

## 3.9. NATURAL HAZARDS

### 3.9.1. INTRODUCTION

Section 31 of the Act establishes the following function for every territorial authority,

*"(b) The control of any actual or potential effects of the use, development, or protection of land, including for the purpose of the avoidance or mitigation of natural hazards ...".* This duty is reinforced by Clause 1(a)(i) of Part II of the Second Schedule.

Section 2 of the Act defines natural hazards as:

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

There are a number of areas within the District that are susceptible to the effects of natural hazards. The land below Balclutha, namely Inch Clutha and the Paretai Flats, forms the flood plain of the Clutha River and has been subject to severe flooding in the past. Structural works are now in place to protect much of this area. Flooding has also caused disruption to other parts of the District in recent years, particularly in Milton and the Tokomairiro Plain area, the Pomahaka, Waitahuna, Waiholā and the Catlins areas. The town of Kelso has in fact been dismantled due to the continuous threat of flood.

The coastal environment is also susceptible to the effects of coastal processes such as sea level rise, storm surges, tsunamis, river mouth migration and movement of the boundary of estuaries, dunes and wetlands. Settlements such as Taieri Mouth, Toko Mouth, Jacks Bay and Pounaweia may be adversely affected by sea level rise in the future. Newhaven is currently affected by erosion and this is likely to be accelerated by sea level rise. However, the community of Newhaven has established protection work which is currently having a positive effect on mitigating erosion problems.

The historic underground coal mines within the District are also considered natural hazard sites due to their potential for subsidence.

Some human activities can result in an increased intensity and frequency of natural hazards. In terms of flood hazard potential, examples of this include land use activities that modify the water retention characteristics of land or the existing overland flow paths of the land which may worsen the downstream situation.

Natural hazard management generally falls into three forms as follows:

- (i) Structural - undertaking physical works to reduce the impact of natural hazards, for example, the constructing of flood banks.
- (ii) Non-Structural - reducing the effects or impact of natural hazards by:
  - (a) Prevention - attempting to ensure that the natural hazard itself does not arise. The unpredictable nature of natural hazards makes this a rather difficult task although some flooding and landslip hazards can be avoided by appropriate land management practices that reduce the occurrence of the natural hazard.
  - (b) Prohibiting certain types of development or imposing controls on development in areas subject to or likely to be affected by natural hazards.

(iii) **Loss Modification** - taking action to reduce social and economic costs of natural hazards when they occur. For example, flood warnings, civil defence, and the taking out of insurance cover.

Doing nothing or paying inadequate attention to the impacts of natural hazards could have the following effects:

- Loss of or damage to property, livestock and human life.
- Interference with the ability of people to undertake economic and social activities.
- Altering the manner in which resources can be sustainably used, either in the short or long term.

Section 30(1) of the Act establishes the following functions for the Otago Regional Council;

*“(c) The control of the use of land for the purpose of*

*.....*

*(iv) The avoidance or mitigation of natural hazards”*

Section 62(1) of the Act requires the Regional Policy Statement to state which local authority shall have responsibility within its own area for developing objectives, policies and rules relating to the control of the use of land for the avoidance or mitigation of natural hazards.

The Regional Policy Statement for Otago states Council’s responsibilities to be as follows:

- prepare information on site specific and localised natural hazards that may affect any component of the Districts built environment under the Building Act; (*Note: the Regional Council will investigate and provide information to all agencies on regionally significant natural hazards*).
- develop objectives, policies and rules for the control of the use of land that is affected by a natural hazard in the District or where that use may exacerbate a natural hazard situation (*Note: the Regional Council will also develop objectives, policies and rules relating to the control of the use of land for the avoidance or mitigation of natural hazards*).
- Prepare and update the Clutha District Civil Defence Plan and take full first-line responsibility for dealing with the impact of a disaster in the District. (*Note: the Regional Council will prepare and update a Regional Civil Defence Plan*).

This section of the District Plan gives effect to the second bullet point above.

The Otago Regional Council will also enable community responses to flood hazard where necessary, which may involve carrying out works or services.

## 3.9.2. OBJECTIVES AND POLICIES

### OBJECTIVE NHZ.1 AVOIDANCE OR MITIGATION OF HAZARDS

**That the risks to people and their property, communities and infrastructure from the effects of natural hazards are understood as far as is practical, and are avoided or reduced to enable resilient communities.**

**OBJECTIVE NHZ.2 ADVERSE EFFECTS OF STRUCTURAL HAZARD MITIGATION**

**That structural hazard mitigation works minimise adverse effects on other natural and physical resources.**

**OBJECTIVE NHZ.3 PROTECTION OF DRAINAGE SYSTEMS**

**To ensure that all earthworks, building development, and associated works are located, designed and constructed to ensure that the efficiency of the District's drainage systems and overland flow paths are not compromised during heavy rainfall events.**

**POLICY NHZ.1 INFORMATION ON HAZARDS**

**To gather and maintain information on natural hazards including:**

- (a) The location or potential location of natural hazard events,**
- (b) The causes of natural hazard events, and**
- (c) The risks associated with natural hazard events,**

**in conjunction with the Otago Regional Council.**

**POLICY NHZ.2 CONTROL OF LAND USE IN HAZARD AREAS**

**To take into account the vulnerability of land and activities to natural hazard events when managing land uses in a particular area.**

**POLICY NHZ.3 SUBDIVISION AND THE ERECTION OF BUILDINGS**

**To control subdivision and erection of buildings in areas where there is a reasonable probability that a natural hazard may cause material damage.**

**POLICY NHZ.4 INTENSIFICATION OF HAZARD EFFECTS**

**To ensure that the location, design and/or operation of subdivision and land use activities, including earthworks and infrastructure, does not:**

- Increase the intensity and frequency of existing natural hazards;**
- Create new natural hazards;**
- Compromise the efficiency of significant drainage systems**

**POLICY NHZ.5 PROTECTION OF DRAINAGE SYSTEMS**

**All earthworks and land disturbance activities to be undertaken within existing drainage systems, including overland flow paths, shall be designed, located and/or controlled to ensure that such systems are kept free of any significant obstruction, impediment or alteration that hinders or alters overland flow, to ensure the efficiency of the drainage system during heavy rainfall events is protected so that any existing flood hazard is not exacerbated and no new flood hazard is created by such works.**

**POLICY NHZ.6 ACCEPTANCE OF EXISTING RISKS**

**To recognise that some areas that are already developed or contain infrastructure are at risk from natural hazards and to minimise such risk as far as possible while acknowledging that landowners and/or operators are prepared to accept a level of risk from natural hazards because of the benefits of remaining in a hazard prone area.**

**POLICY NHZ.7 HAZARDOUS SUBSTANCES AND PROCESSES**

**To ensure that activities which involve the use or production of hazardous substances, and/or hazardous processes are not located within hazard prone areas.**

**POLICY NHZ.8 LAND MANAGEMENT PRACTICES**

**To encourage appropriate land management practices in catchment areas to assist in reducing and/or mitigating the effects of erosion and the effects of flooding.**

### **3.9.3. REASONS AND EXPLANATIONS FOR OBJECTIVES AND POLICIES**

The Council has an obligation under the Act to control the effects of the use, development or protection of land including avoiding or mitigating the effects of natural hazards. Buildings, structures, infrastructure and people need to be protected from natural hazards.

The Council must ensure it is able to respond adequately to the threat and effects of natural hazards in the District. This includes responding to an event when it occurs as well as ensuring any proposed subdivision, land use activities or development will not cause, increase the risk of, or be adversely affected by natural hazards. In assessing the effects of natural hazards, attention will be given to the acceptable level of risk and any potential adverse effects.

There is a need to plan for known potential natural hazards and for anticipated natural hazards. This requires an understanding of natural hazards as well as up to date information on those hazards which may affect the District. Effective planning is needed to reduce risks to people and resources. The responses will vary according to the characteristics of the natural hazard and the affected areas.

The Council is also aware that some development and infrastructure is located in areas subject to natural hazards but that landowners and those residing on, operating businesses from or infrastructure on such land are accepting that risk. However, the Council intends to manage that risk to ensure that any natural hazard is not exacerbated by future development.

## 3.9.4. RULES

### RULE NHZ.1 GENERAL

#### 1. CONSULTATION

In any application for a resource consent which involves a site or activity that is at risk, or in Council's opinion is potentially at risk from natural hazards, the applicant shall, in addition to the information required by Section 3.1.3 provide the relevant hazard information and recommendation from the Otago Regional Council and/or other relevant expertise.

#### 2. APPROVED PROTECTED SITES

Rules NHZ.2 and NHZ.3 below do not apply to any 'approved protected site' as defined below.

'Approved Protected Site; means a site that is:

Identified as being affected by a natural hazard, and

1. Is adequately protected from the effects of that natural hazard by works designed by an appropriately qualified natural hazards engineer, where
2. Those works do not increase the intensity and frequency of the existing natural hazard or create a new natural hazard, and
3. Is certified as an 'Approved Protected Site' by the Chief Executive Officer of the Otago Regional Council.
4. A copy of the certification is provided to the Chief Executive Officer of the Clutha District Council prior to any work commencing at the site.

#### REASON

The Regional Council also has a significant role to play in the mitigation of natural hazards. It is essential that both Councils have a consistent approach on this issue.

Where a site has been protected from the adverse effects of natural hazard through works or other mitigation measures, then the normal rules relating to natural hazards will not apply. However, the protection works must be approved by the Otago Regional Council to ensure they are appropriately designed to achieve the desired outcome.

### RULE NHZ.2 ACTIVITIES LOCATED WITHIN AREA IDENTIFIED AS HAZARD PRONE

#### 1. LANDFILLS, WASTE DISPOSAL, OR THE STORAGE OR USE OF COMMERCIAL QUANTITIES OF HAZARDOUS GOODS OR SUBSTANCES

Landfills, waste disposal, or the storage or use of commercial quantities of hazardous goods or substances are non-complying activities in any area identified as being a natural hazard site where the site is not protected from the natural hazard by floodbanks or erosion protection. For the purposes of this rule, where hazard mitigation responses have been implemented on sites located within the Industrial Resource Area (Toko Plains) and implemented in accordance with an approved Stormwater Management Structure Plan approved in accordance with Rule SUB.4.A.3 and where

stored in accordance with Hazardous Substances and New Organisms (HSNO) Act, the storage of commercial quantities of hazardous substances is a permitted activity.

Provided that for the purposes of this rule, farm tips and offal pits permitted by the Regional Waste Plan are excluded from the definition of landfills or waste disposal.

“Commercial quantities” means quantities used or stored for the purpose of supplying or offering a service to the general public and does not include substances or goods to be used solely on the property upon which it is kept, for the purpose of maintaining or improving the health of stock, crops, land quality or for eradicating pests and/or undesirable weeds or plants from that property.

## 2. DWELLINGS AND BUILDINGS THAT ACCOMMODATE PEOPLE

All dwellings and other buildings that accommodate people locate within any area identified as being a natural hazard site, where the building is not protected from the hazard by flood banks or erosion protection, shall be a discretionary activity.

Provided that this rule does not apply to any activities dealt with under Rule 3.1 below (located within land covered by the “Milton 2060 Strategy: A Flood Risk Management Strategy for Milton and the Tokomairiro Plain”).

## 3. OTHER BUILDINGS

All other buildings not provided for by Rule 2.2 above located within any area identified as being a natural hazard site shall be permitted activities provided that the siting and design of the building ensure that the existing overland passage of stormwater flows is not significantly obstructed, impeded or redirected.

Provided that this rule does not apply to any activities dealt with under Rule 3.1 below (located within land covered by the “Milton 2060 Strategy: A Flood Risk Management Strategy for Milton and the Tokomairiro Plain”).

## **RULE NHZ.3 ACTIVITIES WITHIN AREAS IDENTIFIED AS FLOOD PRONE**

### **3.1. LAND LOCATED WITHIN THE AREA PROVIDED FOR BY THE “MILTON 2060 STRATEGY 2012”**

The following rules apply to the land located within the area covered by the “Milton 2060 Strategy: A Flood Risk Management Strategy for Milton and the Tokomairiro Plain”. Land within the strategy study area which is known to be susceptible to flooding has been identified. Areas which have similar flood hazard characteristics have been defined and identified on the planning maps as follows:

#### **AREA 1: THE TOKOMAIRO RIVER FLOODPLAIN**

Area 1A is the floodplain area which can be flooded by the north and west branches of the Tokomairiro River.

Area 1B is the part of the floodplain area where flood flows are sufficiently fast and/or deep to cause significant safety risk (“floodway corridors”).

#### **AREA 2: LOW-LYING PONDING AREAS**

These are urban areas where water ponds during prolonged heavy rainfall events.

Area 2A is to the north and west of SH1.

Area 2B is to the south and east of SH1.

### **AREA 3: MILTON URBAN AREA**

Area 3A is the Milton urban area, excluding the areas which act as floodway corridors (Area 3B), and low-lying ponding areas (Areas 2A and 2B).

Area 3B includes the floodway corridors which drain internal runoff and water from the floodplain and eastern hill catchments through the Milton urban area.

### **AREA 4: RURAL AND SEMI-RURAL AREAS OF THE TOKOMAIRO PLAIN**

Area 4A refers to the rural/semi-rural floodplain area to the north and east of Milton (excluding the floodway corridors identified as Area 4B). Area 4A is not shown on the planning maps as no regulatory controls apply in these areas.

Area 4B includes the floodway corridors which drain the water from the floodplain and eastern hill catchment.

Area 4C includes parts of Area 4B that are deeper and/or critical for the conveyance of water from the floodplain and eastern hill catchments

#### **3.1.1. AREA 1A: TOKOMAIRO RIVER FLOODPLAIN**

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##### **(a) Dwellings and Other Buildings that Accommodate People**

All dwellings and other buildings that accommodate people located within Area 1A shall be discretionary activities.

This rule does not apply to other buildings that accommodate people located within Area 1A identified within the Industrial Resource Area (Toko Plains) Annotated Structure Plan and where appropriate hazard mitigation responses have been implemented on site in accordance with an approved Stormwater Management Structure Plan in accordance with Rule SUB.4.A.3.

##### **(b) Other Buildings**

All other buildings not provided for by Rule NHZ.3.1.1(a) above located within Area 1A shall be restricted discretionary activities.

Council's discretion shall be restricted to the siting and design of the building to ensure that the existing overland passage of stormwater flows is not significantly obstructed, impeded or redirected.

This rule does not apply to other buildings that are located within Area 1A identified within the Industrial Resource Area (Toko Plains) Annotated Structure Plan and where appropriate hazard mitigation responses have been implemented on site in accordance with an approved Stormwater Management Structure Plan approved in accordance with Rule SUB.4.A.3

##### **(c) Standards for Other Activities**

- i. Any fence, shelterbelt, plantings or storage areas established within Area 1A shall be located and designed to ensure that the existing overland passage of floodwaters or stormwater flows is not obstructed, impeded or redirected.
- ii. No earthworks located within Area 1A shall modify the contour/gradient to a degree that would obstruct, impede, or redirect overland passage of floodwater or stormwater flows unless the earthworks are part of any public flood protection work designed to mitigate or reduce the effects of flowing on the Milton Township.

This rule does not apply to activities listed in (i) and (ii) located within Area 1A identified within the Industrial Resource Area (Toko Plains) Annotated Structure Plan where appropriate hazard mitigation responses have been implemented on site in accordance with a Stormwater Management Structure Plan approved in accordance with Rule SUB.4.A.3.

### 3.1.2. AREA 1B: TOKOMAIRO RIVER FLOODPLAIN

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(a) Dwellings and other Buildings that Accommodate People

All dwellings and other buildings that accommodate people located within Area 1B shall be non-complying activities.

(b) Other Buildings and Storage of Materials

All other buildings not provided for by Rule NHZ.3.1.2(a) above, and the storage of more than 20m<sup>2</sup> of materials outside of a building or structure, that are located within Area 1B shall be a discretionary activity.

(c) Standards for Other Activities

- i. Any fence, shelterbelt, plantings or storage areas up to 20m<sup>2</sup>, established within Area 1B shall be located and designed to ensure that the existing overland passage of floodwaters or stormwater flows is not obstructed, impeded or redirected.
- ii. No earthworks located within Area 1B shall modify the contour/gradient to a degree that would obstruct, impede, or redirect overland passage of floodwater or stormwater flows unless the earthworks are part of any public flood protection work designed to mitigate or reduce the effects of flowing on the Milton Township.

### 3.1.3. AREA 2A: URBAN PONDING AREA

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(a) Building Alterations (including footprint extensions) and Ancillary Buildings

All building alterations (including footprint extensions) and new ancillary buildings located within Area 2A shall be controlled activities provided they have a minimum floor level of 13 metres above mean sea level.

Council's control shall be restricted to the following matters:

- Location to avoid areas of excessive depth or velocity or significant re-direction of flows.
- Suitable floor height to avoid inundation.
- Suitable construction methods to withstand inundation to a defined depth and velocity.
- Earthworks to minimise construction, impediment or redirection of the existing overland passage of stormwater flows.
- Suitable construction methods to ensure utility connections are flood proof.
- The provision of safe egress during flood events.

(b) New Dwellings, Commercial Residential and Other Buildings that Accommodate People

All dwellings, commercial residential and other buildings that accommodate people located within Area 2A shall be discretionary activities.



### 3.1.4. AREA 2B: URBAN PONDING AREA

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(a) Building Alterations (including footprint extensions) and Ancillary Buildings

All building alterations (including footprint extensions) and new ancillary buildings located within Area 2B shall be controlled activities provided they have a minimum floor level of 12m above mean sea level.

Council's control shall be restricted to the following matters:

- Location to avoid areas of excessive depth or velocity or significant redirection of flows.
- Suitable floor height to avoid inundation.
- Suitable construction methods to withstand inundation to a defined depth and velocity.
- Earthworks to minimise obstruction, impediment or redirection of the existing overland passage of stormwater flows.
- Suitable construction methods to ensure utility connections are flood proof.
- The provision for safe egress during flood events.

(b) New Dwellings, Commercial Residential and Other Buildings that Accommodate People

All dwellings and other buildings that accommodate people located within Area 2B shall be discretionary activities.

### 3.1.5. AREA 3B: URBAN FLOODWAY CORRIDOR

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(a) Minor Building Alterations (including footprint extensions) and Ancillary Buildings

All building alterations that do not involve more than 10% of the building or footprint extensions that do not exceed 10% of the existing floor area and new ancillary buildings that do not exceed 10m<sup>2</sup> located within Area 3B shall be permitted activities provided that:

- Floor height is sufficiently elevated to avoid inundation
- Suitable construction methods are used to minimise the redirection of the existing overland passage of stormwater flows.
- Suitable construction methods are used to ensure utility connections are flood proof.
- There is provision for safe egress during flood events.

(b) New Dwellings and Other Building Work not provided for by Rule NHZ3.1.5(a)

All new dwelling and other building work not provided for by Rule NHZ3.1.5(a) that are located within Area 3B shall be controlled activities.

Council's control shall be restricted to the following matters:

- Location to avoid areas of excessive depth or velocity or significant redirection of flows.
- Suitable floor height to avoid inundation.
- Suitable construction methods to withstand inundation to a defined depth and velocity.
- Earthworks to minimise obstruction, impediment or redirection of the existing overland passage of stormwater flows.
- Suitable construction methods to ensure utility connections are flood proof.
- The provision for safe egress during flood events.

### 3.1.6. AREA 4B AND 4C: TOKOMAIRIRO PLAIN: FLOODWAY CORRIDORS

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(a) Dwellings and Other Buildings that Accommodate People

All dwellings and other buildings that accommodate people located within Area 4B shall be discretionary activities.

This rule does not apply to other buildings located within Area 4B and 4C identified within the Industrial Resource Area (Toko Plains) Annotated Structure Plan where appropriate hazard mitigation responses have been implemented on site in accordance with a Stormwater Management Structure Plan approved in accordance with Rule SUB.4.A.3

(b) Dwellings and Buildings that Accommodate People

All dwellings and other buildings that accommodate people located within Area 4C shall be non-complying activities.

This rule does not apply to other buildings located within Area 4C identified within the Industrial Resource Area (Toko Plains) Annotated Structure Plan where appropriate hazard mitigation responses have been implemented on site in accordance with a Stormwater Management Structure Plan approved in accordance Rule SUB.4.A.3.

(c) Other Buildings

All other buildings not provided bit by Rule NHZ.3.1.6(a) and (b) above, located within Area 4B and 4C shall be restricted discretionary activities.

Council's discretion shall be restricted to the siting and design of the building to ensure that:

- Areas of excessive depth or velocity of flood water are avoided
- The existing overland passage of stormwater flows is not significantly obstructed, impeded or redirected.

This rule does not apply to other buildings located within Area 4B identified within the Industrial Resource Area (Toko Plains) Annotated Structure Plan where appropriate hazard mitigation responses have been implemented on site in accordance with a Stormwater Management Structure Plan approved in accordance with Rule SUB.4.A.3.

(d) Earthworks

All earthworks located within Area 4B and 4C shall be restricted discretionary activities.

Council's discretion shall be restricted to matters that ensure the overland passage of floodwaters or stormwater flows are not obstructed, impeded, or redirected. This measure may include measures that mitigate such effects.

Provided that this rule does not apply to earthworks that are part of any public flood protection work designed to mitigate or reduce the effects of flooding on the Milton Township or where the earthworks form part of a hazard mitigation response implemented on site in accordance with a Stormwater Management Structure Plan approved in accordance with Rule SUB.4.A.3.

(e) Standards for Other Activities

Any fence, shelterbelt, plantings or storage areas established within Area 4B and 4C shall be located and designed to ensure that the existing overland passage of floodwaters or stormwater flows is not obstructed, impeded or redirected.

This rule does not apply to any fence, shelterbelt, plantings or storage areas established within Area 4B and 4C identified within the Industrial Resource Area (Toko Plains) Annotated Structure Plan where appropriate hazard mitigation responses have been implemented on site in accordance with a Stormwater Management Structure Plan approved in accordance with Rule SUB.4.A.3.

**REASON**

The effects of landfills, waste disposal, or the storage or use of commercial quantities of hazardous goods or substances have great potential to cause significant environmental damage if associated with a natural hazard. Council considers the best means to avoid such effects is not to permit activities of this nature in actual or potential natural hazard sites. Small scale farm landfills and offal pits have been excluded on the basis that they would have minimal effect as opposed to large public waste disposal areas.

Development in flood prone areas needs to be controlled. If consented the ground level and/or floor levels of new buildings will be defined by conditions of consent to ensure that the effects of flooding on new developments are avoided or mitigated and that the intensity and frequency of flooding is not increased or exacerbated off-site. Consideration will also need to be given to the location of associated infrastructure such as access, effluent disposal fields, essential service and fencing.

### 3.9.5. OTHER METHODS

#### METHOD NHZ.1 HAZARD IDENTIFICATION

The District planning maps identify some areas of the District that are known to be at risk from actual or potential natural hazard occurrences.

These maps identify the following actual or potential natural hazard sites where Council knows of their existence in the District.

- Flood prone areas (Source: Report on Flood Plains within Clutha District, Otago Regional Council, October 1991 and the "Milton 2060 Strategy: A Flood Risk Management Strategy for Milton and the Tokomairiro Plain").
- Areas of land instability (Source: Council files)
- Coastal sites susceptible to erosion and the effects of sea level rise (Source: Proposed Regional Plan: Coast, July 1994)
- Former mining sites that could give rise to subsidence (Source: Compiled from Mining Survey Plans, held by Ministry of Internal Affairs, Mines Section, Greymouth)
- Fault lines (Source: New Zealand Geological Survey Maps, Department of Scientific and Industrial Research and Otago Regional Council report "Earthquake Hazards in the Otago Region" September 1995.)

These maps will be used to assist Council in determining resource consents, building consents and the appropriateness of activities in any particular area. Other natural hazards may be added to this list as they are identified.

## **REASON**

Mapping actual and potential natural hazard sites and incorporating them into the District Plan is seen as the best available method to advise the public of areas with known risk. The availability of such user friendly information will enable Council to make more informed judgements when considering the appropriateness of activities in a particular area, particularly when considering resource and building consents, and also allow the public to make a judgement themselves as to appropriate activities on these sites.

*(Refer also Section 3.7 Subdivision)*

### **METHOD NHZ.2 CONSULTATION**

Council shall, where appropriate, consult with the following bodies on matters that involve natural hazard issues:

- The Otago Regional Council, to ensure that both Councils have a consistent approach.
- The Institute of Geological and Nuclear Sciences
- The New Zealand Fire Service
- Adjacent local authorities
- Local communities and affected landowners
- Landcare groups
- Other bodies with relevant interests

## **REASON**

The community and all other interested bodies must work together to ensure the development of an effective natural hazard management system.

### **METHOD NHZ.3**

Council shall continue to prepare and update the following in accordance with the relevant legislation and in consultation with affected and interested parties;

- Civil Defence Plan for the Clutha District
- Disaster Damage Contingency Funds
- Rural Fire Plan for the Otago Region

## **REASON**

Council is required by other legislation to prepare contingency plans in case of natural hazard events. The development of these plans is an important part of ensuring that effects of natural hazard events are kept to a minimum.

#### METHOD NHZ.4 MONITORING

To assess the effectiveness of these policies and rules Council shall

- analyse the cause of natural hazard events
- analyse the effects of natural hazard events

#### METHOD NHZ.5

With respect to the use, development or protection of land within Catchment areas of the District, Council shall,

- (a) assist the Otago Regional Council in establishing monitoring programmes to assess the degree to which long term trends in land use practices and patterns may increase the vulnerability to natural hazards such as flooding.
- (b) Promote and encourage the revegetation and retention and enhancement of vegetative cover and the retention and enhancement of wetland areas as natural methods of managing natural hazards.

#### **REASON**

Some land use activities can have an adverse effect on water retention characteristics of land which may worsen the downstream situation. More work needs to be carried out to determine the extent land use patterns increase the intensity and frequency of natural hazards. However, it is known that maintenance of vegetation cover and wetlands mitigate such effects.