the objective measureable and how would its achievement be measured?	Yes, the objective is achievable, especially for new development but is slightly more difficult to measure for existing development. Two reports that can provide a degree of monitoring and assessment of this objective are: • State of the environment monitoring • Regional civil defence and emergency management group plan
Is it expected that the objective will be achieved within the life of the proposed Plan or is it an aspirational objective that will be achieved sometime in the future?	The achievement of the objective will become more apparent over time as communities become more resilient to natural hazards through a mix of planning zones, spatial location of development and engineering design. Natural hazards management has been ongoing in the region for a many years. This is a long term objective that will take more than one plan cycle to be achieved and is an ongoing objective as development continues.

Does the council have the functions, powers, and policy tools to ensure that they can be achieved? Can you describe them?	Yes, relevant statutory powers are: Section 11A of the LGA makes natural hazards management a core function for regional councils. Section 126 of the Soil Con Act directs regional councils to maintain and control waterways for the purposes of flood protection. Sections 30(1)(c)(iv) and 30(1)(g)(iv) of the RMA grant regional councils powers to control the use of land and beds of waterbodies to avoid or mitigate natural hazards. Relevant policies are contained within the RPS and NZCPS. RPS Policy 28 directs LAs to identify high hazard areas and avoid inappropriate development in those areas. RPS Policy 50 outlines a number of natural hazard considerations that need to be given regard to for consents, notice of requirements and changes, variations or reviews of regional or district plans. NZCPS Policy 24 directs LAs to identify coastal hazards. NZCPS Policy 25 directs LAs to avoid increasing the risk from coastal hazards. NZCPS Policy 27 directs LAs to develop long term strategies to reduce the risk from coastal hazards to existing development.
What other parties can the Council realistically expect to influence to contribute to this outcome?	Wellington Regional Council will work with a number of agencies to achieve this objective: • Land owners • Resource users • Territorial authorities • Government agencies
What risks have been identified in respect of outcomes?	The Wellington Region is geologically dynamic and subject to the full range of natural hazards. The risks to the community of not managing natural hazards is extreme. By acting to avoid developing inappropriate development in high hazard areas we are helping to build resilience into the infrastructure.

Reasonableness	
Does the objective seek an outcome that would have greater benefits either environmentally or economically/socially compared with the costs necessary to achieve it?	Yes, the costs to the community and New Zealand from natural disasters is extremely high. This objective will have a greater overall benefit than the costs necessary to achieve it. The outcome of avoiding inappropriate development in high hazard areas is that it ensures infrastructure is located in areas with a lower hazard risk, making them less susceptible to hazard impacts and better able to cope when disasters do occur.
Who is likely to be most affected by achieving the objective and what are the implications for them?	Natural hazards affect the whole community. Anyone who is looking to undertake use and development activities in the coastal marine area or in the beds and lakes rivers will have to consider the effects of natural hazards. This may include developers, land owners, councils, government agencies or iwi organisations. The implications for these groups are that they may be required to undertake more rigorous assessments of the impacts from hazards and incorporate appropriate designs to reduce the impacts from hazard events or locate development and structures in a way that minimises potential harm.
Existing objectives	
Are the existing objectives (include a list of objectives or relevant objective to the one being compared) still relevant or useful?	This objective is consistent with objectives 4.1.11 and 4.1.12 of the coastal plan and 4.1.9 and 4.1.10 of the freshwater plan. These objectives talk of reducing hazards to an acceptable level. The direction of the RPS and NZCPS is to avoid or minimise the impacts from natural hazards and this objective has been updated to allow stronger policies and rules to be included in the proposed Plan.

Objective O22	Hard engineering mitigation and protection methods are only used as a last practicable option
Relevance	
Directly related to resource management issue?	Directly related to Issues 2 and 3.
Will achieve one or more aspects of the purpose and principles of the RMA?	Directly related to s5, 7(i), 30(1)(c)(iv), 30(1)(c)(v).
Relevant to Māori environmental issues? (sections 6(e),6(g),7(aa),8)	Yes, many sites of significance are situated in or adjacent water and hazard mitigation structures have historically affected sites of significance to mana whenua to enable development in high hazard areas.
Relevant to statutory functions or to give effect to another plan or policy (i.e. NPS, RPS)?	Gives effect to Policy 51 of the RPS; s11A of the LGA; policies 26, 27 of the NZCPS.

Usefulness	
Will effectively guide decision-making?	Yes, the objective sets up a principle to guide policies and rules across different areas of the proposed Plan and will assist decision makers when assessing consents. The objective is consistent with RPS objective 20.
Meets sound principles for writing objectives? (specific; state what is to be achieved where and when; relate to the issue; able to be assessed)	The objective is a clear mandate related to the natural hazard resources issues highlighted in Section 4 of this report. Because hazard mitigation structures and works persist for a long time and can have long term adverse effects, it will deliver benefits over time and have relevance for the lifetime of the proposed Plan and any future plans.
Consistent with other objectives?	Yes, it is consistent with objectives related to wetlands, biodiversity restoration and protecting areas with significant values for mana whenua, historic heritage, natural character and biodiversity. The objective works together to achieve sustainable management of natural resources in the Wellington Region.
Achievability	
Will it be clear when the objective has been achieved in the future? Is the objective measureable and how would its achievement be measured?	Yes, the objective is achievable, especially for new development but is slightly more difficult to measure for existing development. Two reports that can provide a degree of monitoring and assessment of this objective are: • State of the environment monitoring • Biodiversity reporting and monitoring
Is it expected that the objective will be achieved within the life of the proposed Plan or is it an aspirational objective that will be achieved sometime in the future?	The implementation of policies and rules related to this objective will take place over a number of years and will be an ongoing objective that continues beyond the lifetime of the proposed Plan.

Does the council have the functions, powers, and policy tools to ensure that they can be achieved? Can you describe them?	Yes, relevant statutory powers are: Section 11A of the LGA makes natural hazards management a core function for regional councils. Section 126 of the Soil Con Act directs regional councils to maintain and control waterways for the purposes of flood protection. Sections 30(1)(c)(iv) and 30(1)(g)(iv) of the RMA grant regional councils powers to control the use of land and beds of waterbodies to avoid or mitigate natural hazards. Relevant policies are contained within the RPS and NZCPS. RPS Policy 28 directs LAs to avoid inappropriate development in high hazard areas. RPS Policy 51 outlines a number of considerations for hazard mitigation works that need to be given regard to for consents, notice of requirements and changes, variations or reviews of regional or district plans. NZCPS Policy 25 directs LAs to avoid increasing the risk from coastal hazards. NZCPS Policy 26 directs LAs to recognise and provide for the protection and restoration of natural features that may be used to provide natural hazard mitigation functions. NZCPS Policy 27 directs LAs to develop long term strategies to reduce the risk from coastal hazards to existing development.
What other parties can the Council realistically expect to influence to contribute to this outcome?	Wellington Regional Council will work with a number of agencies to achieve this objective: • Land owners • Resource users • Territorial authorities • Government agencies
What risks have been identified in respect of outcomes?	Hazard mitigation works are required in many instances around the Wellington Region as it is geologically dynamic and subject to the full range of natural hazards. If these structures are not designed and located properly they can cause or increase or the risk from natural hazards and be harmful to the natural environment. By acting to properly design and locate mitigation structures we are helping to build resilience into development that relies on the mitigation works and conserve the benefit the environment.

Reasonableness	
Does the objective seek an outcome that would have greater benefits either environmentally or economically/socially compared with the costs necessary to achieve it?	Yes, the costs to the community and New Zealand from natural disasters is extremely high. This objective will have a greater overall benefit than the costs necessary to achieve it. The outcome of designing and building appropriate hazard mitigation structure or by employing soft options is that it lowers the risks from natural hazards, including those that can be human induced, and brings co-benefits for ecosystem services.
Who is likely to be most affected by achieving the objective and what are the implications for them?	Natural hazards affect the whole community. Anyone who is looking to undertake use and development activities in the coastal marine area or in the beds and lakes rivers will have to consider the effects of natural hazards. This may include developers, land owners, councils, government agencies or iwi organisations. The implications for these groups are that they may be required to undertake more rigorous assessments of the impacts that the hazard mitigation structures may have and incorporate appropriate designs to reduce their impacts or to investigate softer options minimises potential harm on the natural environment.
Existing objectives	
Is the operative objective (4.1.11) in the Regional Plan for Discharges to Land still relevant or useful?	This objective is consistent with objectives 8.1.2 of the coastal plan, 7.1.2 of the freshwater plan and 4.1.10 of the soil plan. These objectives talk of allowing beach renourishment and planting to reduce the effects of erosion and also of not allowing structures that may interfere with natural process and increase the risk from flooding. The direction of the RPS and NZCPS is to avoid where possible or minimise the impacts from hazard mitigation structures. This objective has been updated to allow stronger policies and rules to be included in the proposed Plan.

Table A2: Summary analysis of the appropriateness of hazard policies P27, P28, P29 and P30 and methods M3 and M4

Costs/Benefits	Agency	Option 1 – Status quo (i.e. no change from operative plans)	Option 2 – Proposed Plan (preferred approach) (i.e. to reflect industry best practice and planning for natural hazards)
Costs (of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions)	Council	The costs of making no changes to the current policies are potentially: Increased uncertainty around what development is allowed or not allowed in hazard areas. Potential increased litigation if developments are allowed to be built in high hazard areas. Potential for severe damage to developments that are allowed to build in high hazard areas. Potential increased environmental costs as more extensive mitigation measures are built to protect developments in high hazard areas. Increasing risks from natural hazard due to inappropriate subdivision, use and development in hazard prone areas resulting in increasing litigation. Increasing destruction and damage to council assets, infrastructure and utilities. Economic losses and increasing expenditure on hard engineered hazard mitigation works. Increases insurance to cover losses from natural disasters.	The proposed provisions are more explicit, but it is not envisaged that costs will increase dramatically for the council as there is already funding for research and management of natural hazards. In addition, there is a body of research, undertaken to date, that will continue to be used to inform decision making on natural hazards. Increasing awareness of the impacts from natural hazards means there are alternate sources of funding becoming available that can be drawn upon to help research and education of natural hazards. Council may be required to undertake more thorough analysis of asset and infrastructure upgrades to take into account hazards and hazard impacts. Costs associated with policy development and implementation, including costs of region/district wide studies and investigations, and the costs of plan changes.
	Resource user (consent applicant or permitted use)	Costs to assess impacts from natural hazards. Consent compliance and enforcement costs. Increasing destruction and damage to property, land and infrastructure and utilities. Potential harm to or loss of life from not properly accounting for natural hazards..	Costs to assess impacts from natural hazards. Consent compliance and enforcement costs. Those interested in investing in activities in the beds and lakes rivers or the coastal marine area, may face costs from requirements for more thorough investigations into natural hazards and mitigation measures. Expectations for some types of development may have to

Costs/Benefits	Agency	Option 1 – Status quo (i.e. no change from operative plans)	Option 2 – Proposed Plan (preferred approach) (i.e. to reflect industry best practice and planning for natural hazards)
		Potential economic losses from not properly accounting for natural hazards.	be modified in high hazard areas. More thorough investigations of alternative locations for resource use and development may be required to avoid high hazard areas. Consents may be declined in areas deemed to pose too great a risk from natural hazards.
	Community (environment, social, economic, cultural)	Increasing risks from natural hazard due to inappropriate subdivision, use and development in hazard prone areas. Increasing destruction and damage to property, land and infrastructure and utilities. Economic losses to the community, people and businesses from improperly designed and located development. Increases in rates and insurance to cover losses from natural disasters. Harmful and irreversible adverse effects on the environment from inappropriate mitigation measures. Increasing and ongoing impacts from climate change and sea level rise. Potential loss of amenity, cultural heritage, wāhi tapu and degradation of mauri.	Potential increased costs from investigations into hazards before development proceeds. Communities or individuals living in high hazard areas may face reduced mitigation cover if ongoing works are considered to be prohibitively expensive or be causing adverse hazard effects in adjacent areas.
Benefits (of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions)	Council	The council is still required to manage natural hazards so there is little benefit to the council for retaining the current provisions as opposed to introducing new ones.	Natural hazard events are costly to the community and require enormous resources for both the response and recovery effort. Avoiding and mitigating the adverse effects of natural hazards has significant social and economic benefits. Local authorities will have regionally consistent numbers for sea level rise and align planning for sea level rise across territorial boundaries.

Costs/Benefits	Agency	Option 1 – Status quo (i.e. no change from operative plans)	Option 2 – Proposed Plan (preferred approach) (i.e. to reflect industry best practice and planning for natural hazards)
			Lower damages lead to quicker recovery times allow, councils, to get up and running faster to respond to an emergency.
	Resource user (consent applicant or permitted use)	There are few benefits to resource users for retaining the current provisions for managing natural hazards because the costs from natural disasters outweighs any gains that may be had by cutting costs at the start of a development or project to avoid undertaking a thorough assessment.	Resources users benefit from having greater certainty that developments will not be adversely affected by hazard events. Construction and mining companies benefit economically from dredging activities, gravel and sand extraction and from flood protection works.
	Community (environment, social, economic, cultural)	Communities living in flood prone areas would continue to benefit from ongoing flood protection works.	Community, businesses, regionally significant infrastructure and local authorities benefit from hazard management and mitigation. Community, businesses, regionally significant infrastructure and local authorities benefit from long term hazard management strategies. Communities living in hazard prone areas benefit from long term planning for climate change related hazards. Communities living in flood prone areas will benefit from flood protection works, construction and maintenance that takes account of potential increased flood risk from climate change and sea level rise. The broader community, businesses, regionally significant infrastructure and local authorities benefit from improved environmental outcomes and more effective hazard and mitigation measures. Lower damages lead to quicker recovery times allow and local economies and communities to recover more quickly following a disaster. Provides certainty and protection for people and the

Costs/Benefits	Agency	Option 1 – Status quo (i.e. no change from operative plans)	Option 2 – Proposed Plan (preferred approach) (i.e. to reflect industry best practice and planning for natural hazards)
			community, subdivision and development. Positive environmental outcome, as many high hazard areas also have highly sensitive environmental values (e.g. sand dunes, wetlands). Positive outcomes for community safety as hazard risk is lowered. Lowers the psychological and emotional impact that occurs to people after a disaster destroys property and livelihood. May lead to lower insurance costs for some people if development is located out of high hazard areas.
Efficiency and Effectiveness (costs vs benefits – will the provisions achieve the objective)		The operative provisions were only partially effective as they were permissive in their wording and have allowed some development to occur in high hazards areas or have resulted in costly litigation that could have been avoided. Do not give proper effect to the RPS or the NZCPS. Do not acknowledge the latest research and understanding of climate change impacts and sea level rise.	Methods are effective in requiring district & regional plans to align planning functions to manage natural hazard impacts. Give effect to the RPS and the NZCPS. It is more cost effective to use sound hazard planning than to rely on insurance or expensive mitigation works. Amending the proposed Plan is the only way to achieve this. Provides a consistent framework for development of policies, rules and methods across the region. Effective in setting out the principles to be applied, but specific decision making would still be determined at the local level. Raising awareness of the natural hazard risk leads to the building of more resilient communities and is an efficient way of leading a cultural shift to hazards management. Effective because there are economic benefits from less damages to property and businesses in disaster events. Economically efficient if it leads to minimising the adverse impacts from natural hazards.

Costs/Benefits	Agency	Option 1 – Status quo (i.e. no change from operative plans)	Option 2 – Proposed Plan (preferred approach) (i.e. to reflect industry best practice and planning for natural hazards)
Risks (of acting or not acting if there is uncertain or insufficient information)		There is sufficient information to maintain status quo provisions, but the information and understanding has now surpassed the currents provisions ability to allow comprehensive natural hazards planning and management.	There is sufficient information to implement the new provisions and they will provide for greater certainty over the risks associated with natural hazards and the effects that hazard mitigation works can have on the environment. The risk of not acting given the certainty of information would have greater risk.
Appropriateness (If it is efficient and effective then it must be appropriate)		It is not appropriate to maintain status quo because the operative provisions do not give effect to the RPS or the NZCPS or acknowledge the latest science of climate change and sea level rise. The operative provisions are too permissive and are no best practice for natural hazards management.	The new provisions are appropriate because they give effects to the RPS, NZCPS and the CDEM Group Plan and are consistent with the guidance and direction provided national guidance documents for managing natural hazards.
Conclusions		The operative plans contain a mix of ad hoc policies dealing with natural hazards in their respective areas of management. These provisions have been patchy and only partially successful. Part of this is due to the permissive wording of the policies. Maintaining the status quo would be better than doing nothing, but provisions in the first generation plans have been more passive than instructive and lacked an overall structure. There are provisions in the operative plans that deal indirectly with managing natural hazards however, and these still have associated costs in managing hazards through resource consents, compliance, enforcement and in providing advice and education on natural hazards. Wellington Regional Council has operated a programme of work over the past decade to undertake research into natural hazards and provide advice on mitigating and managing the impacts from hazards. The assessment of the operative objectives and	The alternative provisions seek to address the shortcomings of the operative provisions and create a clear and efficient policy tool with which decision makers and plan users can assess proposals for the risks from natural hazards. The new policies and methods will provide greater certainty and clarity in identifying hazard areas and providing rules for the type and scale of development in those areas. This saves time and money in undertaking expensive assessments. The proposed alternative provisions are useful in achieving the purpose of the RMA as they are: The provisions give effect to the RPS, NZCPS and the CDEM Group Plan. Consistent with the guidance and direction provided national guidance documents for managing natural hazards. Reflect current planning best practice and scientific understanding of natural hazards management.

Costs/Benefits	Agency	Option 1 – Status quo (i.e. no change from operative plans)	Option 2 – Proposed Plan (preferred approach) (i.e. to reflect industry best practice and planning for natural hazards)
		provisions in Section 3 shows that the operative objectives and provisions are either not appropriate or effective in that they: Do not give effect to the operative regional policy statement Do not give effects to the NZCPS. Fail to take into account Ministry for Environment guidance on managing coastal hazards, climate change hazards and flood hazards.	Provide decision makers with a suite of assessment tools that will enable consistent and comprehensive consideration of the risks from natural hazards and climate change and the full range of environmental effects associated with hard engineered hazard mitigation works.

The Greater Wellington Regional Council's purpose is to enrich life in the Wellington Region by building resilient, connected and prosperous communities, protecting and enhancing our natural assets, and inspiring pride in what makes us unique

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July 2015
GW/EP-G-15/53

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