

Appendix 3.28.1

Option Evaluation Paper for Natural Environment Workstream

Natural Hazard Mapping 15 February 2012

Executive Summary

Issues

1. Life, property, infrastructure, natural resources and the Auckland region's economy are at risk from natural hazards such as floods, coastal inundation, storm surge, land instability, cyclones, tornadoes, volcanic eruptions, tsunamis and earthquakes.
2. Identifying natural hazards enables the Council, with public/community input, to regulate and undertake public works to manage/minimise risk to acceptable levels, and the community to self-manage the residual risk beyond these jointly determined levels. Currently, spatial information on areas likely to be affected by natural hazards across the Auckland region is varied, inconsistent and often does not provide detail that would be adequate for inclusion within the Unitary Plan. See Appendix 1 for spatial representations of the current coverage within operative district plans.

Strategic Direction (draft Auckland Plan)

3. The draft Auckland Plan sets out 11 strategic directions to achieve the goal of becoming the world's most liveable city. Of the 11 strategic directions set in the plan, strategic direction number 5 is the most relevant to natural hazards:

Acknowledge that nature and people are inseparable

4. Strategic direction 6 is also relevant:

Contribute to tackling climate change and increasing energy resilience

5. Chapter 5 of the draft Auckland Plan focuses on strategic direction number 5. To achieve this direction, targets, priorities, and directives are set. Actions are also outlined and can be seen below in the document. Relevant to natural hazards are:

Target

Increase the proportion of residents who understand their risk from natural hazards and are undertaking measures to mitigate or reduce their risk from 2011 levels (baseline to be determined) to 80% by 2040

Priority

Build resilience to natural hazards

Directives

5.13 - Take account of environmental constraints as identified on map 5.6 when considering the location and nature of any future development

5.14 - Avoid placing communities, infrastructure and lifeline utilities in locations at risk from natural hazards unless the risks are manageable and acceptable

6. It is also important to note that chapter 6 outlines Auckland's response to climate change. This chapter is important to note as climate change can exacerbate natural hazards, but is not a natural hazard in itself. This chapter is based more on reducing greenhouse gas emissions and energy efficiency and use.
7. Several overlaps between the natural hazards workstream and other workstreams have been identified through the draft Auckland Plan. This includes overlaps between the built environment workstream (residential, business and growth) as well as the infrastructure workstream.

Strategic objectives

8. To increase understanding of natural hazard risk.
9. To reduce risk to people, development, and infrastructure from natural hazards.

Assessment of objectives

10. The strategic objective outlined above is assessed in this document to see if it is the most appropriate way to achieve the purpose of the Resource Management Act (RMA) 1991. The extent to which it assists Council to carry out its functions in order to achieve the purpose of the RMA is also assessed.
11. As discussed below, the report concludes that the objective does achieve the purpose of the RMA as well as assist Council to carry out its functions.

Recommended Policy Approach

12. It is recommended that areas subject to natural hazards be identified in order to avoid or mitigate adverse effects on life, property, the environment and the economy.

Recommended Method

14. It is recommended that no natural hazard maps are included in the Unitary Plan, with specific natural hazard maps along with other information kept in either the legacy

databases or in a centralised database (dependent on timing. This includes any natural hazard maps, technical reports as well as site specific information.

15. This recommendation is based on the separate recommendations presented below for coastal, land instability, flooding and low frequency high magnitude natural hazards.
16. Discussed separately below, natural hazard mapping by Auckland Council generally faces the same issues for each hazard type, such as inconsistent coverage, methodologies, scales and quality of data.
17. By keeping natural hazard maps out of the Unitary Plan, Auckland Council will easily be able to update natural hazard information and provide more effective and correct information to the public. This information is required to be provided to the public under s.35 of the RMA, as well through LIM reports under LGOIMA, but is largely from an advisory perspective. This information provided can also determine the application of rules and additional controls and restrictions on development in relation to the presence of a hazard risk.
18. This recommendation is also based realistically on the timeframes for the Unitary Plan. In the future, Auckland Council may move to incorporate natural hazard mapping within a statutory document such as the Unitary Plan. This is dependent on maps being at a consistent and accurate scale and methodology as well as covering larger areas of the region.

Maori impact statement

Natural hazards are spatially variable across the region, affecting a range of environments such as low lying land, coastal land and hills and cliffs. The nature and location of Maori land (as administered by Te Ture Whenua Maori Act) in the Auckland Region is in areas close to

the coast or waterways. This increases the likelihood of the land being affected by natural hazards such as erosion or inundation. These areas may also be vulnerable to the effects of climate change.

Relevant to this, the nature of natural hazards means that development in hazard prone areas owned by Maori may be limited or require special provisions to ensure natural hazard effects can be avoided or mitigated. This report recommends that natural hazard maps are not included in the Unitary Plan but as required of Council, information on natural hazards can be provided to the public at any time. This is likely to be of benefit to Maori as a more up to date record of where hazards exist can be accessed by Maori land owners reducing unnecessary restrictions on the development and use of Maori land due to out of date maps. The contents of this paper have not been consulted on with Iwi.

Introduction

1. Every year, natural hazards pose significant threat to Auckland communities and cause damage to life, property, infrastructure, natural resources and the economy.
2. These natural hazards include coastal hazards, flooding and land instability. Other natural hazards such as earthquakes and tsunami occur much less frequently in the Auckland Region, but the magnitude and possible destructive effects of these types of events means that they must be taken into consideration.
3. The development of the Unitary Plan means that all issues in relation to natural hazards must be evaluated in order to ensure that the topic is appropriately dealt with under the RMA.
4. This paper does not provide a complete set of options for all issues related to natural hazards and the Unitary Plan. Rather, this paper is specifically focussed on whether natural hazard maps should be included in the Unitary Plan or if all natural hazard information that is spatial in nature should be kept in natural hazard and land information databases and GIS viewers outside of the Unitary Plan. Mapping can play an important part in determining the applicability of other plan provisions such as objectives, policies and rules. Resource consents can be triggered effectively with or without mapping.
5. This issue is considered to be contentious. This is because of the perceived and real effects raised by the public in relation to natural hazard mapping and effects on property values and uses, Auckland Council's liability relating to the provision of information and land use controls (allowing or not allowing development in prone areas), and also the change in direction that Auckland Council may want to take in light of the recent Canterbury earthquake sequence. Therefore, a direction is required by Auckland Council as to what approach should be taken.
6. The approaches presented in this paper are not significantly different from anything that has been undertaken by a legacy council in Auckland, but it will be significant to align the region and achieve a consistent approach. This is important to achieve as natural hazards do not spatially bound themselves within political boundaries and management needs to be consistent and equitable across the region.
7. Under the Resource Management Act 1991 (RMA), Auckland Council has a duty to manage land use and development in order to avoid or mitigate natural hazards. Section 35 of the Act also sets out Council's duty to gather information, monitor and keep records. This includes the storage and provision of information on natural hazards.
8. Identifying and mapping natural hazards provides Auckland Council with the ability to provide the public with information about natural hazards that may affect them in some way. This could help to reduce or mitigate the risk that natural hazards pose to the public as well as reduce Council's liability. To achieve the objective of improving a communities understanding of natural hazards it is important that they are well informed of their risks - mapping is one of the most effective communication tools available.

9. Mapping natural hazards is however potentially contentious because of the effects natural hazard maps can have on property values and the use of land. This is especially so if natural hazard maps are statutory, such as within the Unitary Plan, to inform land use activities. Other means of providing information on natural hazards as collated in council wide databases or Property Information Registers (PIRs) is via LIMs, the resource consent process, and via education and advocacy.
10. Understanding natural hazard risk is the first step of a comprehensive risk management framework. To understand natural hazard risk, data is required on both natural and social systems and how they interact. Maps are an excellent tool to analyse these interactions and to further communicate the natural hazard risk to individuals, communities, local and central governments. Using maps as a communication tool will help improve an understanding of risk.
11. Effective mapping of natural hazards is very dependent on the quality and extent of the data. Significant issues currently exist in relation to the spatial information Auckland Council holds on natural hazards. This includes the varying quality and extent of the data and also the inconsistent scales and methodologies used by legacy councils. See Appendix 1 for spatial representations of the current coverage within operative plans.
12. If used in a regulatory way, natural hazard maps within the Unitary Plan would have to be at the house lot scale to ensure the data is defensible under litigation and can be effectively used for its intended purpose. For a number of hazard types at this scale (with the exception of flooding), currently only a very small portion of the Auckland region would be able to be mapped. The majority of information is at a much coarser scale, which is only useful for advisory purposes.
13. Mapping natural hazards also presents Council with implementation and operational issues including the cost to develop Unitary Plan ready maps as well as the reduced flexibility to update maps if they are included within a statutory plan. Questions also exist around the extent to which the maps should be used to control the use and development of land.

Issues

14. Life, property, infrastructure, natural resources and the Auckland region economy are at risk from natural hazards such as floods, coastal inundation, storm surge, land instability, cyclones, tornadoes, volcanic eruptions, tsunamis and earthquakes.
15. Identifying natural hazards enables the Council, with public/community input, to regulate and undertake public works to manage/minimise risk to acceptable levels, and the community to self-manage the residual risk beyond these jointly determined levels. Currently, spatial information on areas likely to be affected by natural hazards across the Auckland region is varied, inconsistent and often does not provide detail

that would be adequate for inclusion within the Unitary Plan. See Appendix 1 for spatial representations of the current coverage within operative district plans.

Strategic Direction (from draft Auckland plan)

16. The draft Auckland Plan is the strategy to make Auckland the world's most liveable city. The draft Auckland Plan sets out a bold programme of transformational shifts, outcomes, principles and strategic directions to secure the region's future as a globally competitive city by 2040. The following discusses those relevant to natural hazards only.
17. Of the outcomes listed by the draft Auckland Plan, none are specific to natural hazards. However, outcome 1 "A fair, safe and healthy Auckland" and outcome 4 "A well connected and accessible Auckland" do however relate to some of the fundamentals of ensuring communities are resilient against natural hazards.
18. None of the principles outlined in the draft Auckland Plan are considered to be relevant enough to natural hazards to mention here.
19. The draft Auckland Plan sets out 11 strategic directions that are underpinned by a series of targets, priorities, directives and actions.
20. Strategic direction 5 "Acknowledge that nature and people are inseparable" is the most relevant to natural hazards. Strategic direction 6 "Contribute to tackling climate change and increasing energy resilience" is also related to natural hazards. These will be discussed separately below.

Chapter 5 – Auckland's Environment

21. In this chapter, the strategic direction "Acknowledge that nature and people are inseparable" has one target that is specifically related to natural hazards. This target is:

Increase the proportion of residents who understand their risk from natural hazards and are undertaking measures to mitigate or reduce their risk from 2011 levels (baseline to be determined) to 80% by 2040

22. This target is broad in that it can be addressed in many ways by Auckland Council. This includes preparing communities through the provisions of the Civil Defence and Emergency Management Act (2002) as well as communicating natural hazard risks to property owners through planning and the consent process.
23. Priority 4 under the above target is:

Build resilience to natural hazards

24. This priority is directly related to the target as resilience to natural hazards will be built through increasing understanding natural hazards and undertaking measures to mitigate or reduce risk.
25. Directives 5.13 and 5.14 also come under priority 4:
- 5.13 – Take account of environmental constraints as identified on map 5.6 when considering the location and nature of any future development*
- 5.14 – Avoid placing communities, infrastructure and lifeline utilities in locations at risk from natural hazards unless the risks are manageable and acceptable*
26. These directives are key processes that Council needs to utilise to build resilient communities that understand the risks of natural hazards. These directives will rely on future research by Council to sufficiently identify environmental constraints at an appropriate scale in order to avoid or mitigate risks. This point is a particularly relevant overlap between this workstream and the growth areas workstream where environmental constraints need to be taken into consideration in the early stages of planning.
27. The following actions, including details of delivery lead, key stakeholders and timing, are listed in the draft Auckland Plan and will be important in achieving the strategic direction through the Unitary Plan.

Actions	Delivery Lead	Key Stakeholders	Timing
Account for environmental constraints, as identified on map 5.5, when considering the location and nature of future growth and development.	Auckland Council	Central Government	2011- 2013 for Unitary Plan development - ongoing
Improve community awareness and preparedness to natural hazard risk.	Auckland Council	Central Government	Ongoing
Evaluate natural hazards based on the risk they pose to communities and develop strategies and regulatory mechanisms to avoid or mitigate their effects.	Auckland Council	Central Government	2011- 2013 for Unitary Plan development - ongoing
Develop and put in place programmes to protect and restore natural defence systems where possible (e.g. dunes), that reduce the risk from natural hazards.	Auckland Council	DOC, community	2015 - ongoing

Ensure that the effects of climate change are taken into account when managing natural hazard risk.	Auckland Council	Central Government	Ongoing
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Table 1: Actions table. Taken from table 12.5 in the draft Auckland Plan.

28. This mix of targets, priorities, directives, and actions sets the scene for issues surrounding natural hazards and how their effects could be managed.
29. Underpinning each of the above is the concept of risk. A strategic policy framework in the technical document supporting chapter 5 outlines a framework based on risk assessment, risk management and risk communication; all of which are fundamental in building resilience and achieving the strategic direction.
30. It is obvious from the draft Auckland Plan that Auckland Council is heading towards a framework of risk management to build resilient communities.

Chapter 6 – Auckland’s Response to Climate Change

31. Climate change is not a natural hazard in itself but it can exacerbate other natural hazards such as coastal inundation and flooding.
32. This chapter does not specifically mention natural hazards, but it is important to recognise the overlap between this chapter and natural hazards in general. The strategic direction given in this chapter is “Contribute to tackling climate change and increasing energy resilience” which also includes a series of targets and priorities.
33. The adaptation and mitigation directives outlined in this chapter are mainly related to reducing greenhouse gas emissions and energy use. These processes may reduce the effects of climate change in Auckland, lessening the exacerbation effects climate change may have on natural hazards.

Overlaps with other workstreams

34. Several overlaps have been identified across workstreams through analysis of the draft Auckland Plan. This includes the:

Built Environment Workstream – Auckland’s Housing (chapter 9)

- The ‘Auckland’s Housing’ chapter contains priorities that overlap with the natural hazard workstream. Priority 1 – “Increase housing supply to meet demand” overlaps significantly with natural hazard issues as new land for development or redevelopment needs to take into consideration natural hazards, as specified in chapter 5 directives 5.13 and 5.14 above.

- This is especially relevant to growth areas as well as general resource consent procedures which require natural hazards to be avoided or mitigated.

Infrastructure Workstream – Auckland’s Physical and Social Infrastructure (chapter 10)

- Chapter 10’s strategic direction 10 - “Plan, deliver and maintain quality infrastructure to make Auckland liveable and resilient” significantly overlaps with natural hazard issues. Recent events such as the Maui gas leak and the Canterbury earthquake sequence have shown how natural hazards can impact communities and physical and social infrastructure, showing that resilience needs to be built into communities to reduce vulnerabilities.
- Priority 1 “Water, wastewater and Stormwater – Optimise, integrate and align land use with water service provision and planning” and Priority 2 “Energy and telecommunications – Protect, optimise, align and provide for energy and telecommunications infrastructure” signal the intentions of Auckland Council to take natural hazards into consideration when making provisions for and maintaining infrastructure.

Rural Workstream / Growth Workstream – Rural Auckland (chapter 7)

- Chapter 7’s directive 7.5 “Apply pre-conditions to future growth of rural towns and villages as follows: avoid areas prone to the impact of natural hazards (e.g. flooding, land instability) and areas which, if urbanized, are likely to induce flooding or instability elsewhere” also relates to natural hazards.

These overlaps will be managed throughout the Unitary Plan development process by ensuring that natural hazard risk is taken into consideration by other workstreams.

RMA implications

35. This section of the report assesses the RMA implications of giving effect to the strategic directions in the draft Auckland Plan. The Building Act 2004 (BA) and the Civil Defence Emergency Management Act 2002 (CDEMA) are also fundamental to the topic and are also included here.
36. Not detailed here, LGOIMA is also important for managing the effects of natural hazards as it is the Act under which LIM reports are required.
37. There are no fundamental conflicts between the RMA’s purpose and the strategic directions related to natural hazards as set out in the draft Auckland Plan.

38. It must however be noted that changes to the RMA may be introduced in the near future in response to the Canterbury earthquake sequence. A National Policy Statement (NPS) on natural hazards may be developed in the next few years along with the NPS on flood risk that is currently being researched. These factors could significantly change the ways in which natural hazard risks are managed in Auckland and New Zealand.

Resource Management Act, 1991

39. The purpose of the RMA is to promote the sustainable management of natural and physical resources by managing their use, development, and protection. Avoiding, remedying, or mitigating adverse effects of activities on the environment includes considering natural hazards in order to avoid or mitigate their effects.

40. As detailed in section 1 of the Act, natural hazards is defined 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

41. The draft Auckland Plan also promotes the sustainable management of natural and physical resources as well as avoiding or mitigating the risks of natural hazards to life, property, infrastructure and the environment.

Building Act, 2004

42. The purpose of the BA is to improve control of, and encourage better practices in, building design and construction. In relation to natural hazards, this is to ensure that "...buildings are designed, constructed, and able to be used in ways that promote sustainable development".
43. This includes ensuring that development considers the environmental considerations of the area and avoids or mitigates the effects of natural hazards.
44. This aligns with the direction set in the draft Auckland Plan to take environmental considerations in account for future development as well as avoiding risks from natural hazards unless they are manageable and acceptable.
45. It is also important to note here that the BA is not an overarching framework for natural hazards to be managed under. Rather, operational and implementation aspects of the consent process, in relation to constructing buildings, most commonly fall under this legislation.

Civil Defence Emergency Management Act, 2002

46. The purpose of the CDEMA is to improve and promote the sustainable management of hazards in a way that contributes to the social, economic, cultural and environmental well-being and safety of the public and also to the protection of property.
47. The purpose of the Act is delivered through the four key areas of reduction, readiness, response and recovery. These key areas provide a platform for the implementation of natural hazard risk reduction through the Unitary Plan.
48. This aligns with the draft Auckland Plan as the natural hazards target is to increase the proportion of residents who understand their risk and are mitigating or reducing their risk.

Strategic Objectives

49. To increase understanding of natural hazard risk.
50. To reduce risk to people, development, and infrastructure from natural hazards.

Assessment of Objectives

The extent to which the objectives are the most appropriate way to achieve the purpose of the Resource Management Act

51. This section of the report assesses the extent to which the proposed objectives are the most appropriate way to achieve the purpose of the RMA, as set out in Part 2 sections 5, 6, 7 and 8.
52. The purpose of the RMA is to promote the sustainable management of natural and physical resources. Sustainable management, in section 5(2), means managing the use, development and protection of natural and physical resources.
53. The objective achieves the purpose of the Act as it is about protecting natural and physical resources to enable communities to provide for their social, economic, and cultural well-being and for their health and safety. Managing land use activities such as use, development and protection is key in being able to avoid or mitigate the effects of natural hazards.
54. The objective does have particular relevance to section 7, other matters, as the objective seeks to maintain and protect natural and physical resources through reducing risk from natural hazards. This will have benefits to amenity values, social and cultural wellbeing and the characteristics of natural and physical resources. The effects of climate change, section 7(i) is also inherent within the objective.

The extent to which the objectives assist council to carry out its functions in order to achieve the purpose of the Resource Management Act

55. This section of the report assesses the extent to which the proposed objective assists the council to carry out its functions (under sections 30, 31, 35, 59, 61(1), 63, 66(1), 72, 74(1)) in order to achieve the purpose of the RMA. Auckland Council is a unitary authority, and has the function of both a regional council and a territorial authority, which includes developing and administering a fully combined RMA document.

Strategic objective:	
To reduce risk to people, development, the environment, and infrastructure from natural hazards.	
Section 30 (Functions of regional councils)	<p>Under section 30 of the RMA, regional councils have specific functions for the purpose of giving effect to the RMA. This includes the control of land for the purpose of avoiding or mitigating natural hazards.</p> <p>The objective assists Council to carry out its functions under section 30 to achieve the purpose of the RMA as natural hazard risk is reduced to ensure physical and natural resources, as well as social well-being, are sustainably managed.</p>
Section 31 (Functions of territorial authorities)	<p>Under section 31 of the RMA, territorial authorities have specific functions for the purpose of giving effect to the RMA. This includes the control of any actual or potential effects of the use, development, or protection of land, including for the purpose of avoiding or mitigating natural hazards.</p> <p>The objective assists Council to carry out its function under section 31 as controlling the effects of the use, development or protection of land will enable the reduction of the risk natural hazards pose.</p>
Section 35 (Duty to gather information, monitor, and keep records)	<p>Under section 35 of the Act, all local authorities have a duty to gather information as is necessary to carry out effectively its functions. This includes s.35(5)(j) – <i>records of natural hazard to the extent that the local authority considers appropriate for the effective discharge of its functions.</i></p> <p>The objective assists Council to carry out its</p>

	function under section 35 as monitoring natural hazards and keeping detailed records enables Council to effectively communicate risk to the public. This will enable sustainable management of natural and physical resources as well as ensure the well-being of Auckland communities.
Section 59 and 61(1) (Regional policy statements)	Sections 59 and 61 of the Act outline the purpose of regional policy statements and what matters they are to include. From the assessments above, the objective is consistent with the purpose of a regional policy statement.
Section 63 and 66(1) (Regional council plans)	Sections 63 and 66 of the Act outline the purpose of regional plans and what matters are to be considered. These sections do not specifically mention natural hazards, but as seen in the Auckland Regional Plan: Coastal, provisions on coastal natural hazards are included.
Section 72 and 74(1) (Purpose of district plans)	As previously considered in section 31 above, the objective assists Council to carry out its functions as a territorial authority, for the purpose of giving effect to the Resource Management Act 1991.

Table 2: Assessment to which the objective is the most appropriate way to achieve the purpose of the Resource Management Act

Recommended Policy Approach

Identify areas subject to natural hazards in order to avoid or mitigate adverse effects

56. Under sections 30 and 31 of the Act, one of the functions of Auckland Council is to avoid and mitigate the effects of natural hazards through controlling the use, development and protection of land. Identifying and understanding areas that may be affected by natural hazards is crucial in being able to avoid or mitigate the effects.
57. Section 35 of the Act also states the duty of local authorities “*to gather information, monitor, and keep records relating to natural hazards, to the extent that the Council considers appropriate for the effective discharge of its functions*”.
58. Identifying areas affected by natural hazards is central in communicating risk to the public, and specifically property owners, to avoid and/or mitigate their effects as well as achieve the draft Auckland Plan’s priority of building resilience.
59. Natural hazards including flooding, coastal hazards and land instability are already commonly identified by Auckland Council through the consent process and historical

records. Other natural hazards such as earthquakes (fault lines and liquefaction areas) and tsunami are dependent on primary research being undertaken by Council.

60. Methods for how identified data can be managed, and communicated, are outlined below. These methods vary greatly, but ultimately they are set to achieve the same purpose which has been mandated by several pieces of national legislation as well as the draft Auckland Plan.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Natural hazard risk can be communicated more effectively if natural hazard areas identified • Mitigate and avoid natural hazard effects • Achieves the functions set out in the RMA • Protect land owners/users from the effects of natural hazards 	<ul style="list-style-type: none"> • Perceptions of cost to landowners in the interim • Cost to Council of obtaining and updating information – but mandatory

Table 3: Costs and benefits of identifying natural hazard areas

Methods

61. As a primary function, Auckland Council is required to identify areas subject or prone to natural hazards as well as manage this information for public use. Identifying sites subject to natural hazards is primarily a method for communicating natural hazard risk to the public to ensure the effects of natural hazards can be avoided or mitigated.
62. Communicating natural hazard risk information can be achieved through different methods, of which a variety has been used by legacy councils in the Auckland region. Options for identifying and communicating natural hazard risk in the Unitary Plan have been provided by technical specialists within Council and are presented below.

Legacy Databases	Centralised Database
<ul style="list-style-type: none"> • Able to be used now • Relates to the existing natural hazard registers or land/property information registers used by legacy councils in Auckland • Databases on different systems and store different information in varying ways <p>Costs/Benefits</p> <ul style="list-style-type: none"> • Cheap, able to be used now • Not effective or equitable 	<ul style="list-style-type: none"> • Will not be ready for 2+ years • Requires amalgamation of current databases into one system that can be accessed by staff across the region • Likely to cost several+ million dollars <p>Costs/Benefits</p> <ul style="list-style-type: none"> • Improved LIM/PIM efficiency and effectiveness • Timely and costly

means of storing, finding or communicating information	<ul style="list-style-type: none"> Improved Council effectiveness of s.35 – communicating information about natural hazards to the public and regulating to manage natural hazard risk
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Table 4: This table describes the differences between using legacy databases and a centralised database to store natural hazard information. This is important to note as many of the methods below use one/both of these approaches.

Coastal Hazards

Option 1 – Status Quo

63. This method involves rolling over the current coastal hazard maps from the operative district into the Unitary Plan (no maps from regional plans). No new maps produced before notification in 2013 would be put into the Unitary Plan.
64. As seen in Appendix 1, a very small amount of the coastal environment has any natural hazard mapping applied to it in an operative plan. The majority of coastal mapping is most likely stored in reports and legacy databases/GIS systems. Current known mapping includes areas of Rodney, North Shore and Auckland City (Waiheke).
65. Any coastal hazard maps for the Unitary Plan would need to be at the house lot scale. District level mapping is at a more appropriate scale for inclusion but methodologies used differ across the region which may result in operational difficulties and inconsistencies.
66. Both the regional and district level mapping has constraints including scale of the mapping, inconsistent methodologies and planning approaches as well as the extent to which mapping covers the region.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> Easy to implement Low cost to implement Implement, to an extent, the requirements of the NZCPS to identify areas affected by coastal hazards 	<ul style="list-style-type: none"> Inconsistent regional coverage i.e. scale, methods used, extent of region mapped Inconsistent and patchy mapping could be misleading and mean that non-mapped areas are perceived to be safe Provides a poor basis for implementing any land use controls Will require upgrade in the future Any maps that are included in the

	Unitary Plan will be statutory and will be subject to lengthy plan change processes
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Table 5: Costs and benefits of option 1 – coastal hazards

Option 2 – Plan change/variation within 2-3 years of notification of Unitary Plan

- 67. This approach would keep all coastal hazard maps out of the Unitary Plan until regional coverage is available at a consistent standard.
- 68. When the coastal hazard mapping is at an acceptable standard, a variation or plan change to the Unitary Plan could be undertaken to incorporate the information.
- 69. Following from the initial plan change/variation, further plan changes/variations could continue into the future to include any new information.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Provide time to ensure accuracy of risk identification techniques, map presentation and staff support • Enable community interest group support with public awareness campaign • Provide time for national legislative changes on natural hazard risk to be identified • Enable introduction of associated land use controls • Progressively implement NZCPS requirements 	<ul style="list-style-type: none"> • Require Unitary Plan revisions as coastal hazard information extends – expensive • Likely involve legal challenges to the UP and Environment Court proceedings as coastal land owners challenge the position of coastal hazard lines • Likely to be one of the most expensive options

Table 6: Costs and benefits of option 2 – coastal hazards

Option 3 – No coastal hazard maps in Unitary Plan

- 70. Having no coastal hazard maps in the Unitary Plan would mean that all coastal hazard information would be kept outside of the plan, either in the current legacy databases or in a centralised database (yet to made). This would include all technical reports, plans at various scales and site specific information.
- 71. Coastal hazard risk management would be addressed through resource consent procedures for subdivision, earthworks and drainage, supplemented by any site specific information held.
- 72. To ensure a consistent risk management approach other measures, such as covenants on property titles, may need to be considered in order to support consent processes. Legal assistance to Council to protect liability is advisable (see Simpson Grierson advice to Local Government New Zealand, 3 April 2009).

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Keep the Unitary Plan streamlined • Defer likely legal challenges to coastal hazard areas mapped on coastal properties • Be a less regulatory method with greater flexibility • Possibly reduce duplication of resource consents processes • Ensure the costs fall primarily on the land owner/developer for land use activities within a coastal hazard risk area • Potentially progressively implement the NZCPS requirements 	<ul style="list-style-type: none"> • Likely require Auckland Council to upgrade coastal hazard information services/database and LIM/PIM processes, with associated administrative costs • Possibly expose Auckland Council to liability (need legal opinion)

Table 7: Costs and benefits of option 3 – coastal hazards

Option 4 – Option 3 supplemented by the preparation of specific Auckland Council coastal hazard risk maps outside the scope of the Unitary Plan

73. This method approach is basically the same as option 3 but includes the preparation of specific coastal hazard risk maps which sit outside the Unitary Plan in either the legacy databases or a centralised database. Under this option, no coastal hazard maps would be included in the Unitary Plan.
74. Presently, there is sufficient information to enable comprehensive coastal hazard mapping at a scale between that of the draft Auckland Plan and what would be required by the Unitary Plan (house-lot scale) for certain parts of the Auckland region.
75. Under this method, all coastal hazard information, regardless of coverage, could be mapped. This would include cliff instability, soil liquefaction, erosion and other natural hazards with research material being referenced. Total regional coverage could not be achieved at this point in time, but new information could be progressively introduced over time to achieve greater coverage.
76. This advisory approach does not require Auckland Council to adopt a particular report or specific coastal hazard risk identification methodology but would provide the public with a ready source of information on coastal hazards.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Provide an improved form of communicating coastal hazard risk to property owners • Keep the Unitary Plan streamlined • Defer likely legal challenges to coastal hazard areas mapped on coastal 	<ul style="list-style-type: none"> • Require funding and responsibility to prepare maps and provide advice • Possibly expose Auckland Council to liability (need legal opinion)

properties <ul style="list-style-type: none"> • Be a less regulatory method with greater flexibility • Possibly reduce duplication of resource consents processes • Ensure the costs fall primarily on the land owner/developer for land use activities within a coastal hazard risk area • Potentially progressively implement the NZCPS requirements 	
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Table 8: Costs and benefits of option 4 – coastal hazards

Recommended Method

77. The recommended method for coastal hazards is option 4. It is recommended that coastal hazard maps are not included in the Unitary Plan because of the inconsistency of the mapping across the region in relation to its extent, scale and quality. Coastal hazard reports also need to be enhanced across the region. Specific non-statutory coastal hazard risk maps would be developed which would sit outside the Unitary Plan enabling them to be regularly updated and used for a multitude of purposes including advocacy and for consenting purposes.

Flood Hazards

Option 1 – Status Quo

78. This approach would include the current flood hazard maps from the operative plans into the Unitary Plan.
79. Flooding is one of the most common natural hazards in Auckland and a lot of research has been done by legacy councils on the issue but as seen with coastal hazards, few flood hazard maps are included in operative plans in Auckland (see Appendix 1 for detail).
80. Maintaining the status quo in the Unitary Plan would see an incoherent and inconsistent approach as regional coverage is not available.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Inconsistent approach – regional coverage is not available • Only carrying over the flood hazard maps currently included in the Franklin District Plan could be misleading and mean that non-mapped areas are perceived to be safe

	<ul style="list-style-type: none"> • Provides a poor basis for implementing any land use controls • Will require upgrade in the future • Any maps that are included in the Unitary Plan will be statutory and will be subject to lengthy plan change processes
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Table 9: Costs and benefits of option 1 – flood hazards

Option 2 – Include maps in the Unitary Plan with all known flood hazards

81. This approach would see all information that council has on flood hazards mapped in the Unitary Plan. This includes all maps from operative plans, existing maps that were not included in plans as well as any new maps that could produced before notification.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Presents flood hazards to a wide audience • May add clarity for implementation of land use controls if the information is mapped within the plan 	<ul style="list-style-type: none"> • Need a lot of resources – time and money (currently underway to an extent by the Stormwater unit) • Maps are likely to be inconsistent as there is may not be enough time to update all maps to use the same methodology, AEP levels etc • Will require constant updating – hard to do in a timely way once maps are tied into a statutory document • Inability to apply the most up to date and correct information re flood hazard extent / depth etc will result in inappropriate development occurring in areas newly identified as subject to flood risk. This is due to an inability to update the plan maps and keep these ‘live’; and/or development being unnecessarily restricted in areas no longer found to fall within the floodplain when information is updated and improved • Likely to be challenged by the public on account of inequities in information across the region; and perception of increased/new limitations on development rights

Table 10: Costs and benefits of option 2 – flood hazards

Option 3 – No flood hazard maps in Unitary Plan, specific maps in natural hazard database

- 82. Under this approach, no flood hazard maps would be incorporated into the Unitary Plan. All flood hazard information would be kept within either the current legacy databases or in a centralised database.
- 83. This approach is similar to that of some legacy councils in Auckland which kept the majority of their flooding information outside of statutory documents. This was done for several reasons including the quality and accuracy of the data, the lack of ability to update and change information quickly.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Keep the Unitary Plan streamlined and keep application of rules accurate and appropriate • Easy to update information • Don't use out of date 'locked in' information and inappropriately permit or restrict development in relation to flood risk • Defer likely legal challenges from properties mapped in flood hazard areas • Provide greater flexibility to reflect best current knowledge re hazard risk 	<ul style="list-style-type: none"> • Require funding and responsibility to prepare maps and provide advice • Possibly expose Auckland Council to liability (need legal opinion)

Table 11: Costs and benefits of option 3 – flood hazards

Recommended Method

- 84. Option 3 is the recommended option. Flood hazard maps are currently inconsistent in terms of their methodology and coverage. Including them in their current state in the Unitary Plan would most likely result in operational difficulties for council, legal challenges from the public as well as the need to update them in the near future. The use of a database is preferred as maps can still be held and used by council and the public which can ensure flood hazards are avoided or mitigated as well as ensuring information is current and can be easily updated.

Land Instability Hazards

Option 1 – Status Quo

- 85. This approach would involve including any land instability map that is in a legacy Auckland plan into the Unitary Plan.

86. Mapping land instability in statutory documents has also been rare within Auckland with Manukau City and Auckland City (Hauraki Gulf Islands Plan) mapping small areas. The Rodney District Plan has a rural zone called the Physical Limitations Zone, based on the presence of the soggy clay Onerahi Chaos, but specific land instability areas are not mapped within the plan. See appendix 1 for more detail. Some plans reference other documents that sit outside of the plan i.e. land instability or soil registers that contain land instability maps and information.
87. This approach would result in a very small portion of the region being mapped with known land instability hazards.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Low expense option – time and money 	<ul style="list-style-type: none"> • Inconsistent and small regional coverage • Poor basis for implementing land use controls • Mapping such a small area of the region could result in property owners in other areas thinking their land does not have any land instability issues

Table 12: Costs and benefits of option 1 – land instability hazards

Option 2 – Map all known land instability hazards in the Unitary Plan

88. This option would map all known land instability hazards in the Unitary Plan, regardless of the scale of information available.
89. This would include all current maps included in legacy plans as well as information from legacy councils that was kept outside of statutory documents. These are most likely to be held within the current legacy databases.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Provide additional land instability hazard mapping information to the public and increase awareness 	<ul style="list-style-type: none"> • Expensive and long process to map land instability information – need to ground truth all information • Inconsistent regional coverage • Poor basis for implementing land use controls • Mapping such a small area of the region could result in property owners in other areas thinking their land does not have any land instability issues • May involve legal challenge if new land instability areas are included • Will require many resources to implement new land instability maps from past records i.e. land information

	registers or soil registers <ul style="list-style-type: none"> • Not all land instability information is easily available • May lead to litigation if land instability hazard areas are mapped in areas of existing development
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Table 13: Costs and benefits of option 2 – land instability hazards

Option 3 – Plan change/variation within a few years of notification of Unitary Plan

90. This option would keep all land instability maps outside of the Unitary Plan until greater regional consistency could be achieved.
91. Once more information is collected and is consistent; the Unitary Plan could go through a plan change or variation to incorporate the new information. This would include all current land instability maps as well as new information.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Provide time to ensure the accuracy of risk identification techniques, map presentation and staff support • Enables time to interact with the community and to undertake a public awareness campaign • Provide time for national legislative changes on natural hazard risk to be identified/implemented • Will act as a placeholder for future land instability information 	<ul style="list-style-type: none"> • Timing issues – would take a long time to map land instability to an acceptable level as it covers large areas of the region but to date has been one of the least mapped natural hazards • Will require Unitary Plan revisions on land instability hazard provisions to relate to the new maps being introduced • May lead to litigation if land instability hazard areas are mapped in areas of existing development • High costs to produce maps • May not be an efficient use of resources as land instability provisions are already in place through the Building Act and through s.106 of the RMA (subdivision) – this is a common method of dealing with land instability

Table 14: Costs and benefits of option 3 – land instability hazards

Option 4 – No land instability hazard maps in Unitary Plan, specific maps in natural hazard database

92. This option would see no land instability hazard maps in the Unitary Plan. All land instability information would be kept in either legacy databases or a centralised database alongside other natural hazard information.

93. This would include all maps, technical reports and site specific information. It could also include a risk register to be used as an advisory tool for Council to inform the public.
94. This option would mean that the Unitary Plan would need to clearly indicate the use and purpose of the database to ensure that land owners are able to understand any risks.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Maps will be easy to update as they won't have to go through plan change processes- provide greater flexibility • Provide a tool to improve communication to the public on land instability hazards • May reduce the duplication of resource consent processes • Public may respond positively as maps are a non regulatory approach – education may also help public to respond better to regulatory changes as they are informed of the risks and consequences • Can be used to complement regulatory approaches 	<ul style="list-style-type: none"> • Resources and funding will be large – but will be spread over a long time • As information will be presented in a non-regulatory way, the information may reach only a select audience • Information may not communicate risk before land proposals are developed • Possible liability issues

Table 15: Costs and benefits of option 4 – land instability hazards

Recommended Method

95. Option 4 is the recommended method. As noted above, land instability hazard information is sparse and generally at a scale too coarse to be incorporated into the Unitary Plan. Having maps outside the Unitary Plan means they can be constantly updated and will ensure that all information is recorded, as required under s.35 of the RMA, and can be used to inform the public of the risks associated. The Unitary Plan will need to ensure that strong links are made to the database(s) and that the consent process can effectively use the information to ensure that land subject to land instability can be dealt with appropriately.

Low Frequency High Magnitude Natural Hazards

Option 1 – Status Quo

96. This option would continue the status quo approach that was taken by legacy councils in Auckland. This essentially means no low frequency high magnitude (LFHM) natural hazard maps would be included in the Unitary Plan (see Appendix 1).
97. Low frequency high magnitude events relate to natural hazards such as seismic hazards i.e. earthquakes, tsunami and volcanic eruptions.

98. No legacy council in Auckland mapped LFHM natural hazards in their statutory documents. This is because the extent of the data is limited, the scale of data is coarse and the confidence in the data is low. General provisions within some operative plans do exist, but as these events cannot be predicted they are focussed more on post event recovery.
99. Maps for these natural hazards do exist however and are generally used for information and advocacy purposes. This includes mapping on tsunami in the Auckland region as well as fault lines, ground shaking and liquefaction at a regional scale. These maps would continue to be held within council databases and GIS systems.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Little work/time/money required to undertake this option • Research is not at a detailed scale, no challenges will occur from the public if maps available are only used for education purposes outside the Unitary Plan • Provide a tool to improve communication to the public on LFHM natural hazards 	<ul style="list-style-type: none"> • No detailed maps available for public use • Poor basis for implementing land use controls

Table 16: Costs and benefits of option 1 – low frequency high magnitude hazards

Option 2 – Low Frequency High Magnitude Natural Hazard Maps in the Unitary Plan

100. This option would involve including all LFHM maps in the Unitary Plan.
101. Generally this would include any tsunami mapping that had been done for the region as well as active faults. As Auckland's volcanic field is monogenic (means that Auckland's volcanoes generally erupt only once), there is little ability to include volcanic eruption risk areas.
102. This option would result in an inconsistent and unreliable spatial picture of Auckland's LFHM natural hazards. Mapping of these natural hazards is presently at a scale too coarse to be incorporated into a statutory document such as the Unitary Plan.
103. Current maps available to the public are only used for education and advocacy purposes.

Benefits/Advantages	Costs/Disadvantages
<ul style="list-style-type: none"> • Provide more information to the public 	<ul style="list-style-type: none"> • Inconsistent research, coarse scale, limited extent • Research is not at a detailed scale, challenges may occur from the public if maps available are used

	<ul style="list-style-type: none"> • Will be costly to compile research and make it consistent • Maps will have to go through a plan change process to be updated
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Table 17: Costs and benefits of option 2 – low frequency high magnitude hazards

Recommended Method

104. Option 1 is recommended for LFHM. Keeping these maps outside of the Unitary Plan means that information can be readily updated as well as ensure that an inconsistent approach is not introduced.
105. Current maps should continue to be used for information and advocacy purposes, as is to be provided on the Auckland Council website shortly. However, the current maps are inconsistent, at a coarse scale and in some cases do not represent the latest advances in science and therefore do not represent an accurate picture of the hazard risk in Auckland.
106. To improve the awareness of LFHM risk in Auckland it is therefore important that research continues to improve the quality and consistency of these maps across the region. Without maps in the UP other methods will need to be put in place to communicate the purpose and significance of the maps to the public so that they are able to understand the risks in their localities. This would most likely include the use of non-regulatory approaches such as education and advocacy.

Overall Recommended Method

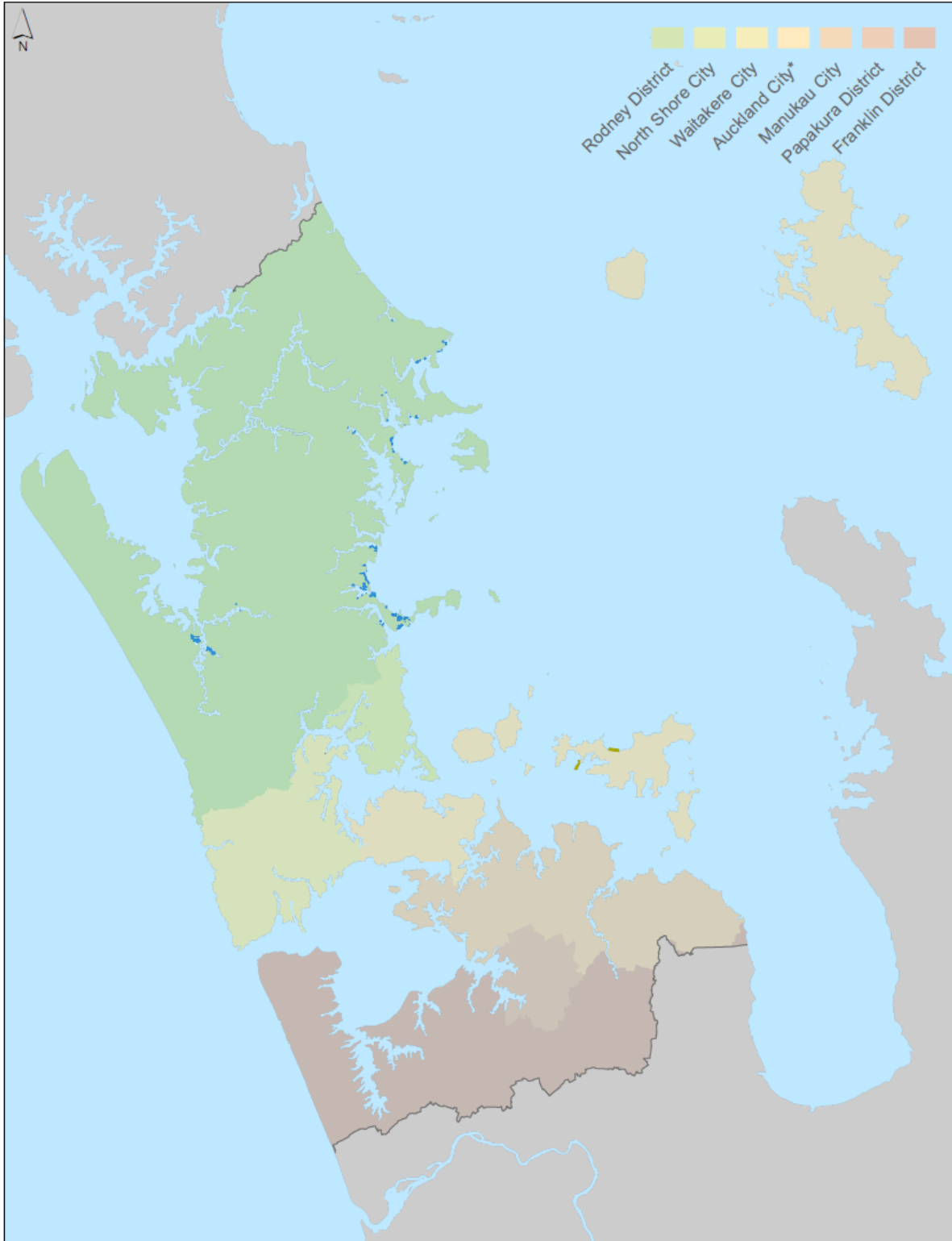
107. It is recommended that no natural hazard maps are included in the Unitary Plan, with specific natural hazard maps along with other information kept in either the legacy databases or in a centralised database (dependent on timing). This includes any natural hazard maps, technical reports as well as site specific information.
108. This recommendation is based on the above recommendations for specific coastal, land instability, flooding and low frequency high magnitude hazards.
109. As shown above, coastal, flooding, land instability and low frequency high magnitude hazards generally face the same issues in relation to mapping such as inconsistent coverage, methodologies, scales and data quality.
110. By keeping natural hazard maps out of the Unitary Plan, Auckland Council will easily be able to update this information. The information will also be provided to the public as stated in s.35 of the RMA, but it will largely be from an advisory perspective. This will ensure that less resistance is encountered from property owners.
111. The information will also be able to be used by consents staff to ensure that natural hazards will be avoided or mitigated effectively.

112. This recommendation is also based realistically on the timeframes for the Unitary Plan. In the future, Auckland Council should move to incorporate natural hazard mapping within a statutory document such as the Unitary Plan. This will be able to occur when maps are consistent in scale and methodology and cover larger areas of the region.

Appendix 1

This appendix contains spatial representations of the coverage of natural hazard maps as found within operative district plans in Auckland.

Note – the proposed Auckland City Hauraki Gulf Islands plan was used as it is nearly fully operative.



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Natural Hazards Coastal Hazards

1:680,000

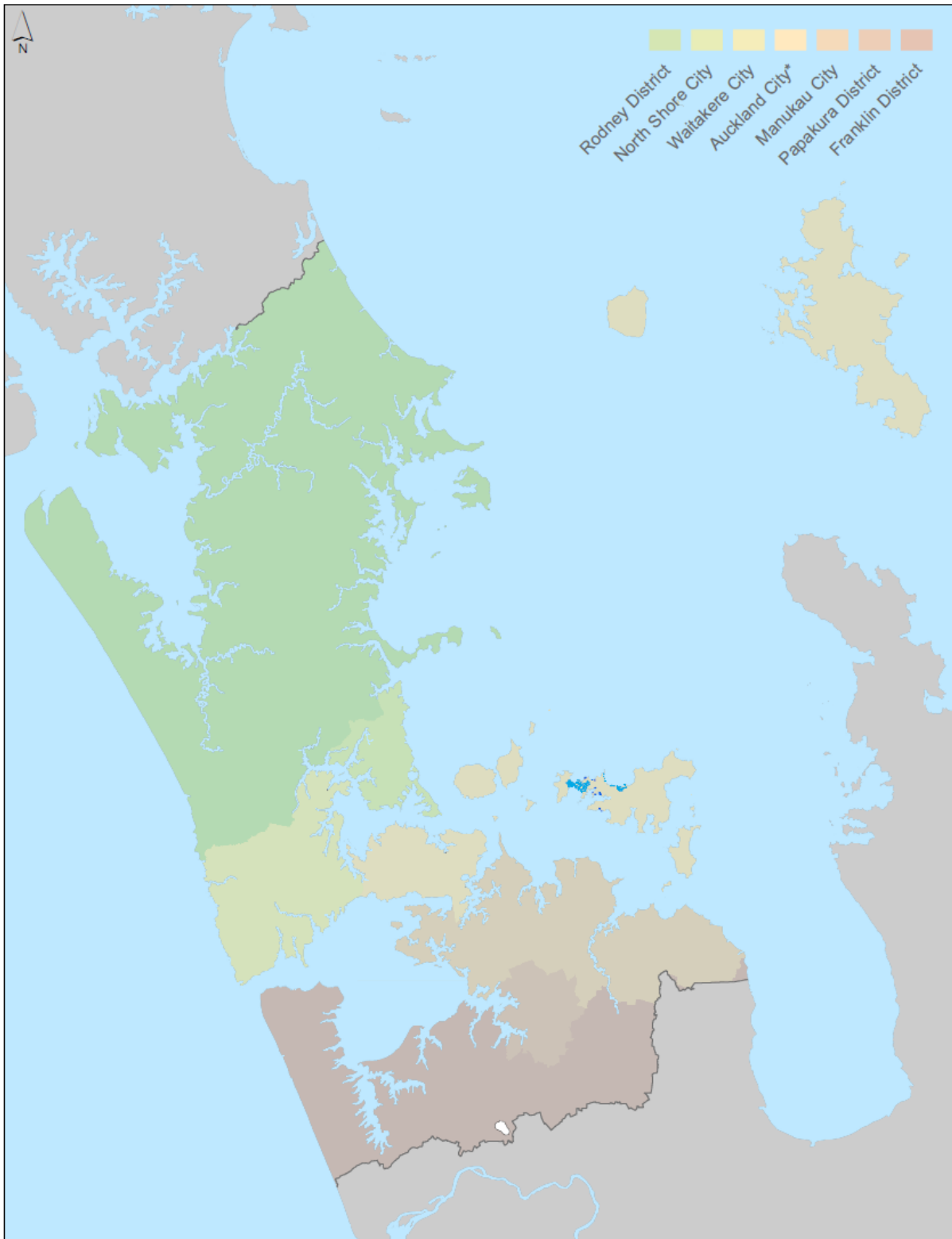
Date: January 2012

Source: Auckland Operative District Plans

*NOTE: Hauraki Gulf Islands will not be included as part of the Unitary Plan



Coastal Hazards – only small parts of the Hauraki Gulf Islands have been mapped by the Auckland City Hauraki Gulf Islands Plan (proposed).



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Date: January 2012




Source: Auckland Operative District Plans

*NOTE: Hauraki Gulf Islands will not be included as part of the Unitary Plan

Natural Hazards

Flood Hazards

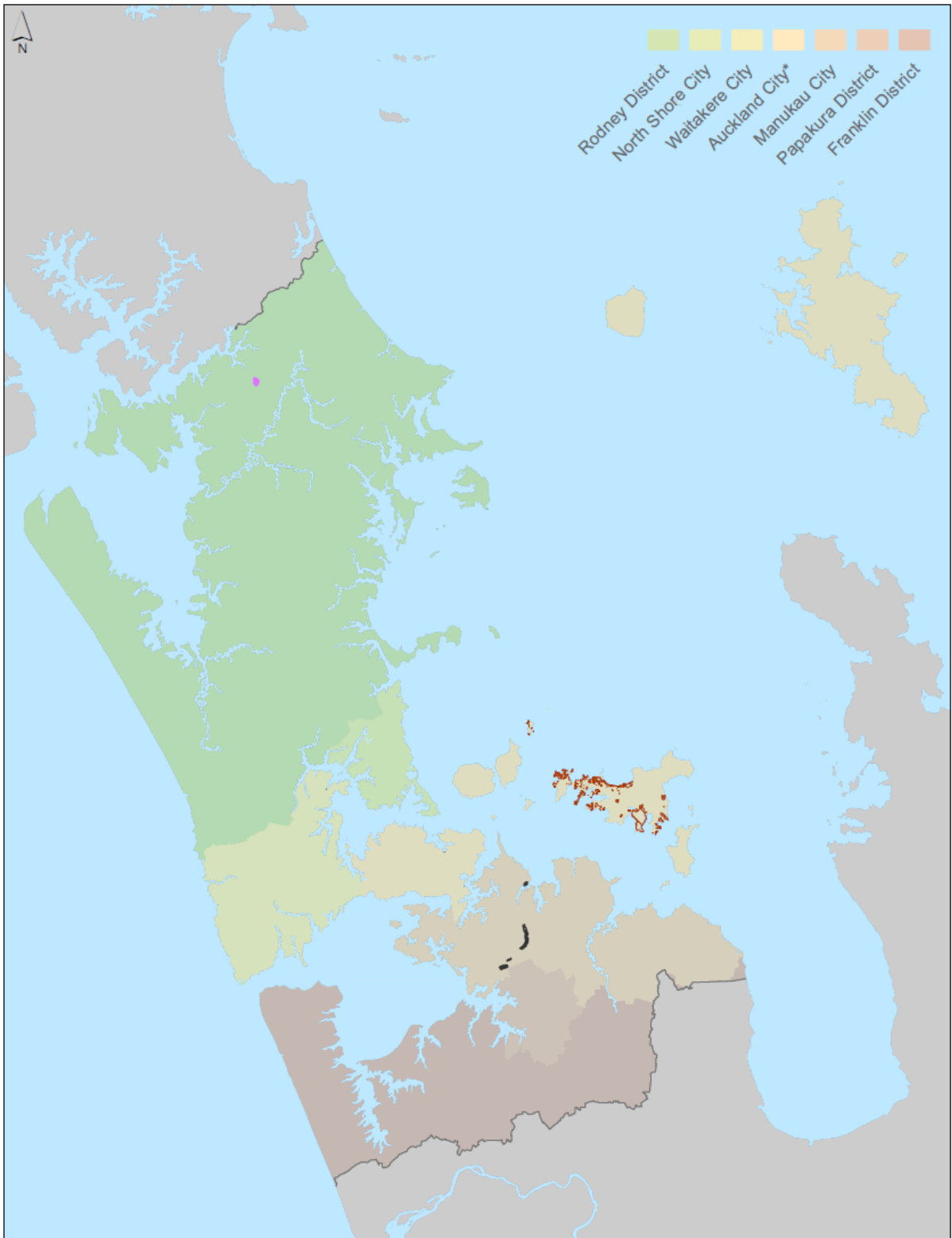
1:680,000

-  Flood prone land - type A flood plain
-  Flood prone land - type B flood plain
-  Tutaenui Floodway Policy Area



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Te Kaitiaki o Tamaki Makaurau

Flood Hazards - a small part of the Hauraki Gulf Islands has been mapped by the Auckland City HGI Plan (proposed) as well as a small section of Franklin.



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Date: January 2012

Source: Auckland Operative District Plans

*NOTE: Hauraki Gulf Islands will not be included as part of the Unitary Plan

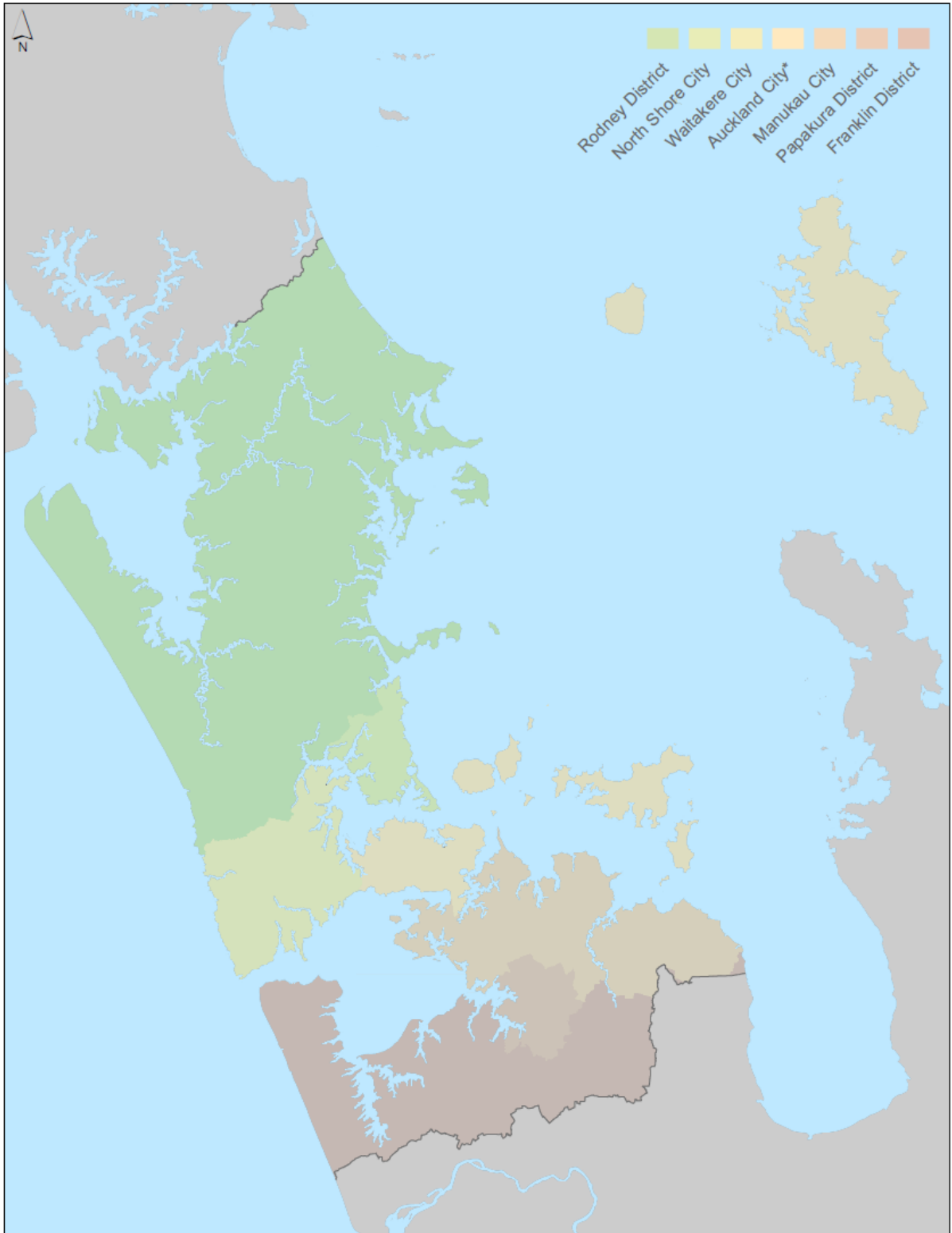
Natural Hazards Land Instability Hazards

1:680,000

-  Residential Physical Limitation
-  Soil warning area
-  Stability Area



Land Instability Hazards - only small parts of the Hauraki Gulf Islands have been mapped by the Auckland City Hauraki Gulf Islands Plan (proposed) as well as a small section of Rodney and Manukau.



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Natural Hazards Low Frequency High Magnitude (LFHM) Hazards

No Data

Date: January 2012

Source: Auckland Operative District Plans

1:680,000

*NOTE: Hauraki Gulf Islands will not be included as part of the Unitary Plan



Auckland Council
To Kaitiaki e Teihaki e

Low Frequency High Magnitude Hazards – no operative district plan in Auckland mapped or included provisions for any low frequency high magnitude hazards. This includes hazards such as liquefaction areas, fault lines and tsunami areas.