



# **Bay of Plenty Regional Policy Statement Methodology for Risk Assessment**

## **Interim Implementation Guidance**

Strategic Policy Publication 2015/03  
ISSN: 1176-4112 (Print)  
ISSN: 1178-3907 (Online)

October 2015

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# Contents

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<b>Part 1: Background</b>	<b>1</b>
1.1 Introduction	1
1.2 Interim and Phase II Guidance	1
1.3 What this guidance covers	2
1.4 What is a risk assessment methodology?	3
1.5 Who should read this interim guidance?	3
<b>Part 2: An introduction to Change 2</b>	<b>5</b>
2.1 Structure of Change 2	5
2.2 Policy and guidance	5
2.3 Spatial scales and associated defined terms	8
2.4 Mapping risk	11
<b>Part 3: How do you apply Appendix K with incomplete information?</b>	<b>13</b>
3.1 Applying Table 6 – Event likelihoods	13
3.2 Applying Table 7 - Consequences	14
3.3 The qualitative method of determining likelihood and consequences	15
3.4 Proportionality of effort	16
3.5 Overview	17
<b>Part 4: What is a recognised risk assessment methodology?</b>	<b>19</b>
4.1 Criteria for determining a qualifying RRAM	19
4.2 Application of Criteria	20
4.3 Risk methodologies deemed to comply	20
<b>Attachment 1: Scope of Phase II Guidance</b>	<b>23</b>
<b>Attachment 2: Appendix K default methodology</b>	<b>24</b>



# Part 1: Background

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## 1.1 Introduction

Proposed Change 2 (Natural Hazards) to the Bay of Plenty Regional Policy Statement, amended in accordance with Council's decisions on submissions, was publicly notified on 20 October 2015. Change 2 brings into the RPS provisions relating to the management of natural hazards. The Change requires that a "risk-based approach" be taken to the management of natural hazards across the region.

Change 2 is very specific about what it means by a "risk-based approach". It includes, in Appendix K, a default methodology for risk assessment.

The default methodology is to be used unless an alternative recognised risk assessment methodology is approved for use.

## 1.2 Interim and Phase II Guidance

As a result of feedback received through submissions and hearings, the Regional Council decided that implementation guidance on Appendix K would be issued. It is accepted that, ultimately, guidance would be helpful on a wide range of detailed matters associated with how the default methodology in Appendix K should be applied. However, it is acknowledged that such guidance would take some time to prepare. Therefore, the implementation guidance on Appendix K will be issued in two phases.

City and district councils are required to "have regard to" a proposed regional policy statement (or change) when preparing district plans (section 74(2) of the Act). Plans are to "give effect to" such statements (or changes) once they are operative (section 75(3) of the Act). Similarly, from the time Change 2 was notified, city and district councils were required to "have regard to" it when considering resource consent applications (section 104(1)(b) of the Act).

Because of these statutory requirements, there is a sense of urgency in providing guidance on at least the core questions likely to arise in the initial stages of Change 2's implementation by city and district councils. Accordingly, the Regional Council determined that this interim guidance be issued when the decisions on submissions on Change 2 are released.

The Regional Council is committed to produce the fuller range of detailed implementation guidance ("Phase II guidance") when Change 2 is made operative. The list of matters to be addressed by the Phase II guidance is included as Attachment 1 to this interim guidance. The Phase II guidance will replace this interim guidance.

This guidance is not part of the RPS. It is provided to assist users of the RPS. Adherence to the guidance is not mandatory but it does set out the Regional Council's expectations about how Appendix K can be appropriately implemented and therefore provides clear direction on the position the Regional Council may take in statutory processes. Where necessary, the Regional Council may amend or supplement this interim guidance, in response to any unforeseen implementation issues that may arise in the period prior to the issuance of the full Phase II guidance.

### **What is the Regional Policy Statement?**

The Regional Policy Statement (RPS) is a document prepared by Bay of Plenty Regional Council under the Resource Management Act 1991 (“the Act”). It does not contain rules but it does contain policy that district and regional plans must ‘give effect to’. Change 2 has been designed to influence resource consents and the development of district and regional plans as they affect natural hazards.

### **Background to Change 2**

The current operative RPS was publicly notified with a suite of objectives and policies in relation to natural hazards. However, those natural hazards provisions attracted a number of submissions which led to six appeals to the Environment Court that were not resolved by negotiation. Accordingly, the Regional Council decided to withdraw almost all the natural hazards provisions from the RPS to allow the balance of the RPS to become operative in 2014. At the same time as it withdrew those earlier natural hazards provisions, it notified a new set of provisions in the form of Change 2.

## **1.3 What this guidance covers**

This guidance is produced in four parts. Part 1, Background, is this part.

### **Part 2**

Part 2 provides some background to understanding the way Change 2 is constructed and some of the key concepts it proposes for natural hazards management. It also contains flow diagrams that explain:

- (a) The overall process by which natural hazard risks are to be identified, assessed and managed (Figures 1 and 2); and
- (b) The use of Appendix K and the process steps involved in determining how risk categories are assigned (included as Attachment 2).

This is important context for understanding how Appendix K fits within, and is integral to, the broader natural hazards management framework proposed by Change 2.

### **Part 3**

One of the most frequently expressed concerns of stakeholders in relation to Change 2 is what to do if the information required to implement the Appendix K methodology does not exist? Part 3 of this interim guidance answers that question by considering the approach to take when:

- available information on hazard event likelihoods is not consistent with the expectations of Table 6;
- available information on the consequences of a hazard event does not address any, or all, of the matters set out in Table 7.

In doing so, this guidance further explains the role of *qualitative* risk assessment.

## **Part 4**

The other key concern of stakeholders is that some have used, or propose to use, a risk assessment methodology that differs from that promoted through the default methodology of Appendix K. Appendix K does provide for the use of an alternative methodology, provided that it is a “recognised risk assessment methodology” (RRAM). Accordingly, this interim guidance provides greater clarity about what will be regarded as a RRAM.

### **1.4 What is a risk assessment methodology?**

For the purpose of this guideline, a risk assessment methodology is a systematic procedure for determining the level of risk from a natural hazard that an area or site and its associated development is exposed to. A risk assessment methodology must consider the combination of both the likelihood of an event occurring and the consequences on people and communities (including their property and social, cultural and economic well-being) from the event occurring.

### **1.5 Who should read this interim guidance?**

The interim implementation guidance is relevant to two groups of people:

- The Bay of Plenty community who participate in Resource Management Act (RMA) processes, or who may require resource consent from the Regional Council or any of the city or district councils in the region. This includes iwi and hapū, developers, landowners and special interest groups.
- City and district councils of the region, as they review their district plans or prepare changes to existing plans in relation to natural hazards issues. It aims to assist the Regional Council and city and district councils and other stakeholders in the Bay of Plenty Region to interpret and apply Appendix K and its requirement for natural hazard risk assessment.



## Part 2: An introduction to Change 2

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### 2.1 Structure of Change 2

The general structure of Change 2 is described in its introduction. The policies set out a framework that:

- (a) Directs that a risk-based approach is to be used (Policy NH 1B).
- (b) Establishes the risk categories to be used for the risk-based approach (Policy NH 2B).
- (c) Specifies the *management approach* to be taken in respect of each risk category (Policy NH 6B).
- (d) Provides direction on the management of natural hazard risk in particular contexts:
  - Policy NH 7B
  - Policy NH 9A
  - Policy NH 10B
- (e) Requires *identification of areas susceptible to natural hazards* in the context of city, district and regional plan development (Policy NH 3A).
- (f) Requires *risk analysis and evaluation* in the context of both plan development and consent applications (Policies NH 4A and NH 5B/NH 5B(a) respectively).
- (g) Requires regional, city and district plans to manage land use to reduce (or “*treat*”) natural hazard risk (Policy NH 8A).

In that way, Change 2 broadly reflects the risk management process from AS/NZS ISO 31000:2009, particularly (e) and (f) above which together represent the “risk assessment” stage of the process.

The process elements of the policy framework, as they apply in the context of regional, city and district **plan preparation**, are illustrated in Figure 1. The process elements of the policy framework as they apply in the context of **resource consents** are illustrated in Figure 2.

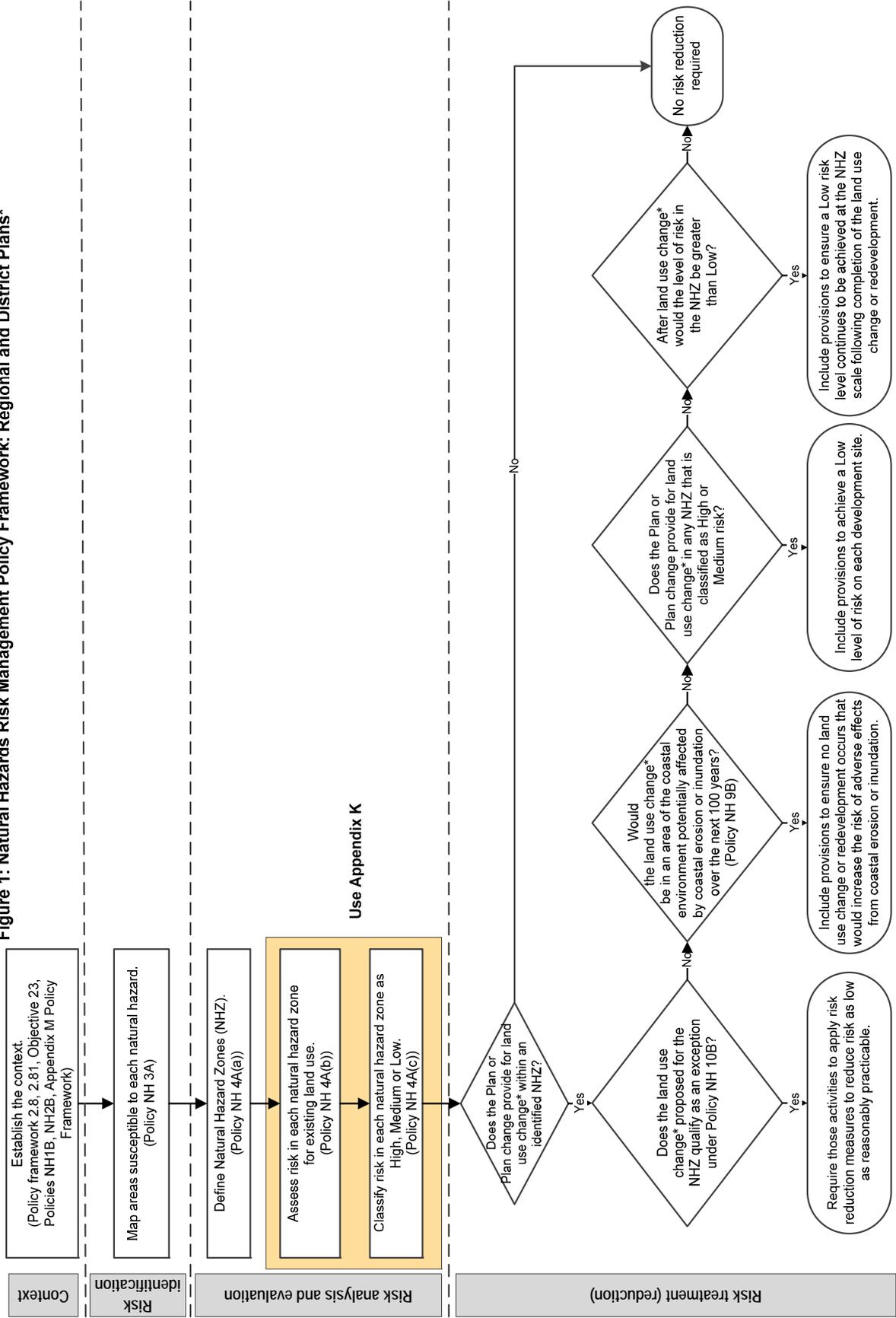
Both Figures 1 and 2 illustrate that analysis and evaluation (the subject of Appendix K) are at the heart of the natural hazards risk management process. This document accordingly sets out guidance on the methodology to be used when risk analysis and evaluation under Appendix K are required (i.e. when (f) applies).

### 2.2 Policy and guidance

Change 2 makes a clear and deliberate distinction between what is in policy and what is in guidance (including, in particular, the guidance provided by Appendix K). In simple terms, the requirements on local authorities and applicants (i.e. what needs to be done) is located in the policy. How councils and applicants give effect to

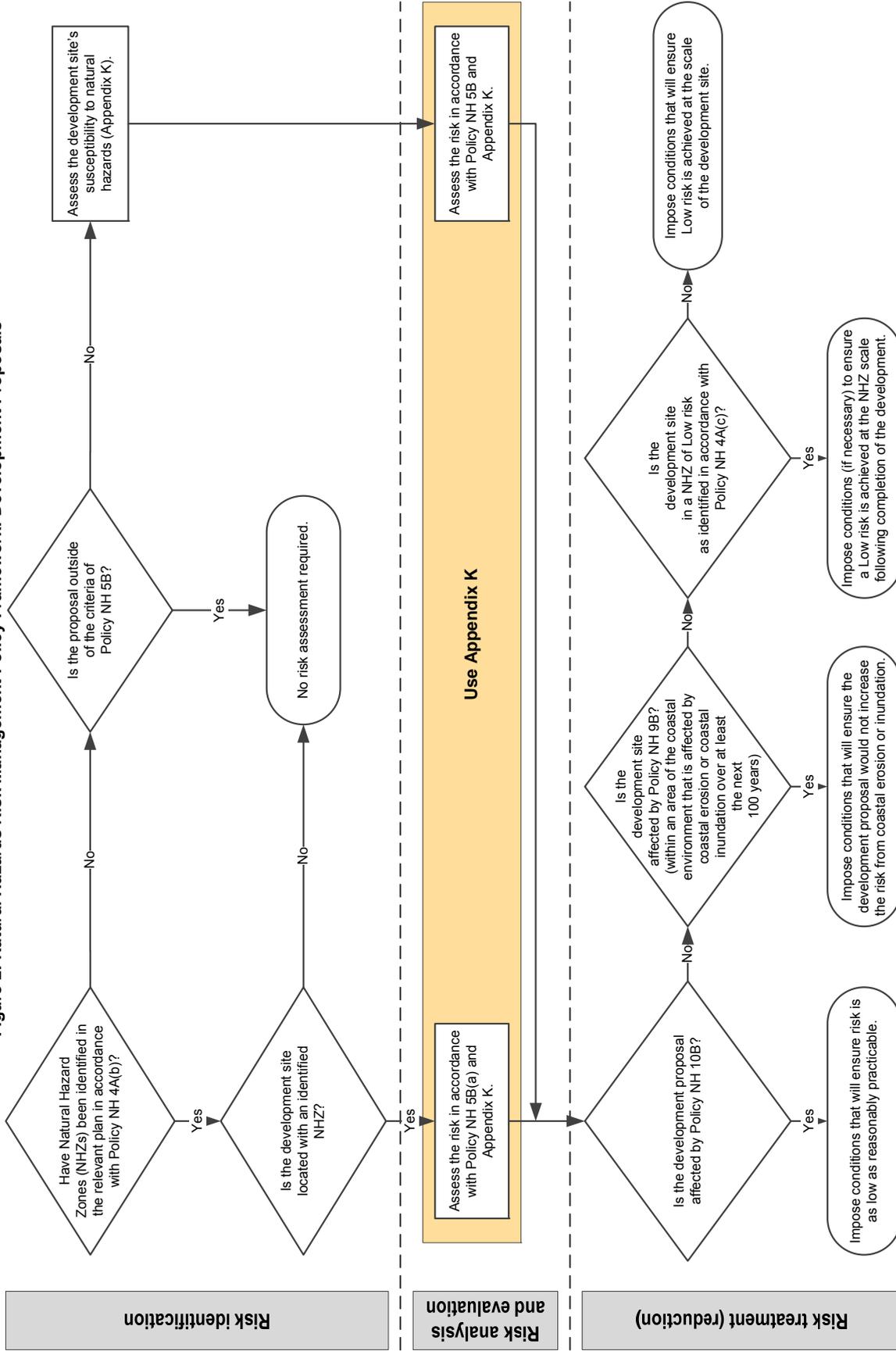
the policy requirements is contained in the appendices (being a form of implementation guidance) and in guidance published outside of the RPS, including this document. Hence Appendix K sets out *how* risk analysis and evaluation is to be undertaken and Appendix L sets out *how* risk reduction can be achieved. The requirement to analyse, evaluate and reduce risk (the “what”) is the subject of the policy within Change 2 itself.

**Figure 1: Natural Hazards Risk Management Policy Framework: Regional and District Plans\***



\*For the purpose of Figure 1 "land use change" includes the subdivision, development, redevelopment and protection of land.

Figure 2: Natural Hazards Risk Management Policy Framework: Development Proposals\*



\*For the purpose of this figure the term "development proposal" means the subject of a resource consent, notice of requirement or private plan change

## 2.3 Spatial scales and associated defined terms

Change 2 uses a number of terms to describe the various spatial scales and mapping that is envisaged. These include:

- Hazard Susceptibility Area (HSA)
- Natural Hazard Zone (NHZ)
- Development Site
- Hazard Assessment Area (HAA).

These are interrelated terms.

- The HSA is simply a mapped area representing the spatial extent of a particular hazard (see Policy NH 3A).
- The NHZ is a zone defined by a regional, city or district plan as being the scale at which hazard risk assessment is to be undertaken for the purpose of developing appropriate risk management provisions in plans (see policy NH 4A). An NHZ can be an entire HSA or (more likely) part of such an area, but it cannot be bigger than a HSA.
- A development site is also defined and means that area of land on which development of land is to be undertaken (being land held in a single certificate of title (CT) or land held in multiple CTs that are contiguous). The development site is the scale at which risk assessment is to be undertaken when required by Policies NH 5B and NH 5B(a).
- The HAA is the term applied to the scale of assessment carried out in accordance with Appendix K. It can mean either the NHZ or Development Site. The term HAA is only used in Appendix K. It is included simply to avoid having to refer to “natural hazard zone or development site whichever is applicable”.

A conceptual depiction of these terms is shown in Figure 3 below:

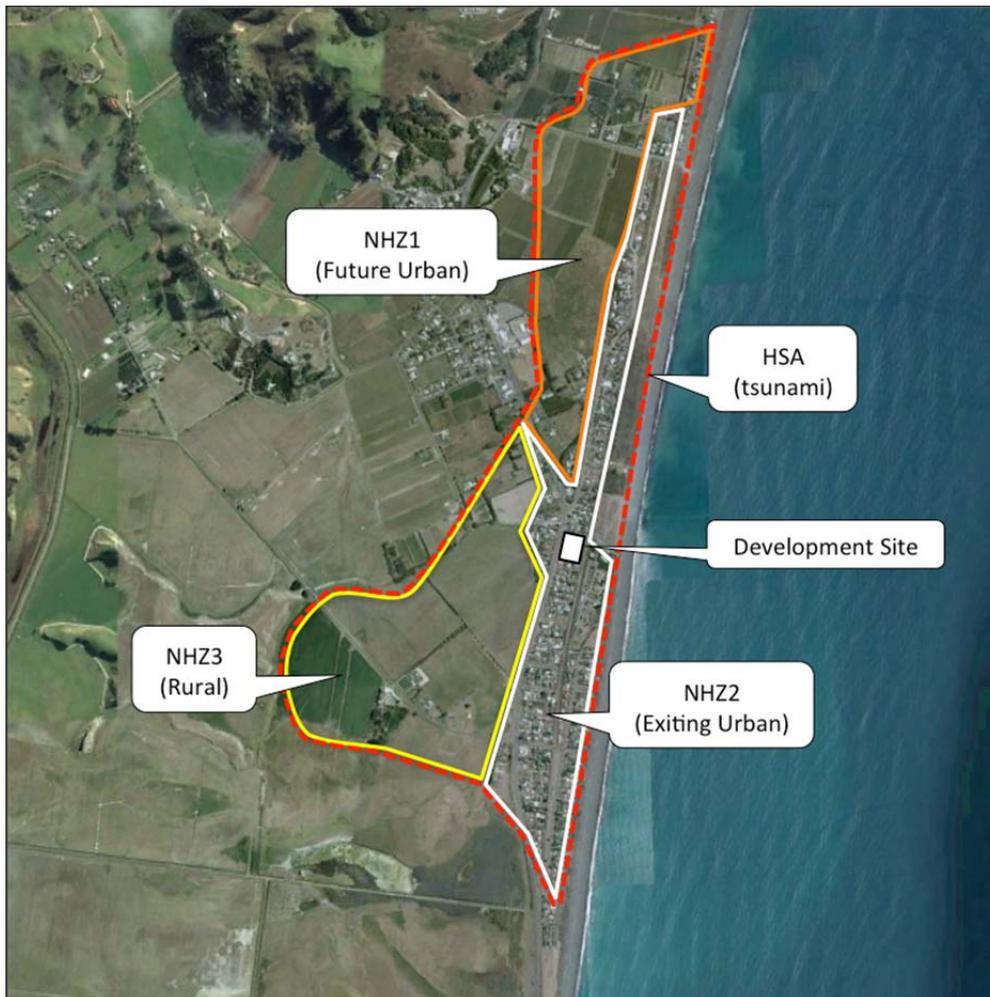


Figure 3 Hypothetical example of hazards susceptibility area (HSA) and natural hazards zone (NHZ) based on a tsunami hazard

In the above example, the HSA has been divided into three NHZs for the purpose of hazard risk assessment. These are based on actual or potential land use. It is anticipated that land use will be a common criterion used to define NHZs. Separating existing development from new development (future urban), for example, will ensure that the risk level applicable to the future urban area is not influenced by the level of hazard mitigation present in the existing urban area. That is, if the existing urban area is already subject to high risk, that need not influence the “developability” of the future urban area provided that it can meet the low risk criterion within its own zone. Conversely, if an existing urban area has invested heavily in hazard risk mitigation to achieve “low” risk, it may not be appropriate to allow new adjacent development to rely on that low existing risk level, to “dilute” the risk of its own development, by effectively sharing the same zone for assessment purposes<sup>1</sup>.

<sup>1</sup> Whether this should be allowed or not ought to be a conscious decision of the regional, city or district council, made in the context of defining NHZs through the Schedule 1 process prescribed in the RMA. Some increase in risk to an existing developed area may be acceptable, for example, provided the overall level of risk remains in the low range.

The HAA for the purpose of applying Appendix K will be:

- one of the NHZs (when applied in the context of plan development); or
- the development site (when applied in the context of a resource consent application, notice of requirement or plan change related to a specific development project).

Establishing the boundaries of NHZs will require considerable thought and the appropriate boundaries will be very much place and context specific. For that reason, Change 2 proposes (Policy NH 4A) that they be set through the Schedule 1 process, as part of regional and district plan development, and not be defined in an ad hoc manner.

## 2.4 Mapping risk

It is important to be clear about the purpose of risk assessment. It is not, as is sometimes described, the precursor to “mapping risk” in the traditional sense of hazard lines on planning maps.

That said, areas of like risk can be spatially defined (i.e. “mapped”). For example, following risk assessment an area might be identified, based on existing land use, as low risk. However, that does not mean that anything can occur within that area without hazard assessment, simply because the area is low risk. A change of use can, and to a greater or lesser degree will, change the risk.

This is the fundamental difference between a risk-based approach and the more traditional approaches that have informed land use planning in the past, where areas subject to a certain likelihood of hazard event (e.g. flooding or coastal erosion) have been mapped and only if an activity is proposed within such an area do hazards provisions apply.

Traditional hazard maps are more akin to what Change 2 has termed “susceptibility mapping” (although hazard susceptibility maps will often define the maximum credible event, whereas traditional hazard maps are typically based on events of greater likelihood – i.e. more frequent – than the maximum credible event).

Risk classification by contrast is context (or “scenario”) dependent. That is, what the appropriate risk classification is on any site or area depends on what use that site or area is put to.

An area of greenfield land, therefore, cannot be described as low, medium or high risk, unless that classification is associated with a particular future land use of known design.

In short, while the extent of effect of a particular hazard (of a certain likelihood) can be mapped, risk cannot be “mapped” except in respect of a particular development scenario.

Hence, it is not accurate to refer to an area or site as being subject to a particular level of risk. Risk can only be assessed, and hence mapped, in respect of land and its associated use.



## Part 3: How do you apply Appendix K with incomplete information?

To apply the default risk assessment methodology of Appendix K the user needs:

- Information about the *scale of event* that would occur (statistically) from events of the likelihoods specified in Column A and (potentially) Column B of Table 6 of Appendix K.
- Information to assess the potential *consequences* (in terms of loss of life/injury, building loss, damage to lifeline infrastructure) from the scale of event described above.

Considerable information exists on the natural hazards of the Bay of Plenty Region. This is held mostly by the Regional Council and city and district councils. However, information is currently not comprehensive across the region. There will be gaps in terms of particular hazards and particular localities.

For that reason, this part provides guidance on how to apply Appendix K in the absence of complete information.

### 3.1 Applying Table 6 – Event likelihoods

Table 6 of Change 2 sets out the likelihoods of hazard events for which risk assessment is required.

The likelihoods listed in Column A are the starting point for the analysis (called the “initial analysis”). These likelihoods were selected as they broadly represent commonly researched likelihoods for the respective hazards.

Column B includes upper and lower likelihoods whose consequences may also need analysing through what Change 2 refers to as “secondary analysis”.

As explained in Change 2, the purpose of primary and then secondary analysis is to try to identify the hazard event (shown as “likelihood of maximum risk ( $L_{MR}$ )” in Figure 4 below) that represents the greatest risk — being the point of maximum risk on the conceptual risk curve as shown in Figure 4 below.

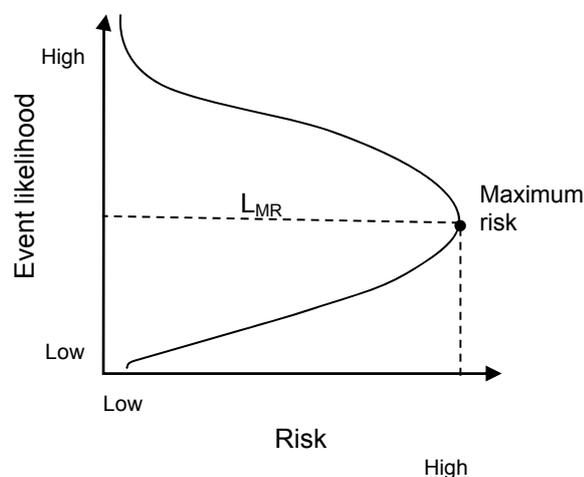


Figure 4 Conceptual Curve of Maximum Risk

The likelihood in Column A of Table 6 might represent the event of maximum risk or it might not. That cannot be determined until events of other likelihoods are also analysed (through what is, in effect, a form of sensitivity analysis).

In that regard it does not much matter (within reason) what event likelihood is selected for the initial analysis, as long as that analysis and secondary analysis ultimately identifies the event that represents maximum risk (shown as “L<sub>MR</sub>” on Figure 4 above).

For that reason, the approach adopted by AECOM in report “*Proposed Change 2 Natural Hazards Scenario Testing, May 2015*” is considered appropriate. In that report, information was not available on events of the likelihoods set out in Table 6. The authors accordingly analysed events for which information was available. For example, a flood event with a 50 year ARI (2% AEP)<sup>2</sup> was analysed, rather than the 100 year ARI (1% AEP) as specified for initial analysis in Table 6.

This accords with the principle of using *best available information*. Should there be information on multiple event likelihoods but none corresponding to the initial assessment likelihood of Table 6, then the event closest to the likelihood listed in Table 6 should be used.

### 3.2 Applying Table 7 - Consequences

For a number of hazards and hazard prone areas, detailed studies have been undertaken of the consequences of particular hazard events. However, in many cases, applying Appendix K will mean making an assessment of the likely consequences of a hazard event for the first time.

Just because no previous detailed, highly quantified study can be drawn on, that does not mean that no assessment can or should be made.

The expectation is that, in the absence of existing information, a systematic approach to working through each of the potential consequences (from Table 7) will be undertaken, with documented *reasoned judgements* about the extent to which damage and loss could be expected.

Where hazard susceptibility mapping has been completed, the number of dwellings and other buildings (including “social and cultural” and “critical” buildings) within the HAA will be readily determined, through manual survey or analysis of aerial photographs and cadastral databases. Judgement is then required to be exercised about the extent to which these buildings will be functionally compromised.

Similarly, the presence and nature of lifeline utilities within the HAA should be relatively easily identified. Again, informed judgement is required about the extent to which such lifelines might be out of service.

When conclusions are made about particular consequences based on judgement (rather than mathematical calculation or modelling) the assessment will be qualitative (at least in part).

Change 2 allows for assessments of consequences to be quantitative or qualitative (or a combination). It sets out clear criteria for identifying when assessment must be quantitative. For completeness these are repeated here.

A quantitative approach must be used where:

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<sup>2</sup> [ARI = average recurrence interval](#)  
[AEP = annual exceedance probability](#)

- *The hazard has generated a damaging event in the recent past and there is a high likelihood that events of a similar scale will continue, or occur again*

This recognises that communities who have experienced hazard events, or at least have first-hand knowledge of events in their community, will have a heightened sensitivity to hazard risk and will expect careful and considered assessment of risk should, for example, further land be proposed for urban development.

- *The hazard susceptibility area is greenfield land and is proposed to be developed with an ultimate urbanised footprint of five hectares or more.*

This recognises that larger developments mean greater potential consequences should a hazard event occur.

- *The hazard susceptibility area has been subject to previous quantitative risk assessment and the development proposal that gives rise to the need for risk assessment would materially increase the potential consequences of an event.*

This recognises that the conclusions of previous quantitative assessments can be invalidated by new development occurring within the hazard assessment area. Because a previous quantitative assessment exists, a new quantitative assessment (based on updating the original assessment) ought not to be onerous.

### 3.3 **The qualitative method of determining likelihood and consequences**

As noted earlier, outside of the situations outlined above, Change 2 allows for the assessment of consequences to be qualitative. This just means that likelihood and consequences need not be identified and described in highly quantitative terms.

Qualitative analysis has been defined in the guidance on taking a “risk-based approach to planning for natural hazards” contained on the Quality Planning website. That definition is as follows:

*Qualitative analysis: Qualitative analysis uses words to describe the magnitude of potential consequences and the likelihood that those consequences will occur. These descriptions can be adapted or adjusted to suit the circumstances, and different descriptions may be used for different risks. Qualitative analysis may be used:*

- *As an initial screening activity to identify risks which require more detailed analysis.*
- *Where this kind of analysis is appropriate for decisions.*
- *Where the numerical data or resources are inadequate for a quantitative analysis.*

*Qualitative analysis should be informed by factual information and data where available.*

Change 2 provides that where a qualitative approach is used, the assessment should be undertaken by a “suitably qualified person”. It is expected that such a person would estimate the level of each potential consequence and assign an overall consequence level (using the five-tier scale of Table 7).

Guidance on who a suitably qualified person might be is provided in Box 1 below.

#### **Box 1 - Guidance on suitably qualified and experienced practitioners**

As a general guide, a suitably qualified and experienced practitioner is a person who is independent, applies good professional practice, and assesses consequences with reference to accepted benchmarks and industry guidelines. Environmental practitioners are not expected to act alone across the large number of disciplines required to deal with natural hazard risk issues. For example, someone may be suitably qualified in understanding the consequences associated with flooding but have no experience in assessing earthquake related consequences. The practitioner is essentially an expert in some specific and relevant fields and experienced in drawing together multi-disciplinary inputs and drawing conclusions about likely consequences.

A suitably qualified and experienced practitioner would need to be willing to certify (by signature) that the content of the hazard consequence assessment complies with good practice and professional standards, and to stand by the conclusions of the report. For example, a person certifying a report should be someone who could ultimately stand in the Environment Court and provide expert testimony, and whose experience and qualifications stand up to Court scrutiny.

### **3.4 Proportionality of effort**

The Regional Council is also mindful of other national level guidance on risk assessment associated with natural hazards. In the publication *Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand*<sup>3</sup>, the following advice is provided:

*Any risk assessment needs to be:*

- *conducted at a level of detail appropriate to the scale of the risk and nature of the decision.*
- *consistent with the level of data or information available.*

This guidance endorses both the definition of qualitative assessment and the “proportional principle” included in the Ministry for the Environment’s coastal hazards guidance.

<sup>3</sup> Ministry for the Environment 2008, (Publication Reference ME892)

### 3.5 Overview

In summary, the following general principles are adopted here:

- 1 An absence of pre-existing quantified information on potential likelihood or consequences of a natural hazard event does not mean that no risk assessment is required or possible.
- 2 Quantified information should be gathered where it is reasonably practical to do so. This will ordinarily require at least the number and type of buildings and lifeline utilities within the HAA to be calculated or estimated where calculation is not reasonably practical.
- 3 Where it is impractical or unreasonable to gather quantitative information (through, for example, modelling), qualitative assessment of effects and consequences using the five-tier scale of Table 7 is appropriate, provided it is undertaken by a suitably qualified person.
- 4 The approach taken in the absence of full information should be systematic and transparent.
- 5 Where estimates and judgements about the scale and degree of consequences are used, the assumptions and uncertainties should be described.
- 6 The degree of effort and depth of analysis should reflect the scale, intensity and severity of the potential consequence.



## Part 4: What is a recognised risk assessment methodology?

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The preceding sections explain how to apply the default risk assessment methodology of Appendix K when there is an absence of information.

Another option available to councils and resource consent applicants is to use an alternative recognised risk assessment methodology (RRAM).

Appendix K states that a RRAM must be either:

- *included in a regional, city or district plan; or*
- *recognised in the consideration of a resource consent application (note that this reference should be read to include a private plan change process or notice of requirement).*

In determining whether a risk assessment methodology can qualify as an RRAM for the purpose of Change 2, regard should be had to the criteria set out below.

### 4.1 Criteria for determining a qualifying RRAM

#### 1 **The risk assessment method is generally used or is generally accepted for use in New Zealand as good practice to meet professional standards.**

A qualifying methodology will be:

- (a) Endorsed or promoted by a national policy statement or national environmental standard or regulation under section 360 of the Resource Management Act (or any associated official guidance); or
- (b) Endorsed or promoted by regulations (or any associated official guidance) under any other New Zealand statute; or
- (c) Accepted by a New Zealand Court as being appropriate for risk assessment by a decision or declaration pursuant to the Resource Management Act; or
- (d) Contained within an Industry Code of Practice issued by an organised industry collective or industry-good organisation;

OR

#### 2 **The method is well-founded and based on accepted scientific principles.**

A qualifying methodology will be:

- (a) Based on deliberative consideration of both the likelihood and consequence of a natural hazard event; and
- (b) Peer reviewed and published in a reputable science or industry publication; and

- (c) Promoted by a public agency or independent professional organisation (e.g. institute or society) with a statutory or professional development role in risk assessment and/or natural hazards research or policy development.

AND

**3 The outputs from applying the method are generally comparable with those from other accepted risk methodologies and relate to the RPS policy framework.**

A qualifying methodology will produce outputs that assign a risk level that can be applied, or be reasonably adapted to apply, within Change 2's High, Medium and Low risk framework. That is, the output must enable a determination of whether the risk is acceptable, tolerable or intolerable by reference to other risks faced by the community. Similarly, the risk assessment must enable councils to apply the policies of Change 2 with confidence that the management approach will be the same, or similar, to what would apply if other recognised risk assessment methodologies were used.

#### 4.2 Application of Criteria

For the avoidance of doubt, to qualify as a RRAM for the purpose of Appendix K, a methodology must meet primary criteria 1 or 2 and, in either case, primary criterion 3 as set out above.

In asserting through a resource consent application, or through a regional or district plan preparation process, that a methodology other than the default methodology may be used to assess natural hazard risk, justification should be provided referencing the above criteria.

#### 4.3 Risk methodologies deemed to comply

For the avoidance of doubt and to provide certainty for potentially affected stakeholders, the Regional Council invites stakeholders to identify risk methodologies that they believe comply with the criteria set out above.

The Regional Council will consider any methodology submitted to it and maintain a list of methodologies on its website that it considers comply with the criteria set out above.

At this point, the Regional Council can confirm that it regards the following guideline as a RRAM. As noted above, further methodologies may be added to this list from time to time.

Name	Date	Author	Hazard type
Landslide Risk Management	2007	Australian Geomechanics Society	Landslide

In addition, the Regional Council notes the general approach to hazard risk assessment promoted in the following publications and considers that the concepts and approaches proposed in those guidelines provide useful context for applying Change 2.

<b>Name</b>	<b>Date</b>	<b>Author</b>	<b>Hazard Type</b>
Risk management - Principles and guidelines AS/NZS ISO 31000:2009 and SA/SNZ HB 436:2013 Risk management guidelines — Companion to AS/NZS 31000:2009	2009 2013	Standards Australia/New Zealand	All
Risk-based land use planning for natural hazard risk reduction	2013	GNS Science	All
Preparing for future flooding: A guide for local government in New Zealand	2010	Ministry for the Environment	Flooding
Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand	2008	Ministry for the Environment	Coastal
Climate change effects and impact assessment: A Guidance Manual for Local Government in New Zealand - 2nd Edition	2008	Ministry for the Environment	Coastal/ Flooding
Managing Flood Risk – A Process Standard. Standards New Zealand NZS 9401:2008	2008	Standards New Zealand	Flooding



# Attachment 1: Scope of Phase II Guidance

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Implementation guidance for Appendix K was identified as being required through the Change 2 submission process. The provisional scope of the Phase II Guidance is listed below. It is to be released when Change 2 is made operative.

## ***Interim guidance***

- 1 Review and update of matters addressed in Interim Implementation Guidance.

## ***Addressing natural hazard risk assessment in regional, city and district plans***

- 2 How *natural hazard zones* should be defined to ensure a sound risk assessment.

## ***Consequences analysis***

- 3 How the test of “*functionally compromised*” should be applied and whether application should vary according to hazard type or size of the HAA. A particular issue is the length of time a building’s functionality might be compromised.
- 4 How to determine the likely *consequences on lifeline utilities* (i.e. the length of time they are likely to be out of service).
- 5 How to assign a consequence level to *social/cultural buildings*, particularly when there are very few within a hazard zone.
- 6 How to estimate the *risk of death or injury*.

## ***Mitigation measures***

- 7 How to *account for mitigation measures* to be employed (including civil defence and emergency management measures that might reduce death and injury).

## ***Multiple hazards***

- 8 How to account for *multiple hazards* and the effect of cumulative events.

## ***Sensitivity analysis***

- 9 Whether *sensitivity analysis* should be applied to the assessment (to consider, for example, how sensitive the outcome is to assumptions about the timing of a hazard event)

# Attachment 2: Appendix K default methodology

