
MARLBOROUGH ENVIRONMENT PLAN

Section 32 Report

Chapter 11: Natural Hazards

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Overview

Background

Section 32 of the Resource Management Act 1991 (RMA) requires that in the process of reviewing its regional policy statement and resource management plans, the Marlborough District Council (the Council) must prepare and publish an evaluation report. The three documents being reviewed are the Marlborough Regional Policy Statement (MRPS), the Marlborough Sounds Resource Management Plan (MSRMP) and the Wairau/Awatere Resource Management Plan (WARMP). Each resource management plan is a combined regional, coastal and district plan.

Section 32¹ of the RMA requires that:

- reviewed regional policy statements and plans must be examined for their appropriateness in achieving the purpose of the RMA;
- the benefits, costs and risks of new policies and rules on the community, economy and environment be clearly identified and assessed; and
- the written evaluation must be made available for public inspection.

The Section 32 process is intended to ensure that the objectives, policies and methods the Council decides to include in the new resource management framework have been well-tested against the sustainable management purpose of the RMA. The Section 32 evaluation report for the proposed Marlborough Environment Plan² (MEP) has been prepared on a topic basis, centred on the policy chapters of Volume 1 of the MEP. Individual reports have been prepared on the following:

Topic	Volume 1 Chapter of the MEP
Introduction to Section 32 evaluation reports	
Marlborough's tangata whenua iwi	3
Use of natural and physical resources	4
Allocation of public resources – freshwater allocation	5
Allocation of public resources – coastal allocation	5
Natural character	6
Landscape	7
Indigenous biodiversity	8
Public access and open space	9
Heritage resources	10
Natural hazards	11
Urban environments	12
Use of the coastal environment – subdivision, use and development activities in the coastal environment, recreational activities, fishing, residential activity, shipping activity and Lake Grassmere Salt Works	13
Use of the coastal environment – ports and marinas	13
Use of the coastal environment – coastal structures, reclamation and seabed disturbance	13

¹ See Appendix A.

² The Marlborough Environment Plan is a combined regional policy statement, regional plan, regional coastal plan and district plan.

Section 32: Chapter 11 – Natural Hazards

Topic	Volume 1 Chapter of the MEP
Use of the rural environment	14
Resource quality – water	15
Resource quality – air	15
Resource quality – soil	15
Waste	16
Transportation	17
Energy	18
Climate change	19

Chapters 1 and 2 of the MEP are not included within the Section 32 evaluation as they provide an introduction and background to the proposed document. These chapters do not include provisions that must be evaluated in accordance with Section 32.

The Introduction report covers the scope of the review that the Council has undertaken, including consultation and the nature of information gathered, investigations and research undertaken, and analysis that has occurred. An overview of the Council's statutory obligations, the relationship of the MEP with other plans and strategies and working with Marlborough's tangata whenua iwi is described. A set of guiding principles the Council has used in the development of the objectives, policies and methods for the MEP is provided. The Council acknowledges that the principles have no statutory basis and do not in themselves have specific objectives, policies or methods. However, they provide the philosophy and values underlying the content of the MEP and consequently help to inform the Section 32 evaluation.

This Section 32 evaluation report relates to provisions for natural hazards. The policy approach for these provisions is set out in Chapter 11 - Natural Hazards while the rules are set out within individual zone. This evaluation report is set out as follows:

- Description of issues – provides an overview of the resource management issues concerning natural hazards.
- Statutory obligations – the extent to which there are direct links with Section 6 or 7 matters and whether the provisions are directed or influenced by national policy statements or national environmental standards.
- Information and analysis – whether specific projects, investigations or other information have influenced the inclusion of provisions or other responses to dealing with resource management issues.
- Consultation – an overview of the extent and nature of specific consultation undertaken on the proposed provisions.
- Evaluation – an assessment of the provisions under each of the identified issues. Where appropriate, reference is made to supporting material that has helped to inform why a particular option has been chosen. In some cases the evaluation is undertaken on an individual provision, while in others groups of policies or methods have been assessed together.

In some parts of this evaluation report there are references to provisions within other chapters of the MEP. This is due to those provisions assisting in implementing the management framework for the subject matter of this report or vice versa. A reader should consider the evaluation for these other provisions where they are referred to in this report.

Key changes

The key changes in the MEP from the approach in the MRPS, WARMP and MSRMP are:

- Establishment of a hierarchy of flood risk which characterises the nature of likely flood events relative to the potential severity of flooding. This includes direction about where

houses and other structures should avoid being located to help reduce the risk to life, property and regionally significant infrastructure.

- Guidance for the development of areas subject to a risk of liquefaction, including requirements for geotechnical investigations.
- A new zone (Floodway Zone) will be used to identify river channels and land on Council-managed berms to reduce the risk of flooding on adjoining land.
- The Council has removed the instability hazard layers in the Marlborough Sounds that identified the location of this hazard. This was done because all of the Marlborough Sounds are inherently at risk from land instability. Rather than cover the whole Sounds with such a layer, a different response through the Building Act is now used.
- Specific policy has been included to guide the circumstances in which it is appropriate to create esplanade reserves or esplanade strips to enable mitigation of flooding hazards.

Summary of reasons for the proposed provisions

Section 32(1)(b)(iii) requires a summary of the reasons for deciding on the provisions included in the MEP. The summary of reasons for the provisions included in the MEP in relation to natural hazards are set out below; however, the more detailed evaluation is set out in the remainder of this report.

- The Council has identified three specific hazards to be mapped within the MEP. This will help to reduce the risk of natural hazards and allow new land uses in these areas to be managed in a way that recognises the inherent risks of a development proceeding.
- The provision of an emergency response to a natural hazard event is important in managing the adverse effects of the hazard. It is intended for the Council to continue to be involved in emergency responses on an ongoing basis and that the role of the Council is complimentary to that of Civil Defence.
- On the Lower Wairau Plain, a significant investment has been made over a considerable period of time to protect Blenheim, other towns and the surrounding rural land through the construction and maintenance of stopbanks and the training and diversion of rivers. The Council has also administered flood defences on the Waitohi and Waikawa rivers in Picton. The costs of managing flood hazards are significant. However, given the extensive development of the Wairau Plain and areas in Picton, it is important that ongoing maintenance is provided for.
- There is a history of strategic removal of accumulated gravel in Marlborough's rivers (especially the Wairau River) to maintain floodway capacity. This approach will continue as it has proven to be effective and efficient. The extracted gravel also provides a significant resource that is used in road construction and maintenance and in the construction industry.
- Historical records of flood flows have been used to determine and update annual recurrence intervals. For consistency, the standards used in Chapter 11 of the MEP have been taken from the Council's Rivers and Land Drainage Asset Management Plan.
- Using a Floodway Zone to identify river channels and land on Council-managed berms will allow the application of regional and district rules to prevent people from undertaking activities that might impair the hydraulic efficiency of the floodway or the effectiveness of any flood defences.
- Mapping areas associated with flooding by the level of risk posed means an appropriate level of management can be applied.
- There is a risk-based approach to coastal hazard management in the NZCPS through Policies 24-27. These policies provide direction on identification of coastal hazards, subdivision, use and development in areas of coastal hazard risk, the use of natural defences against coastal hazards and strategies for protecting significant existing development from coastal hazard risk. This level of direction was not apparent at the time the MRPS, MSRMP and WARMP were first prepared.

Description of issues

A natural hazard is defined in the RMA as any atmospheric, earth or water related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire or flooding) that may adversely affect human life, property or other aspects of the environment. On their own, natural processes do not constitute a hazard; they only become hazardous when they adversely affect human lives, property and infrastructure.

The Council can act to reduce the risk of natural hazards adversely affecting life, property and regionally significant infrastructure. Using its functions under the RMA to control the use of land to avoid or mitigate natural hazards, the Council can influence the location and management of new developments to ensure that they are not subject to unreasonable risk. Other land uses may adversely affect hazard mitigation works and these can be similarly controlled to ensure that the integrity of the works is not compromised.

Climate change has the potential to worsen the effects of some natural hazards and itself creates a new hazard of sea level rise. These issues are dealt with in Chapter 19 - Climate Change (Volume 1 of the MEP). The provisions for natural hazards are included in Chapter 11 of Volume 1 of the MEP and are based on two issues:

Issue 11A – Natural hazards in Marlborough, particularly flooding, earthquakes and land instability, have the potential to cause loss of life and significant damage to property and regionally significant infrastructure.

- Marlborough is subject to a wide range of naturally occurring hazards. Earthquakes, tsunamis, land instability, severe rainfall, flooding, wind, drought, fire, hail and snowfall can occur in Marlborough.
- Flooding has been the most regular natural hazard experienced in Marlborough. Significant investment has been made to reduce the risk of flooding occurring, which historically has caused considerable damage to properties and infrastructure, especially to residential properties in both rural and urban environments, farm properties (including stock losses) and transportation links. Flood protection works along the Wairau River and its tributaries and along the Waitohi and Waikawa rivers in Picton has created an 'artificial' river pattern that the Council has a responsibility to maintain.
- Eastern Marlborough contains the Wairau, Awatere and Clarence faults onshore and significant and proximate faults in Cook Strait, as well as a number of lesser but still active faults. These faults have the potential to cause significant damage to property and infrastructure and create considerable disruption on an ongoing basis. Seismic activity can also result in a number of different natural hazards, including liquefaction of soils, tsunamis, inundation by sea and salt water intrusion into freshwater aquifers.
- Other potential hazards may have localised effects, such as flooding from streams and stormwater overflows, slope instability and fire. Slope instability is of particular concern in some parts of Marlborough because it has the potential to affect residential sites, rivers and transportation routes.
- Using and developing natural and physical resources can increase the risk and consequences of natural hazards and may put peoples' lives, property and infrastructure in danger. In some cases, the severity of the hazard and its effect may be able to be mitigated through good location, design and construction.

Issue 11B – The use of natural and physical resources can make existing natural hazards worse.

- It is undesirable to place people and property in areas subject to natural hazards. Use, development and people's actions can also increase the severity of existing hazards, e.g. erecting impermeable structures or depositing material in floodways will create a barrier to flood flows, could increase water levels or divert flood flows elsewhere. Planting unsuitable vegetation within a floodway could create similar effects

- Earthworks on or near and/or the construction of structures on a stopbank can compromise the integrity of the stopbank and result in the breakthrough of flood waters. Structures can affect the ability of the Council to access the flood defence for maintenance work or emergency response. In areas prone to land instability, the discharge of stormwater to land increases soil moisture saturation, making the soil more prone to ground failure.

Statutory obligations

Section 30 of the RMA identifies that regional councils control the use of land for the purpose of (among other things) the avoidance or mitigation of natural hazards. Similarly, Section 31 of the RMA identifies that district and city councils control any actual or potential effects of the use, development or protection of land for the purpose of the avoidance or mitigation of natural hazards. Although this can create a confusing situation whereby both regional councils and territorial local authorities have a role in hazard management, because the Council is a unitary authority, it has the functions of both a regional and district council. The distinction between the two functions is therefore irrelevant.

Section 7 of the RMA requires the Council to have particular regard to the effects of climate change. This is important in the context of possible changes in the nature and frequency of existing hazards and the potential for new hazards to be experienced (e.g. sea level rise). Climate change provisions in the MEP, including for sea level rise, have been evaluated in the Section 32 on climate change.

The Council also has a specific function under Section 35(5)(j) to keep records of natural hazards to the extent the Council considers appropriate for the effective discharge of its functions.

New Zealand Coastal Policy Statement 2010

The New Zealand Coastal Policy Statement 2010 (NZCPS) recognises that one of the key issues facing the coastal environment is that of “*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.*”

There is a risk-based approach to coastal hazard management in the NZCPS through Policies 24-27. These policies provide direction on identification of coastal hazards, subdivision, use and development in areas of coastal hazard risk, the use of natural defences against coastal hazards and strategies for protecting significant existing development from coastal hazard risk. All coastal hazard policies flow from Objective 5 in the NZCPS, which states:

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.*

While there is increased direction within the NZCPS for coastal hazard management, the Council is not currently faced with significant coastal hazards in the same way it is for flooding, earthquakes or land instability. For this reason the provisions of Chapter 11 do not provide specific direction for coastal hazards. Instead there is general direction within the policies for the coastal environment which can be found in Chapter 13 - Use of the Coastal Environment (Volume 1 of the MEP). Issues concerning sea level rise have been included in Chapter 19.

Civil Defence and Emergency Management (CDEM) Act 2002

The CDEM Act sets out the management of hazards and risks, emergency response and recovery through coordinated and integrated policy, planning and decision-making processes at the national and local level. It sets out the duties, functions and powers of central government, local government, emergency services, lifeline utilities and the general public. The Act is administered by the Ministry of Civil Defence and Emergency Management.

Much of the responsibility for civil defence planning and response is devolved to Civil Defence Emergency Management Groups established under the Civil Defence Emergency Management Act 2002. The Marlborough Civil Defence Emergency Management Group involves the Council, the

Nelson/Marlborough District Health Board, police and fire services. The group has prepared the Marlborough Civil Defence Emergency Management Plan, which was adopted in 2011. The core of the plan is to manage hazards and risks in accordance with the principles of reduction, readiness, response and recovery.

Although the readiness, response and recovery aspects of the Marlborough Civil Defence Emergency Management Plan are primarily operational, the provisions of the plan relating to risk reduction will have a strong link with the MEP provisions seeking to avoid and mitigate natural hazards.

Local Government Act 2002

The Local Government Act 2002 provides the general framework, obligations, restrictions and powers under which local authorities operate. There is a very specific responsibility for the Council under this Act in relation to natural hazards: Section 11A requires the Council to have particular regard to the contribution that avoiding or mitigating natural hazards makes as a core service to its community.

Building Act 2004

The Building Act 2004 provides for the regulation of building work, the licensing regime for building practitioners and the setting of standards for buildings. It manages natural hazards in relation to the construction and modification of buildings. In addition, this Act requires local authorities to develop a policy for those local buildings most vulnerable in a moderate earthquake. The Council's policy was adopted mostly recently in 2012. The policy requires the earthquake risk of non-residential buildings to be evaluated and requires earthquake prone buildings to be strengthened.

Information and analysis

A number of investigations and monitoring activities have helped to inform the review of the natural hazard provisions. An overview of these is provided below.

Review of known flood hazard areas

As part of the review, the extent of areas subject to flood hazard has been reassessed. Aerial photography of flood events has been used to more accurately identify the extent of floods and this information has been used as the basis for mapping within the MEP. In addition, a level of risk has been assigned to areas with flood hazard, increasing from Level 1 to Level 4 as follows:

- Level 1: Land that suffers flooding of shallow, low-velocity water in a flood event, with an annual recurrence interval of 1 in 50 years;
- Level 2: Land that suffers flooding but the depth/velocity of the flooding is not well understood or cannot easily be expressed relative to natural ground level, in a flood event with an annual recurrence interval of 1 in 50 years, or land within 8 metres of any lake, river or wetland;
- Level 3: Land that suffers flooding of deep, fast-flowing water in a flood event, with an annual recurrence interval of 1 in 50 years, or land in the bed of any lake or river or in any wetland; and
- Level 4: Land that has the potential to suffer flooding of deep, fast-flowing water in an extreme flood event that overwhelms stopbanks and other constructed flood defences.

The mapping in the MEP shows these levels of risk. In addition and as a consequence of the review of the extent of flooding, a review of the location of the Council's designations for river works has also been completed. This has seen some changes to the extent of designations, particularly where stopbanks have been shifted. The designations have been amended to coincide with the shifted stopbank. These designations are also mapped in the MEP.

Review of floodway capacity

Historical records of flood flows are used to determine annual recurrence intervals. An annual recurrence interval is the expected period between river flows of a particular magnitude (in other words, a flood of that magnitude has a certain probability of being exceeded in any year). The Council has adopted standards in the Rivers and Land Drainage Asset Management Plan for rivers for which

the Council provides flood defences. The standards provide a measure of the level of protection provided by stopbanks, river diversions, detention dams, stopbank erosion protection measures, river channel clearing, channel excavation channel training, flow control gates and other flood mitigation measures. The standards that have been used in Chapter 11 of the MEP are those from the Rivers and Land Drainage Asset Management Plan.

Liquefaction

The Council has undertaken a project aimed at planning for Marlborough's urban growth for the 25 year period, from the 2006 census through to 2031. Growth in Marlborough covers different areas, each tailored to specific issues and opportunities facing different parts of the District. In looking at areas with potential for urban expansion around Blenheim, one of the considerations has been the geo-technical composition of soils and the potential for those soils to liquefy in the event of an earthquake. For that purpose, tests were carried out on the periphery of Blenheim to generally characterise the soil properties.

The results of these investigations resulted in some areas earmarked for possible development not proceeding. This included areas to the east and southeast of Blenheim which were shown to be underlain by significant thicknesses (> 15 m) of loose materials susceptible to liquefaction. Some areas to the north and west of Blenheim have been rezoned for residential development but have been identified as needing further geotechnical work prior to subdivision occurring. As a consequence of this work, specific policy has been included to guide potential development in these areas.

Gravel extraction

Periodically the Council carries out topographical surveys of the Wairau River between State Highway 1 and the confluence of the Waihopai River to provide an understanding of how the bed of the Wairau is changing from gravel build-up and natural scour. The results of the surveys help determine the appropriate amounts of gravel able to be extracted from the Wairau River, a practice that has been actively encouraged since 1994. The Council has used a gravel permit system to enable gravel extractors to remove gravel at assigned sites and in a manner that ensures environmental effects are minimised while simultaneously achieving river control aims.

In 2005 the Council introduced tighter controls over gravel extraction in response to some adverse effects being experienced. Tighter monitoring has included periodic surveys and reassessments of the amount of gravel that is able to be safely removed from the river. At the time of writing this evaluation report, surveys were about to commence to assess the effect of gravel removal since the last review in 2012. That 2012 review recommended a considerable reduction in the amount of gravel able to be removed, as extraction from the Waihopai to Tuamarina reach of the Wairau River had reached a stage where there were limited benefits for river control purposes. However, the report also noted that if the Wairau River were to aggrade again, the amounts of gravel to be removed would need to be increased.

The MEP has continued with a system of gravel permits to enable gravel extraction, even though the amounts needing to be removed for river control purposes has significantly decreased.

Tsunami

Coastal communities in New Zealand are at risk from tsunami. The Council engaged GNS Science to use the latest available information to assess the risk for the entire coastline of Marlborough. While the possibility of a large tsunami event occurring in Marlborough is very unlikely, the consequences could be catastrophic. GNS have mapped the potential extent of two return periods, one being a 1:500 year event and the second being a 1:2,500 year event. These return periods have been accepted nationally as appropriate and are used by all other councils to create Tsunami Evacuation Maps.

As part of this project, mapping has been prepared to identify safe evacuation zones. At the time of preparing this Section 32 evaluation report, the Council was about to undertake consultation with local communities to share information about the risks posed by tsunami. This information has not been mapped within the MEP as the process of identification is ongoing. However, this information will be made available through consultation and in time will be available on the Council's website.

Identifying soils at risk

Throughout the review there has been consideration of the nature of Marlborough's soils and whether some types may be at risk of contamination depending on what activities occur on them. Subsequently, investigations have been carried out and a report has been produced³ that identifies some high risk soils. From this report the Council has produced a Soil Sensitive Area map that identifies three soil types within Marlborough as being high risk: free draining, impeded and loess. (Loess soils are considered high risk because of their potential for erosion.) This map is provided as an overlay in the MEP. The Soil Sensitive Area map will be used to prevent certain activities occurring on high risk soil types unless resource consent is granted. Through the consent process, an assessment will be made as to whether it is appropriate for an activity to occur on a particular soil type.

Consultation

Early consultation

In 2006, the first round of consultation was initially undertaken solely for the review of the MRPS and saw the distribution of a community flyer to all ratepayers advising of the review. The aim of this exercise was to find out the community's views on the most important resource management issues that Marlborough would face over the next ten years. Approximately 380 responses were received, although very little comment was provided on natural hazard issues.

Some concern was expressed at the extent to which bed levels in the Wairau River appeared to be rising and that too much water was going down the Diversion. Several comments were made about flood protection works on the Waikawa Stream. The only other natural hazard issue identified was associated with the coastal environment - specifically, planning for sea level rise. A number of respondents expressed concern regarding the future development of Rarangi, with some stating that this area was a hazard zone. Respondents suggested that the Council needed to consider the manageable level of residential development in the area that would allow residents space to evacuate during an emergency, as presently there is only one road in Rarangi.

Following this initial consultation, a series of discussion papers were prepared by the Council and released for public feedback in late 2007. *Discussion Paper 12 Natural Hazard and Other Issues* is particularly relevant to this Section 32 evaluation report.

In total, 35 responses were received from individuals, iwi, industry and environmental groups on *Discussion Paper 12*. In response to issues concerning the need to protect existing flood protection works and floodways, and threats to public safety and property where flood protection works do not exist, the following comments were made:

- There was general support for regulating land use activities in floodways and in close proximity to flood protection works. Respondents suggested that in considering any activity that could adversely affect flood defences, community safety should be prioritised over business interests. Several respondents wanted to ensure all flood protection work, public and private, is co-ordinated to ensure that the works are contiguous and compatible with others in the vicinity to avoid flooding on adjacent properties. It was noted that not all flood protection works are shown on planning maps and that all known flood defences should be included in any planning framework. Many respondents also highlighted the need to map and publicise known flood hazards so that people could make informed decisions on where they base their activities.
- One respondent requested consultation with iwi before any reconfiguration of waterbodies for flood protection works is undertaken.
- Whilst accepting the need for flood protection works, several respondents expressed concerns about the impact of the works on the environment. It was suggested that flood

³ AgResearch (Seth Laurenson and Dave Houlbrooke). (July 2015) Information to support Marlborough District Council's Land Discharge Permit Trigger Soil Profile Map using the AgResearch Soil and Landscape Risk Framework.

protection works should be integrated with other instream and riparian needs and could incorporate wetlands and riparian plantings.

- There was a certain level of disquiet regarding a ‘at your own risk’ building policy being included in regional policy statement. Several respondents suggested that the flood hazard should be avoided and anticipated and that the Council should regulate land use activities in unprotected flood prone areas. However, others thought the Council should provide flood protection works to unprotected areas. Several requests were made for strong policy to be included in the regional policy statement to discourage people from building or subdividing in areas of known or likely flood hazard.

In response to issues on the uncertainty over the hazard posed by tsunami and storm surge and the threats to public safety, buildings and community infrastructure from earthquakes, the following comments were made:

- Although there was agreement that tsunami and storm surge were potentially significant issues in Marlborough, there was little elaboration in the feedback on the options that had been included in the discussion paper. One respondent suggested that subdivision in vulnerable coastal areas should be discouraged, while another identified a need to develop early warning systems. There was some concern that not enough was actually known about the nature and risk of the hazard to actually act and that more research was required.
- There was agreement that earthquakes are a significant issue in Marlborough, but again little feedback was received on the options for dealing with this issue. One suggestion was that fault lines should be identified and the construction of buildings and other structures on or near these fault lines should be regulated.

There was a high level of agreement on including an issue in the regional policy statement on the threats to public safety and property when building on unstable land. Several respondents identified the need to carefully manage any conversion of forestry land in the Marlborough Sounds to alternative uses, especially on the basis that the loss of vegetation may result in instability. Some respondents suggested that policies should limit the amount of vegetation able to be cleared to create building sites in the Marlborough Sounds and that sites should be replanted before building begins.

Another issue highlighted in the Marlborough Sounds was the potential for debris to build-up in small creeks and behind culverts, resulting in flooding and instability during rainfall events. One response suggested that more research was required to identify all areas at risk of instability.

Several respondents highlighted the importance of managing natural hazards and encouraged the Council to do as much as possible to protect people and physical resources from disasters. Many others highlighted the importance of being ready to act in the event of a natural disaster and wanted recognition in regional policy statement of the role Civil Defence plays in this regard. Several respondents made specific comments about Civil Defence, including the need for education so that people are well briefed about what to do in the event of emergencies.

Later consultation

The provisions for natural hazards were completed late in the review process and therefore were not the subject of wide consideration by the focus groups established by the Council to test the provisions before the new resource management documents were formally notified under the First Schedule of the RMA. The only group that considered the provisions was the Sounds Advisory Group. Feedback was also provided by Transpower.

Evaluation for Issue 11A

Issue 11A – Natural hazards in Marlborough, particularly flooding, earthquakes and land instability, have the potential to cause loss of life and significant damage to property and regionally significant infrastructure.

Appropriateness of Objective 11.1

Objective 11.1 – Reduce the risks to life, property and regionally significant infrastructure from natural hazards.

Relevance

Natural hazards can have significant adverse effects on individuals and the community, including loss of life, personal injury, damage to property and disruption of day-to-day life, business and the provision of community infrastructure. For this reason, the objective seeks to reduce the risks and consequences of natural hazards. This objective also implements direction from the CDEMP, which signals that resource management provisions have an important role to play in risk reduction. Objective 11.1 is considered very relevant in achieving the purpose of the RMA as it is clearly within the Council's functions in both Sections 30 and 31, assists in giving effect to the NZCPS and is directed at addressing Issue 11A.

Feasibility

For some natural hazards such as flooding, the Council has already gone to extensive lengths to ensure the objective can be achieved. Flooding has been the most regular natural hazard experienced in Marlborough and significant investment has been made to reduce the risks of flooding, especially with the flood protection works along the Wairau River and its tributaries. These works include changing the location of rivers through the construction of diversions and blocking off alternative outlet channels through the provision of stopbanks.

For some natural hazards, less is known about the associated risks and it is uncertain when the hazard event may occur (for example, earthquakes and tsunami). This may make it more difficult to achieve the objective, but having response mechanisms in place, such as through the CDEMP and Civil Defence, will assist in achieving the objective.

Acceptability

Our actions in using and developing natural and physical resources can increase the risk and consequences of natural hazards. Building in areas prone to flooding, land instability, fault rupture and/or liquefaction will put peoples' lives, property and infrastructure at risk. In some cases, the severity of the hazard may be able to be mitigated through good location, design and construction, to the extent that the consequences are minimal. However, given the nature of some natural hazards the risks can only be mitigated to a certain extent. The Council considers that high costs may be associated with achieving the objective, but that these are justified given the potential for serious risk to life, property and regionally significant infrastructure from natural hazards

Through the feedback received during the early consultation and through the development phase of the policy provisions, there was support for the Council to actively manage risks from natural hazards. The Council was encouraged to do as much as possible to protect people and physical resources from natural hazards.

Assessment of provisions to achieve Objective 11.1

Policies 11.1.1 and 11.1.16

Policy 11.1.1 – Establish the extent of land subject to flooding, liquefaction and tunnel gully erosion and identify this land within the Marlborough Environment Plan as a hazard overlay.

Policy 11.1.16 – Refine the boundaries of flood hazard overlays in response to:

- | |
|--|
| (a) changes to levels of protection provided by flood defences and other flood mitigation/management works; or |
| (b) new observations of flood events or more detailed assessment of the flood hazard; or |

- (c) changes in catchment hydrology due to land use change or climate change; or
- (d) changes in flood hydraulics due to channel aggradation or erosion, vegetation growth within the floodway or sea level rise.

Benefits

In order to reduce the risk of natural hazards it is first important to establish the land likely to be subject to these hazards. This will allow new land uses in these areas to be managed in a way that recognises the inherent risks of the development proceeding. The natural hazards identified in the policy are those to which management can be applied to reduce risk using the provisions of the RMA. The result of implementing Policy 11.1.1 will be the production of natural hazard overlays. These will be mapped (or otherwise identified) and included in the MEP. The most significant benefit of this is that there will be greater awareness of where natural hazards are present.

For Policy 11.1.16, from time to time the flood risk physically changes or the Council's knowledge of flood risk improves with new information and/or analysis. Where the extent of the flood hazard changes as a result of the matters set out in (a) to (d), it will be necessary to refine the boundaries of the flood hazard overlay in the MEP. This policy reflects the Council's ongoing commitment to monitoring.

Costs

The initial development work for identifying the extent of land subject to flooding, liquefaction and tunnel gully erosion has been completed for the review of the MEP and therefore the costs of establishing where to place hazard overlays have been incurred during the review process. Where uncertainty existed over the spatial extent of a natural hazard, a precautionary approach was taken. This means that the overlay may be a conservative estimation. However, this approach is considered appropriate given the potentially significant consequences of natural hazards, especially the loss of life. There will be subsequent costs to individuals resulting from the identification of risk areas, depending on how a person may wish to use their land. There may also be some perceived effects from an overlay being placed on private land. There will be ongoing costs associated with monitoring and research, as set out in Policy 11.1.16.

Efficiency and Effectiveness

The policies are considered the most efficient and effective way to inform people of areas subject to flooding, liquefaction and tunnel gully erosion. For Policy 11.1.16 it is important to have ongoing monitoring of flood hazard and a potential need to refine the boundaries of the overlays in response to changes in the level of risk. The benefits of this approach to individuals and the wider community significantly outweigh the costs. The Council has used this method previously and it has been proven to be effective. This approach is considered to be essential in helping to achieve Objective 11.1.

Policy 11.1.2

Policy 11.1.2 – In conjunction with Civil Defence, provide an emergency response to natural hazard events.

Benefits

The provision of an emergency response to a natural hazard event is important in managing the adverse effects of the hazard. The Council is actively involved in the provision of a response to natural hazard events for which they are the lead agency, including floods, urban stormwater, sewer or water supply failure. The Council may also provide support or ancillary services to agencies leading the response to other emergency events such as earthquakes or major fires. Once a state of local or national civil defence emergency has been declared, the Council will continue to provide services under the direction of the Civil Defence Controller. The benefit of the policy is that it signals a coordinated response between agencies in response to natural hazard events.

Costs

Financial costs will be incurred irrespective of the policy. However, the costs will be reduced due to coordinated response efforts, the details of which are included in the CDEMP. In addition, the costs of the policy are no greater than what currently occurs under the MSRMP and WARMP, as both plans include methods of implementation relating to liaison with other agencies such as Civil Defence.

Efficiency and Effectiveness

This approach has proven to be both efficient and effective under the current resource management framework and the benefits of the policy are therefore considered to significantly outweigh the costs.

Policies 11.1.3 to 11.1.5

Policy 11.1.3 – To actively manage any flood hazard through the provision and maintenance of flood defences and other flood mitigation works, where there is significant community benefit.
Policy 11.1.4 – Establish and maintain floodway capacities for Marlborough’s rivers to the following standards: (a) to an annual recurrence interval of 1 in 100 years for major rivers on the Wairau River floodplain (below the confluence with the Waihopai River); (b) to an annual recurrence interval of 1 in 50 years for the Waitohi and Waikawa Rivers; and (c) to an annual recurrence interval of 1 in 50 years for rivers and drainage channels that provide for urban stormwater disposal.
Policy 11.1.5 – Enable the maintenance of existing Marlborough District Council administered flood defences and other Council initiated flood mitigation works.

Benefits

One of the means of reducing the risk of flooding is to provide flood defences to protect the existing population, properties and community infrastructure. On the Lower Wairau Plain, significant investment has been made over a considerable period of time to protect Blenheim, other towns and the surrounding rural land through the construction and maintenance of stopbanks and the training and diversion of rivers. The Waitohi and Waikawa rivers in Picton are the only other rivers to which the Council has administered flood defences.

Policy 11.1.4 establishes standards for the rivers for which the Council provides flood defences. It also applies to rivers and drainage channels that receive urban stormwater discharges. The standards in (a) to (c) reflect those adopted by the Council in the Rivers and Land Drainage Asset Management Plan. Given the population and community infrastructure that relies on the protection provided by existing Council-administered flood defences, it is important that flood defences be maintained to the standards specified in Policy 11.1.4. Policy 11.1.5 therefore signals that the maintenance of the flood defences and other flood mitigation works will be enabled.

The benefits of these policies are clear in that the creation and maintenance of flood defences reduces the risk of flooding hazards for a significant proportion of Marlborough’s population, including risks to life, property and infrastructure. Additional benefits have resulted over time from the establishment of flood defences, including the ability to use land on the river side of flood defences for both primary production purposes and wider community benefit through access to rivers. In some cases it may also increase the opportunity to enhance indigenous biodiversity with areas of planting.

Costs

The costs of managing flood hazards are significant. However, expenditure to establish flood defences and pay for their ongoing maintenance is warranted given the significant community benefit that results. The maintenance costs are set out in the Council’s Long Term Plan.

The costs of achieving the standards set out in Policy 11.1.4 (and in the Rivers and Land Drainage Asset Management Plan) could be significant where the standard is not currently met. There are potential costs associated with activities taking place close to flood defence systems such as stopbanks. Often setbacks are required for activities to ensure the structural integrity of stopbanks is maintained.

Efficiency

The benefits that arise from these policies for community safety and wellbeing far outweigh the significant costs. This is particularly the case in time of high rainfall.

Effectiveness

The Council and its predecessors have had a long history of establishing and maintaining flood defence systems and this has proven to be effective in reducing the risks to protect life and property.

Previous failures of flood defence systems, such as those for the Wairau River in 1983, have resulted in changes to the standards to improve levels of protection.

Policies 11.1.6 and 11.1.7

Policy 11.1.6 – Recognise and provide for gravel extraction as a means of mitigating the adverse effects of gravel deposition in river beds.
Policy 11.1.7 – Mitigate the adverse effects of gravel extraction on ecological and recreational values, water clarity and bank stability by: <ul style="list-style-type: none"> (a) avoiding, where practicable, extraction from the wet bed of any river; (b) placing limits on: <ul style="list-style-type: none"> (i) the timing of operations (especially to avoid bird nesting); (ii) the method of extraction; (iii) the location of the extraction and access to the location; (iv) the amount of gravel that can be extracted; and (v) the length of time over which the extraction can occur.

Benefits

Gravel that naturally accumulates in river beds can act to impede flood flows and encourage bank erosion. There is a history of strategic removal of accumulated gravel from Marlborough's rivers, especially the Wairau River to maintain the floodway capacities specified in the standards of Policy 11.1.4 and reduce the potential for bank undercutting and erosion. This extracted gravel also provides a significant resource that is used in road construction and maintenance and the construction industry.

Provided the adverse environmental effects of gravel extraction are avoided, remedied or sufficiently mitigated, the removal of gravel from the river bed in these circumstances has beneficial outcomes for the mitigation of flood hazard.

Costs

The only costs are relevant to Policy 11.1.7. This policy sets standards that must be met either through permitted activity standards or through conditions on resource consent. There will be a cost to any individual who must meet these standards, although the individual also gains significantly from the use of the gravel.

Efficiency and Effectiveness

Historical practice has shown that gravel extraction is extremely efficient and effective in maintaining floodway capacity. This approach has also been used in the current WARMP in which provisions are included for gravel extraction to improve the efficient and effective performance of river channels and floodway systems, especially of the main Wairau floodplain. These policies will help to achieve Objective 11.1.

Policies 11.1.8 to 11.1.11

Policy 11.1.8 – Unless provided for by Policy 11.1.10(a), avoid locating houses and other habitable structures, including associated on-site wastewater management systems, where they could be inundated or otherwise damaged by flood events.
Policy 11.1.9 – Establish a hierarchy of flood risk as follows: <ul style="list-style-type: none"> (a) Level 1: Land that suffers flooding of shallow, low velocity water in a flood event with an annual recurrence interval of 1 in 50 years; (b) Level 2: Land that suffers flooding but the depth/velocity of the flooding is not well understood, or cannot easily be expressed relative to natural ground level, in a flood event with an annual recurrence interval of 1 in 50 years, or land within 8 metres of any lake, river or wetland; (c) Level 3: Land that suffers flooding of deep, fast flowing water in a flood event with an annual recurrence interval of 1 in 50 years, or land in the bed of any lake or river or in any wetland; and (d) Level 4: Land that has the potential to suffer flooding of deep, fast flowing water in an extreme flood event that overwhelms stopbanks and other constructed flood defences.

Policy 11.1.10 – Control the erection and placement of houses and other habitable structures within areas subject to a flood hazard overlay, and reduce the risks to life and property by:

- (a) establishing minimum floor levels for houses and other habitable structures subject to a Level 1 flood risk, set at 450 mm above the natural ground level as measured at any point of the building footprint. The building footprint includes any associated on-site wastewater management system;
- (b) requiring houses and other habitable structures subject to a Level 2 flood risk to be subject to evaluation of the flooding hazard and effective mitigation actions; and
- (c) avoiding houses and other habitable structures in locations where they will be subject to a Level 3 flood risk.

Policy 11.1.11 – Avoid locating intensive residential, commercial or industrial developments on land subject to a Level 4 flood risk.

Benefits

Through a combination of historical records and modelling, the Council has been able to characterise the nature of likely flood events. The different flood hazard levels in Policy 11.1.9 (in terms of depth and velocity) reflect the potential severity of flooding. Flood risk increases from Level 1 to Level 4, creating a hierarchy that allows the management of flooding to be specifically tailored to reflect the risk. In other words, avoiding or mitigating a Level 1 flood risk requires a different response to avoiding or mitigating a Level 4 flood risk. Policies 11.1.10 and 11.1.11 then set out the management approach to each level within the hierarchy, from setting minimum floor levels for houses and other habitable structures at the Level 1 flood risk through to avoiding any future commercial, industrial or multi-lot residential developments in areas subject to a Level 4 flood risk. Setting out the risks in this way provides greater certainty of outcome to landowners, especially for areas where there is risk level of 1 or 3.

Costs

Setting out the management framework relative to the level of risk could well mean that some landowners may not be able to develop their properties in the way they wish. There could be additional costs at the Level 1 risk, where minimum floor levels may require fill to be brought onto a site to establish those minimum levels. For Levels 2 and 3 there will be a cost associated with a resource consent; subsequently if consent is not granted then the aspirations of a developer may be frustrated.

Efficiency

Although there could be a significant cost for a landowner if a new development is proposed, this is considered warranted given the potential consequences of a flooding event. Therefore setting out the levels of risk and the management framework to apply to those levels in conjunction with identifying to where those levels of risk apply is considered the most efficient method to enable the Council to reduce the risk to life and property from flooding.

Effectiveness

Although the four levels of risk have not been previously applied in the MSRMP or WARMP, mapping the levels of risk provides an effective means to address the potential impacts on a person choosing to reside in a flood prone area. Applying a low-to-high level risk framework also ensures that people are not unnecessarily constrained from carrying out activities, where at the lower end of the risk spectrum permitted activities may still be undertaken but subject to minimum floor levels.

The approach of Policy 11.1.9 reflects the Council's Flood Atlas, which has been used by the Rivers section of the Council in providing information through Land Information Memorandums (LIMs) as well as in giving advice internally for the processing of resource consents.

Overall these policies are considered effective in providing more targeted management of one of Marlborough's more significant natural hazards.

Policy 11.1.12

Policy 11.1.12 – Where an activity within an area subject to a flood hazard overlay is dependent upon the provision of flood defences to reduce the risk of flooding, there must be an ongoing commitment to the maintenance of the flood defences over time.

Benefits

The provision of flood defences (either new or existing) may be sufficient to reduce the risk of flooding of any proposed development. However, the effectiveness of flood defences is reliant on their ongoing maintenance. For example, stopbanks can erode and vegetation can compromise the efficiency of a floodway or the integrity of a stopbank. Therefore, where resource consent is to be granted for a development in an area subject to a flood hazard overlay and that resource consent is dependent on a flood defence, then a condition of consent will be imposed requiring the private flood defence to be maintained. This policy sends a clear message that in order for flood defences to be effective, they need to be maintained. This in turn will have social, economic and environmental benefits for the community.

Costs

There will be costs associated with Policy 11.1.12. However, if the proposal is to take place within an area subject to a flood hazard overlay, then it is considered the costs are justified. If the flood defences are in response to a private development, then the maintenance costs will fall to the consent holder; where the flood defences are the Council's, maintenance costs will fall to ratepayers. In either situation the extent of costs will be dependent upon the extent of the flood defences required and their composition.

Efficiency

This approach is considered the most efficient, particularly for private developments where the wider community should not be responsible for the maintenance of a private individual's flood defence systems. In situations where there is a wider benefit to the community from flood defences, then it is appropriate that funding comes from the community.

Effectiveness

Unless circumstances change, flood defence systems deemed to be necessary at the time of consent are enduring. This means that benefits will continue to accrue to landowners in that the risks to life, property and regionally significant infrastructure will be reduced.

Policy 11.1.13

Policy 11.1.13 – Recognise that the risk to life and property during flood events is greater in rural environments.

Benefits

Isolation of properties affects the ability of the Council and Civil Defence to provide an emergency response in the event of flooding. The greater the distance of flooded properties from Blenheim (the location of the Emergency Operations Centre) and other towns, the longer it will take to respond to the flooding, especially in the event of large scale or District-wide events. Therefore, including Policy 11.1.13 raises awareness for individuals, developers and decision makers that:

- the potential increase in flood risk caused by locating development in rural areas needs to be taken into account by individuals when purchasing properties;
- the Council needs to recognise this issue when planning for residential growth in Marlborough; and
- the issue needs to be taken into account when considering the rezoning of land in rural environments to provide for residential, commercial or industrial developments.

Costs

There is a potential outcome from this policy that a landowner's aspirations may not be achieved through a refusal of resource consent or plan change. There may also be a perception that rural areas are inherently at risk from floods, especially where flooding information for a property is relayed through LIMs.

Efficiency

It is difficult to determine the costs of the policy as this is reliant upon people undertaking activities in rural environments. For situations where a plan change is proposed to rezone rural land for urban purposes, it is much more efficient to consider the risks of flooding at the time of rezoning as opposed to waiting until subsequent development occurs. Consideration at the time of rezoning enables decision makers to assess the risks for the whole area to be rezoned.

However, there can be specific responses to future flood events as a consequence of past flood events. For example, unprecedented rainfall in the rural Wakamarina catchment in December 2010 resulted in extensive damage. Of concern was the need to improve information about river levels and rainfall in the Canvastown–Wakamarina area and ensure that residents could easily gain access to this information. Another concern arising from the December flooding was the lack of communication protocols for emergency events in the area and the associated lack of timely communication to assist the response process. Improved communication systems and an emergency planning guide for the local community have been developed in response to the risks associated with living in this area.

Effectiveness

Policy 11.1.3 is considered to be effective in helping to achieve Objective 11.1. Through consideration of the potential risks from flooding events in rural environments prior to development occurring, it is more likely that any risks to life and property will be reduced. This means the policy is also likely to be successful in helping to deal with Issue 11A. As explained in the Efficiency evaluation, there are also situations where non-regulatory responses can be undertaken to reduce the risks to life and property from flooding hazards.

Policy 11.1.14

Policy 11.1.14 – Require applicants for subdivision consent for land not serviced by a Marlborough District Council administered reticulated stormwater system to demonstrate that the method of stormwater management will not adversely affect any third party.

Benefits

The subdivision of land often acts a precursor for land use change, including the use of rurally zoned land for residential, commercial or industrial purposes. Buildings and hardstand areas (for example driveways, car parking areas and yards) constructed following the subdivision of land intercept rainwater that would otherwise have soaked into the ground (or ponded) and quickly directs it to other parts of the property or offsite. If the property is not serviced by a Council-administered reticulated stormwater system, this stormwater has the potential to adversely affect neighbouring properties or properties further afield. Therefore this policy has environmental, social and economic benefits in requiring the potential for flooding to be considered as part of the process of creating future allotments. Third parties are protected from the effects of stormwater and depending on how the stormwater is to be disposed of, there could be community benefits with the creation of greenspace to deal with stormwater.

Costs

There are costs for an applicant in considering various options to manage stormwater in an application for subdivision, as well as the costs associated with installing an appropriate system. The policy itself does not generate the need for resource consent and so no additional costs arise, particularly as the current framework for determining subdivision applications also has a requirement for stormwater management to be considered. The policy makes it very clear that an applicant has to show that their management of stormwater will not adversely affect a third party.

Efficiency

The policy is efficient as the costs of a subdivision application and subsequent development should lie with the developer, including the costs of ensuring there is no adverse effect on a third party from the management of stormwater.

Effectiveness

The policy is regarded as effective as it essentially already occurs under the current MSRMP and WARMP, albeit without well-defined policy guidance. Policy 11.1.14 is clear that the assessment of stormwater management should occur at the time of subdivision application. The policy will assist in

part to achieve Objective 11.1 and in reducing the risks to property in particular as identified in Issue 11A.

Policy 11.1.15

Policy 11.1.15 – Any allotment of less than one hectare proposed to be created in the Rural Environment Zone or the Rural Living Zone must be shown to have a minimum area free of flooding during a flood event with an annual recurrence interval of 1 in 50 years of:

- (a) 1,000 square metres; or
 - (b) 80 percent of the property,
- whichever is the greater.

Benefits

Section 106(1)(a) of the RMA provides the Council with options through the subdivision consent process for managing the material damage to land or any structure on that land as a result of flooding (and other hazards). Policy 11.1.10 sets standards for new dwellings and associated servicing to minimise material damage. However, property owners will also have a reasonable expectation that they can use the remainder of their property on an ongoing basis. This policy establishes a standard to minimise the amount of material damage that can occur to land. The threshold of one hectare is used to differentiate between residential properties and properties used for rural purposes. The Council's experience is that people residing on properties smaller than one hectare have expectations similar to those in residentially zoned properties, which is that their property will not be affected by flood events. The standards set in (a) and (b) ensure that most of a property remains capable of use during a flood event, thereby providing certainty for a landowner.

Costs

There could be costs associated with Policy 11.1.15 if works are needed to ensure that the thresholds set out in (a) or (b) can be met. In some situations a subdivision may not proceed if it cannot be shown that the thresholds will be met.

Efficiency

Policy 11.1.15 is efficient as the costs to the individual are warranted to ensure there are useable areas on the property that are free from flood events with an annual recurrence interval of 1 in 50 years.

Effectiveness

Currently there is a lack of guidance in the MSRMP and WARMP regarding what constitutes material damage in the context of Section 106 of the RMA, which includes damage to both the land and structures on the land. By setting thresholds for determining usable area, the policy helps to achieve Objective 11.1 in terms of reducing the risk to property. For Issue 11A, the policy helps to address that part of the issue that describes how flooding has the potential to cause significant damage to property. For these reasons the policy is considered effective.

Policies 11.1.17 and 11.1.18

Policy 11.1.17 – Avoid locating residential, commercial or industrial developments on Rural Environment or Rural Living zoned land on the Wairau Plain east of State Highway 1/Redwood Street, unless remediation methods are to be used to reduce the level of liquefaction risk to an acceptable level.

Policy 11.1.18 – Where it is proposed to subdivide land zoned Urban Residential 2 – Greenfields and land identified in Appendix 23 for residential purposes, the subsoil of the site must be investigated to establish if specific foundation designs of buildings are required to mitigate the effects of liquefaction or lateral spread.

Benefits

These policies deal with the potential effects of liquefaction in two areas of Marlborough. For Policy 11.1.17, an area east of State Highway 1/Redwood Street is underlain by the Dillons Point formation. This is marine sediment deposited on the eastern margin of the Wairau Plain by previous marine processes and consists of small grains of relatively uniform particle size. The small size of particles, combined with high groundwater levels, make this land conducive to liquefaction. Another area of

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localised soils that may be susceptible to liquefaction and/or lateral spread is within the Urban Residential 2 – Greenfields zone to the north and west of Blenheim.

For Policy 11.1.17 it has been determined that on Rural Environment or Rural Living zoned land east of State Highway 1/Redwood Street, any future commercial, industrial or multi-lot residential developments should not be allowed to occur unless remediation methods can be put in place to reduce the risk of liquefaction to acceptable levels. For the Urban Residential 2 – Greenfields Zone, future subdivision proposals will need to undertake investigations to determine whether specific foundation designs of buildings are required to mitigate the effects of liquefaction or lateral spread. For both areas, the policies provide some certainty over where a liquefaction risk may exist in the event of an earthquake and that measures may need to be undertaken to allow future developments to proceed in these locations. This certainty is important for landowners and provides direction to decision makers on areas where liquefaction risk needs to be assessed in some detail.

Costs

There are costs associated with both policies in terms of investigations that need to be undertaken and subsequent remediation works to reduce the risk of liquefaction if soil conditions dictate such a response. These costs could be significant, but without investigations the potential risks to life and property could be significant.

Efficiency

These policies are the most efficient way to address a potential liquefaction issue arising from an earthquake. It is important that the risks are assessed prior to the subdivision or rezoning of rural land. For the Urban Residential 2 – Greenfields zone land, it is more efficient for the investigations to occur prior to subdivision, as once subdivision occurs it will be more difficult to carry out mitigation works. For land east of State Highway 1/Redwood Street, an approach has been taken with respect to residential development that the policy only applies to allotments being created that are smaller than one hectare. This is because the density of development of lots larger than one hectare is considered an acceptable risk given the probability of an earthquake occurring. This means that landowners are not being unnecessarily constrained in proposals for residential development.

Effectiveness

By identifying areas where there are potential risks from liquefaction which need consideration through subdivision applications, resource consent or zoning changes, the policies help to achieve Objective 11.1 in terms of reducing the risk to life and property. For Issue 11A, the policies help to address that part of the issue that describes how earthquakes have the potential to cause loss of life and significant damage to property. For these reasons the policy is considered effective.

Policies 1.1.19 to 11.1.21

Policy 11.1.19 – Control the erection and placement of structures within areas prone to tunnel gully erosion.
Policy 11.1.20 – Continue to manage the Wither Hills Soil Conservation Reserve to maintain and enhance soil stability.
Policy 11.1.21 – Locate new structures and works to: (a) avoid them being damaged from the adverse effects of land instability; and (b) avoid any increase in the adverse effects of slope instability that the structure or work may cause.

Benefits

Marlborough is characterised by steep terrain and in some locations, unstable geology. Combined with the potential for intense rainfall events, these factors create the potential for slope instability. Examples historically include rock/debris slumps, debris slides or flows, coastal erosion and tunnel gully erosion. These three policies provide direct responses for dealing with land instability hazards. Policies 11.1.19 and 11.1.21 are regulatory responses for dealing with this hazard. In the case of loess soils, this includes them being identified within the MEP.

In areas prone to tunnel gully erosion, it is important that any new structure is not subject to an unreasonable risk of damage. The controls in relation to Policy 11.1.19 will be primarily applied through the Building Act 2004. For Policy 11.1.20 any new structure or work is to be located in such a way that avoids them being adversely affected by land instability. The policy also addresses the

situation of a structure or work exacerbating those adverse effects. The policy will primarily be implemented through the zoning of land and the scale/intensity of activity that the zone rules enable. However, the policy can also be applied in a resource consent context when an assessment of environmental effects for the structure or work identifies a risk of land instability.

The Wither Hills Soil Conservation Reserve runs along the southern boundary of the Blenheim urban area. The soils over the reserve are loess and are particularly vulnerable to tunnel gully erosion. Eroded material has the potential to fill stream channels at the base of the Wither Hills and create a flood risk for the Blenheim urban area. Policy 11.1.20 signals that soil conservation management will continue for the foreseeable future to manage this flood risk.

Costs

Costs are ongoing for the Council with the administration of the Wither Hills Soil Conservation Reserve. However, historically these have been considered justified given the potential for flood risk for Blenheim with eroded material filling stream channels at the base of the Wither Hills.

There may be costs associated with Policies 11.1.19 and 11.1.21 where standards of permitted activities have to be met or, when standards cannot be met, the requirement for a resource consent. In some cases, if the adverse effects are considered significant it may be appropriate to refuse consent.

Efficiency

The benefits of these policies outweigh the costs that may be incurred, given the risk to life, property and regionally significant infrastructure from land instability hazards. For the Wither Hills Soil Conservation Reserve particularly, there is a significant whole-of-community benefit in the policy for the residents of Blenheim in ensuring soil stability is maintained and enhanced.

Effectiveness

The three policies are effective as they signal there is the potential for slope instability with activities occurring on either steep terrain or areas with unstable geology when combined with intense rainfall events. Highlighting that these activities need to be controlled to ensure that material damage does not occur to land or structures will help to achieve the objective. Identifying the location of loess soils in the MEP also helps to provide certainty to landowners about where additional controls or methods of mitigation may be needed.

Policy 11.1.22

Policy 11.1.22 – Require a buffer between dwellings, ancillary structures and land used for commercial forestry.

Benefits

To reduce the risk of fire in rural environments, a setback distance will be imposed through permitted activity standards to create a buffer between plantations of commercial forestry and residential (and associated) activity. The policy recognises that it is the new activity relative to an existing activity that has to provide the buffer; that is, a restriction will apply to the proximity of houses and ancillary structures to existing plantations of commercial forestry as well as new plantations of commercial forestry to existing dwellings and other habitable structures. This approach provides a degree of protection to both residential and forestry land users.

Costs

Significant costs are not expected to arise from this policy. It is an approach currently used in the MSRMP and WARMP, though it has not previously been included in policy. There may be some loss of area available to be planted for commercial forestry, but this is not considered significant in the context of setting back from a single dwelling.

Efficiency and Effectiveness

The policy is considered both efficient and effective relative to the costs associated with its implementation. It will help to reduce the risks of fire spreading, thereby helping to achieve Objective 11.1.

Evaluation for Issue 11B

Issue 11B – The use of natural and physical resources can make existing natural hazards worse.

Appropriateness of Objective 11.2

Objective 11.2 – Natural hazard mitigation measures, structural works and other activities do not increase the risk and consequences of natural hazard events.

Relevance

Given the serious nature of the adverse effects caused by natural hazards, it is important that human activities do not increase the risk and consequences of natural hazard events. For example, placing or constructing buildings, walls, fences and other impermeable structures or depositing material in floodways will create a barrier to flood flows and potentially increase water levels or divert flood flows elsewhere. Similarly, planting unsuitable trees and other vegetation within a floodway could create similar effects, although trees also assist to maintain bank stability.

Objective 11.2 is considered very relevant in achieving the purpose of the RMA as it is clearly within the Council's functions in both Sections 30 and 31, assists in giving effect to the NZCPS and NPSFM and is directed at addressing Issue 11B.

Feasibility

For some natural hazards such as flooding, the Council has already taken extensive measures to ensure the objective can be achieved. Flooding has been the most regular natural hazard experienced in Marlborough. Significant investment has been made to reduce the risks of flooding, especially with the flood protection works along the Wairau River and its tributaries. Rules have historically been applied to activities within these floodways to ensure there are no barriers to flood flow.

The objective is considered feasible given the Council's past experience, especially with flooding hazards. The fact that the policies included to achieve Objective 11.2 have a strong focus on flooding hazards reflects this.

Acceptability

Our actions in using and developing natural and physical resources can increase the risk and consequences of natural hazards. In some cases, the severity of the hazard may be able to be mitigated through good location, design and construction to the extent that the consequences are minimal. However, given the nature of some natural hazards, the risks can only be mitigated to a certain extent. The Council considers that there may be some high costs associated with achieving the objective, but that these are justified given the potential for serious risks to life, property and regionally significant infrastructure from natural hazards.

Through the feedback received during the early consultation and through the development phase of the policy provisions, there was support for the Council to actively manage natural hazards. The Council was encouraged to do as much as possible to protect people and physical resources from natural hazards.

Assessment of provisions to achieve Objective 11.2

Policies 11.2.1 to 11.2.3

Policy 11.2.1 – Designate Marlborough District Council administered floodways.
Policy 11.2.2 – Control land uses on or in close proximity to existing Marlborough District Council administered flood defences and within floodways to ensure that they do not compromise the effectiveness of any defence or the efficiency of any floodway.
Policy 11.2.3 – Where appropriate, ensure that privately initiated and constructed flood defences integrate with Marlborough District Council administered flood defences.

Benefits

There are several responses included in these policies for dealing with flooding hazards. These include designation of Council administered floodways, regulating some activities close to Council flood defence systems and integrating private flood defences with those of the Council. These three actions allow the Council to control whether activities in and adjacent to floodways are appropriate in terms of protecting the efficiency of floodways.

Designating land within Council administered floodways (which will be a combination of Council and privately owned land) will see areas mapped and scheduled within the MEP. The effect is that any person wanting to undertake work in a floodway (that may adversely affect the floodway) will require the written permission of the Council. Land use activities undertaken on or in close proximity to existing flood defences and within floodways have the very real potential to compromise the effectiveness of the defence, the efficiency of the floodway or access to the flood defence or floodway for maintenance purposes. For this reason, resource consent will be required to allow an assessment of the proposal and its potential adverse effects on the floodway. These processes allow the Council to assess the proposal and its potential adverse effects on the floodway prior to the activity commencing. This provides certainty to landowners, resource users and the Council that inappropriate activities will not be located in floodways.

Costs

In some cases a resource consent will be required to enable an activity to take place within a floodway. There are costs associated with this, however this is currently already a practice for the WARMP in particular, which is where Marlborough's most extensive flood defence systems are located. The system of designating floodways is also a current practice in the WARMP and other than updating the known areas of flood risk, there are no specific costs associated with this. The most likely cost would be that an individual wishing to undertake an activity will be denied because the activity would have a significant impact on the functioning of the floodway and defences.

Efficiency and Effectiveness

The approaches set out in the three policies are considered both efficient and effective. They reflect past practice and given the reliance of some communities on the performance of the flood defences and/or floodway, it is important that activities do not increase the risk and consequences of flooding events. The policies will help substantially in achieving Objective 11.2 in relation to flood hazards and, with the Council retaining control of the use of land resources in and adjacent to floodways, will likely be successful in solving Issue 11B.

Policies 11.2.4 and 11.2.5

Policy 11.2.4 – Where appropriate, require the creation of esplanade reserves and esplanade strips (as part of the subdivision consent process) to enable the mitigation of flooding hazards and to provide access for maintenance purposes. Priority rivers for setting aside esplanade reserves and esplanade strips for this purpose are:

- (a) rivers on the Wairau River Floodplain; and
- (b) rivers flowing through or in the vicinity of residential development in the Marlborough Sounds.

Policy 11.2.5 – The width of any esplanade reserve or esplanade strip set aside for flood hazard mitigation shall generally be 8 metres, except on land adjoining the Wairau River, Omaka River, Waihopai River, Pelorus River or Rai River, where the width shall be 20 metres.

Benefits

Maintaining floodways and river channels can help to mitigate and manage flood hazards. For some rivers, it is desirable for erosion-resistant vegetation to be planted and maintained on the river channel edge. For other rivers, it is necessary for vegetation to be removed to provide for the free flow of flood water. Access to carry out river control works in the channel can therefore be important. Such access can be achieved through the creation of esplanade reserves and esplanade strips as part of the subdivision consent process. The waterbodies identified in Policy 11.2.4(a) and (b) provide greater certainty about when and where the Council will use the esplanade reserve provisions of the RMA for flood hazard mitigation purposes.

Policy 11.2.5 sets out that in most circumstances, an 8 metre width reserve or strip is sufficient to undertake river control works and to access the river for this purpose. Exceptions are set out in the

policy and include larger rivers which, because of their scale, require a wider reserve or strip to undertake river control works. While these widths have historically been used by the Council, they have not been clearly defined in the MSRMP or WARMP.

Costs

The RMA clearly states the circumstances under which an esplanade reserve, esplanade strip or access strip is to be taken to mitigate natural hazards (Section 229(a)(v)). These policies are only triggered where a subdivision is proposed adjacent to a river and esplanade areas do not already exist in the location. It is difficult to determine the exact costs of the policies, as they will depend on an application being made by a landowner and the nature of the proposal. Where an application for subdivision is for allotments greater than four hectares in area and an esplanade reserve is to be taken, then there is a requirement for the Council to compensate the landowner for this.

Efficiency and Effectiveness

The policies are considered efficient and effective as they provide a consistent approach for decision makers, particularly in determining the appropriate width for an esplanade area. The approach builds on the Council's experience in assessing such issues on subdivision consents since the RMA was first introduced.

Policy 11.2.6

Policy 11.2.6 – When considering any application for resource consent or notice of requirement for hazard mitigation works, have regard to:

- (a) the likely effectiveness of the mitigation works and the residual risks remaining after mitigation works are in place;
- (b) whether non-structural or soft engineering methods are a more appropriate option;
- (c) the cumulative effects of isolated structural mitigation works;
- (d) any adverse effect on existing hazard mitigation works;
- (e) responsibility for the ongoing maintenance of the mitigation works to the required standard; and
- (f) the method and effects of construction on the surrounding environment.

Benefits

Although hazard mitigation works act to protect the community, the construction and ongoing presence of these works can themselves have adverse effects on the environment. Where they involve substantial modification to the natural character of the waterbody, these effects can be significant. Recognising the potential for adverse effects, this policy provides direction to ensure that any proposed new works are effective in the first instance and that the method of hazard mitigation is the most appropriate. This provides both environmental and economic benefits to the applicant and the wider community. This guidance is also beneficial for both applicants and decision makers and can be applied when processing the resource consent applications required to undertake the work or any notice of requirement application to provide for the work.

Costs

The policy is very specific in relation to the need for hazard mitigation works, either through resource consent or through a notice of requirement. The costs associated with this are considered justified to ensure that any adverse effects, including those on existing hazard mitigation works, are avoided or mitigated and that mitigation works are maintained in an effective state on an ongoing basis.

Efficiency

The policy is efficient as it focusses on those matters that must be considered when assessing proposals for hazard mitigation works and ensures a consistent approach is taken to assessing such proposals. The costs lie with the applicant undertaking the assessment, but the wider community will benefit from hazard mitigation works where these are appropriately located.

Effectiveness

Policy 11.2.6 will be effective in helping to achieve Objective 11B as it is directly aimed at ensuring hazard mitigation measures do not increase the risk and consequences of hazard events. This policy will also be helpful in achieving other objectives of the MEP in relation to 11.2.6(f), in which the

broader effects of the method and effects of construction on the surrounding environment are to be considered. This could extend to consideration of natural character, water quality and public access issues, for example.

Policy 11.2.7

Policy 11.2.7 – Where stormwater is to be discharged into a surface waterbody or drainage channel, there must be sufficient capacity within the waterbody to accommodate the likely rate of discharge without overtopping the banks or causing any scour.

Benefits

Where land disposal of stormwater is not a viable option, it is likely that the collected stormwater will be discharged into a surface waterbody/drainage channel. To ensure that this discharge does not cause a flooding hazard downstream, it is important that there is sufficient capacity within the waterbody/drainage channel to accommodate the discharge. If this is not the case, the discharge will cause overtopping of the banks. Breakout can also occur when the discharge velocity causes scour of the bed and/or banks of the waterbody/drainage channel. This policy will therefore have environmental, social and economic benefits through the appropriate disposal of stormwater.

Costs

There will be costs associated with the disposal of stormwater into a surface waterbody/drainage channel as the policy seeks to ensure that the receiving environment is appropriate to accommodate the stormwater. As there could be adverse effects on the wider environment including people, if the surface waterbody/drainage channel is not of adequate capacity, any costs associated with this policy are considered justified.

Efficiency and Effectiveness

The policy is considered efficient and effective as a discharge of stormwater cannot occur when the receiving waterbody/drainage channel is not of sufficient capacity. There is therefore a wide community benefit as overtopping will not occur and there will be no costs associated with repairing scoured beds or banks of the waterbody/drainage channel. The policy also helps to achieve Objective 11.2 through appropriate consideration of hazard mitigation measures.

Methods of implementation to achieve Objectives 11.1 and 11.2

The most significant change in the methods of implementation from the current MRPS and the two resource management plans are the introduction of a Floodway Zone to identify river channels and land on Council-managed berms to reduce the risk of flooding on adjoining land, the use of the Building Act 2004 to implement policy, the use of a gravel permit system to authorise extraction of gravel river beds and the use of geotechnical standards for reporting on investigations.

Some of these methods have been in practice for some time, including the use of gravel permits, geotechnical reporting standards and use of the Building Act; however, they were not expressly referred to within the WARMP or MSRMP. The other methods of implementation in these two plans have been retained in the MEP but have been reviewed and updated to reflect changes in knowledge, awareness and information of natural hazards in Marlborough.

Other options considered to achieve Objectives 11.1 and 11.2

The only other option considered by the Council to achieve Objectives 11.1 and 11.2 was the status quo in terms of the existing provisions of the MRPS, MSRMP and WARMP.

The MRPS contains a high level objective (7.4.2) that seeks to “*avoid or mitigate the actual or potential effects of loss or damage to life or property from natural hazards.*” The MSRMP includes a similar objective. The WARMP differs however in that the objectives and policies have been included in response to different natural hazards. Regardless, the objective for each of the identified hazards is similar to those of the MRPS and MSRMP.

The MEP is most similar to the WARMP, in that policies are grouped together by hazard, albeit under one objective (Objective 11.1). However, the WARMP policies are general and do not provide the specific guidance that the MEP policies do. For example, the MEP includes very specific policies for earthquake related liquefaction risks. At the time the WARMP was prepared, the extent of the risks were not as evident as they have become, particularly since the Christchurch earthquakes of 2010 and 2011. In comparison, the only real direction in the WARMP comes through a rules method that states development in areas proven to be a liquefaction risk will be discouraged. However, there are no rules in the WARMP to express this. The only other earthquake related policy is that Marlborough's location in a high risk zone for earthquakes is to be recognised and that emergency recovery and responses are to be established and maintained (Policies 17.6.2.1.1 – 17.6.2.1.3). These matters are now covered in the MEP, which recognises the risks of earthquakes in the issue description and in general policy and methods of implementation concerning emergency responses.

For flooding issues, the Council has better information now than when the current MRPS, MSRMP and WARMP were prepared; improved mapping systems are better able to reflect the differences in the level of flood risk in different locations. Therefore, while there are similarities in the direction of policy of the MEP and the MRPS, MSRMP and WARMP, there is greater guidance in how to reduce risk relative to the level of risk which will be mapped.

The guidance in the WARMP for gravel extraction as a response to improving the efficiency and effectiveness of river channels and floodways systems is not included within the natural hazards chapter, rather it is within Chapter 24 Mineral Extraction of the WARMP. As the Council considers that gravel extraction is still an appropriate response to ensure flood flows are not impeded, provisions have been included in Chapter 11.

Overall there are similarities between the current MRPS, MSRMP and WARMP and the provisions proposed for the MEP. However, with improved knowledge through monitoring and specific investigations, improved mapping systems and more guidance through the NZCPS for coastal hazards, the Council has decided that the status quo is not the preferred option.

Risk of acting or not acting

In terms of Section 32(2)(c) of the RMA, an assessment of the "*risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the provisions*" is required. There is inevitable uncertainty about the timing and exact nature of natural hazard events. However, the Council has extensive experience in particular in dealing with flooding hazards, with long records of rainfall events, river flows and mapped flood events. The Council has been able to respond through physical works to protect Marlborough's communities and through providing a response through Civil Defence. Although there may be some risk associated with the identification of the extent of flood hazard, the Council considers that based on historical records the risk of including the provisions is acceptable.

The Council also has heightened awareness of the risks posed by earthquakes, especially for liquefaction and lateral spread. Given the information the Council has about particular soils in parts of Marlborough that are subject to this hazard, it considers it is in a position to include provisions to manage this risk in the MEP.

In recent years the Council has gathered detailed information about the risk of land instability, especially for the hills to the south of Blenheim where loess soils are subject to tunnel gully erosion. Consequently, a more refined set of provisions have been included to deal with these soils.

Overall, despite the uncertainty about when natural hazard events may occur, the Council considers it has enough information to include the provisions relating to natural hazards in the MEP.

Appendix A – Section 32 of the RMA

32 Requirements for preparing and publishing evaluation reports

- (1) An evaluation report required under this Act must—
 - (a) examine the extent to which the objectives of the proposal being evaluated are the most appropriate way to achieve the purpose of this Act; and
 - (b) examine whether the provisions in the proposal are the most appropriate way to achieve the objectives by—
 - (i) identifying other reasonably practicable options for achieving the objectives; and
 - (ii) assessing the efficiency and effectiveness of the provisions in achieving the objectives; and
 - (iii) summarising the reasons for deciding on the provisions; and
 - (c) contain a level of detail that corresponds to the scale and significance of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the proposal.

- (2) An assessment under subsection (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.

- (3) If the proposal (an **amending proposal**) will amend a standard, statement, regulation, plan, or change that is already proposed or that already exists (an **existing proposal**), the examination under subsection (1)(b) must relate to—
 - (a) the provisions and objectives of the amending proposal; and
 - (b) the objectives of the existing proposal to the extent that those objectives—
 - (i) are relevant to the objectives of the amending proposal; and
 - (ii) would remain if the amending proposal were to take effect.

- (4) If the proposal will impose a greater prohibition or restriction on an activity to which a national environmental standard applies than the existing prohibitions or restrictions in that standard, the evaluation report must examine whether the prohibition or restriction is justified in the circumstances of each region or district in which the prohibition or restriction would have effect.

- (5) The person who must have particular regard to the evaluation report must make the report available for public inspection—
 - (a) as soon as practicable after the proposal is made (in the case of a standard or regulation); or
 - (b) at the same time as the proposal is publicly notified.

Section 32: Chapter 11 – Natural Hazards

(6) In this section,—

objectives means,—

- (a) for a proposal that contains or states objectives, those objectives:
- (b) for all other proposals, the purpose of the proposal

proposal means a proposed standard, statement, regulation, plan, or change for which an evaluation report must be prepared under this Act

provisions means,—

- (a) for a proposed plan or change, the policies, rules, or other methods that implement, or give effect to, the objectives of the proposed plan or change:
- (b) for all other proposals, the policies or provisions of the proposal that implement, or give effect to, the objectives of the proposal.

Appendix B – Bibliography

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