

SECTION 12.3 NATURAL HAZARDS RESOURCE MANAGEMENT UNIT

12.3.1 INTRODUCTION

In order to manage the use, development and protection of natural and physical resources, the Hastings District Council needs to pay particular attention to the risk of natural hazards. In the District there is an identified risk from flooding, coastal erosion, seismic activities, land instability, climatic conditions, volcanic fallout and fire. It is recognised that it is not always necessary, possible or appropriate to mitigate all potential effects of natural hazards at all times, for every situation.

This section of the District Plan controls land use activities for the purpose of avoiding or mitigating natural hazards. The rules of the District Plan do not seek to address those issues where more appropriate controls exist, such as the Building Act, to deal with the issue. The Hastings District Council will liaise with the Hawke's Bay Regional Council to establish an integrated approach to hazard mitigation with this part of the District Plan controlling land use in relation to risk from natural hazards.

The implementation of this section of the District Plan involves regulating land use activities through Resource Management Units to ensure that the effects from natural hazards are minimised. A significant way of achieving the objectives of this section of the District Plan will be through alternative methods to avoid or mitigate the adverse effects from natural hazards. In conjunction with the Hawke's Bay Regional Council information will be produced and distributed on the avoidance and mitigation of natural hazards. An information database for use in administering the Building Act, providing information for land users, and carrying out monitoring will be established to achieve the objectives and policies of this section of the District Plan.

12.3.2 RESOURCE MANAGEMENT ISSUES

- ***Parts of the Hastings District are susceptible to the effects of natural hazards.***

Land use activities can be affected by or can accelerate, worsen or cause adverse effects in areas subject to natural hazards. There are areas in the District where natural hazards can occur and it will be the responsibility of the Hastings District Council to control the effects of land uses for the avoidance or mitigation of the natural hazard. Natural hazards are being progressively identified, generally focusing on areas of high concentrations of assets and population.

Natural Hazard types and areas that have been identified in the Hastings District to date are those listed below:

FLOODING HAZARD

The Heretaunga Plains

The Heretaunga Plains is a natural flood plain, and in the past, in its unmodified state, was frequently subject to flooding. River and flood control works on the major rivers protect the Heretaunga Plains from floods up to a 100 year flood return period in those rivers. The low lying nature of the land in the Heretaunga Plains however, still makes certain areas susceptible to localised flooding and ponding. The effects of alterations to ground levels in the flat grades of the plains can have adverse effects on drainage patterns in times of flood. Areas and structures that in the past have not flooded may be subject to flooding if inappropriate earthworks take place.

Valleys of the larger rivers in the District

The larger rivers in parts of the District beyond the Heretaunga Plains, have a history of occasional, severe flooding. When this natural hazard occurs, not only is the area covered with water but silt and gravel is often deposited by the floodwaters.

Low Lying Peat Land

Areas, such as that around Lake Poukawa, are subject to regular extensive flooding which is slow to drain.

Other areas

Outside the above areas, valley floors, fans and flood plains are subject to periodic inundation and these hazards should be recognised and appropriate land use practices adopted.

Effects that can be caused by flooding are:

- Flooding of properties and land causing damage and temporary loss of use.
- Risk to lives
- Contaminants mixing with floodwaters causing adverse effects.

COASTAL HAZARD

The coastal margin in the Hastings District is subject to problems caused by different types of natural hazards. The two hazards that apply to the coastal zone are flooding and erosion. Flooding can be caused by effects originating on the land or out to sea, or a combination of both. On land, heavy rainfall can cause flooding in the coastal area when drainage to the sea is impeded by high sea levels blocking outlets. Wave overwash, from storm events, in addition to high tides or tsunami, can cause sea flooding in the coastal area. Large amounts of erosion may also be caused by these hazardous events in a short time frame. Erosion in the coastal area also occurs gradually as an ongoing result of natural coastal processes. This may be further increased in the future, due to the effects of global warming and the possible resultant rise in sea level. Over the next 100 years, this hazard is predicted to increase through sea level rise and increased intensity of storms. Effects that can be caused by coastal hazards are:

- Flooding of properties and land, causing damage and temporary loss of use.
- Risk to life.
- Loss of land, property and services through erosion.
- Contaminants mixing with floodwaters causing adverse effects.

EARTHQUAKE HAZARD

The Hawke's Bay Region is one of the most earthquake-prone regions in New Zealand. Within the Hastings District there are a large number of active earthquake faults that are capable of producing very strong earthquake shaking in the future. Some mitigation measures against the effects of earthquakes already exist, most notably a comprehensive building code that requires a high level of earthquake resistant design. Areas close to faultlines and areas underlain by materials capable of amplifying earthquake ground shaking may require additional methods to mitigate the effects of earthquakes. Data concerning the location of some of these areas is available and over time this will become more detailed.

Effects that can be caused by earthquakes are:

- Potential risk to people
- Damage to property

- Disruption of essential services

FIRE HAZARD

In the Hastings District there is a risk to people and properties from fire. This occurs in the rural areas of the District and the fringes of the urban area. The dry weather conditions that exist on the eastern side of the North Island make the rolling hills and forested areas of the Hastings District susceptible to fire. In addition to these climatic conditions other factors can create or exacerbate the risk from fire. These are:

- Large areas of combustible vegetation.
- Inaccessible terrain making suppression difficult.
- Areas where water supply for fire suppression is limited.
- Properties where water may be available in storage tanks but cannot be accessed by fire fighters because inappropriate valves have been installed.
- Access routes that are unsuitable for fire service vehicles to use.
- Combustible vegetation near access routes and in close proximity to dwellings and other buildings.

LAND INSTABILITY HAZARD

Land Instability Hazards include bedrock landslides, surface landslides, areas of steep slopes that may be subject to shallow landsliding, or lacustrine geology (old lake bed) with high liquefaction risk. Effects that can be caused by land instability hazards include:

- Potential risk to people
- Damage to property

- ***Certain Land Use Activities can avoid or mitigate the effects of Natural Hazards.***

The occurrence of Natural Hazards can be avoided or mitigated by certain land use techniques; for example flooding can be controlled by erecting stopbanks, erosion can be controlled by protection planting and buildings can be protected by avoiding certain locations and using particular design techniques.

A number of public bodies are empowered by statute to carry out such activities in the Hastings District; for example, the Hawke's Bay Regional Council carry out, as part of their functions, activities undertaken under the Soil Conservation and Rivers Control Act 1941.

Works to mitigate the effects of flooding, such as stormwater drains, stopbanks and detention dams, are key structures that for example, allow the use and occupancy of flood plains at an acceptable level of risk. Land use activities nearby should not impair the function or maintenance of these structures and must recognise there may be a local hazard created when their capacity is exceeded.

- ***Land Use Activities have a potential to increase the risk from Natural Hazards.***

The adverse effects of natural hazards can be made worse by land use activities. It may be necessary to regulate activities that have the potential to cause further hazards from natural occurrences. The location of hazardous substances and unstable building structures in potential flood paths for example, may need to be controlled to ensure that the effects of flooding are not made worse.

- ***Future land use development options may need to consider the existence of natural hazards.***

In the past, developments have taken place in areas prone to natural hazards. The community has then, in response to dangers posed by natural hazards, had to undertake mitigation measures, (such as stopbanks for flooding control), that do not always have positive net financial or social benefits. The HUDS study examined possible areas in the Hastings District for urban expansion and the presence and cost of mitigation versus avoidance of natural hazards was one of the criteria by which the suitability of areas was measured. The potential for the occurrence of natural hazards is now one of the matters considered before land use activities take place.

12.3.3 OBJECTIVES

- *NHO1 To identify and minimise the effects of natural hazards on the community and natural and physical resources.*
- *NHO2 To ensure that land use activities avoid or mitigate adverse effects arising from natural hazards.*

12.3.4 POLICIES

- **NHP1 Control land use activities in identified natural hazard areas where communities and resources are at risk.**

Explanation

Areas where it is considered that there is a high degree of risk from natural hazards have controls to ensure that the effects of natural hazards are avoided or mitigated. These areas will be identified in accordance with the type of natural hazard and the degree of risk to people and communities. The controls will determine which activities are appropriate in these areas. Where activities are provided for, standards may apply to ensure that activities and their effects avoid, remedy or mitigate the risk of the natural hazard.

The following hazards are identified as being significant issues in Hastings District: flooding, earthquake, volcanic activity, adverse climatic events, erosion and fire. These hazards will be addressed in separate sub-sections of the District Plan as Resource Management Unit's (RMUs) addressing the natural hazard issue according to the nature of the hazard, as follows:

Flooding Resource Management Unit

This consists of areas of concentrated population or assets, or localities of high risk identified as being prone to flooding. Rules will sometimes apply in these areas to prevent or restrict building in identified flood prone areas where the Building Act regulations are not appropriate. The Flooding Resource Management Unit has been further broken down into individual identifiable flood prone areas. This allows the most appropriate rules to apply to a particular area.

The individual flood prone areas identified in the District Plan are:

- Flooding RMU: including the following flooding RMU sub-areas:

- Clive This identifies properties zoned residential below RL11.5 which equates to approximately a 50 year flood. This is based on a documented flooding event in 1974 of RL11.2 with a freeboard of 300mm. Flooding can also occur on the Rural side of Muddy Creek, but at the time this Plan was prepared, the extent of likely flooding had not been mapped with sufficient accuracy to be included.
- Karamu This is based on a modelled 50 year flood level in the Karamu catchment.
- Southland This is based on a modelled 50 year flood level along the Southland Drain.
- Te Awanga This identifies properties below RL12.2 which equates to approximately a 50 year flood. This is based on preliminary investigations into the risk of flooding and anecdotal records of previous flooding events. (NB: further investigations may indicate further properties at risk and this information may be included on LIM reports and be used in determining compliance with the provisions of the New Zealand Building Code 1992 as well as proposed subdivisions under Section 106 of the Resource Management Act 1991, before this Plan can be changed as a result).
- Haumoana
Inundation RMU This identifies properties below RL11.5 which equates to approximately a 50 year flood. Preliminary analysis of likely flooding scenarios for the TukiTuki River indicate however that in the event of flooding during a high tide water may back up at the river mouth and spill into the residential areas to a level of RL12.9. The effect of this flooding risk is planned to be mitigated as part of the Hawke's Bay Regional Council's current stopbank upgrading scheme programmed for 2002. In the interim, these effects can be mitigated during such an event by sandbagging or other emergency works. Nevertheless, this risk remains and accordingly the whole of Haumoana is identified as a Hazard RMU whether or not land is above RL11.5.
- River RMU

Earthquake Resource Management Unit

This consists of areas identified as being prone to seismic hazard. Rules will apply in this area in the future to prevent or restrict land uses. The identification and monitoring of the effects of earthquakes will also be undertaken. While substantial research has been undertaken into this hazard, a complete database of areas within the Earthquake RMU has not yet been developed. Research into this hazard will therefore continue to be carried out over the life of the District Plan. However, the susceptibility of areas within the District to liquefaction, and ground shaking amplification from earthquakes are identified for informational purposes in Appendix 12.3-1 and 12.3-2. The active fault lines within the District are also identified in both of these Appendices.

Volcanic Resource Management Unit

If an area is identified as being prone to volcanic activity this will be identified and appropriate rules developed. The identification and monitoring of the effects of volcanic eruption will also be undertaken.

(No specific areas prone to volcanic activity have been identified, although these may exist in the Hastings District)

Coastal Hazards Resource Management Unit

This consists of an area identified as being prone to one or a combination of adverse climatic events such as storms, high winds or high tides.

Fire Hazard Resource Management Unit

This is an area identified as being prone to fire. A Fire Hazard RMU has been identified and rules apply that control activities in this area. (The Fire Hazard RMU comprises areas of the District that do not have a reticulated water supply. Note: the area is not identified on the District Planning Maps.)

Land Instability Hazard Resource Management Unit

These areas are identified as being prone to bedrock landslides, surface landslides, areas of steep slopes that may be subject to shallow landsliding, or lacustrine geology (old lake bed) with high liquefaction risk. Council has land instability information for the additional land rezoned to Rural Residential in the Avery and Seafield Roads area. If sites are outside the areas that Council has got instability information on, then advice should be sought from a registered engineer when considering subdivision and development options.

- NHP2 Develop a database that identifies areas at risk from natural hazards and the level of the risk in the Hastings District.**

Explanation

The recognition and identification of the effects of natural hazards will help to ensure that decisions concerning present and future activities are made with knowledge of the risks of natural hazards and take account of these. An integrated approach to natural hazard identification will help the District Council and Regional Council and other organisations with expertise in this field, to recognise the effects of natural hazards. Information provision will be used as a non regulatory method to promote public awareness of natural hazards.

- NHP3 Ensure that activities intended for human habitation in an identified hazard RMU, either avoid the hazard, or are undertaken in a manner that ensures that the effects of the hazard on the activity are mitigated.**

Explanation

Some activities located in areas subject to natural hazard events can be managed to avoid adverse environmental effects. However in certain areas the effects caused by the natural hazards mean that it is unsuitable for people to live permanently in these areas. Where the District Plan allows for subdivision, use or development that results in human occupation or activity in hazard areas, the District Plan will seek to minimise the risk of loss and injury to human life.

- NHP4 Allow Public Bodies exercising their statutory powers to carry out natural hazard mitigation works.**

Explanation

The Hastings District Council, Hawke's Bay Regional Council, and other public bodies have, a statutory obligation as part of their functions and powers to carry out mitigation work for some hazards. The District Plan enables these Authorities to carry out these functions where they follow the provisions of the relevant statute and they have expertise in this field.

- NHP5 Ensure that land use activities do not exacerbate the adverse effects of natural hazards.**

Explanation

The District Plan recognises that certain land use activities can take place in areas subject to natural hazards. Some land use activities may worsen or create further adverse effects than those expected from the natural hazard. The community and environment should not be placed at greater risk from a natural hazard event by the effects of a land use activity.

- NHP6 Monitor the occurrence and effects of natural hazards on the natural and physical environment, to ensure that the Hastings District Plan adequately addresses natural hazards that are likely to occur in the District.**

Explanation

The occurrence and effects of natural hazards are currently being studied, however the community's knowledge is incomplete due to the relatively short period of time over which records have been available, the infrequency of natural hazards occurring and the complexity of predicting effects. As the knowledge base improves, the District Plan will need to reflect this greater understanding of natural hazards. Monitoring will therefore take place to examine the continuing need for natural hazard regulations.

- NHP7 Provide and build upon an information database to encourage more informed decision making in terms of natural hazards.**

Explanation

Natural hazards have a tendency to occur infrequently, therefore the number of people who can provide information from a first hand experience of a natural hazard occurrence is small. Information provision can provide a better understanding of the potential threats from natural hazards. It is anticipated that more informed decision making will occur if information is provided. The information database, in order to be effective and useful, will need to be updated over time, be easily accessible and simple to use.

- NHP8 When hazard mitigation techniques are undertaken that reduce the risks of natural hazards the provisions of the Hastings District Plan should reflect this.**

Natural hazard mitigation measures, for example the building or improvements of river stopbanks to address flooding, are proposed to be undertaken in the life of the District Plan. This may reduce the area of land that may be potentially at risk from flooding. In order to ensure that only those regulations that are absolutely necessary are imposed, the District Plan recognises that these mitigation measures are taking place and that

regulations to protect natural hazard prone areas may become obsolete. Further knowledge of natural hazards may be obtained, requiring the modification of existing rules or the formulation of new rules.

12.3.5 METHODS

These Objectives and Policies will be implemented through the following Methods:

- **Hastings District Plan**

Natural Hazard Resource Management Units: All Natural Hazards RMUs (apart from the Fire Hazard RMU; See Policy NHP1) will be identified on the Planning Maps according to the natural hazard event identified in a particular area. The Natural Hazard Resource Management Units, will introduce rules to address the effects of land use activities on natural hazards.

Rural Zone (Section 5.0): Contains Rules relating to the Fire Hazard RMU to control land use activities in identified Fire Hazard areas where communities and resources are at risk.

- **Building Act 1991**

The administration of the Building Act in the Hastings District will take into account (but not be limited to), the natural hazard RMUs identified in the District Plan. This will mean that the Hastings District Council may refuse to grant a building consent involving construction of a building or major alterations to a building if:

- (a) The land on which the building work is to take place is subject to, or is likely to be subject to erosion, avulsion, alluvion, falling debris, subsidence, inundation or slippage, or
- (b) The building work itself is likely to accelerate, worsen, or result in; erosion, avulsion, alluvion, falling debris, subsidence, inundation or slippage of that land or any other property.

- **Subdivision Consents**

Subdivision consent may be refused Under Section 106 of the Resource Management Act 1991, where land is subject to a natural hazard (erosion, falling debris, subsidence, slippage, or inundation). Refer to Section 15.1 on Subdivision and Land Development.

- **Engineering Code of Practice**

To ensure that subdivisions and developments recognise and avoid, remedy or mitigate potential effects from natural hazards.

- **Hastings District Council Consolidated Bylaws 1995**

Part 14: Public Places: "Beaches" - includes the ability for the Hastings District Council by resolution, to define such areas prohibited to vehicles unless required for access to a property.

- **Land Information Memorandum/Project Information Memorandum**

Within an identified natural hazard zone, LIMs and PIMs that are issued, will indicate that the area is a known natural hazard area, and that the property owner should take this into account when considering future development on the site.

In addition, LIMs and PIMs that are issued to those sites located within a High to Very High Liquefaction Susceptibility area, as shown in Appendix 12.3-1, or areas with a rating of 3 or 4 for Ground Shaking Potential, as shown in Appendix 12.3-2, will indicate that the site is located within an identified seismic area, and that site-specific investigations should be conducted to determine actual soil properties for liquefaction susceptibility and ground shaking potential, where protection greater than that provided under the New Zealand Building Code is desired.

- **Hawke's Bay Regional Policy Statement and Plans**

- **Information and Monitoring Exchange**

To occur between the Hawke's Bay Regional Council and other experts in Natural Hazard planning.

- **Information Gathering from relevant sources**

Establishment of a Natural Hazard Database on Council's GIS system.

Natural Hazards Historical Database- information concerning past natural hazard events, including: photographic records, data descriptions.

- **Guidelines**

Guidelines that are relevant to address the effects of natural hazards will be referred to applicants. For example, on landscaping techniques and non flammable vegetation planting (including trees), in locations that are prone to fire hazard to ensure "defensible spaces" are created between forestry and residential units.

- **Performance Standards**

The adoption of Performance Standards for the Hastings District Council's Natural Hazard mitigation works and the progressive upgrading and maintenance of these works to achieve these Standards. For example; The Hastings Target Stormwater Performance Standard.

- **Civil Defence Act 1983**

- **Local Government Act 1974**

- **Forest and Rural Fires Act 1977**

12.3.6 ANTICIPATED OUTCOMES

It is anticipated that the following specific outcomes will be achieved:

- Avoidance or mitigation or minimisation of the potential effects of natural hazards on land uses.
- Promotion of public awareness of the risk from natural hazards.
- Reduction of risks to people and the community from natural hazards.

12.3.7 RULES

The Rules of the relevant Natural Hazard Resource Management Units shall be complied with first, then the relevant underlying Zone or District Wide Activity Rules shall apply. Activities shall be assessed as a particular status under the rules of this RMU (e.g.: Permitted or Restricted Discretionary) before they can be assessed under the relevant Rules and Standard(s) and Terms of the underlying Zoning or District Wide Activity apply.

12.3.7.1 FLOODING RESOURCE MANAGEMENT UNIT (EXCEPT RIVER HAZARD RMU), FIRE HAZARD RMU AND COASTAL HAZARDS RMU**12.3.7.1.1 PERMITTED ACTIVITIES**

The following activities shall be Permitted.

- ANY ACTIVITY WHICH COMPLIES WITH ANY RELEVANT SPECIFIC PERFORMANCE STANDARDS AND TERMS IN SECTION 12.3.8 (EXCLUDING COASTAL PROTECTION WORKS).

12.3.7.1.2 DISCRETIONARY ACTIVITIES

(a) The following activities shall be Discretionary:

- ANY PERMITTED ACTIVITY NOT MEETING ONE OR MORE OF THE RELEVANT SPECIFIC PERFORMANCE STANDARDS AND TERMS IN SECTION 12.3.8.
- COASTAL PROTECTION WORKS

(b) Applications for Discretionary Activities will be assessed against, but not restricted to, their ability to meet the relevant Specific Performance Standards and Terms in Section 12.3.8, those matters identified in Section 12.3.9 of the Plan, and the Objectives and Policies of the Zone.

12.3.7.2 RIVER HAZARD RMU**12.3.7.2.1 PERMITTED ACTIVITIES**

The following activities shall be Permitted provided they comply with any relevant Specific Performance Standards and Terms in Section 12.3.8:

- NATURAL HAZARD MITIGATION ACTIVITIES
- PRODUCTION FORESTRY FOR RIVER CONTROL WORKS
- CONSTRUCTION AND OPERATION OF WATER INTAKES
- CONSTRUCTION AND MAINTENANCE OF BRIDGE STRUCTURES
- THE REMOVAL, STOCKPILING AND PROCESSING OF RIVER BERM SILT OR OTHER RIVER CONTROL OR DRAINAGE WORKS CARRIED OUT BY A LOCAL AUTHORITY, EXERCISING ITS POWERS, FUNCTIONS AND DUTIES UNDER THE SOIL CONSERVATION AND RIVERS CONTROL ACT 1941, OR THE LAND DRAINAGE ACT 1908.

12.3.7.2.2 DISCRETIONARY ACTIVITIES

- (a) The following activities shall be Discretionary:
- ANY PERMITTED ACTIVITY NOT MEETING ONE OR MORE OF THE RELEVANT SPECIFIC PERFORMANCE STANDARDS AND TERMS IN SECTION 12.3.8.
 - ANY OTHER ACTIVITY (NOT LISTED AS A PERMITTED ACTIVITY)
- (b) Applications for Discretionary Activities will be assessed against, but not restricted to, their ability to meet the relevant Specific Performance Standards and Terms in Section 12.3.8, those matters identified in Section 12.3.9 of the Plan, and the Objectives and Policies of the Zone.

12.3.7.3 LAND INSTABILITY RESOURCE MANAGEMENT UNIT**12.3.7.3.1 RESTRICTED DISCRETIONARY ACTIVITIES**

- (a) The following activities shall be Restricted Discretionary:

ANY BUILDING.

Applications for Restricted Discretionary Activities will be assessed against their ability to meet those matters identified in Section 12.3.9 of the Plan, and the Objectives and Policies of the Zone.

12.3.8 SPECIFIC PERFORMANCE STANDARDS AND TERMS**12.3.8.1 FLOODING RMU**

- | | |
|--|--|
| <p>(a) Minimum floor levels for residential buildings shall be RL 11.5 metres or 0.5 metres above ground level, whichever is the greater.</p> | <p><u>Outcome</u>
<i>The floors of residential buildings will remain above floodwaters in a 1 in 50 year flooding event.</i></p> |
| <p>(b) On site wastewater treatment systems shall be designed to operate in all seasonal ground conditions and ensure that in a 1 in 50 year flood event, the contents of the system are not able to mix with floodwaters.</p> | <p><u>Outcome</u>
<i>Pollution will be prevented from escaping from on site waste water treatment systems.</i></p> |

12.3.8.2 FLOODING RMUS (EXCEPT KARAMU)

- | | |
|--|---|
| <p>Any filling or excavation shall not exceed 10 cubic metres, whether or not the work is undertaken on the same site.</p> | <p><u>Outcome</u>
<i>Flooding drainage patterns will not be significantly adversely affected.</i></p> |
|--|---|

12.3.8.3 HAUMOANA INUNDATION RMU

- (a) Minimum ground levels for a habitable building site shall be: RL 11.5 metres.
- (b) Minimum floor levels for habitable buildings shall be 0.5 metres above ground level.
- (c) On site wastewater treatment systems shall be designed to operate in all seasonal ground conditions and ensure that in a 1 in 50 year flood event, the contents of the system are not able to mix with floodwaters.

Outcome

Habitable building sites will be raised to protect them from fast moving flood waters. The floors of habitable buildings will remain above floodwaters in a 1 in 50 year flooding event.

Outcome

Pollution will be prevented from escaping from on site wastewater treatment systems.

12.3.8.4 RIVER HAZARD RMU

- (a) Activities shall generally be confined to daylight hours.
- (b) The temporary or permanent storage or placement of materials that have the potential to become flotsam or jetsam shall take place outside the River Hazard RMU.

Outcome

Loss or injury to human life will be avoided.

Damage from debris in floodwaters will be avoided. Pollution will not be carried along with floodwaters in flooding events.

12.3.9 ASSESSMENT CRITERIA FOR DISCRETIONARY ACTIVITIESExplanation of Restricted Discretionary Activities

For Restricted Discretionary Activities, the following identify those matters that Council may assess the activity against.

Explanation of Discretionary Activities

For Discretionary Activities, the following identify those matters which Council may assess the activity against. Council's assessment is not however restricted to these matters.**12.3.9.1 AVAILABILITY OF ALTERNATIVE SITES FOR THE ACTIVITY**

Where there are expected to be significant adverse effects on the environment, the availability of alternative sites which are not identified as being at risk from the effects of natural hazards, will be taken into consideration.

12.3.9.2 MITIGATION

The extent to which mitigation measures will ensure that adverse effects arising from the activity during a natural hazard occurrence are either avoided or mitigated.

12.3.9.3 FINANCIAL CONSIDERATIONS

- (a) The effects of the activity will be assessed in terms of its potential effect on:
 - (i) The cost to the community of any upgrading that will have to be undertaken to existing hazard mitigation techniques.
 - (ii) Any new or further hazard mitigation techniques that will have to be undertaken in the present or future.

- (b) Financial contributions may be required where an activity causes the need to upgrade or provide new natural hazard mitigation methods. The amount of any contribution taken will be equal to the applicant's fair and reasonable share of the cost of upgrading the natural hazard mitigation measures to accommodate the activity.

12.3.9.4 NATURAL HAZARDS

The effect of the occurrence of the identified natural hazard on the proposed activity will need to be assessed. In making this assessment the following factors will need to be considered:

- (a) The extent to which public safety can be achieved. In assessing the proposal, regard will be had to methods of ensuring public safety such as early warning systems, emergency management contingency plans and any other mitigation techniques.
- (b) Assessment of the probability and magnitude of the natural hazard event.
- (c) The type, scale and distribution of any potential effects from the natural hazard.

12.3.9.5 PUBLIC WORKS AND NETWORK UTILITIES

The activity will be assessed in terms of its potential effects on public works and network utilities. Regard will be had to the proximity of the activity to stopbanks, transpower lines, telecommunication facilities and other network utilities and public works, and the extent to which the activity may interfere with the safe and efficient operation or maintenance of those works and utilities.

12.3.9.6 EFFECTS ON OTHER LAND USES AND ADJOINING PROPERTIES

The extent to which the activity may cause the effects of the natural hazard to affect other properties that were previously not at risk from the effects of natural hazards.

12.3.9.7 COASTAL PROTECTION WORKS

In the case of Coastal Protection Works the following additional matters will be considered:

- (a) Design and construction of the Coastal Protection Works including, size length, materials, construction methods and likely design life.
- (b) Whether the Coastal Protection Works will increase the likelihood of erosion, inundation or any other hazard event occurring, or increase its magnitude, including to other properties.
- (c) Whether the works are necessary to prevent loss of life, damage to assets, and/or disruption to the community.
- (d) Whether alternative methods have been considered and if so why have they been rejected.
- (e) Whether the benefit of the works outweigh the environmental social and economic costs estimated for the life of the works including maintenance and removal costs.
- (f) Impacts on natural character.
- (g) Cumulative effects.

Liquefaction Susceptibility

Legend

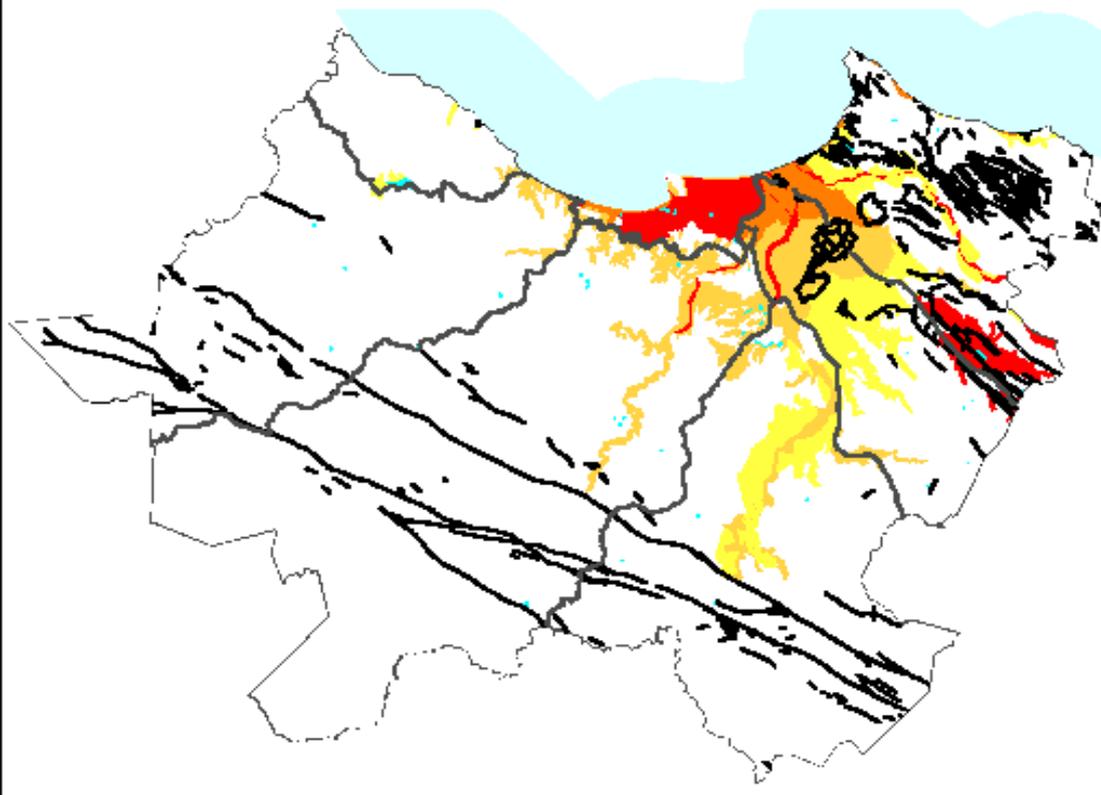
RELATIVE LIQUEFACTION SUSCEPTIBILITY

-  Very Low / Negligible
-  Low
-  Moderate
-  High
-  Very High

 Active Faultlines

 Main Roads

The presence of a hazard zone on this map does not guarantee the occurrence of such a hazard, nor does the lack of a hazard on this map preclude the occurrence of a hazard. Site-specific investigations should be undertaken in accordance with local legislation and general engineering principles. The information will be used by the user at their own risk. The Institute of Geological and Nuclear Sciences Limited, while providing the information in good faith, accepts no responsibility for any loss, damage, injury, or loss to value of any person, property, service or otherwise resulting from reliance on this information or knowledge of vulnerabilities identified in the Hazards by Region.



Scale: New Zealand Map G10
 Height Datum: Mean Sea Level
 Coordinates: In Meters
 Geoid: DATUM 840

Scale 1 : 75000



Date : June 2005



NOT A RISK
 This map is not a risk assessment. It is a hazard map. It shows the potential for liquefaction to occur in the event of an earthquake. It does not show the likelihood of an earthquake occurring, or the magnitude of any earthquake that may occur. The map is based on the best available information at the time of its preparation. It is not intended to be used as a basis for any decision on the need for, or the extent of, any remedial or protective measures.

Earthquake Ground Shaking Amplification

Legend

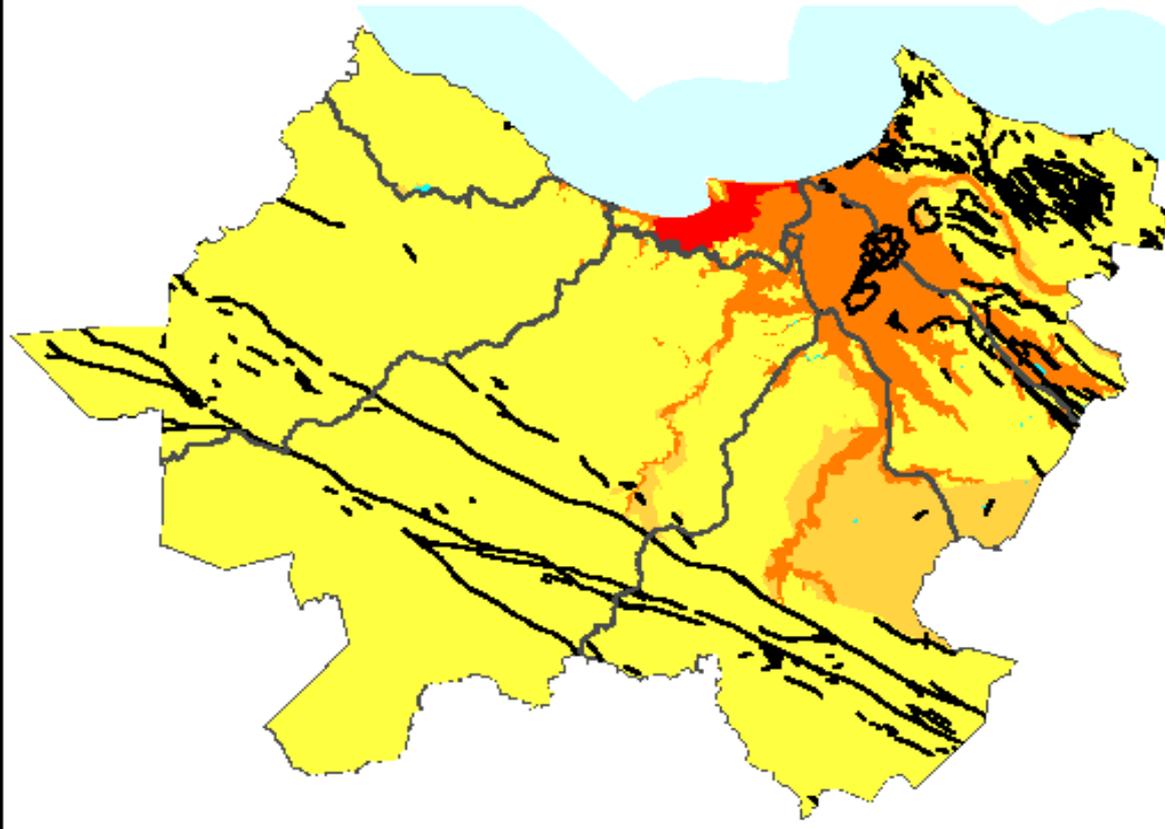
RELATIVE EARTHQUAKE AMPLIFICATION

- 4** Unconsolidated swamp, estuarine and lagoonal deposits and reclaimed land
- 3** Alluvial sand, silt and gravel
- 2** Compact alluvial sand, silt and gravel
- 1** Bedrock / Regolith

Active Faultlines

Main Roads

The process of a hazard map or the map does not guarantee the occurrence of such a hazard, nor does the lack of a hazard on the map preclude the occurrence of a hazard. Disposition investigations should be conducted to determine what all properties and ground shaking amplification potential. The information will be used by the user of their own risk. The benefits of the hazard map to the user of their own risk, while providing the information to the user, examples include: (1) the user, (2) the user, (3) the user, or (4) the user of the user's property or otherwise resulting from the user's knowledge or knowledge of the user's knowledge of the user's knowledge.



DATA SOURCE
 Hastings District Council
 Hastings District Council
 Hastings District Council
 Hastings District Council

COMMENTS
 Hastings District Council
 Hastings District Council
 Hastings District Council
 Hastings District Council

Scale 1 : 70000

7.2 0 7.7 8.4 9.1 9.8

Metres

North

Date : June 2010

© Hastings District Council

Ortho New Zealand Map Grid
 Height Datum: Mean Sea Level
 Contour Interval: 5 Metres
 Geoid: Datum 1949



