Section 32 Report

Natural Hazards and Climate Change

prepared for the

Proposed Waikato District Plan – Stage 2

July 2020

Waikato
DISTRICT COUNCIL
Te Kaunihera aa Takiwaa o Waikato

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1 OVERVIEW AND PURPOSE

1. This report outlines the process undertaken to review the natural hazards and climate change provisions in the Waikato District Plan, including the evaluation of the extent to which the proposed objectives are the most appropriate way to achieve the purpose of the Resource Management Act 1991 (the Act) and whether the proposed provisions (policies and rules) are the most appropriate way to achieve the objectives. This evaluation is a requirement of Section 32 of the Act.

2. The review of the natural hazards chapters of the Waikato District Plan has focussed on developing a comprehensive policy framework for managing natural hazards in the district. It includes proposed objectives, policies and rules to address natural hazards and climate change and these are set out in Chapter 15 of the Proposed District Plan. The policy framework for hazards includes general policies for multiple hazards, inside and outside high risk areas, as well as more specific policies for use and development of land within the floodplain, in coastal hazard areas, within defended areas, on land subject to slope instability and subsidence, fire risk, and liquefaction. There are also policies that focus on increasing awareness of natural hazard through information sharing and civil defence and emergency management projects and policies that focus on climate change. The climate change policies set out a framework for managing land use and development in the face of uncertainty of future sea levels and climatic conditions and includes direction on mitigation, adaptation, assessing future impacts and using a precautionary approach.

3. The objectives, policies and methods apply to areas throughout the district that have been identified as being exposed to one or more natural hazards. Some of these hazards have been assessed and their spatial extents shown as hazard overlay areas on the planning maps. Rules to regulate proposed land use, subdivision and development in each of the hazard overlay areas are also set out in Chapter 15. The spatial extents of some hazards have not been identified on the planning maps and therefore specific rules for these areas have not been developed. These areas have been addressed through the objective and policy framework and matters over which the council will restrict its discretion to.

4. This report contains a level of detail that corresponds to the scale and significance of the effects (environmental, economic, social and cultural) that are anticipated as a result of implementing the proposed provisions. A provision cascade table which shows the provisions proposed and how they relate to each other is included in Appendix 1.

1.1 Topic Description

1.1.1 Natural Hazards

5. Natural hazards are naturally occurring geological or meteorological processes including any atmospheric, earth or water-related events that may have an adverse impact on human health and safety, property or the environment. They include events such as earthquakes, tsunami, erosion, volcanic and geothermal activity, landslips, subsidence, sedimentation, wind, drought, fire, and flooding.

6. The Waikato District is susceptible to a range of natural hazards. Some of these, such as volcanic eruptions and tsunami hazards have a low frequency of occurrence but can have severe consequences. With respect to some of these events non-regulatory instruments or processes, such as education and advocacy, civil defence recovery plans, increasing community preparedness, insurance, emergency services and contingency planning can be utilised.

7. More frequent natural hazards that occur in the Waikato District, such as river flooding, flood ponding, coastal inundation and erosion and land instability (land slips and subsidence) have been addressed through a regulatory framework that focusses on reducing risk by avoiding, remedying or mitigating the effects of natural hazards to ensure that damage to property or injury or loss of lives is minimised.

8. Some natural hazards can be exacerbated by climate change. Increased temperatures can increase the likelihood and intensity of weather-related natural hazard events such as rainfall, flooding, coastal storms, drought and wildfire. Climate change will also increase mean sea level which will increase the risk of hazards such as coastal inundation and erosion on communities in some coastal areas.

9. The Ministry for the Environment predicts the effects of climate change on the Waikato District to include overall warmer temperatures, fewer frosts, a decrease in spring rainfall, increased storm events and an average rise in mean sea level. This is likely to mean more frequent droughts leading to water shortages, more inland flooding and salt water intrusion in low-lying coastal areas and an increase in erosion and land instability.

10. The review of the natural hazards provisions has focussed on developing a risk-based framework to manage natural hazard risk in line with the policy direction in the Waikato Regional Policy Statement 2016 (WRPS) as well as the NZ Coastal Policy Statement 2010 (NZCPS). The risk that natural hazards pose to the Waikato District is made up of several factors including:

    - the nature, magnitude and extent of the hazard;
    - the anticipated frequency or probability of the hazard event occurring; and
    - the exposure and vulnerability of the environment to the hazard, including the likely community losses/damages that could occur.

11. An understanding of both the scale and likelihood of the natural hazard event, and the likely consequences to the community, are central to the risk-based approach. From a district plan perspective, a risk-based approach requires identification and management of activities based on the level of risk to which they are exposed (e.g. farming may be acceptable in a high flood risk area, whereas residential development may not). The level of control over activities in the

district plan is therefore related to the level of risk, and whether such risks are considered acceptable or not.

12. The proposed policy framework includes a suite of general and specific policies for a range of natural hazards as well as policies to address the projected effects of climate change. The policy framework also recognises that there is existing development, including infrastructure, already located on land subject to natural hazards. These areas will require management through mitigation and adaptation to reduce risk either during redevelopment or through place-specific adaptive management planning processes.

13. The rules that implement the natural hazards policies rely largely, but not solely, on mapping hazard areas throughout the district. Each hazard area has a suite of additional rules to regulate new land use, including subdivision and development, based on the level of risk associated with the hazard. Certain types of new development will be avoided due to the level of risk present, while other types of new development will be able to be designed or located to effectively remedy or mitigate the risk. A summary description of hazards and hazard areas are set out below. A more detailed description of specific hazard modelling and assessments is set out in section 1.5 of this report.

14. Flood Plain Management Area

The Flood Plain Management Area is the 1% Annual Exceedance Probability (AEP) floodplain, and is identified through both 1D and 2D modelling, depending on the level of information available. 2D modelling is only available adjacent to the main stem of the Waikato River between Horotiu and Ohinewai and a small length of the Waipa River from Saulbrey Road to the confluence in Ngaruawahia. The 1D modelling extends south from Saulbrey Road to the Waikato district boundary and North from Ohinewai to Port Waikato.

15. An allowance for the projected effects of climate change has been included in the 2D flood modelling (Horotiu to Ohinewai).

16. Flood Ponding Area

Flood Ponding Areas are areas of land that experience floodwater ponding in a 1% AEP rainfall event. Only two Flood Ponding Areas have been specifically identified on the planning maps. One of the areas is located in the southern part of Huntly adjacent to the eastern bank of the Waikato River and the other is in Huntly West adjacent to Lake Waahi and Lake Puketirini.

17. High Risk Flood Area

High Flood Risk Areas have also been identified as areas within the Flood Plain Management Area where the depth of flood water in a 1% AEP flood event exceeds 1 metre and the speed of flood water exceeds 2 metres per second as required by the WRPS. These areas are considered to pose a high level of risk in terms of the potential for loss of life, injury or serious damage to property.

18. Defended Area (Residual Risk Area)

Defended Areas are areas of land that would be at risk from flooding during a 1% AEP flood event if it were not for a structural defence such as a stopbank. These areas are generally located along the length of the Waikato River from the southern boundary of Huntly township to Otaua in the northern part of the district.

19. High Risk Coastal Hazard (Erosion) Area and High Risk Coastal Hazard (Inundation) Area
The High Risk Coastal Hazard (Erosion) Area and High Risk Coastal Hazard (Inundation) Area overlays identify land where there is significant risk from either coastal erosion or coastal inundation with existing sea level and coastal processes.

20. Coastal Sensitivity Area (Erosion) and Coastal Sensitivity Area (Inundation)
The Coastal Sensitivity Area (Erosion) and Coastal Sensitivity Area (Inundation) overlays identify land that is potentially vulnerable to either coastal erosion or coastal inundation over a 100 year period to 2120, assuming a sea level rise of 1.0 metre due to the projected effects of climate change.

21. Mine Subsidence Risk Area
The Mine Subsidence Risk Area identifies land in Huntly East that is currently at risk of subsidence due to historic underground coal mining activities and the subsequent closure and refilling of the Huntly East underground mine.

22. Liquefaction
Liquefaction areas have not been identified on the plan maps, however additional assessment matters have been included in some subdivision and land use rules which may require a liquefaction assessment to be carried out before subdivision or development takes place.

23. Slope Instability
Areas of slope instability have also not been identified on the planning maps. To comprehensively identify these areas over the entire district is not practical given the size of the district and the changing circumstances in which slope instability occurs (often after high rainfall or seismic events). Therefore, a set of policies have been developed and assessment matters included in relevant rules to ensure assessment of this hazard occurs before subdivision or development takes place.

24. Wind and Seismic Loading
Wind and seismic loadings are controlled by the council under the Building Act 2004. The risk of fire hazard is controlled by the Waikato Regional Council, the Department of Conservation and the Waikato District Council through legislation other than the Act, using both regulation and by increasing public awareness through information.

1.1.2 Climate Change

25. Climate change will have impacts for the environment beyond the exacerbation of natural hazard events outlined above. Impacts such as increased periods of drought are predicted to place further strain on biodiversity. Sea level rise is also likely to impact on coastal habitat and access to the coast as coastal margins are increasingly eroded or inundated.

26. A policy framework has been included in this proposed plan to address the need for increased resilience to the projected changes in climatic conditions. These policies seek to ensure future land use planning and natural hazard management incorporate measures to address climate change. Further to this, there will be an increased focus on environmental protection and facilitating inland migration of biodiversity. Policies in this district plan will include promoting low impact urban design and green infrastructure, and increased coastal hazard setbacks to provide a more sustainable and adaptive approach for new development.

1.2 Significance of this Topic

27. Natural hazards can have a significant impact on and cause major disruption to people's lifestyles, well-being and financial stability. The Waikato district is susceptible to a range of natural hazards such as river flooding and ponding, coastal inundation and erosion and land instability (land slips and subsidence) and to a lesser extent, earthquakes and liquefaction, volcanic eruptions and tsunami.

28. Climate change is expected to increase the likelihood and intensity of weather-related natural hazard events. The effect that climate change will have on flooding and coastal inundation and erosion has been taken into account in the flood modelling between Horotiu and Ohinewai and the assessment of coastal hazards along the west coast.

29. The legislation and policy documents relating to natural hazard management and climate change are arranged in a hierarchy where lower level documents, such as district plans, need to either be consistent with, to have regard to, or to give effect to the higher order documents. All provisions within these policy documents and plans prepared under the Act must achieve the purpose of the Act (Part 2 Section 5).

30. The management of significant risks from natural hazards is a matter of national importance under Section 6(h) of the Act, and under Section 7(i) the council is required to have particular regard to the effects of climate change when exercising its functions and powers, including the preparation of a district plan.

31. The Act outlines specific responsibilities for councils in managing natural hazards. Regional councils control the use of land in order to avoid or mitigate natural hazards. Territorial authorities control any actual or potential effects of the use, development, or protection of land for the same purpose (s31(1)(b)(i)). The Regional Policy Statement outlines the respective roles where there is an overlap between regional and territorial councils' functions.

1.3 Resource Management Issues to be addressed

32. There is competing pressure between the need for growth and development in some areas of the district and the need to regulate land use and development where land may be exposed to natural hazards. This pressure requires careful management of development to ensure the risks of natural hazard events on land use and development are either avoided or effectively remedied or mitigated.

33. The Waikato Regional Policy Statement (WRPS) sets out what the Waikato District Council is expected to do when managing natural hazard risk. The WRPS includes specific policies and methods, which are to be implemented through provisions in the district plan.

34. The WRPS requires district plan provisions to incorporate a risk-based approach when regulating subdivision, use and development in relation to natural hazards. Currently, the provisions in the Waikato and Franklin Sections of the Waikato District Plan (the Operative Plan) are not consistent with the risk-based approach outlined in the WRPS, and this needs to be addressed.

35. Some hazards may not need to be managed through the district plan (e.g. tsunami, extreme wind events and drought) as other mechanisms can be used, such as community education and advocacy, warning systems, emergency preparedness, civil defence recovery plans, and contingency planning. Insurance and emergency services also play a role.

36. For those hazards that do need a district plan response, the district plan will need to follow the direction set out in the WRPS, including:

- **identifying the areas potentially affected by flooding during a 1% AEP flood event and coastal hazards, prioritising the areas at high risk;**
- **controlling subdivision in areas identified as high risk flood zones and high risk coastal hazard areas to avoid the demand for new protection structures;**
- **controlling the use and development (including habitable structures, significant community infrastructure such as hospitals and emergency services, and lifeline utilities) in high risk flood zones and high risk coastal hazards risk areas;**
- **ensuring risk to development within the floodplain or a coastal hazard area is appropriately assessed and any adverse effects either avoided, remedied or mitigated;**
- **allowing for essential infrastructure where it cannot be located elsewhere or where it will not increase natural hazard risk;**
- **identifying key hazard areas on the planning maps including:**
  - **1% AEP Floodplain**
  - **High risk flood zones**
  - **Residual risk zones**
  - **Coastal hazard areas**
  - **Areas at high risk of coastal hazards;**
- **deciding how the council will manage 'residual risk' in areas where there are existing defences against flooding;**
- **making provision for managed retreat in areas where the risk is 'intolerable';**
- **focusing on community resilience; and**
- **considering the potential effects of high impact, low probability natural hazard events.**

1.4 Current Objectives, Policies, Rules and Methods

37. The Operative Waikato District Plan currently consists of two sections, the Waikato Section and the Franklin Section, which is a legacy of the amalgamation of the southern part of the ex-Franklin District with the Waikato District in 2009. Each sections of the plan takes a slightly different approach to regulating use, development and subdivision of land that is subject to natural hazards.

38. The Operative District Plan recognises that natural hazards are an important issue that the plan must address. Both Waikato and Franklin Sections of the district plan seek to manage natural hazards and their risk, and advocate for a precautionary approach where there is uncertainty over the extent of future impacts. Current operative objectives, policies and methods, including rules for natural hazards and climate change are summarised below. The full suite of operative objectives, policies and methods for both sections of the Waikato District Plan are set out in Appendix 3.

39. Chapter 5 of the Waikato Section provides an objective and policy framework for natural hazards and the effects of climate change. The objective and policies focus on:

- **minimising the natural hazard risk to people and property;**
- **avoiding development of land that is subject to significant natural hazards;**
- **mitigating risk to health, safety and property;**
- **ensuring new development does not exacerbate natural hazards or compromise natural processes;**
- **controlling development in areas where 0.5m of sea level rise will result in the land being either below Mean High Water Springs (MHWS) or subject to coastal erosion or subject to inundation during storm surge events;**
- **minimising impervious surfaces, stormwater drainage and mitigating offsite effects of stormwater;**
- **providing fire protection through fire breaks, water source for firefighting and development setbacks;**
- **maintaining or enhancing natural buffers;**
- **designing and locating development to avoid or mitigate the effects of climate change on natural hazards including flooding, erosion, fire and storms;**
- **applying a precautionary approach where there is insufficient information or uncertainty around the effects of climate change and sea level rise;**
- **managing onsite and offsite effects of stormwater;**
- **retaining natural drainage systems and minimising impervious surfaces.**

40. Methods to give effect to the objectives and policies include:

- **identifying hazard areas on the planning maps;**
- **designing and locating buildings to mitigate hazard risk, i.e. requiring minimum floor levels and identifying the location of building platforms;**
- **specifying coastal building setbacks;**
- **controlling subdivision on land subject to hazards;**
- **utilising designations, i.e. stop banks;**
- **providing flood, coastal and other protection works;**
- **cooperating with the Waikato Regional Council to implement the public information objectives of the Regional Policy Statement;**
- **collating hazard information into a hazard register and updating that information regularly. The register is used when assessing building permit applications in terms of section 36 of the Building Act 2004.**

41. The Franklin Section identifies climate change as a natural hazard and manages its effects through the natural hazards provisions in Part 7 and coastal issues in Part 16 and Part 17. The objectives and policies focus on:

- **ensuring activities on land subject to, or likely to be subject to instability do not cause, increase or contribute to the risk from natural hazards;**
- **reducing the risk to property and the environment from flooding caused by watercourse, stormwater overflow and inundation by coastal waters;**
- **avoiding, remedying or mitigating the adverse effects to property and the environment from erosion including coastal erosion;**
- **avoiding land modification and development along sandy coastal margins and seaward faces of the coastal escarpments or ridgelines;**
- **informing the public about natural hazards in the district and why subdivision, land use and development activities must avoid, remedy, or mitigate the adverse effects from natural and land hazards;**
- **taking a precautionary approach to natural hazard management including sea level rise and climate change, where limited information on the hazard risk exists;**
- **allowing low impact design and soft flood protection works options to be considered.**

42. Methods to give effect to the objectives and policies include:

- **requiring site suitability reports to accompany resource consent applications to identify land instability, inundation and more specifically**

land within the 1% AEP flood plain and primary and secondary overland flow paths;

- **controlling stormwater runoff from impervious surfaces;**
- **identifying the location of streams and other water bodies on the planning maps;**
- **identifying setback distances from waterbodies and controlling development within the setback;**
- **identifying coastal setback distances and controlling development within the setback;**
- **controlling development within the 1% AEP floodplain;**
- **requiring minimum floor levels for new occupiable floor space above the 1% design flood level;**
- **requiring provision for esplanade reserves at time of subdivision of land adjacent to coastal, stream, river and lake margins;**
- **providing evidence of ability to avoid, remedy or mitigate adverse effects in resource consent applications, concept plans and structure plans;**
- **using Section 106 of the Resource Management Act (RMA) to decline subdivision applications where land or any structure on the land is likely to be subject to material damage from a natural hazard.**

43. The natural hazards provisions in the former Franklin District Plan (Franklin Section) were updated in 2010 through Plan Change 25 to address gaps in the management of natural hazard risk.

1.5 Information and Analysis

Risk-based Approach

44. Managing natural hazards through a risk-based approach requires a large amount of up to date and robust information. In particular, technical assessments and modelling to identify the spatial extent of different hazards. As part of the review of the natural hazards topic, information on different natural hazards such as flooding, ponding, subsidence and coastal inundation and erosion has been collated and analysed to help with the preparation of the hazard mapping and district plan provisions. This work has involved input from the Waikato Regional Council, technical experts, Civil Defence, local authorities, iwi, the community and emergency services and is described in the following paragraphs.

Flood Modelling

45. The Waikato Regional Council (WRC) completed 1D flood modelling for the 1% Annual Exceedance Probability (1% AEP) flood event along the full length of the Waikato and Waipa

Rivers (within the Waikato District) in November 2016. The model was created by extrapolating the 1959 flood protection scheme design 1% AEP 1D flood model over the adjacent floodplain (topography derived from LiDAR using WaterRide Software) to create a representation of the flood extent. The resulting maps only model flooding from the main river channels (many tributaries and over bank ponding areas are not included) and do not include the projected effects of climate change on rainfall intensity and sea level rise.

46. The WRC commissioned DHI to develop a 2D model of the 1% AEP flood event for the Waikato River from Horotiu to Ohinewai and a section of the Waipa River from Saulbrey Road to the confluence at Ngaruawahia. This model includes two projected climate change scenarios in addition to the current climate (0°C temperature increase). The two climate change scenarios were based on the projected temperature increases as a result of greenhouse gas concentration trajectories, i.e. the Representative Concentration Pathway (RCP) scenarios adopted by the Intergovernmental Panel on Climate Change (IPCC). One scenario is based on the projected New Zealand land-average temperature increase between 1986-2005 and 2101-2120 for the RCP6.0: 2.3°C scenario. The other scenario is based on the projected Waikato region temperature increase between 1986-2005 and 2101-2120 for the RCP8.5: 3.8°C scenario (Appendix 5(a)).

47. The Waikato Regional Policy Statement (WRPS) requires district plans to recognise and provide for the effects of climate change, having particular regard to projected increase in rainfall intensity assuming a minimum increase in temperature of 2.1°C by 2090 (relative to 1990 levels). This is equivalent to RCP6.0: 2.3°C increase in temperature over the next 100 years to 2120. The RCP6.0 modelled scenario is the 1% AEP flood hazard overlay area in the Proposed District Plan planning maps. This model also distinguishes areas within the floodplain that, during a 1% AEP flood event, the depth of flood water exceeds one metre and the speed of exceeds two metres per second. These areas have been identified as the High Risk Flood Area on the planning maps.

Flood Ponding

48. The council has relied on existing information to identify ponding risk at Huntly South (rather than including this in the 2D flood hazard model). This existing hazard layer has not been reassessed as there is not enough data available on the Huntly stormwater network to evaluate the hazard and provide meaningful results.

Residual Risk

49. Residual risk areas have also been identified using existing information from the Regional Council. These areas are called Defended Areas in the district plan. Residual risk areas are those areas that would be at risk from flooding during a 1% AEP flood event were it not for a structural defence such as a stopbank. In the rural areas, the WRC mapping of defended areas is based on those properties that are directly protected by a stop bank and pay targeted rates to the WRC for this protection (High Benefit Areas). In Huntly, the mapping is based on land that is at or below the design flood level of the stop bank, based on LiDAR data.

Coastal Hazard Assessment

50. A coastal hazards assessment has been undertaken for the west coast, focusing initially on the urban areas of Raglan and Port Waikato (Appendix 5(f)). This has been extended to include a desk-top assessment of rural areas along the open coastline. The assessment has defined areas potentially vulnerable to coastal erosion and coastal flooding, including:

- areas at greatest risk with existing sea level - High Risk Coastal Hazard (Erosion) and High Risk Coastal Hazard (Inundation)
- additional areas that could be affected with projected sea level rise over the next 100 years - Coastal Sensitivity Area (Erosion), Coastal Sensitivity Area (Open Coast) and Coastal Sensitivity Area (Inundation).

51. Iwi and local communities have provided local knowledge on coastal hazards through hui, open days and public meetings. This information, along with GIS mapping, has been used in the identification of these coastal hazard risk areas.

52. The coastal hazard areas proposed are as follows:

- **A High Risk Coastal Hazard Area (Erosion) and a High Risk Coastal Hazard Area (Inundation), identifying areas where there is already significant risk from coastal erosion or inundation with existing sea level and coastal processes in the short term (within the lifespan of a district plan).**
- **A Coastal Sensitivity Area (Erosion) and a Coastal Sensitivity Area (Inundation), identifying the areas potentially vulnerable to coastal erosion/inundation over the period to 2120, assuming sea level rise of 1.0 m.**
- **A Coastal Sensitivity Area (Open Coast) in the rural areas along the open coastline and within the estuaries, which includes areas of the coastal margin that could potentially be impacted by coastal flooding and/or coastal erosion, assuming sea level rise of 1.0 m to 2120.**

53. A review of coastal hazards along the eastern coastline (approximately 168m at the Firth of Thames) has been undertaken as part of the Hauraki District Council Kaiaua Coast 2120 project and is not included in Stage 2. This hazard information will be incorporated into the Proposed Waikato District Plan by way of a variation at the completion of that project.

Liquefaction Studies

54. A number of studies indicate that liquefaction has the potential to occur within the district, particularly in recent Holocene soils which are susceptible to ground shaking. The Waikato Zone Natural Hazard Management Plan 2016 (LWZNHMP) includes a map showing broad areas in the Lower Waikato Zone that are most hazardous to least hazardous in respect to earthquake hazard (shaking) causing liquefaction. However, the map scale is too small for use in the district plan and does not cover the entire district. It is also generalised in that it does not include groundwater information or shaking intensities and is based mainly on lithology and underlying soil types with the assumption they can become easily saturated. While the

LWZNHMP recommends the identification of liquefaction susceptible areas in the Region, including the Waikato district, no work to date has been completed. However, there are proposed changes to the Building Act that will require mapping of liquefaction risk and this work is being progressed. The WRC is working on more detailed liquefaction information taking into account groundwater and predicted earthquake shaking intensities.

55. In the absence of detailed mapping, the Proposed Chapter provides additional matters of discretion in respect to liquefaction for subdivision and higher density development, which are already restricted discretionary activities in Stage 1. A section on information requirements when liquefaction risk requires assessment is also included. The technical literature informing the liquefaction risk section of the chapter includes: Planning and Engineering Guidance for Potentially Liquefaction-prone Land", EQC, MBIE, MfE, September 2017 and Earthquake Geotechnical Engineering Practice, Module 3: Identification, Assessment and Mitigation of Liquefaction Hazards, May 2016, MBIE and NZ Geotechnical Society Inc. Others relied upon are included in the list of technical documents accompanying this Section 32 Report and the provisions of the Christchurch District Plan (referred to in the joint EQC, MBIE, MfE document referenced above), where liquefaction after the Canterbury Earthquake Sequence (2010-2011) was significant.

Mine Subsidence

56. An assessment has been carried out to confirm the likelihood of ongoing mine subsidence and methane gas migration from mine workings to the ground surface above the Huntly East mine and the South Headings as a result of the closure of the Huntly East Mine and subsequent flooding of the underground mine workings (Appendix 5(c)). This assessment included more detailed mapping of the hazard areas, and this has resulted in some changes to the spatial extent of the subsidence area. A peer review of this work confirmed the presence of both hazards (Appendix 5(d)). Council then engaged RDCL (Appendix 5(e)) to assess the level of risk from mine subsidence or gas migration to the land use and development above the mine. This work confirmed that there is a continued risk of subsidence while the mine is flooding, but the likelihood of methane gas migrating to the ground surface was considered to be extremely low due to the geology and presence of ground water above the mine obstructing the upward migration of gas.

Key Technical Reports and Peer Reviews

57. The key technical assessments and reports list in Table 1 below were prepared specifically for, and used to inform the development of, the Proposed District Plan Stage 2 provisions on natural hazards and climate change. The technical reports listed below are included in Appendix 5.

Table 1: *Key technical assessments and reports prepared specifically for the Waikato District Plan Review (Stage 2)*

Hazard	Title	Prepared by	Prepared for	Date
River Flood Modelling	Lower Waikato 2D Modelling – Huntly, Ohinewai and Horotiu Model Build - DHI Project No. 44801126	DHI	Waikato Regional Council and Waikato District Council	February 2020
	Lower Waikato River Model Peer Review - T+T Job No. 1005528	Tonkin + Taylor Ltd	Waikato Regional Council	May 2020
Mine Hazards	Report on hazards following mine closure, Huntly East - IRBA Project No. 1003	IRBA Geological Engineering Consultants	Waikato District Council	October 2018
	Peer Review of Ian R Brown Associates report titled Report on Hazards following mine closure, Huntly East - Project No. TFM0096	TerraFirma Mining Ltd	Waikato District Council	January 2019
	Risk Assessment for Urban Areas above the Mine – Huntly East Mine Closure Assessment - Report No. R-19357-01	RDCL	Waikato District Council	October 2019
Coastal Hazards	Waikato District Hazard Assessment - Focus Report No. 20/130	Focus Resource Management Group	Waikato District Council	February 2020
	Review of Waikato District Coastal Hazard Assessment - T+T Job No. 1012915	Tonkin + Taylor Ltd	Waikato District Council	December 2019
	Waikato District Council Coastal Hazard Assessment – Response to Peer Review	Focus Resource Management Group	Waikato District Council	March 2020
	Addendum – Amended mapping criteria for Whaanga Coast and Te Kopua	Focus Resource Management Group	Waikato District Council	June 2020
Economic Assessment	Waikato District Plan Review: Natural Hazards and Climate Change Economic Assessment	M.E Consulting	Waikato District Council	June 2020

58. Council relied on key relevant technical documents to guide and assist with the development of the proposed provisions and hazard mapping. These documents are listed in Table 2 below:

Table 2: *Other relevant technical reports and guidance*

Title	Prepared by	Date
Climate Change Projections for New Zealand.	Ministry for the Environment - Pub Ref No. MFE 1385	September 2018
Coastal Hazards and Climate Change, Guidance	Ministry for the Environment	December

for Local Government.		2017
Earthquake Geotechnical Engineering Practice, Module 3: Identification, Assessment and Mitigation of Liquefaction Hazards.	Ministry of Business, Innovation and Employment and NZ Geotechnical Society Inc.	May 2016
Engineering Geological Feasibility Assessment – Lorenzen Bay Structure Plan Hills Road, Raglan. Prepared by Mark T Mitchell Ltd.	Waikato District Council	August 2005
Huntly Flood Management Plan, 1995.	Waikato Regional Council. Technical Publication No. 1992/15.	1995
Liquefaction Vulnerability Study. Prepared by Tonkin + Taylor Ltd.	Earthquake Commission. T+T Ref. 52020.0200/v1.0.	February 2013
Lower Waikato Waipa Control Scheme – Land Classification and Direct Benefit Analysis for Differential Rating Purpose.	Environment Waikato, TR 01/16.	January 2016
Lower Waikato Zone Natural Hazards Management Plan.	Waikato Regional Council. Internal Series No. 2016/27.	2016
Numerical Modelling of Tsunami Effects at Port Waikato, Raglan and Aotea Waikato West Coast, New Zealand – V2. Prepared by eCoast Ltd - Borrero J.C & O'Neill S	Waikato District Council	February 2016
Planning and Engineering Guidance for Potentially Liquefaction-prone Land.	Earthquake Commission, Ministry for the Environment and Ministry of Business, Innovation and Employment.	September 2017
Planning and Engineering Guidance for Potentially Liquefaction-prone Land – Resource Management Act and Building Act aspects.	Earthquake Commission, Ministry for the Environment and Ministry of Business, Innovation and Employment.	September 2017
Waikato District Council Hazard Register.	Waikato District Council	Ongoing
Waikato Regional Council Position on residual risk and implementation of PRPS Method 13.2.6.	Waikato Regional Council. WRC Document No. 3613684.	2015
Waikato Regional Flood Event of 9 to 20 July 1998.	Environment Waikato Technical Report 1998/15.	1998
Waikato Regional Policy Statement – Implementation Practice Note on Natural Hazards.	Waikato Regional Council. Document No. 12000091	March 2019
River Modelling – Meta Data		
Waikato River 1% AEP 2D Flood Extent (Horotiu to Port Waikato) as interpolated from a MIKE 1D model – Meta Data.	Waikato Regional Council. Meta Data that accompanied the flood data shape files.	January 2018
Waipa River 1% AEP 1D Flood Extent created using WaterRIDE software to create a 2D representation - Meta Data.	Waikato Regional Council. Meta Data that accompanied the flood data shape files.	October 2017
Resource Consent Technical Assessments		

Geotechnical Assessment Report for Ray Road Ngaruawahia. hdgeo, Project Number: HD703.	WDC Resource Consent	September 2018
Preliminary Subdivision Assessment for 21 Galbraith Street, Ngaruawahia - DB Consulting Engineers. Ref 180848.	WDC Resource Consent	July 2018
AS/NZS and NZ Standards		
AS/NZS1547:2012 – Australian/New Zealand Standard. On-site domestic wastewater management.	NZ Standards	2012
NZS4404:2010 – New Zealand Standard. Land Development and Subdivision Infrastructure.	NZ Standards	2010
Stormwater Catchment Management Plans and flood management plans		
Tamahere Stormwater Catchment Management Plan.	Prepared by GHD for the Waikato District Council	March 2011
Te Kauwhata Catchment Management Plan.	Prepared by Beca Infrastructure Ltd for the Waikato District Council.	July 2009
Ngaruawahia Catchment Management Plan.	Prepared by T+T for the Waikato District Council.	March 2015
Tuakau Draft Catchment Management Plan.	Prepared by T+T for the Waikato District Council.	July 2014
Pokeno Catchment Management Plan.	Prepared by Franklin District Council.	2010
Port Waikato Stormwater Catchment Management Plan.	Prepared by City Design Ltd for the Franklin District Council.	September 2004

1.6 Consultation Undertaken

59. To help the council prepare the new natural hazard provisions, consultation with a wide range of stakeholders was carried out at different times throughout the review. This included consultation with communities, individual land owners, Iwi Authorities, hapuu and organisations either directly or indirectly affected by natural hazards and climate change. In addition, Waikato District Council staff with different functions related to natural hazards; the Waikato Regional Council hazard advisory team; and central government departments (LINZ, Worksafe and MBIE), provided their expertise during the development of the draft provisions and hazard mapping.

60. The engagement on the natural hazards topic started when the draft objectives and policies and the 1% AEP flood modelling for the Waikato and Waipa Rivers were made available for public feedback along with the Stage 1 Draft Proposed District Plan in November 2017. A series of community drop-in sessions were held throughout the district following the release of the draft to allow the community to discuss with staff and councillors about any topic in the district plan that was important to them. There was interest in the natural hazards and climate change topics from a small number of stakeholders at that time. The main feedback received was from Mercury Energy. Its feedback was regarding the inclusion of objectives and policies without

having completed the hazard modelling; stating it was impossible to carry out a risk-based approach without an understanding of the location and extent of hazard areas. Mercury Energy also opposed the staging of the district plan review and suggested that the Proposed District Plan not be notified until the natural hazards and climate change topics were completed.

61. Community and iwi input was specifically sought during the assessment of coastal hazards, with public workshops and/or open days being held at Port Waikato and Raglan in December 2017 and November 2018 and workshops with iwi being held with Tainui o Tainui in Raglan in March 2019 and November 2019 and with Ngati Karewa/Ngati Tahinga Trust in Port Waikato in May 2019 and January 2020. The initial sessions were to gather information about coastal hazards from the local communities. The subsequent sessions were to provide an opportunity to share the findings of the coastal hazard assessment and to give the community and iwi an opportunity to provide feedback.

62. Workshops were held in February and August 2019 with council staff (including representatives from building consents, roading, three waters infrastructure, resource consents and planning policy), consultants, and staff from LINZ, Worksafe and MBIE to specifically discuss the issues and hazards associated with the Huntly East Mine and the South Headings.

63. A collaborative partnership with Waikato Regional Council staff was established for the development of Stage Two with both councils contributing to the development of the 1% Annual Exceedance Probability 2D flood modelling for the Waikato and Waipa rivers and the Waikato Regional Council staff contributing technical information and support to Waikato District Council staff throughout the development of the draft provisions and hazard maps. Mercury were also included in some discussions in relation to the outputs of the 1D and 2D 1% AEP flood modelling and the defended area mapping.

64. Communities, including iwi and key stakeholders across the entire district, were given an opportunity to submit feedback on draft provisions and hazard maps during the release of the draft Chapter 15, the hazard maps and Variation 2 to Stage 1 Proposed district plan when these documents were released for public feedback at the end of September 2019. The release of the draft was followed by stakeholder meetings and public drop-in sessions held in Raglan, Ngaruawahia, Huntly, Tuakau and Port Waikato in October and November 2019.

65. Hui were held with iwi to discuss the Draft District Plan provisions, hazards maps and the variation with Tainui o Tainui in Raglan in late November 2019 and with Ngati Karewa/ Ngati Tahinga Trust in Port Waikato in January 2020. Two further hui were held with Tainui o Tainui on 21 May and 4 June 2020 to discuss the implications of hazard mapping and draft provisions for development on Maaori Freehold Land.

66. Email correspondence was also sent to the Minister for the Environment, the Minister for Climate Change, the Minister for Land Information, the Minister for Conservation, and the Minister for Energy and Resources, as well as adjacent local authorities including Waikato Regional Council, Hamilton City Council, Waipa District Council and Hauraki District Council following the release of the draft in September 2019.

67. Issues raised through public feedback on the draft provisions and hazard maps were assessed and considered and, where appropriate, draft provisions were amended to incorporate feedback.

68. A schedule of all consultation undertaken is contained in Appendix 6 and includes who was consulted, what they were consulted on, the date of consultation and a summary of feedback received.

1.7 Iwi Authority Advice

69. The council is required to undertake further consultation with iwi authorities on a draft proposed plan prior to notification of the plan and to take into account any advice received from those authorities before it notifies a proposed plan[1]. This section of the report sets out the process carried out and the advice received from iwi authorities and how that advice has been taken into account.

70. Council emailed a copy of the draft Stage 2 documents, including the draft Chapter 15, the draft Variation 2 to Stage 1 PDP and an electronic link to the online draft hazard maps to the Iwi Authorities and Hapuu listed below on 14 April 2020.

- Waikato Tainui
- Whanake Taiao-Maniapoto Maaori Trust Board
- Waahi Whaanui Trust
- Ngāti Wairere
- Tainui Hapū Environmental Management Committee
- Ngāti Tamaoho Trust
- Ngāti Paoa Iwi Trust
- Ngāti Hauā Iwi Trust
- Moana Rāhui o Aotea
- Hauraki Collective

71. Follow up emails and phone calls were made to ensure the documents were received and not overlooked. Each recipient was provided with an opportunity to meet with the council project team to talk through the approach taken with Stage 2 and to ask questions. As a result of this process, a total of five (online) hui were held with Waikato Tainui, Maniapoto, Ngāti Wairere and Tainui o Tainui (Raglan) and phone conversations with Ngāti Tamaoho Trust, Moana Rahui o Aotea, Ngāti Haua Iwi Trust and Waahi Whaanui Trust. Council staff tried to make phone contact with the Hauraki Collective and Ngāti Paoa Iwi Trust but were unsuccessful.

72. The advice and feedback received to date are summarised in Table 3 below.

[1] Clause 4A of Schedule 1 of the RMA

Table 3: *Consideration of advice from Iwi Authorities*

Date	Iwi Authority /Hapuu	Subject Matter/Purpose	Information Received	Consideration of information and resulting amendments
14 April 2020	Waikato Tainui	Draft District Plan (Stage 2), Variation 2 to Stage 1, online link to Draft Hazard Maps and a letter from WDC explaining the request for feedback and timeframe for Notification.	Hui held on 15 April, 4 June and 1 July 2020 and included Waikato Tainui, Ngāti Wairere and Maniapoto to discuss the broad approach taken in Stage 2 to manage natural hazard risk and the effects of climate change. Feedback received on 1 July 2020 - • Requested that Stage 2, Variation 2 and the s32 report to recognise the Vision and Strategy as the primary direction setting document with regards to the Waikato River and for activities in the catchment; and • ensure that stage 2 topics are given adequate consideration during zoning hearings; General support for: • the risk-based approach as this aligns with the directions set out in the Waikato-Tainui Environmental Plan (WTEP); • the identification/mapping of hazard areas as it gives a greater degree of certainty, noting that worse case scenarios should also be modelled and discussed with communities outside of the district plan context; and • the avoidance of increased risks to significant natural hazards as this aligns	In respect of Chapter 15 - Accepted Reference in the introduction (2nd paragraph) to the particular considerations that should be considered when addressing potential impacts of natural hazards on Maori Freehold Land; Amended Policy 15.2.1.8(a)(iv) to include reference to hard protection works not transferring or increasing risk to Maori Sites and Areas of Significance; Amended Policy 15.2.2.1(a)(ii) to include the Waikato Regional Council Hazard Portal and added 15.2.2.1(a)(iv) to ensure alignment with the work of other agencies including WRC and Iwi; Amended Policy 15.2.3.1(a)(iii) to include in respect of rezoning, the requirement for an assessment under the RCP 8.5 climate change scenario for rainfall and RCP 8.5H+ climate change scenario for sea level rise; Amended Policy 15.2.3.2(a)(i) to include reference to addressing the potential environmental and social costs of climate change. Rejected Amendment to Policy 15.2.1.4(a) to reference avoidance rather than enablement. The policy enables new infrastructure in areas at significant risk of natural hazards as it

			with the directions set out in the WTEP; • Continued community engagement and awareness of climate change and natural hazards, carried out in a coordinated way with Iwi and other lead agencies such as WRC. • Add a permitted/controlled activity to enable earthworks for the establishment and reinstatement of wetland habitat and creation of eel and whitebait habitat. <u>Climate change:</u> • The Waikato-Tainui 5-year plan, Te Ara Whakatupuranga 2050, identifies the need to support whaanau to respond to climate change impacts through the development and implementation of marae-based climate change mitigation plans. The technical/spatial information presented in the plan change will assist in the development of these Marae Plans. • Further assistance and support should be available from council and central government to assist hapuu and marae to adapt to the effects of climate change, particularly given the costs of adaptation that Maaori throughout the takiwaa and motu have already been forced to undergo. • Waikato District Council should take an active role in this space – particularly around lobbying government for funding assistance where there is a pressing need for adaptation.	recognises there are situations where infrastructure and utilities are technically, functionally or operationally required to be located there and it is not practical to be located elsewhere. Any increase in risk is still required to be mitigated. Amendment to Policy 15.2.3.2(a)(ii)(C) to qualify efficient water to be only for 'reuse' as this change is considered unnecessary and more restrictive; Adding 15.2.3.2(a)(v) to include 'raising community awareness of worst case scenarios associated with climate change'. It was considered that a change relating to community awareness was better reflected in Policy 15.2.2.1. The worst case flooding scenario is shown on the WRC Hazards Portal in relation to a dam burst. Any flood modelling for an RCP 8.5 climate change scenario are only required to be carried out when proposing rezoning; New permitted/controlled activity to enable earthworks for the establishment and reinstatement of wetland habitat and creation of eel and whitebait habitat. This is a substantial change. There was not enough time to give this change consideration. Waikato-Tainui agreed to consider including this in a submission to the PDP (Stage 2). In respect to Variation 2 – Accepted Reference to river communities in 1.4.4 The urban environment;

			• Waikato-Tainui expect a stronger stance on climate change; <u>Specific feedback on Stage 2 and Variation 2</u> • Amend text to include commentary on the location of each hazard area in regard to affected communities (towns and villages) and Maaori Freehold Land and Marae; • Make minor amendments to provisions to better reflect Waikato-Tainui values and impacts on communities and owners of MFL.	Reference to addressing natural hazard risk when preparing plans for developing urban land. Waikato-Tainui feedback requested the use of the terms growth planning and master planning. Rather than using those terms the amendment refers to spatial planning as this is a term that can be used to describe land use planning over various scales.
14 April 2020	Whanake Taiao-Maniapoto Maaori Trust Board	Draft District Plan (Stage 2), Variation 2 to Stage 1, online link to Draft Hazard Maps and a letter from WDC explaining the request for feedback and timeframe for Notification.	Feedback received on 30 June 2020. Main issues raised in feedback included: • Maniapoto Maaori Trust Board advise and recommend Stage 2 recognises and provides for Ko Tā Maniapoto Mahere Taiao Maniapoto - Environmental Management Plan by ensuring the Maniapoto actions are clearly expressed and referenced in the Plan • Maniapoto supports Waikato-Tainui feedback on Stage 2; • Requests further engagement with iwi following formal notification.	No changes were made to Chapter 15 or Variation 2 through feedback from the Maniapoto Maaori Trust Board. The development of stage 2 of the district plan review had particular regard for Ko Tā Maniapoto Mahere Taiao Maniapoto - Environmental Management Plan. Further refinement can be considered through a formal submission; Further engagement with the Maniapoto Maaori Trust Board will be carried out prior to Maniapoto making a formal submission.
14 April 2020	Waahi Whaanui Trust	Draft District Plan (Stage 2), Variation 2 to Stage 1, online link to Draft Hazard Maps and a letter from WDC explaining the request for feedback and timeframe for Notification.	Waahi Whaanui Trust supports feedback from Waikato Tainui	

14 April 2020	Ngati Wairere	Draft District Plan (Stage 2), Variation 2 to Stage 1, online link to Draft Hazard Maps and a letter from WDC explaining the request for feedback and timeframe for Notification.	Ngati Wairere supports feedback from Waikato Tainui	
14 April 2020	Tainui Hapū Environmental Management Committee	Draft District Plan (Stage 2), Variation 2 to Stage 1, online link to Draft Hazard Maps and a letter from WDC explaining the request for feedback and timeframe for Notification.	Hui held on 21 May and 4 June 2020. Main issues raised at the hui included: • The Whaanga Coast Coastal Sensitivity Area mapping is too conservative and places too heavier burden on owners of Maaori Freehold Land to develop land in accordance with development aspirations; • Council regulatory instruments have continuously placed significant restrictions on land development along the Whaanga Coast that result in costly regulatory processes for landowners; • Te Kopua land MFL blocks significantly affected by hazard modelling - Coastal Sensitivity Areas (inundation and erosion). This places an additional burden of needing resource consent to construct any buildings on this land where the land may not be affected by coastal hazards for some decades. • Addressing future hazards areas (as a result of sea level rise) through an adaptive management approach was debated. This approach was generally supported but only if rules could be	Agreement was reached between council and the Tainui Hapuu Environmental Management Committee to carry out detailed modelling for the Coastal Sensitivity Area for the Maaori Freehold Land blocks along the Whaanga Coast from just west of Whale Bay to the just west of Wainui Reserve. Also a minor amendment was made to the Coastal Sensitivity Area (Erosion) overlay area to remove the overlay from part of the Te Kopua 2B3 land block (western side of Riria Kereopa Memorial Drive). Both updates to the mapping have been completed. With regard to the issue of requiring resource consent to develop land at Te Kopua, an agreement was reached to consider development of rules for that land to allow development as a permitted activity where an approved adaptive management plan is in place and development is carried out in accordance with the plan. The Tainui Hapuu Environmental Management Committee agreed to investigate the criteria for an adaptive management plan and to formally submit on this matter through a

			redrafted to allow development as a permitted activity. No formal written feedback submitted. However, through discussions at both hui, agreement was reached on an approach to resolve the main issues raised.	submission on the Proposed District Plan.
14 April 2020	Ngāti Tamaoho Trust	Draft District Plan (Stage 2), Variation 2 to Stage 1, online link to Draft Hazard Maps and a letter from WDC explaining the request for feedback and timeframe for Notification.	Feedback received 14 May 2020. Main issues raised in feedback included: • Request to identify waterways/over land flow paths and intermittent streams in stage 2; and • To include provision for "green infrastructure" as a means to address climate change.	Permanent waterways are currently shown in the District Plan maps. Council drains are shown on the Waikato Regional Council Hazards Portal. Overland flow paths and ponding areas for most urban and peri urban areas throughout the district are included in the publicly available stormwater catchment management plans. The ponding areas could not be included in the District Plan as they have not been modelled using the consistent methodology. This makes it difficult to apply a consistent ponding area overlay in the District Plan. Low impact, stormwater management and green infrastructure, as measures to help mitigate the effects of climate change, are provided for in the proposed Policy 15.2.3.2. Rules are included in Proposed Plan Chapter 14 with the Regional Infrastructure Technical Specifications providing acceptable means of compliance standards for low impact design features.
14 April 2020	Ngāti Paoa Iwi Trust	Draft District Plan (Stage 2), Variation 2 to Stage 1, online link to Draft Hazard Maps	No feedback received	

		and a letter from WDC explaining the request for feedback and timeframe for Notification.		
14 April 2020	Ngāti Hauā Iwi Trust	Draft District Plan (Stage 2), Variation 2 to Stage 1, online link to Draft Hazard Maps and a letter from WDC explaining the request for feedback and timeframe for Notification.	No feedback received	
14 April 2020	Moana Rāhui o Aotea	Draft District Plan (Stage 2), Variation 2 to Stage 1, online link to Draft Hazard Maps and a letter from WDC explaining the request for feedback and timeframe for Notification.	No feedback received	
14 April 2020	Hauraki Collective	Draft District Plan (Stage 2), Variation 2 to Stage 1, online link to Draft Hazard Maps and a letter from WDC explaining the request for feedback and timeframe for Notification.	No feedback received	

1.8 Decision-making

73. The process of deciding how the council should manage natural hazards through its district plan requires much discussion between the council, council staff and technical experts. This section describes the process that was followed and the focus of the discussions that took place.

74. The process started with the preparation of two discussion documents, one for natural hazards and one for climate change, which were presented and discussed at council workshops in December 2015 and March 2016 respectively. This was followed by a project update, gap analysis (which identified where the operative plan was not meeting the requirements of the WRPS) and a workshop on the draft objectives and policies in August 2017.

75. In February 2018 the council decided to separate the district plan review into two stages. Delays to the coastal hazard assessment and flood modelling work meant that critical information was missing from the natural hazards and climate change topics. Work on these chapters was put on hold until the flood modelling and coastal assessment work could be completed.

76. Once this information was available, a series of council workshops were held between June and August 2019 to discuss the findings, draft policy framework and provisions/approaches to specific hazards. This included workshops to discuss flood risk, liquefaction, mine subsidence and coastal hazards. Detailed discussions were had during these workshops in relation to the draft provisions. In September 2019, the council approved release of the draft (Stage 2) natural hazard provisions, draft hazard maps, along with the draft variation to relevant provisions in the Stage 1 of the Proposed District Plan. A further workshop was held in March 2020 to present the finalised provisions (which had been modified in response to public feedback). Towards the end of July 2020, the council approved the provisions for public notification.

77. Appendix 7 provides a timeline of council workshops and meetings, what topics were discussed, and what decisions were made. The process included:

- **Preparation of briefing papers for councillors, followed by officer or technical expert presentations, with an opportunity for questioning;**
- **Formal committee meetings (Strategy and Finance Committee) to approve key decisions (e.g. the decision to split the plan review into two stages and to publish draft provisions for consultation);**
- **Project updates, to keep all councillors informed of progress;**
- **Councillor workshops on particular types of natural hazards, with detailed discussions on the policy framework, degree of consistency with the WRPS, neighbouring council's approaches, and draft rules.**

2 ISSUES, OBJECTIVES, POLICIES AND RULES

2.1 Relevant Legislation

78. This section of the report summarises the legal framework and high-level guidance the council works within. These documents help to frame or define the resource management issues and provide higher-level policy direction to resolve the issues. A summary is provided in Table 4 below and the relevant legislation and strategic direction setting provisions are set out in Appendix 2.

79. Six key statutes guide the council in the management of natural hazards. These are set out below. However, for the purpose of Stage 2 of the district plan review, the provisions of the Resource Management Act 1991, the Civil Defence and Emergency Management Act 2002, the Local Government Act 2002 and the Building Act 2004 are the most important statutes for providing legislative guidance for the management of natural hazard risk. The Resource Management Act outlines the specific responsibilities of regional and district councils with regard to the regulatory functions and development of a regulatory framework for managing natural hazards.

80. Effective management of natural hazard risk and climate change relies on the interplay between multiple statues and the coordination of the various agencies that exercise powers and functions under them. However, it is important to note that the policy guidance within these statutes remains very high level and much is left to the discretion and judgement of those responsible for implementation.

2.1.1 Resource Management Act 1991

81. The Act outlines the specific responsibilities of regional and district councils when managing natural hazards.

82. Part 2 Section 5 sets out the purpose of the Act, which includes promoting the sustainable management of natural and physical resources, while enabling people and communities to provide for their wellbeing and for the health and safety and avoiding, remedying or mitigating any adverse effects of these activities on the environment. In achieving the purpose of the Act, Section 6(h) of the RMA requires the management of significant risks from natural hazards as a matter of national importance to be recognised and provided for, and section 7(i) requires particular regard to be given to the effects of climate change.

83. Section 75 of the Act requires territorial authorities to prepare a district plan that provides objectives, polices and rules (if any) to fulfil its functions under Section 31 of the RMA. This includes under section 31(1)(b)(i)) the control of any actual or potential effects of the use, development, or protection of land for the purpose of the avoidance or mitigation of natural hazards.

84. Section 75(3)(a)-(c) of the Act states that a district plan must give effect to any national policy statement, any New Zealand coastal policy statement, any national planning standard and any regional policy statement. The NZ Coastal Policy Statement and the Waikato

Regional Policy Statement apply and relevant provisions are described below. Section 75(4) of the Act states that a district plan must not be inconsistent with a regional plan.

85. Natural hazards are defined under section 2 of the Act as being "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".

86. Climate change is defined as "a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods".

87. Section 31 of the Act requires council to control the actual or potential effects of land use, development and protection of land for the purpose of avoiding or mitigating natural hazards. Section 35 requires council to gather information, monitor and keep records, including "records of natural hazards to the extent that the local authority considers appropriate for the effective discharge of its functions".

88. Section 106 Act enables a consent authority to refuse to grant subdivision consent if it considers that there is a significant risk from natural hazards. The consent authority can request an assessment of the risk from natural hazards, which may include a combined assessment of the material damage to, the land being subdivided, or any structures, or any other land, or any likely subsequent use of the land, that would result from natural hazards; and that would accelerate, worsen, or result in material damage.

89. Schedule 4(7)(1)(f) of the Act requires the assessment of environmental effects (AEE) that must be prepared to accompany an application for resource consent to consider, "any risk to the neighbourhood, the wider community or the environment through natural hazards…" This implies natural hazards will be a consideration in the assessment of resource consent applications. (Although the extent to which that is relevant will depend on the proposed activity, plan provisions and the type of consent required.)

2.1.2 Local Government Act 2002

90. The Local Government Act 2002 (LGA) is the primary statute that mandates many local government functions. Section 10 of the LGA sets out the purpose of local government, and includes the requirement to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future.

91. A key requirement of the LGA is to prepare long term plans (LTPs) (under section 93). LTPs identify local authorities' activities and expenditure over at least a 10-year planning horizon and provide a basis for accountability. Section 101A requires that as part of their LTP, local authorities must prepare financial strategies, which include asset management planning (i.e. what capital expenditure for network infrastructure, flood protection and flood control works are required to maintain existing levels of service).

92. Through the LTP and asset management planning process, local authorities must make decisions about what level of natural hazard protection their assets are to provide (in the case of flood protection works) or what level of event they are to withstand (in the case of network infrastructure). A separate infrastructure strategy must to be prepared (under section 101B), which covers at least 30 consecutive financial years. The Strategy must give explicit consideration to the resilience of infrastructure in the event of natural disasters; the identification and management of risks relating to natural hazards and make appropriate financial provision for those risks. The Waikato District Council LTP contains objectives in relation to community resilience and capacity to respond and recover in an emergency.

93. There is no direct reference to climate change in the LGA, however as local government are to take a sustainable development approach to promoting the wellbeing of communities, it is likely that climate change adaptation and mitigation will be a consideration in future infrastructure planning.

2.1.3 Building Act 2004

94. One of the purposes of the Building Act (BA) is to ensure that buildings are designed, constructed, and are able to be used in ways that promote sustainable development (Section 3(a)(iv)).

95. Sections 71 to 74 of the Building Act relate to land subject to a known natural hazard. Under Section 71, councils must refuse building consent if the land on which the building work is to be carried out is subject to, or is likely to be subject to one or more natural hazards; or the building work is likely to accelerate, exacerbate, or result in a natural hazard on that land or any other property. The exception to this is if provision can be made to protect the land, building work, or other property, or restore any damage to that land or other property as a result of the building work.

96. The presumption of section 71(1) can be reversed by section 72, which states that the territorial authority must issue a building consent for building work on land subject to a natural hazard if the building work will not accelerate, worsen or result in a natural hazard on the land on which the building work is to be carried out or any other property; and it is reasonable to grant a waiver or modification of the Building Code in respect of the natural hazard concerned.

97. Where the territorial authority grants a building consent under section 72, a notice identifying the hazard must be registered on the Record of Title. This process alerts future owners of the presence of the hazard and ensures territorial authorities are protected against civil liability when granting consent to build on land subject to a natural hazard.

98. 'Natural hazard' is defined in section 71 of the BA as any of the following:

    (a) erosion (including coastal erosion, bank erosion, and sheet erosion);
    (b) falling debris (including soil, rock, snow, and ice);
    (c) subsidence;
    (d) inundation (including flooding, overland flow, storm surge, tidal effects, and ponding); and

(e) slippage.

99. Although climatic conditions are taken into account prior to issuing a building consent, climate change is also not explicitly referenced in the Building Act.

100. The Building Act requires new buildings to meet the performance requirements of the Building Code (these requirements are designed to protect against certain hazards (ground shaking and flooding).

2.1.4 Civil Defence and Emergency Management Act 2002 (CDEM)

101. The purpose of the CDEMA is to promote the sustainable management of hazards and encourage communities to achieve acceptable levels of risk.

102. Council is required to plan and provide for civil defence emergency management within its district with regards to reduction, readiness, response, and recovery. This means that the less frequently occurring natural hazards can be dealt with through contingency controls such as civil defence and insurance systems. Reduction and readiness are 'business as usual' functions of the council while response and recovery commence as soon as a hazard event occurs. The CDEMA has a post-event focus, with the risk reduction element being covered through a link to the Act (Section 17(3)). District Plan provisions and asset management plans should be developed in conjunction with CDEM and emergency services to ensure they manage activities to reduce the risk from natural hazards.

103. Most natural hazard events occur at the local or regional level. Individuals, communities and local government are best placed to develop the management options suited to them, for example, through land-use planning and building control activities. Local CDEM Plans identify the most common natural hazards affecting the district or region and identify how each of these can be managed in terms of reduction (generally through the district plan regulatory framework), readiness, response and recovery.

104. The local Waikato District CDEM plan's vision is for people, organisations and communities to work together to increase resilience to hazards. The plan's goals are around reducing risk, enhancing capability to respond and recover, building effective leadership and partnerships, increasing preparedness and ownership, building and sustaining understanding of hazards and risks and monitoring outcomes. Reducing areas of greatest risk can be achieved through initial identification of high-risk areas, carrying out community consultation and providing a regulatory framework through the District Plan that focuses on reducing risk through either avoidance, remediation or mitigation.

105. Stage 2 of the District Plan Review has been carried out in consultation with the local CDEM team to ensure that the provisions within the Proposed District Plan support the outcomes sought in the Local CDEM Plan.

2.1.5 Soil Conservation and Rivers Control Act 1941 (SCRCA)

106. The original Soil Conservation and Rivers Control Act 1941 (SCRCA) established a framework for the appointment of catchment boards and a systematic approach to erosion and flood control issues. Many of the soil conservation reserves and flood protection schemes now administered by regional councils were developed with government and local government funding appropriated under the SCRCA.

107. While much of the original SCRCA has since been repealed, it still provides powers for regional councils (and the Minister for the Environment) to undertake catchment works to promote soil conservation or minimise and prevent damage by floods and erosion. These works are subject to the RMA.

108. Section 10 sets out the 'objects' of the SCRCA, which include the promotion of soil conservation, the prevention and mitigation of soil erosion, the prevention of damage done by floods, and the utilisation of lands in a manner which achieves these objectives. Section 10A of the SCRCA sets out the relationship with the RMA, which has primacy over the provisions in the SCRCA.

2.1.6 Local Government Official Information and Meetings Act (LGOIMA) 1987

109. Under the LGOIMA local authorities are obligated to issue Land Information Memoranda (LIM) on request. A LIM must include information known to the territorial authority on (amongst other things) the potential erosion, avulsion, falling debris, subsidence, slippage, alluvion (accretion), or inundation related to the site. The territorial authority is not required to supply information in a LIM that is included in a district plan.

2.2 Higher Level Planning Documents

2.2.1 New Zealand Coastal Policy Statement 2010 (NZCPS)

110. The NZCPS sets out policies to achieve the purpose of the Act in relation to New Zealand's coastal environment. The coastal environment has characteristics, qualities and uses that mean there are particular challenges in promoting sustainable management. Activities in the coastal environment are susceptible to the effects of natural hazards such as coastal erosion and tsunami, and those associated with climate change including sea level rise.

111. In order to give effect to the NZCPS, district plans must identify areas of the coastal environment where particular activities and forms of subdivision, use, and development are inappropriate (Policy 7) and identify areas in the coastal environment that are potentially affected by coastal hazards (including tsunami), giving priority to the identification of areas at high risk of being affected (Policy 24). Hazard risks, over at least the next 100 years are to be assessed while having regard to a number of matters, including climate change.

112. Once hazard risk areas have been identified, provision must be included in district plans to ensure that activities (subdivision, land use and development) within these areas do not increase the risk of adverse effects from coastal hazards (Policy 25). In areas subject to

existing development, district plans may encourage redevelopment and changes in land use to reduce risk. A range of options are to be considered (Policy 27) and may include 'managed retreat' by relocation or removal of existing structures and designing structures for relocatability or recoverability following a hazard event.

113. The NZCPS also encourages natural defences against coastal hazards (Policy 26) while providing exceptions for hard structural defences to protect existing infrastructure of national or regional importance where there is no practical alternative.

114. It is important to recognise the special and enduring relationship that taangata whenua have with areas of the coastal environment and to take into account any relevant iwi resource management plan and any other relevant planning document recognised by the appropriate iwi authority or hapuu and lodged with the council. Taangata whenua should also be provided opportunities to exercise kaitiakitanga over waters, forests, lands and fisheries in the coastal environment (Policy 2).

115. A precautionary approach is required to be adopted where the effects of proposed activities on the coastal environment are unknown, and in particular, where coastal resources are potentially vulnerable to climate change effects (Policy 3).

116. Section 75(3) the Act requires a district plan to give effect to the NZ Coastal Policy Statement.

2.2.2 Te Ture Whaimana o Te Awa o Waikato – the Vision and Strategy for the Waikato River

117. The Vision and Strategy in Schedule 2 of the Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010, is the primary direction setting document for the Waikato River and its catchments, including the lower reaches of the Waipa River. The Vision and Strategy is deemed in its entirety to be part of the Waikato Regional Policy Statement (WRPS) and if any part of the WRPS, or any NPS, including the NZCPS is inconsistent with the Vision and Strategy, the Vision and Strategy prevails.

118. The Vision is for a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come. In order to realise the vision a number of objectives are to be pursued and strategies to be followed. The objectives and strategies that are most relevant to Stage 2 PDP are as follows:

Objectives

- the recognition that the strategic importance of the Waikato River to New Zealand's social, cultural, environmental, and economic wellbeing requires the restoration and protection of the health and wellbeing of the Waikato River:
- the promotion of improved access to the Waikato River to better enable sporting, recreational, and cultural opportunities:
- application to the above of both maatauranga Maaori and the latest available scientific methods.

Strategies

- recognise and protect waahi tapu and sites of significance to Waikato-Tainui and other Waikato River iwi (where they do decide) to promote their cultural, spiritual, and historic relationship with the Waikato River:
- ensure appropriate public access to the Waikato River while protecting and enhancing the health and wellbeing of the Waikato River.

119. Although natural hazards or climate change are not specifically mentioned in the Vision and Strategy, natural hazards and the effects of climate change may impact on certain aspects of the restoration and protection of the river. Of note is the recognising that the river is of strategic importance to New Zealand's social, cultural, environmental and economic wellbeing; that flooding may impact on public access to the river which provides sporting, recreational and cultural opportunities; that flooding may have adverse impacts on waahi tapu and sites of significance to Waikato-Tainui and other Waikato River iwi and that both Maatauranga Maaori and scientific methods are important for the restoration and protection of the health and wellbeing of the river.

2.2.3 Waikato Regional Policy Statement 2016 (WRPS)

120. The purpose of the WRPS is to provide an overview of the resource management issues of the region, and together with objectives, policies and methods, provides guidance for the regional and territorial authorities when developing their regional, coastal and district plans. This supports an integrated and consistent approach to the management of natural and physical resources across the region.

121. *Issue 1.2 – Effects of Climate Change* acknowledges that climate change is a significant issue for the region due to its effects on wellbeing, including health and safety and that, when addressing this issue, focus should be directed to an increase in the potential for storm damage and weather-related natural hazards; and to the long term risk that sea level rise poses to settlements and infrastructure through coastal erosion and flooding.

122. *Issue 1.4 – Managing the Built Environment* acknowledges that development can have either positive or negative impacts on natural and physical resources and the provision for our wellbeing and that focus should be directed to, amongst other matters, the increasing potential for natural hazards.

123. The WRPS provides policy direction for managing natural hazard risk and climate change adaptation through a number of either general or specific objectives, policies and implementation methods within chapters 3, 4, 6, 11, 12 and 13 and identifies where policies must be given effect to through district plans.

124. *Objective 3.6 - Adapting to climate change* promotes land use management that avoids the potential adverse effects of climate change, including sea level rise on amenity, the built environment, infrastructure, indigenous biodiversity, natural character, public health and safety and public access. Relevant polices are 4.1, 6.1, 6.2, 12.4, 13.1 and 13.2.

125. *Objective 3.7 – Coastal environment* promotes integrated management of the coastal environment that, amongst other matters, recognises the dynamic, complex and

interdependent nature of natural biological and physical processes. Relevant polices are 4.1, 6.2, 6.3 and 12.4.

126. *Objective 3.23 – Public access* promotes the maintenance and enhancement of public access to the coast, lakes and rivers. Relevant polices are 4.1, 6.1, 6.2 and 12.4.

127. *Objective 3.24 – Natural Hazards* promotes managing the effects of natural hazards on people, property and the environment by increasing community resilience, reducing risk to acceptable or tolerable levels and enabling the effective and efficient response and recovery from natural hazard events. Policies 4.1, 6.1, 6.2, 13.1, 13.2 and 13.3.

128. *Policy 4.1 – Integrated approach* requires the adoption of an integrated approach to the management of resources through the recognition of the inter-connectedness of natural and physical resources; the benefits of aligning decisions of agencies across boundaries; maximising benefits and efficiencies of working together; the multiple values of natural and physical resources including ecosystem services; the nature and values of resources and the diversity of effects that can occur; the ability to maximise opportunities to achieve multiple objectives; the benefits of taking a long term strategic approach that recognises the change to the environment, resource use and pressures and trends; best consistent and practice standards and processes to decision making; and the establishment of a planning framework that sets clear limits and thresholds for resource use.

129. *Policy 6.1 – Planned and co-ordinated subdivision, use and development* seeks to ensure that subdivision, use and development is planned and co-ordinated and is based on sufficient information to allow assessment of potential cumulative and long-term effects of the development; has regard to the existing built environment; and has regard to the development principles in section 6A.

130. *Section 6A - Development Principles.* The specific principles in section 6A relating to natural hazards and climate change are, 6A(h) ensure development is directed away from natural hazard areas, 6A(l) maintain and enhance public access to and along the coast marine area, 6A(p) be appropriate with respect to the projected effects of climate change and be designed to allow adaptation to these effects, and 6A(q) consider the effects on the unique taangata whenua relationships, values, aspirations, roles and responsibilities with respect to an area.

131. *Policy 6.2 - Planning for development in the coastal environment* seeks to ensure the built environment, within the coastal environment is managed, amongst other matters, through the use of sufficient setbacks to protect natural hazard mitigation functions of the coast, allow for the potential effects of sea level rise, avoid increasing natural hazard risk associated with coastal erosion and inundation, and have regard to the potential effects of a tsunami event, including taking appropriate steps to avoid, remedy or mitigate that risk.

132. *Policy 12.4 – Maintain and enhance public access*, seeks to maintain and enhance public access to and along the coastal marine area by, amongst other matters, ensuring that subdivision, use and development does not constrain the ability of the land/water edge to adjust over time in response to natural processes, including the effects of climate change.

133. *Policy 13.1 - Natural hazard risk management approach* directs district plans to utilise a risk-based approach to managing natural hazard risks through an integrated holistic approach. This approach focusses on avoiding the creation of new 'intolerable' risk and reducing existing intolerable risk to tolerable or acceptable levels. The policy also focusses on protecting health and safety, enhancing community resilience, aligning civil defence approaches, and encouraging the use of natural features over man-made defences, while also promoting a natural systems/whole systems approach and using the best available information and best practices.

134. *Policy 13.2 - Manage activities to reduce the risks from natural hazards* sets out a framework for assessing subdivision, use and development on land subject to natural hazards to ensure risk is maintained at an acceptable or tolerable level, while avoiding levels of risk that are considered intolerable and minimising vulnerability to residual risk. This framework also discourages the use of hard protection structures, while promoting the use of natural defences, and also strongly discourages development that creates a demand for new protection structures.

135. In order to manage risk to subdivision, land use and development, district plans must first identify areas within the district that are subject to natural hazards, including areas at risk of flooding during a 1% AEP storm event; coastal hazards and residual risk, prioritising areas at high risk, (i.e. areas at high risk of flooding and coastal areas that are at high risk of either coastal erosion or inundation) and then controlling activities within those areas, including ensuring development is appropriate in areas at high risk.

136. *Policy 13.3 - High impact, low probability natural hazard events* requires local authorities to consider the potential effects of high impact, low probability natural hazard events such as tsunami, volcanic eruptions and earthquakes and to direct vulnerable development away from high risk hazard areas, and to promote contingency planning through civil defence readiness, response and recovery.

2.2.4 Waikato Regional Plan 2012 (WRP)

137. The WRP is currently under review, which will be carried out in stages over a number of years. The existing Regional Plan has not yet given effect to all relevant matters in the WRPS. The current Regional Plan provisions address accelerated soil erosion (Chapter 5) which can cause land instability hazards, particularly in steep hill country, and also addresses discharge onto or into land which can increase the risk of flooding and land instability. Objective 5.1.2 seeks a net reduction of accelerated erosion across the Waikato region. Section 5.1.3 sets out three policies to manage accelerated erosion, including non-regulatory methods, the use of regulatory methods in high risk erosion areas and promotion of good practice.

2.2.5 Waikato Regional Coastal Plan 2014 (WRCP)

138. The purpose of the WRCP is to achieve integrated management of the coastal environment, including the Coastal Marine Area (CMA), which applies from the Mean High Water Springs (MHWS) to the 12 mile nautical limit of territorial sea.

139. The WRCP includes policies that apply to all of the coastal environment (landward and seaward of MHWS), while the district council's jurisdiction is applicable to management of land landward of MHWS. However, both the district and the regional plans acknowledge and seek to address natural hazard risk. Objective 8.1 of the WRCP acknowledges that coastal hazards are a risk to people and property and should be avoided or mitigated. Policies 8.1.1 to 8.1.4 seek to:

- **identify areas of coastal hazard risk and develop integrated management strategies for these areas,**
- **adopt a precautionary approach in the assessment of coastal hazard risks,**
- **promote the protection of natural features that provide a buffer against natural hazards,**
- **ensure the use of any structures to control coastal erosion is necessary and avoids or remedies any adverse effects on other coastal processes and natural character.**

2.2.6 Iwi Management Plans

140. The council must take into account provisions in iwi management plans which are relevant to the resource management issues being considered by the plan review (s74). In the Waikato district, this includes the Waikato-Tainui Environmental Plan (Tai Tumu Tai Pari Tai Ao) (WTEP) and the Maniapoto Environmental Management Plan (MEMP).

2.2.6.1 Waikato-Tainui Environmental Plan (Tai Tumu Tai Pari Tai Ao) (WTEP)

141. Chapter 17 lists three key issues - land use, risk management and climate change in relation to natural hazards and provides an objective and policy framework to address these issues.

142. The WTEP includes provision for climate change, but only in so far as it relates to human induced climate change (noting that this is consistent with the definition in the RMA). The WTEP recognises that global warming and climate change are likely to result in coastal inundation from an increase in mean sea level rise; more extreme weather events; changes to rainfall patterns; increased erosion; changes in the population density and distribution of fish and wildlife; and changes in the viability of cultural and/or spiritual resources and activities. The WTEP also recognises that human-induced climate change and its projected effects are a controversial issue both globally and nationally.

143. The impact that climate change has on indigenous flora and fauna is largely unknown, therefore Waikato-Tainui consider it vital that they actively engage and contribute to any nationally-led initiatives, policies, guidelines and programmes on climate change. Most importantly, Waikato-Tainui wants to avoid any disruption that climate change causes to indigenous ecosystems, Waikato-Tainui cultural and/or spiritual beliefs and/or practices.

144. Climate change is intricately linked with natural hazards, as climate change is predicted to increase the frequency and magnitude of weather-related natural hazards. The WTEP identifies sea level rise, more frequent and intense rainfall as well as increased frequency and duration of drought as likely impacts of climate change. The plan identifies the need to change the way hazards are managed to protect developments in areas that may be at risk in the future and that human activity and the cumulative effect of discharges, farming, industry and commercial practices, and deforestation may adversely contribute to climate change, global warming, and the reduction in the ozone layer.

2.2.6.2 Maniapoto Environmental Management Plan (MEMP)

145. Parts 13 (climate change), 15 (wetlands) and 20 (natural hazards) of the MEMP highlight issues with regards to increasing risk from natural hazards; preparedness and resilience; climate change; and flood protection and drainage.

146. The MEMP defines natural hazards as naturally occurring processes that pose a risk to people and property, and within its rohe includes climate-related hazards such as flooding, drought, coastal hazards and hill country erosion. It also recognises that Maniapoto cannot avoid the events occurring, but can take steps to reduce the risk, prepare responses and increase resilience.

147. The MEMP recognises climate change as a key driver for more frequent and severe natural hazard events.

148. Flood protection and drainage schemes are recognised as key components that ensure continued productivity. Natural infrastructure such as wetlands is a major asset in combating and adapting to climate change.

2.2.7 Catchment Management Plans

149. A number of catchment management plans have been prepared which consider the potential for flooding or significant ponding and the constraints on growth in particular areas. Catchment management plans have been prepared for Ngaruawahia; Tamahere; Port Waikato; Pokeno; Te Kauwhata and Tuakau.

2.2.8 Future Proof Growth Strategy and Implementation Plan 2009

150. Future Proof is a joint strategy prepared by the Waikato Regional Council and district councils – Hamilton, Waikato and Waipa – to manage growth across territorial boundaries. It is a non-statutory document, implemented through the WRPS and district plans, LTPs and other regional strategies. The Strategy includes a section (8.13) on natural hazards and climate change. Key approaches to addressing the challenges of natural hazards and climate change include:

- **Ensuring risks are appropriately assessed before development decisions are made;**

- **In general, directing urban and rural-residential development away from the flood plains, natural ponding areas and poorly drained areas, including areas subject to flood protection schemes;**
- **Proactively identifying, avoiding and mitigating natural hazards and establishing systems and procedures of response;**
- **Educating the community about natural hazards and how to respond to them to increase community resilience;**
- **Linking the growth projects of the Strategy with the CDEM plans;**
- **Avoiding development in areas subject to high likelihood of natural hazards;**
- **Ensuring strategic transport infrastructure is located away from hazard areas.**

2.2.9 Summary of relevant statutory and non-statutory documents

151. Table 4 summarises the relevant provisions from the statutes and documents discussed above.

Table 4: *Relevant legislation and higher order documents*

Document	Relevant provisions Stage 2 is required to take into account/give effect to
Resource Management Act	Sections 2, 5, 6, 7, 8, 31, 35, 75, 106 and Schedule 4
Local Government Act 2002	Sections 10 and 101B
Building Act	Sections 71, 72, 73, 74
Civil Defence and Emergency Management Act (CDEM) 2002	Section 17(3)
Soil Conservation and Rivers Control Act 1941 (SCRCA)	Sections 10, 10A
Local Government Official Information and Meetings Act (LGOIMA) 1987	Section 4
The New Zealand Coastal Policy Statement, 2010	Objectives 3, 4 and 5, Policies 2, 3, 7, 18, 24, 25, 26 and 27
Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010	Schedule 2 - Te Ture Whaimana o Te Awa o Waikato – the Vision and Strategy for the Waikato River
Waikato Regional Policy Statement, 2016	Issues 1.2 and 1.4, Objectives 3.6, 3.7, 3.23, 3.24, Policies 4.1, 6.1, 6.2, 6A, 12.4, 13.1, 13.2, 13.3
Waikato Regional Plan, 2012 (reprinted)	Chapter 5, Objective 5.1.2, Policies 5.1.3
Waikato Regional Coastal Plan 2014	Objective 8.1, Policies 8.1.1, 8.1.2, 8.1.3, 8.1.4
Waikato-Tainui Environmental Plan (Tai	Objective 17.3.1, Policy 17.3.1.1, Objective 17.3.2,

Tumu Tai Pari Tai Ao)	Policy 17.3.2.1, Objective 17.3.3, Policy 17.3.3.1
Maniapoto Environmental Management Plan	Objectives 13.3.1, 13.3.2, 13.3.3, Policies 13.3.1.1, 13.3.2.1, 13.3.3.1 Objectives 15.3.2, 15.3.3, Policies 15.3.2.1, 15.3.3.1. Objectives 20.3.1, 20.3.2, 20.3.3, Policies 20.3.1.1, 20.3.2.1, 20.3.3.1

2.3 Issues

152. The first step in considering how to manage the risks from natural hazards through the District Plan is to set out clearly what resource management issues need to be addressed. This is informed by the legislative and policy framework described above, feedback from iwi, stakeholders and the community; and the technical assessments and information which has been collated. The objectives in the plan should address these issues and set out the outcomes the council plans to achieve.

153. The following tables set out the key issues that form the basis for evaluating the objectives and provisions in the following sections.

Issue statement	**Risks from Natural Hazards** Land use, subdivision and development on land that is prone to natural hazards can increase risks to people, property, infrastructure and the environment and reduces the resilience of the community to natural hazards.
Natural hazards are a result of natural processes that form, shape and alter the environment. These processes can have an adverse effect on human health and safety, property or the environment. Natural hazards which could occur in the district include low frequency but severe consequence events such as earthquakes and liquefaction, volcanic eruptions, cyclones and tsunami hazards, as well as higher frequency hazards such as flooding, coastal inundation, land instability (land slips and subsidence) and coastal erosion. The technical reports for this topic describe the nature and extent of hazards which may be present in the district (these are expanded on below), and what risks they might pose. A large portion of the land within the district is potentially subject to some form of natural hazard. The risk of a natural hazard occurring is based on the likelihood or probability of an event occurring and the impact or consequences that it may have on people, property or the environment. The impact on people and property is dependent on the community's resilience to it. The purpose of the Act is to promote the sustainable management of natural and physical resources where sustainable management includes the protection of these resources in a way that provides for the social, economic and cultural well-being and the health and safety of people and communities. Not managing the risks associated with natural hazard events is contrary to the purpose of the Act. The need to manage risks associated with natural hazards is explicitly expressed in Part 2, Section 6 of the Resource Management Act, in the New Zealand Coastal Policy Statement and the Waikato Regional Policy Statement.	
Flooding and ponding Flooding can be caused by a range of factors and circumstances including: • **high, or particularly intense, periods of rainfall**	

- **snowmelt (which may also coincide with high rainfall)**
- **obstructed waterways or drainage systems (including natural damming after landslips or earthquake, or vegetation blocking drains, creeks or streams).**

Human activity can also contribute to, or exacerbate, flood hazards by, for example:

- **obstructing natural overland flow paths (such as by placing buildings, raised roadways, embankments and other similar obstacles in the flow path or flood channel)**
- **increasing the flow of water into natural or man-made drainage systems (removing vegetation, increasing areas of impermeable surfaces, or increasing the number of stormwater outlets, and thereby the amount of stormwater that enters a particular drainage system[2]).**

The effects of flooding include movement of debris carried by flood waters, build-up of debris against structures, silt and/or mud deposition, erosion, and water damage to buildings and vehicles. Overloaded sewerage systems or transportation of hazardous substances can result in contamination which can adversely affect human health.

The Waikato and Waipa rivers flow through the district and can carry large flood flows, which bears a risk to people, property and the environment. The Lower Waikato has a flood plain of approximately 36,400 hectares. This risk could be increased by heavier and longer periods of rain, which is one of the predicted effects of climate change. Flood modelling has been undertaken to identify where the risks are greatest[3]. The 2D modelling completed for a portion of the Waikato River between Horotiu and Ohinewai and a short portion of the Waipa River between Saulbrey Road and the confluence at Ngaruawahia has also included the effects of climate change based on the RCP 6.0 climate change scenario.

After heavy rainfall, ponding of flood water often occurs across the Waikato basin. Where there is little change in elevation through the river system, this can result in flooding or ponding that can take weeks to drain. This water can reach depths that can cause damage to property and a risk to the safety of communities. This can be an issue on land protected by stopbanks and around the lakes near the Waikato River.

Around 21,500 hectares of the Waikato floodplain is defended by stopbanks, which protect against flooding of specified magnitude anywhere from a 10% AEP to 1% AEP. The 1% AEP stopbanks defend an area of 13,800 hectares and for the purpose of the District Plan are called Defended Areas. Although the stopbanks are designed and constructed to achieve a specified level of protection, there is still a 'residual' level of flood risk from, for example, the stop banks failing or a flood occurring that was larger than the stopbanks were designed to withstand. This residual risk needs to be assessed when considering new development in such areas.

Coastal hazards (inundation, tsunami, coastal erosion)

Storm surge, coastal erosion, sea-level rise, coastal flooding, and tsunami are natural processes that become a hazard when they threaten property and life. Storms can result in flooding and erosion; sandy areas are particularly vulnerable to erosion during coastal storms. Large areas of the district's coastline are remote and undeveloped, but there are areas such as the Raglan Harbour shoreline and Port Waikato which are densely developed and, in places, highly modified. In Raglan and at Port

[2] See the Quality Planning website: https://qualityplanning.org.nz/node/812
[3] During the 1% Annual Exceedance Probability flood event

Waikato, existing residential areas and public reserve are vulnerable to coastal erosion and coastal flooding. The extent and type of hazard varies along the shorelines in these areas, which include open sandy beaches, estuarine intertidal sand flats and beaches, cliffed shorelines, and low-lying estuarine margins.

Tsunami are a series of large waves generated by sudden displacement of water (caused by earthquake, volcanic eruption or submarine landslide) that are capable of travelling over large distances. These waves cause a destructive surge when they reach land, which is a risk to life, property and the environment. This inundation of water can also contain debris. There is only a minor risk of coastal inundation resulting from tsunami along the west coast and Raglan harbour.

Wild fire

Fires can cause damage to infrastructure, property, the environment and loss of life. Fires can be caused by lightning strike or accidentally through human activities (such as sparks from machinery, arson or discarded cigarette butts).

The risks from wild fire in New Zealand is expected to increase in severity and frequency as a result of climate change, which is predicted to result in less rainfall, higher temperatures and stronger winds. More homes (and people) are likely to be at risk as a result of expanding urban development and increasing lifestyle block development in close proximity to forestry. An increase in exotic plantation forests will also add to the risk. While the Waikato Region is less affected than some regions, the risk is still expected to increase.

Land instability and subsidence

Land instability includes landslides, slips, debris flows and subsidence. There are many different types of landslides[4]. The most common landslide trigger is prolonged or intense rainfall, however large earthquakes, volcanic eruptions and geothermal activity can also trigger landslides.

Land instability can cause a risk to life, property, and infrastructure. Communities in hilly areas can be cut off if landslides or slips block access roads or destroy 'lifeline' services such as water, power, telecommunication and transport networks. They can also increase the risk of further erosion.

Landslides on steep land have a greater chance of slope failure. Other factors such as high rainfall, accelerated soil erosion, unstable basement rock structure or earthquakes also increase the risk. Human activities such as mining, quarrying and road construction, explosions and the use of heavy equipment, can also initiate landslides. The removal of vegetation can increase the rate of erosion or increase the rate at which the soil absorbs water, raising the ground water level and de-stabilising the slopes.

Areas of slope instability occur within the Waikato district, but it is difficult to identify and map out all at risk areas, because the level of risk can change under different environmental conditions. Ground shaking, high rainfall and soil type, topography, underlying geology and vegetation type all play a part in the potential for slope failure and some of these factors can change over time.

Subsidence is the sinking of the ground surface due to a loss of underlying support. The early signs of subsidence are not always visible before a major slump occurs. Subsidence can occur on peat soils where soil shrinks when the surrounding land is drained and during dry periods.

Coal mining in the Huntly area has resulted in subsidence in areas where the underlying coal has been extracted. A study (2019) has assessed the risk presented by the closed mine, both in terms of subsidence and methane gas leakage from the mine workings.

[4] For example: earth flows, topples, debris flows, rock falls, block slides, debris avalanches, lateral spreads, and rotational and translational landslides (see the Quality Planning website: https://qualityplanning.org.nz/node/812)

Earthquake and seismic hazards

New Zealand is a high earthquake hazard region. The construction of buildings, roads and other utilities needs to take into account potential seismic hazards, including fault line and mass movement, ground shaking and liquefaction.

A fault is a fracture in the Earth's crust, which can suddenly rupture as stress builds up. In a large rupture, shock waves cause the earth to shake violently and cause an earthquake.

An active fault is a fault that has ruptured repeatedly in the past, and whose history indicates that it is likely to rupture again. Active faults can include faults that weren't previously identified. An active fault increases earthquake risk. There are few known active faults with a surface expression in the Waikato district, although there are number of 'potentially active' or 'inactive' faults.

When the ground shakes, and/or when there is surface rupture on a fault line causing ground deformation, there is likely to be damage and/or destruction of structures built across or near the fault line. Earthquakes may also trigger other hazards such as liquefaction, tsunami, landslides, and flooding, although this depends on the intensity of the earthquake and a combination of other factors such as location, geology, weather and ground conditions and soil types.

Issue statement	**Climate Change** The effects of climate change (including climate variability) can exacerbate weather-related natural hazards and increase mean sea level. This may have adverse impacts on people (including their health and safety), land use, development, infrastructure and the natural environment.

In the Waikato district, climate change is likely to result in overall warmer temperatures, fewer frosts, a decrease in spring rainfall, a rise in mean sea level and increased storm events including extreme winds. This is likely to result in:

- **more frequent droughts leading to water shortages,**
- **more inland flooding and salt water intrusion in low lying coastal areas,**
- **an increase in erosion and land instability,**
- **increased risk of invasive weeds and pests,**
- **higher lake levels and**
- **possible opportunities for a longer agricultural growing season.**

Climate change isn't a natural hazard itself, but it does have an impact on the frequency and intensity of natural processes, including weather-related natural hazard events. Climate change may affect food and water security, and biodiversity, and may increase risks to life and property through impacts on weather-related natural hazards. In coastal areas, the potential for increased coastal flooding and erosion through storm surges and sea level rise will adversely impact coastal margins, including coastal habitats, and coastal development, including infrastructure and public access to the coast.

3 SCALE AND SIGNIFICANCE EVALUATION

154. There is a range of options to address the key resource management issues identified in the previous section. The scale and significance assessment must consider the environmental,

economic, social and cultural effects of the provisions in each option. To identify the scale of the problem, and how significant it might be, the following questions have been asked:

(a) Is the issue of regional- or district-wide significance?

(b) Would it have effects on resources that are considered to be a matter of national importance in terms of Section 6 of the RMA?

(c) Would it adversely affect people's health and safety?

(d) Would it result in a significant change to the character and amenity of local communities?

(e) Would it adversely affect stakeholders with particular or special interests, including Maaori?

(f) Would it limit options for future generations to remedy effects?

(g) Have higher level documents considered the effects and specified how to deal with them?

(h) Would dealing with this issue be likely to result in regulations or other interventions that will impose significant costs on individuals or communities?

(i) A summary of the assessment of the key issues (and associated provisions) is set out in Appendix 8.

Table 5: *Scale and significance assessment*

Issue	Provisions which address the issue	Scale and Significance Reasoning
Land use, subdivision and development on land that is prone to natural hazards can increase risks to people, property, infrastructure and the environment and reduces the resilience of the community to natural hazards.	**Objective 15.2.1** - Resilience to natural hazard risk **Objective 15.2.2** - Awareness of natural hazard risks **Includes Policies 15.2.1.1 – 15.2.2.2, Rules 15.4 – 15.5, Assessment matters** in **15.12** and **Variation 2** and mapped hazard areas shown on the **planning maps**. **Information requirements** in **15.13.** Also includes processes outside the District Plan such as LIMs, Hazard Register, stormwater management plans and CDEM community response plans.	*Overall, this issue is considered to be of district-wide scale and highly significant, because of its potential to adversely affect not just individuals and their property, but the wider community, the natural environment and future generations.*
Risks to people, property, infrastructure and the natural environment from flooding and ponding of flood waters.	**Objective 15.2.1** - Resilience to natural hazard risk **Objective 15.2.2** - Awareness of natural hazard risks **Includes Policies 15.2.1.1 – 15.2.1.6, 15.2.19 – 15.2.1.15 and 15.2.2.1 – 15.2.2.2.** **Rules 15.4 – 15.6** **Assessment matters Variation 2,** mapped hazard areas shown on the	*Overall, this issue is considered to be at a scale which is more than localised, but still a district-wide issue. It is considered of high significance, because of the potential risks to people's health, safety and property, essential infrastructure and the environment. It also has an impact on future generations.*

Issue	Provisions which address the issue	Scale and Significance Reasoning
	planning maps and **information requirements in 15.13**. Also includes processes outside the District Plan such as LIMs, Hazard Register, stormwater management plans and CDEM community response plans.	
Risks of coastal inundation and erosion on people, property, infrastructure and the coastal environment.	**Objective 15.2.1** - Resilience to natural hazard risk **Objective 15.2.2** - Awareness of natural hazard risks **Includes Policies 15.2.1.1 – 15.2.1.9, 15.2.1.11, 15.2.16 – 15.2.1.17 and 15.2.2.1 – 15.2.2.2.** **Rules 15.7 – 15.10.** **Assessment matters Variation 2,** mapped hazard areas shown on the **planning maps** and **information requirements in 15.13**. Also includes processes outside the District Plan such as LIMs, Hazard Register, stormwater management plans and CDEM community response plans.	*Overall, this issue is considered to be localised in scale (the effects are limited to discrete communities on the coastal margin) but of high significance, because of the potential risks to people's health, safety and property, essential infrastructure and the environment. It also has an impact on future generations.*
Risks to people, property, infrastructure and the natural environment from wild fire.	**Objective 15.2.1** - Resilience to natural hazard risk **Objective 15.2.2** - Awareness of natural hazard risks **Includes Policy 15.2.1.18 and 15.2.2.1 – 15.2.2.2.** **Assessment matters Variation 2.** Also includes processes outside the District Plan such as Hazard Register.	*Overall, this issue is considered to be of local scale and of lower significance at present. The significance of this issue is expected to increase over time with climate change.*
Risks to people, property, infrastructure and the natural environment from landslides, slips and subsidence, including mine subsidence.	**Objective 15.2.1** - Resilience to natural hazard risk **Objective 15.2.2** - Awareness of natural hazard risks **Includes Policy 15.2.1.19 – 15.2.1.20 and 15.2.2.1 – 15.2.2.2.** **Assessment matters Variation 2.** Also includes processes outside the District Plan such as stormwater management plans, CDEM community response plans and the Hazard Register.	*Overall, the risks to people, property and the environment from landslides, slips and subsidence is considered to be an issue of lower significance and local scale, because only a very small percentage of land in the district is subject to such hazards.*
Risks to people, property, infrastructure and the natural environment from	**Objective 15.2.1** - Resilience to natural hazard risk **Objective 15.2.2** - Awareness of natural hazard risks **Includes Policy 15.2.1.22 –**	*A large earthquake could happen in Waikato District and liquefaction could be severe in localised areas of Holocene soils. The Waikato district could also be significantly*

Issue	Provisions which address the issue	Scale and Significance Reasoning
earthquakes and lliquefaction of soils.	**15.2.1.23 and 15.2.2.1 – 15.2.2.2. Assessment matters Variation 2** and **information requirements** in **15.13**. Also includes processes outside the District Plan such as LIMs, Hazard Register, and CDEM community response plans.	*affected by a large earthquake in the lower North Island or upper South Island which could have a significant impact on people, property, infrastructure and the natural environment. The risk is considered to be of a localised scale but of high significance.*
The effects of climate change (including climate variability) can exacerbate weather related natural hazards and increase mean sea level. This may have adverse impacts on people (including their health and safety), land use, development, infrastructure and the natural environment.	**Objective 15.2.3** - Climate change Includes **Policies 15.2.3.1 – 15.2.3.5** and includes **2D flood hazard modelling** and the **coastal hazard assessment** and **coastal hazard maps.** **Rules 15.4, 15.5, 15.7** and **15.8** and **assessment matters** in **Variation 2.**	*Climate change is a slow onset phenomena that has the potential to significantly adversely affect people not just at the individual and property level but also across the wider community through adverse effects on infrastructure, the natural environment and the social, cultural and economic wellbeing of current and future generations. Mitigation measures to reduce the effects of climate change (i.e. either a reduction in activities that produce greenhouse gas emissions or activities that help to reduce the amount of greenhouse gas emissions entering the atmosphere) are challenging, complex and difficult to administer.* *A certain degree of climate change is already locked in regardless of any efforts to reduce carbon emissions. For this reason, it is important to focus on adapting to impacts such as coastal inundation and erosion resulting from sea level rise and potential increase in the scale and intensity of weather-related natural hazard events.* *Overall, this issue is considered to be of district-wide scale and highly significant.*

4 EVALUATION OF OBJECTIVES

155. Having considered the scale and significance of the issues which are to be addressed, the council is required to consider what options or approaches it could adopt to address them. The Act enables objectives, policies and rules/methods to be specified under the district plan to address resource management issues. In terms of the objectives, an evaluation under s32 of the Act is required to determine whether the objectives chosen are the most appropriate objectives to achieve the purpose of the Act. That evaluation is provided below.

156. To assist this evaluation three options have been identified.

- **Option 1 -** Status quo/do nothing option: retain the existing objectives in the Operative District Plan.
- **Option 2 –** Develop amended and/or new objectives
- **Option 3 -** Step back from a district plan regulatory approach and rely on other methods – no objectives.

157. An evaluation of whether the objectives chosen are the most appropriate to achieve the purpose of the Act includes an assessment of whether the objectives give effect to the relevant higher order statutory directions promulgated under the Act. The most important statutory directions and documents have been identified in Section 2. This includes the WRPS (particularly objectives 3.6 and 3.24 and the policies and methods in Chapter 13) and the NZCPS (particularly objective 5 and policies 3, 24, 25, 26, and 27). These statutory directions are discussed below.

4.1 Evaluation Summary

158. The evaluation of the objectives is provided in Table 6 below. The existing objectives in the Operative Plan (Option 1) are considered against amended/new objectives (Option 2) and other methods/no district plan objectives (Option 3).

Table 6: *Evaluation of the objectives*

Objective - Most appropriate way to achieve the purpose of the Act	
Existing Objectives (Option 1)	**Summary of evaluation**
Waikato Section 5.2.1 Risks from natural hazards to health, safety and property, resulting from use, development or protection of land, are minimised. **Tamahere Country Living Zone** 5.2.11 Hydrological characteristics of the Mangaonua, Mangaone and Mangaharakeke Streams and their tributaries are retained. 5.2.15 Risks from ponding of surface water and poor drainage are avoided. **Franklin Section**	Individually the objectives, particularly Objective 5.2.1, address key resource management issues and Part 2 of the Act. However Objective 5.2.1 only applies over the Waikato Section geographical area of the district, and the objectives (7.2.2, and 17E.7.3) only apply over the Franklin geographical area of the district. As a package the existing suite of objectives currently contained within both sections of the Operative Plan need to be rationalised and amended to: • be consistent over the entire amalgamated district; • give better effect to the Act and WRPS by incorporating an objective on climate change (section 7(i) of the Act, and Objective 3.6, WRPS); • providing stronger direction to avoid the effects of natural hazards or appropriately mitigate (s31 of the Act), and; • focus on community resilience and reducing risk (Objective 3.24 of the WRPS). In terms of Option 1 (the status quo) the possibility of utilising the Franklin Plan provisions over the entire district or conversely the Waikato Section provisions over the entire district, rather than the

7.2.2 Objectives **Instability** 1) To ensure activities on land subject to, or likely to be subject to instability, do not cause, increase or contribute to the risk from natural hazards. **Inundation** 2) To ensure that the risk to property and the environment from flooding caused by watercourse, stormwater overflow and inundation by coastal waters are reduced. **Erosion** 3) To ensure that the adverse effects to property and the environment from erosion including coastal erosion are avoided, remedied or mitigated. **General** 4) To ensure that the public are informed about natural hazards in the district and understand why subdivision, land use and development activities must avoid, remedy, or mitigate the adverse effects from natural and land hazards. **17E.7.3 Tasman Coast Objectives** To recognise natural coastal processes by avoiding subdivision, use and development which would create coastal hazards.	separate operative provisions as they currently fall within each geographic section of the district was also considered. This was disregarded as neither Objective 5.2.2 in the Waikato Section or the suite of objectives in the Franklin Section in themselves fully gave effect to the WRPS. It was also noted that the Franklin objectives where phrased more like policies. It was considered that amalgamating and redrafting would be more appropriate and result in objectives that would be more effective in achieving the purpose of the Act and Part 2, than retaining the existing objectives.
Proposed Objectives (Option 2	**Summary of evaluation**
Strategic objective: The choice, location and design of development in the district takes into account the risks from natural hazards and	The proposed strategic objective has no equivalent in the Operative Plan, but is considered appropriate as an overarching objective to achieve the purpose of the Act, thus providing for the protection of natural and physical resources, the health and safety of communities, and for their social, economic and cultural

potential impacts of climate change. **Objective 15.2.1 - Resilience to natural hazard risk** A resilient community where risks from natural hazards to people, property, infrastructure and the environment from subdivision, use and development of land are avoided or appropriately mitigated. **Objective 15.2.2 – Awareness of natural hazard risks** A well-informed community that: (a) Is aware of, and understands which natural hazards affect the district; and (b) Is able to effectively and efficiently respond to, and recover from, natural hazard events. **Objective 15.2.3 - Climate change** A well-prepared community that: (a) is able to adapt to the effects of climate change; and (b) has transitioned to development that prioritises lower greenhouse gas emissions.	wellbeing (Part 2, section 5 – Act). This objective sets the overall importance of assessing natural hazard risk (s6(h), s31, and s106 Act and considering climate change (7 (i) Act) in deciding on the location and design of future development in the district. The strategic objective ties in with and complements the three objectives proposed in the Natural Hazards and Climate Change Chapter. Proposed Objective 15.2.1 is an amended form of the existing general objective 5.2.1 in the operative Waikato Section. It is considered that this objective is appropriate to provide an overall objective that is applicable over both geographic sections (Franklin and Waikato) covered by the existing Operative Plan. It achieves the purpose of the Act (Part 2, s5) and has specific regard to s6(h) (management of significant risks from natural hazards), s31 and s106. The following higher statutory documents are given effect to: • the WRPS, and specifically Objective 3.24 Natural Hazards, which requires that the effects of natural hazards on people, property and the environment are managed by increasing community resilience to hazard risks; reducing risks to acceptable/tolerable levels, and enabling efficient and effective response and recovery from natural hazard events. Where the risks from natural hazards associated with subdivision, use and development are avoided or mitigated as per proposed Objective 15.2.1 community resilience will increase and risks will be reduced to acceptable levels. This will be achieved through targeting areas of greatest risk, implementing measures such as avoiding rezoning in areas subject to risks from natural hazards or mitigating the risk such as through setting appropriate minimum floor levels. • the NZCPS and specifically objective 5. Objective 15.2.1 applies to natural hazards which includes coastal hazards. Objective 15.2.1 anticipates an outcome where new development is required to be directed away from areas prone to coastal hazard risk (avoided) unless able to be appropriately mitigated (i.e. no longer prone to risks). Overall, proposed Objective 15.2.1 drives a risk-based approach as required by the WRPS, which enables policies and rules to be developed that recognise, spatially and over time (through planning map overlays), where and when avoidance is necessary and where and when mitigation is appropriate depending on the level of risk, to achieve a more resilient community. The target land use planning activities are clearly stated as subdivision, use and development. The objective recognises that managing natural hazards through managing the activities occurring in the environment will reduce the level of risk from natural hazard events for future generations. The proposed objective is therefore more appropriate and efficient in achieving the purpose of the Act than Option 1 or 3. Resource management issues identified in Section 2.3 are

	addressed by this objective. Proposed Objective 15.2.2 amends and extends the Objective 7.2.2 General in the Franklin Section of the Operative Plan which identifies the need to ensure the public is aware of natural hazards. The revised objective 15.2.2 improves on this original objective and gives better effect to the WRPS (which requires the WRC to store natural hazard information which is available and relevant to the Waikato Region, and share this information with territorial authorities and other relevant stakeholders). It also better considers the CDEM Act (which encourages readiness for a natural hazard event and has a mandate to increase public awareness). The WRPS, specifically requires through Objective 3.24 that effects of natural hazards on people, property and the environment are managed by enabling the effective and efficient response and recovery from natural hazard events. Proposed Objective 15.2.2 is consistent with and gives effect to Objective 3.24. Proposed Objective 15.2.2 also gives effect to WRPS requirement 13.1.5, to develop and implement public education and awareness programmes on natural hazards and their associated risks, in collaboration with other agencies. Furthermore, the council is required under section 35 of the Act to gather information in areas subject to natural hazards. This objective will drive practices to ensure that the council continues its obligation to gather more technical information as appropriate and use it in its district planning maps, its GIS systems and other documents as appropriate, increasing public awareness of natural hazards. While it is largely a "process objective" it is considered appropriate to achieve Part 2 of the Act (enabling communities to provide for their social, economic and cultural well-being). This objective, therefore, assists the council to carry out its functions under the RMA s31(1)(a) and (b). There are also considerable obligations under LGOIMA and the LGA to enable people to find out information and be aware of the natural hazards in the district. It is not feasible to identify and map every hazard prone area on the planning maps, because of costs and information deficiencies. Information provided under this objective will help to enable communities to provide for their health and safety against these types of hazards. Under the status quo option (Option 1) of retaining the operative provisions, it is noted that there is no similar objective in the Waikato Section. The Franklin Section objective would be required to be extended over the Waikato section geographical area if it was to be retained in its entirety. Overall, it is considered that the proposed objective 15.2.2 is clearer and is an appropriate improvement to the operative provision. Objective 15.2.2 achieves the purpose and principles of the RMA and makes a material contribution to sustainable management (s5) and managing the risks of natural hazards (s6) by improving community knowledge and resilience to natural hazards. Resource management issues identified in Section 2.3 are

	addressed by this objective. Objective 15.2.2 addresses the risks of natural hazards through increasing the community's awareness and understanding, which will influence development proposals and help to redress market failures. The objective is realistically able to be achieved. While public information programmes will require funding independently of the District Plan, the funding requirement is not excessive and it is realistic that it can be achieved with the council's civil defence emergency management programmes. It will not result in unjustifiably high costs on the community or part of the community. The collaborative approach required under the regional policy statement will share the costs between relevant central and local government agencies. Overall, it is considered that this objective is appropriate in achieving the purpose of the RMA. A well-informed community is usually more able to effectively respond to natural hazard events. Proposed Objective 15.2.3 is a new objective. It has no similar counterpart in the Operative Plan (Option 1). It is considered that this new objective (first limb) provides an objective that is applicable over both geographic sections (Franklin and Waikato). It gives effect to Part 2, particularly s5, and s7(i), and s31 of the Act and the following higher statutory documents: • the WRPS, and specifically Objective 3.6 - Adapting to climate change, which requires that land use is managed to avoid potential effects of climate change-induced weather variability. The WRPS objective focuses on the built environment, infrastructure, indigenous biodiversity, natural character, public health and safety and public access, which is addressed in the first limb of the proposed objective. • the coastal hazards and climate change focus of the NZCPS and specifically objective 4 and 5 in relation to the effects of inland migration and adaptive responses (e.g. managed retreat). The second limb of the proposed objective focuses on the need to address greenhouse gas emissions which gives appropriate regard to Climate Change Response (Zero Carbon) Amendment Act 2019. Overall, proposed Objective 15.2.3 is more consistent with the WRPS and the intentions of the Zero Carbon Amendment Act. Proposed Objective 15.2.3 more appropriately addresses s7(i) of the Act than Option 1 or 3. Resource management issues identified in Section 2.3 are addressed by this objective. Neither Option 1 nor Option 3 give better effect to the higher order statutory directions outlined above. Consequently, it is considered that the proposed objectives in Option 2 are more appropriate and efficient to achieve the Act.
Other methods (Option 3)	This option comprises a less directive/regulatory approach than

– no objective in the District Plan	would be provided by including objectives and policies in a district plan. Such an approach could include the use of guidelines, relying on the Building Code, insurance, and evacuation plans under CDEM. The higher order documents, require district plans to include objectives, policies and rules/methods to address natural hazards and climate change in controlling appropriate subdivision, use and development. An approach devoid of objectives and a supporting framework of provisions would not give effect to the higher order documents. The third option could involve a strategy where district planning provides less direction rather than no direction. Such an approach would include an objective which effectively handed the responsibility over to other institutions or individual property owners to undertake their own future planning for natural hazards and climate change but with a corresponding increase in measures outside the District Plan, such as GIS information and guidelines for developing in hazard prone areas. Under either approach, Option 3 would provide minimal incentive for land developers and property owners to avoid or mitigate natural hazard risk. Relying on insurance is, however, a form of mitigation which could be effective to an extent. Overall, the Waikato District Council would not be upholding its obligations and responsibilities under s31, s6(h), s(7) and s106 of the Act if it did not include objectives and supporting provisions in the District Plan. Furthermore, the council would fail to give effect to the WRPS in terms of the policies and implementation methods required of district councils in the management of natural hazards (Chapter 13) and consideration of climate change (Objective 3.6). It is noted that Options 1 and 2 above, are able to be supplemented by the type of direction offered in Option 3 such as guidelines, GIS information, hazard portals, insurance, reliance on the Building Code and CDEM activities. These methods remain effective additions to any strategy to address natural hazard risk. Overall, however, Option 3 fails as it would not give effect to the higher statutory documents or the obligations of district councils under s31 of the Act, and is not a complete option on its own.

4.2 Recommendation

159. The recommendation is to adopt Option 2 which includes two amended and rationalised objectives and a new objective in order to:

- give better effect to the higher order planning documents particularly Objective 3.24 and Objective 3.6 of the WRPS;

- provide a more focused, streamlined and updated set of objectives on which to develop more directive provisions on natural hazards and provide a new objective on climate change;

160. The proposed objectives (Option 2) are in accordance with the purpose and principles of the Act and reflect the role and functions of the council in respect to natural hazards and climate change. Overall, the proposed objectives support a risk-based approach which is consistent with the WRPS and are considered the most appropriate to achieve the purpose of the Act.

5 EVALUATION OF PROPOSED POLICIES, RULES AND METHODS

161. Once the objectives are chosen, the council must consider a range of policy options and decide which of these options would be the most appropriate way to achieve the objectives. In choosing an option, the council must think about how efficient and effective that option would be if it was put into place. This includes identifying the benefits and costs of any environmental, economic, social and cultural effects that would arise if the option was implemented, and any opportunities it might provide for economic growth and employment. The benefits and costs should be quantified where practicable. The council must also assess the risk of acting or not acting if there is uncertain or insufficient information available.

162. This is a complex process, and the council is not required to conceive of and consider every possible course of action.

5.1 Identification of reasonably-practicable options – for achieving objective(s)

163. The following tables set out the broad options that were considered for achieving the objectives that the council considers to be the most appropriate to achieve the purpose of the RMA and the high-level screening process that was undertaken to consider how effective each broad option might be. Only those options considered to be reasonably practicable have been evaluated.

164. The options evaluated comprise broad approaches, rather than detailed provisions and range from a non or minimal regulatory approach through to a more restrictive regime of new provisions to manage natural hazard risk.

165. To identify the broad options, the council considered:

- **Option 1: Status quo** – retain existing objectives, policies and rules in the operative plan including where they fall geographically. Alternatively:
    - **Sub Option 1a:** Status quo for Franklin Section part of the district, and amend Waikato Section so that Franklin provisions extend to the part of the district currently covered by the Waikato section.
    - **Sub Option 1b:** Status quo for Waikato section part of the district and amend Franklin Section so that Waikato provisions extended to the part of the district currently covered by the Franklin section.
- **Option 2: New or revised objective and policy framework** to strengthen and reflect new information and updated statutory directions.
    - **Sub Option 2a:** A more restrictive regime which does not provide permitted activities in natural hazard areas.
    - **Sub Option 2b:** A less restrictive new regime with greater use of permitted activities and restricted discretionary activities

- **<u>Option 3: Non or minimal regulatory approach</u>** - Relies largely on other legislation such as the Building Act and the Civil Defence Emergency Management Act, non-regulatory guidelines, technical information, GIS mapping information and insurance.

Table 7: *Reasonably Practicable Options for Achieving Objective*

Objective(s)	**Objective 15.2.1 - Resilience to natural hazard risk** A resilient community where the risks from natural hazards to people, property, infrastructure and the environment from subdivision, use and development of land are avoided or appropriately mitigated.				
Options Approach to achieve objective(s)	**Description (brief)** Describe the option and acknowledge the source of this option (if there is one e.g. feedback from consultation, suggestions from workshops with elected members etc).	**Relevance** How effective provisions are in achieving the objective(s).	**Feasibility** Within council's powers, responsibilities and resources, degree of risk and uncertainty of achieving objectives, ability to implement, monitor and enforce.	**Acceptability** Level of equity and fair distribution of impacts, level of community acceptance. Where possible identify at a broad level social, economic, environmental, cultural effects.	**Recommendation** Discard or evaluate further (with brief explanation).
<u>Option 1: Status quo</u> Retain existing objectives policies and rules as they currently stand in both sections of the ODP	Retain existing objectives, policies and rules in the operative plan including where they fall geographically.	The Operative District Plan contains objectives, policies and rules to reduce risk of natural hazards and increase resilience. Currently the plan has two sets of provisions and provides an inconsistent approach to achieving the objective. The Operative District Plan does not include mapped coastal hazard areas, minimal flood hazard and ponding areas, no provision for	This option does not meet council's responsibility to give effect to the WRPS and the NZCPS.	This option does not provide a consistent approach across the district.	**Discard**

		liquefaction, and no residual risk areas.			
Option 2: New or revised objective and policy framework	New objective and policy framework developed to strengthen and reflect new information and updated statutory directions.	Option 2 provides a comprehensive suite of policies, rules and other methods (including hazard maps) to achieve the objective.	This option is within council's powers, and meets council's statutory responsibilities. Council has the ability to implement, monitor and enforce this option. There is a low degree of risk and uncertainty of achieving the objective with this option.	Option 2 includes new hazard mapping which provides certainty to the whole community. Rules apply to mapped hazard areas, with the exception of ponding areas that may occur throughout the district. This approach reduces the requirement to unnecessarily carryout hazard assessments to determine if a site is subject to a hazard. This option introduces assessment criteria for evaluation of liquefaction vulnerability (required at the time of subdivision and proposals for multi-unit development). However, this is currently a requirement for subdivision applications under the Operative District Plan to satisfy s106 RMA.	**Further evaluation**
Sub Option 2a: A more restrictive	New objective with a more restrictive policy framework which does	Option 2a would provide a similar suite of policies, rules and other	This option does not meet council's responsibility to give	This option would not provide a level of equity and fairness or a high	**Discard**

regime	not provide permitted activities in natural hazard areas.	methods (including hazard maps) to achieve the objective, but would strengthen policies to be less enabling. Rules would be less permissive and require consent for any activity in an identified hazard area. This option would achieve the objective.	effect to the WRPS and the NZCPS.	level of community acceptance as it would unnecessarily increase the cost of development and number of consents required to achieve the same outcomes as Option 2.	
Option 3: Non or minimal regulatory approach-	Minimal regulatory intervention within the district plan. Relies largely on other legislation such as the Building Act and the Civil Defence Emergency Management Act, non-regulatory guidelines, technical information, GIS mapping information and insurance.	Option 3 potentially reduces the number of policies, rules and other methods (including hazard maps) and would rely on other legislation and ad hoc methods to achieve the objective. Although mapping would be available, it would rely on the building consent process to manage risk and new subdivision applications to assess significant risk of natural hazards. CDEM would be responsible for reducing risk through readiness, response and recovery.	A number of the regulatory and non-regulatory guidelines and methods are within council's powers and responsibility to regulate and control. This approach would not absolve council from its responsibility to give effect to the WRPS or the NZCPS by providing a risk-based policy approach and hazard mapping in the District Plan.	This option does not provide a consistent approach across the district and does not provide a high level of certainty to the community, council, insurers and other agencies and stakeholders. It may result in inconsistent outcomes, and be ineffective and reducing risk and increasing resilience.	**Discard**

Objective(s)	**Objective 15.2.2 - Awareness of natural hazard risks** A well-informed community that: (a) is aware of, and understands, which natural hazards affect the district; and (b) is able to effectively and efficiently respond to, and recover from, natural hazard events.				
Options Approach to achieve objective(s)	**Description (brief)** Describe the option and acknowledge the source of this option (if there is one e.g. feedback from consultation, suggestions from workshops with elected members etc).	**Relevance** How effective provisions are in achieving the objective(s).	**Feasibility** Within council's powers, responsibilities and resources, degree of risk and uncertainty of achieving objectives, ability to implement, monitor and enforce.	**Acceptability** Level of equity and fair distribution of impacts, level of community acceptance. Where possible identify at a broad level social, economic, environmental, cultural effects.	**Recommendation** Discard or evaluate further (with brief explanation).
Option 1: Status Quo Retain existing objectives policies and rules as they currently stand in both sections of the ODP	Rely on current policies and methods in the Operative District Plan (both sections)	The ODP contains policies and methods relating to information and advocacy. However it is more effective and efficient to update the policy framework to be more directive in terms of outlining the methods through which information can be made available to the public in order to achieve Objective 15.2.2.	Council has a responsibility to control the effects of the use, development or protection of land for the purpose of avoiding or mitigating natural hazards and to manage significant risks from natural hazards. As a consenting authority Council can also refuse subdivision consents where there is significant risk of natural hazards. It is more efficient for	Providing up to date information on natural hazards and making it available to the public fairly distributes the information and any impacts of that information. Without up to date information being available means the community will look elsewhere for information and this may be adhoc and hard assess This option would not be as effective for	**Discard**

			Council to have up to date information on natural hazard risk areas and to make that available to the public.	informing the community.	
Option 2: New objective and policy framework developed to be more directive and reflect new information and updated higher order statutory direction.	Information would be made available through LIMs, the hazards register, Stormwater Catchment Management Plans on the Council website, district planning maps, Regional Hazards Portal, signage, education, and community engagement and developing awareness of CDEM Community Response Plans Improved community awareness of community response plans will help to improve response to and recovery from natural hazard events.	It is more effective and efficient to update the policy framework to be more directive in terms of outlining the methods through which information can be made available to the public in order to achieve Objective 15.2.2.	This is feasible as being within council control. New risks can be included as it emerges over time. Education programmes can be developed in collaboration with other agencies. This is feasible as being within council control and can programmes be developed in collaboration with other agencies.	It is more efficient and cost effective for Council and the community when Council carry out hazard modelling; collect and store hazard information; develop community response plan and make all information available to the public so all parties have access to the same information. This will be acceptable to stakeholders. While LIM reports can be controversial, the messaging can be managed appropriately. The majority of the community can access the council website. This will be acceptable to stakeholders. Engagement with communities on the	**Evaluate further**

				plans will assist to increase knowledge of the plans and the hazards. This option allows for gradual development of community knowledge in accessible ways. This option helps to develop a well-informed community able to respond to, and recover from, natural hazard events.	

Objective(s)	**Objective 15.2.3 - Climate change** A well-prepared community that: a) is able to adapt to the effects of climate change; and b) has transitioned to development that prioritises lower greenhouse gas emissions.				
Options Approach to achieve objective(s)	**Description (brief)** Describe the option and acknowledge the source of this option (if there is one e.g. feedback from consultation, suggestions from workshops with elected members etc).	**Relevance** How effective provisions are in achieving the objective(s).	**Feasibility** Within council's powers, responsibilities and resources, degree of risk and uncertainty of achieving objectives, ability to implement, monitor and enforce.	**Acceptability** Level of equity and fair distribution of impacts, level of community acceptance. Where possible identify at a broad level social, economic, environmental, cultural effects.	**Recommendation** Discard or evaluate further (with brief explanation).

Option 1: Status quo Retain existing objectives policies and rules as they currently stand in both sections of the ODP	Retain existing objectives, policies and rules in the operative plan including where they fall geographically.	Minimal provision for either mitigating or adapting to climate change in either section of the ODP. Operative provisions do not give effect to the WRPS or the NZCPS.	Council has a statutory obligation to give effect to higher order policy documents prepared under the RMA. The Status Quo provisions do not give effect to the WRPS or the NZCPS in respect of addressing the projected effects of climate change. This option does not achieve this.	Retaining the status quo provisions will not provide certainty for current or future generations, could place the community at risk, reducing resilience of communities over time and burdening future generations with the cost of retreating from future hazard areas.	Discard
Option 2: New or revised objective and policy framework	New objective and policy framework developed to strengthen and reflect new information and updated statutory directions.	New provisions provide a comprehensive approach to addressing the projected effects of climate change, including guidance on the allowances to use when undertaking technical assessments. Policies support Stage 1 coastal setback rules and support a precautionary approach when there is insufficient information or uncertainty with regards to the scale of future effects, such as the rate and timing of sea level rise.	Council has a statutory obligation to give effect to higher order policy documents prepared under the RMA. The Status Quo provisions do not give effect to the WRPS or the NZCPS in respect of addressing the projected effects of climate change.	This option provides more certainty to council officers and the community with regards to the most up to date flood and coastal hazard modelling, incorporating climate change projections based on national guidelines. This option also provides guidance on assessing the effects of climate change in technical assessments using most up to date national guidelines. The enable adaptive pathways approach	Further evaluate

				results in a higher level of resilience and reduces financial burden for future generations.	

5.2 Evaluation of selected options

166. The tables in section 5.1 set out the high-level screening that was undertaken to narrow down the broad options that should then be evaluated in more detail. This section contains an evaluation of those options which warranted further consideration.

167. The short list of options has been developed further to include the specific polices, rules and other methods (provisions). In some instances, these provisions have been bundled into packages of provisions where they are designed to work together to provide a comprehensive approach to achieving the relevant objective. Each evaluation focuses on the approach that is taken by each package of provisions, rather than a detailed analysis of every policy and every rule. The level of detail in each evaluation depends on the extent to which the options are departing from the existing District Plan provisions and the scale and significance of each option.

168. The provisions (policies and rules, or other methods) that work together to achieve the three objectives can be separated into eight bundles. The objectives, the overall policy framework to address each objective and the bundles of provisions are set out in the table below. In some cases policies can appear in multiple bundles. This is due to the provision to address multiple hazards within some of the more general policy.

Objective	Policy Framework	Bundles
15.2.1 Resilience to natural hazard risk A resilient community where the risks from natural hazards to people, property, infrastructure and the environment from subdivision, use and development of land are avoided or appropriately mitigated.	Policies 15.2.1.1 to 15.2.1.23 work together to achieve Objective 15.2.1 and are structured to include general policies and rules to address significant hazard risk for a range of activities; general policies and rules to address activities on land outside high risk areas; and policies and rules or matters of restricted discretion to address specific natural hazards or activities in hazard areas. The specific hazards include flooding and ponding, flood management infrastructure, coastal inundation and erosion, including current risk areas and areas potentially at risk with 1 metre of sea level rise, coastal hazard protection works, earthworks in hazard areas, hazardous substances within the floodplain, stormwater management, fire risk, land instability, mine subsidence and liquefaction.	There are a number of policies to address different types of hazards that work together to achieve objective 15.2.1. These policies can be evaluated together in the following bundles: **(1) <u>Floodplain Management Area</u>** • Policies 15.2.1.1 – 15.2.1.6, and 15.2.1.11 - 15.2.1.15; • Rules 15.4 and 15.5; and matters of restricted discretion in stage 1 PDP rules; • Floodplain Management Area, High Risk Flood Area and Ponding Area Mapping. **(2) <u>Defended Areas</u>** • Policy 15.2.1.10; • Rules 15.6 • Defended Area Mapping. **(3) <u>Coastal Hazards</u>** • Policies 15.2.1.1 – 15.2.1.9,

		15.2.1.11, 15.2.1.16 and 15.2.1.17; • Rules 15.7 to 15.10; • Coastal Sensitivity Area and High Risk Coastal Hazard Area mapping. **(4) <u>Natural Features and Buffers</u>** • Policy 15.2.1.9 • Rules 15.4, 15.9 and 15.10 and building setbacks from the coast (Stage 1 PDP rules) **(5) <u>Fire Risk, Land Instability and Subsidence</u>** • Policies 15.2.1.18, 15.2.1.19 and 15.2.1.21; • Matters of restricted discretion in Stage 1 subdivision rules. **(6) <u>Mine Subsidence</u>** • Policies 15.2.1.19 – 15.2.1.21; • Mine Subsidence Risk Area mapping. **(7) <u>Liquefaction</u>** • Policies 15.2.1.22 and 15.2.1.23; • Matters of restricted discretion in Stage 1 subdivision rules.
15.2.2 Awareness of natural hazard risks A well informed community that: (a) is aware of and understands which natural hazards affect the district, and (b) is able to effectively and efficiently respond to and recover from natural hazard events.	The policy framework to support this objective includes two policies that set out a range of methods to increase community awareness of natural hazard risk. The associated methods, with the exception of hazard overlay areas on the planning maps, are non-regulatory methods and processes that sit outside the District Plan.	**(8) <u>Awareness of natural hazard risks</u>** The following policies, rules and/or other methods work together to achieve objective 15.2.2 and can be evaluated as one bundle: • Policies 15.2.2.1 and 15.2.2.2; • Hazard overlay areas on planning maps; • CDEM processes; • Other means of making information to the public.
15.2.3 Climate change A well prepared community that: (a) is able to adapt to the effects of	The policy framework to support this objective includes guidance for allowances when assessing the projected effects of climate change, mitigation and adaptation methods, taking a precautionary approach,	**(9) <u>Climate change</u>** The following policies, rules and/or other methods work together to achieve objective 15.2.3 and can be evaluated as one bundle:

climate change; and (b) has transitioned to development that prioritises lower greenhouse gas emissions	assessing the impacts of climate change on natural hazards and providing sufficient coastal setbacks for new development. These policies largely provide guidance for assessments that are undertaken to ensure development can either avoid, remedy (adapt to) or mitigate the impacts of climate change.	• Policies 15.2.3.1 to 15.2.3.5; • 2D flood modelling; • Coastal Sensitivity Areas mapping; • Rules 15.4, 15.5, 15.7, 15.8 • Rules 15.9 and 15.10 and all coastal setback rules in Stage 1 PDP apply to Policy 15.2.3.4

169. The general approach taken to managing natural hazard risk is to strictly regulate vulnerable land uses and development and certain activities within high risk areas, while applying a more lenient approach to land use and development outside high risk areas where realistic and effective mitigation measures can be utilised to reduce risk. For this reason the high risk areas within the Floodplain Management Area and the Coastal Hazard areas have been evaluated separately.

170. The evaluation of the effectiveness and efficiency of each bundle of provisions in achieving the objective is set out in the following tables. In some cases, where there is limited information available, the effectiveness and efficiency of each option cannot be quantified. In these instances, the evaluations rely on qualitative analysis, national and regional policy guidance and guidelines and best practice approaches.

5.2.1 Flooding and ponding

Provisions (Policies, Rules, Methods) most appropriate way to achieve the objective
Objective 15.2.1 Resilience to natural hazard risk A resilient community where the risks from natural hazards to people, property, infrastructure and the environment from subdivision, use and development of land are avoided or appropriately mitigated.

Evaluation of Option 2: New or revised policy and rules/methods to strengthen and reflect new information and updated statutory directions.

Policies relating to Flood Risk	
Provisions most appropriate	**Effectiveness, Efficiency, Benefits & Costs**
<u>High Risk Flood Areas</u> **Policy 15.2.1.1 - New development in areas at significant risk from natural hazards** (a) Avoid new subdivision, use and development where it will increase the risk to people's safety, well-being and property in the following areas identified as being at significant risk from natural hazards: (i) High Risk Flood Area; (ii) High Risk Coastal Hazard (Inundation) Area; (iii) High Risk Coastal Hazard (Erosion) Area. **Policy 15.2.1.2 – Changes to existing land use and development in areas at significant risk from natural hazards** (a) In areas of High Risk Flood, High Risk Coastal Hazard (Erosion) and High Risk Coastal Hazard (Inundation), ensure that when changes to existing land use activities and development occur, a range of risk	**<u>Effectiveness and Efficiency</u>** • Land use provisions that avoid subdivision, use and development occurring in localities where there is potential for increased risk from flood hazards, or require mitigation to ensure that the risk does not increase, have been found nationally and internationally to be an effective means of flood risk management. It reduces the risk of harm to people and property, including infrastructure, during large flood events. • The proposed policies (Option2) identify specific areas likely to be affected by a 1% AEP design flood event as required by Method 13.2.6 of the WRPS (a large flood event). The mapped area (overlay) shows the flood extent and spatially limits where the policies and rules apply. This is more effective, efficient and certain than having policies and rules applying across the board (with no mapped extent) as per both Waikato and Franklin Sections of the existing Operative Plan (Option 1). These existing Operative Plan provisions rely on various sources of information to determine where the 1% AEP flood plain and ponding areas occur. • It is noted, however, only two flood ponding areas have been identified

reduction options are assessed, and development that would increase risk to people's safety, well-being and property is avoided. **Policy 15.2.1.3 – New emergency services and hospitals in areas at significant risk from natural hazards** (a) Avoid locating new emergency service facilities and hospitals in areas which are at significant risk from natural hazards, including High Risk Flood, High Risk Coastal Hazard (Inundation) and High Risk Coastal Hazard (Erosion), unless, considering engineering and technical constraints or functional and operational requirements, they cannot be reasonably located elsewhere and will not increase the risk to or vulnerability of people or communities. **Policy 15.2.1.4 – New infrastructure and utilities in areas subject to high risk natural hazards** (a) Enable the construction of new infrastructure and utilities in areas at significant risk from natural hazards, including High Risk Flood, High Risk Coastal Hazard (Inundation) and High Risk Coastal Hazard (Erosion) areas only where: (i) the infrastructure and utilities are technically, functionally or operationally required to locate in areas subject to natural hazards, or it is not reasonably practicable to be located elsewhere; and (ii) any increased risks to people, property and the environment are mitigated to the extent practicable; and (iii) the infrastructure and utilities are designed, maintained and managed, including provision of hazard mitigation works where appropriate, to function to the extent practicable during and after natural hazard events. **Policy 15.2.1.11 - New development that creates demand for new protection structures and works**	in the proposed provisions. The status quo method is retained for the remainder of the flood ponding areas due to the lack of information on flood ponding areas (i.e. they are not mapped). • The rules operate only where the flood overlay falls. This means that if a property owner has a large site with land within the Flood Plain Management Area and also land outside of it, then the rule only applies to that part of the property within the Flood Plain Management Area. • Policies and rules (Policy 15.2.1.12 and Rule 15.4.1) which require minimum floor levels for new buildings and additions, build upon those already in the Operative Plan. Minimum floor levels have already proven their effectiveness at mitigating flood hazard over a number of years and hence will be effective in achieving Objective 15.2.1 (increasing community resilience and mitigating risk). This level of intervention is also consistent with the policy framework in the WRPS (Policy 3.24 and Implementation Method13.2.6 a) iv)). • Under Rule 15.4.1 new buildings and additions to existing buildings are required to provide finished floor levels above the level of a 1% AEP design flood level plus an allowance for 500mm freeboard. The area from Horitiu – Huntly – Ohinewai where 2 D flood modelling was undertaken, also includes an allowance for climate change. The climate change allowance equates to greater rainfall volumes as a result of a projected temperature increase of 2.3° C. Exceptions for some activities are provided for activities that are not likely to suffer material damage and the risk to them has been assessed as acceptable as provided for in Implementation Method 13.2.6 of the WRPS. • The 2D modelling was also used to identify a High Risk Flood Area where the depth of water is predicted to exceed 1m or where the speed of water exceeds 2m/s in a 1% AEP event (see full definition in the Proposed Chapter 15 Rules and the definition in the WRPS). In these areas Rule 15.5.4 requires construction of a new building or additions to an existing building to be assessed as a non-complying activity unless provided as permitted or restricted discretionary activities in Rules 15.5.1 or 15.5.2. Subdivision located entirely within in High Risk Flood Area and emergency facilities and hospitals are also non-complying

(a) Avoid locating new subdivision, use and development in high risk areas where a demand or need for new structural protection works will be required to reduce the risk from natural hazards to acceptable levels. **<u>Floodplain Management Area and Ponding Areas</u>** **Policy 15.2.1.5 – Existing infrastructure and utilities in all areas subject to natural hazards** (a) Provide for the operation, maintenance and minor upgrading of existing infrastructure and utilities in all areas subject to natural hazards. **Policy 15.2.1.6 - Managing natural hazard risk generally** (a) Provide for rezoning, subdivision, use and development outside High Risk Flood, High Risk Coastal Hazard (Inundation) and High Risk Coastal Hazard (Erosion) Areas where natural hazard risk has been appropriately identified and assessed and can be adequately avoided, remedied or mitigated and does not transfer or exacerbate risk to adjoining properties. **Policy 15.2.1.12 - Reduce potential for flood damage to buildings located on the Waikato and Waipa River floodplains and flood ponding areas** (a) Reduce the potential for flood damage to buildings located on the Waikato and Waipa River floodplains and flood ponding areas by ensuring that the minimum floor level of building development is above the design flood levels/ponding levels in a 1% AEP flood event, plus an allowance for freeboard, unless: (i) the building development is of a type that is not likely to suffer material damage during a flood; or (ii) the building is a small-scale addition to an existing building; or (iii) the risk from flooding is otherwise avoided, remedied or mitigated.	activities. This set of rules is consistent with the requirements of WRPS Implementation Method 13.2.5 which requires avoiding the placement of structures or development where these would be vulnerable to a natural hazard event or would place the community at intolerable risk. Examples of such structures are habitable structures, hospitals and emergency services. While lifeline utilities are included in the list, the functions of these activities as defined in the CDEM make it difficult and impractical for them to be included in Rule 15.5.4 as a non-complying activity. It is anticipated that they can be controlled efficiently under Rule15.5.2 (utilities). • Some exceptions for small building additions have also been provided as the increased risk associated with them is expected to be minimal. • There are also policies and rules relating to earthworks and utilities. • The policies and rules provide a more permissive regime for utilities recognising that in many instances utilities are required to be located in areas subject to natural hazards and will be designed and located by utility providers in a manner that takes these risks into account. In the High-Risk Flood Area new utilities, and upgrading of existing utilities, require resource consent and will be assessed in accordance with the maters of restricted discretion. These matters acknowledge that it is difficult for infrastructure to locate elsewhere due to functional and location requirements. They also acknowledge that in most circumstances appropriate mitigation can be implemented to ensure the risk to people and property (including the infrastructure itself) is not increased. • It is noted that the proposed provisions do not affect owners existing use rights in respect to existing buildings under s10 of the RMA. Where existing use rights are able to be relied upon the rules do not apply. In this respect the effectiveness of the new rules could be reduced but this is an inherent feature of the RMA and applies to Option 1 and Option 2 depending on when the original building was constructed. **<u>Benefits</u>** • The proposed policies provide clear guidance for managing activities to

Policy 15.2.1.13 - Control filling of land within the 1% AEP floodplain and flood ponding areas (a) Control filling of land within the 1% AEP floodplain and flood ponding areas to ensure that the potential adverse effects on flood storage capacity, overland flows, run-off volumes on surrounding properties or infrastructure, are avoided or mitigated. **Policy 15.2.1.14 – Hazardous substances located within floodplain and flood ponding areas** (a) Ensure that the location and storage of hazardous substances within the 1% AEP floodplain and flood ponding areas do not create an unacceptable hazard to people, property or the environment. **Policy 15.2.1.15 - Flood ponding areas and overland flow paths** (a) Manage stormwater hazards by requiring new subdivision and development within flood ponding areas and overland flow paths to adopt integrated catchment plan-based stormwater management methods which: (i) maintain the flood storage capacity of natural floodplains, wetlands and ponding areas; and (ii) retain the function and capacity of overland flow paths to convey stormwater run-off; and (iii) do not transfer or increase risk elsewhere; and (iv) promote low impact stormwater management practices with reference to the Waikato Stormwater Management Guideline and the Regional Infrastructure Technical Specifications (RITS); and (v) minimise impervious surfaces. **Relevant rules include:**	ensure acceptable levels of risk. • The proposed Flood Plain Management Area overlay, and within that, the High Risk Flood Area overlay, provides important up-to-date information for property owners, developers and the community on flood risk in the district. • The proposal also makes more use of permitted activities when compared to the Operative Plan, in respect of flooding hazard, thus reducing unnecessary resource consents. • Damages to property are avoided by requiring new subdivision, use and development to be avoided in areas of significant risk. Damages are also avoided or reduced in other areas subject to flood risk where development is able to proceed under mitigation measures such as implementation of the required minimum floor levels (Rule 15.4.1). • It is noted that loss of life from flooding is not common in New Zealand (being more related to outdoor pursuits during flash floods in high country/remote areas). • Increased certainty is an additional benefit from the proposed framework. Areas not identified in the Flood Plain Management Area and High Risk Flood Areas have certainty and have minimal expectation to investigate flood hazard (the exception to this is flood ponding areas). On the other hand, for property owners with land identified within the Flood Plain Management Area or the High Risk Flood Area, there is greater certainty about the processes that will be required to develop the land, such as engaging the relevant experts to ensure appropriate mitigation such as minimum floor levels, or alternatively identify no-go areas. • Avoiding development in areas with significant risk of flooding (high risk) and mitigation risk where that is economically viable will help build resilience, and potentially help reduce the need for costly remediation/retreat after an event. • The actual cost of loss of life (less likely in flood risk) and damage to property and infrastructure will be reduced overall by a policy and rule framework that is effective in signalling where avoidance should occur

• Rule 15.4 Flood Plain Management Area and Flood Ponding Areas, and • Rule 15.5 High Risk Flood area **Planning maps:** • Flood Plain Management Area overlay • High Risk Flood overlay **Variation to Stage 1** where added matters that discretion is restricted to includes avoidance and/or mitigation of natural hazards.	and where mitigation is appropriate. • Flooding of floors bears a high cost in house and contents repair, high personal disruption and increased health risks (mould, rising damp and cleaning up contaminated water under homes). Policies that require avoidance or mitigation prior to an event is therefore beneficial, enabling such damage and disruption to be prevented. • The requirement to identify and assess flood risk under Policy 15.2.1.6 and to provide technically robust recommendations to avoid, remedy or mitigate the flood risk, and ensure the risk is not transferred elsewhere, will provide increased employment opportunities in hydrology and risk assessment fields of expertise and contribute to the economic growth of the district, support universities and technical colleges, and tertiary education. This will also have the benefit growing the body of knowledge within the district on flood hazards. **Costs** • Some proposed rezonings of rural land to urban may be curtailed by the proposed High Risk Flood Area polices and rules. This could possibly result in loss of development capacity for the district as a whole on greenfield areas (areas of new urban development). More suitable land areas for urban growth may need to be found. • Individual property owners may experience costs from: o loss of development potential of their land, where policies require avoidance; or o Increased cost of developing land where increased or unexpected mitigation is required. • This could occur, for example, where as a result of falling within the floodplain mapped extent, an increased floor level to 1% AEP (a one in one-hundred-year event) is required rather than the Building Code 2% AEP requirement (one in fifty year event). It should be noted that this results from both Option 1 (retaining the existing provisions) and Option 2 (developing revised/new provisions), as both the Operative Plans and this Proposed Plan require a floor level above the 1% AEP event. However, Option 2 more clearly defines where that 1% AEP floor level

	will apply, and requires a freeboard of 500mm. The Franklin Section of the Operative Plan requires a 500mm freeboard, whereas the Waikato Section requires 300mm. Neither section of the Operative Plan identified on the planning maps where the minimum floor level rules apply. • There could be a negative perception on land values for those identified in the flood plain area of the planning maps and more so for those areas identified as High Risk Flood Area. There is also the potential for impact on insurance premiums or ability to obtain insurance. • There is also a cost to developers and the community for flood hazard advice, assessments, mapping, modelling and engagement, and plan drafting, but this is considered to be greatly outweighed by the benefits of appropriate awareness and regulatory planning for flood hazards, noting council's responsibility to collect and share information on natural hazards under the RMA, LGA and WRPS and the council's responsibility to manage natural hazards (s31). These costs are likely under all three Options proposed to manage natural hazards including flood risk. • Costs will also occur in the administration, monitoring and enforcing the District Plan rules, noting that this is the case for Option 1 and Option 2. This cost falls onto the Council, but is also passed on to developers and property owners to the extent that relevant legislation enables the Council to pass on such costs. Where the costs cannot be passed on, it ultimately falls on ratepayers. • Property owners will also bear the costs in terms of mitigation of flooding hazard on individual properties, or the developer will pay in order to get approval for the development (see above). This includes the costs of preparing resource consent applications under the rules and the processing costs of those applications. On-going monitoring costs are also passed on by the council in most instances through conditions of consent. • Overall, there is difficulty in quantifying the benefits and costs of the flood hazard policies and rules (Option 2) because there are no mapped areas under the Operative Plans (Option 1) that confine the assessment

	of the 1% AEP floodplain or define the High Risk Flood Area. Consequently, there is no basis for a useful comparison of the increase/decrease of the areas identified within the planning maps subject to the new rules. • Many areas identified in the floodplain and in areas of high flood risk would already have had to provide flood assessments and comply with minimum floor levels. But it is difficult to quantify the actual difference between the two options. • The proposed provisions do however, provide more certainty where those areas are.

Risks of acting or not acting

It is considered that there is enough information on which to base the proposed policies and rules. The risk of not acting, could be significant in terms of developing on land subject to flooding, including significant damage to property. The community would be more vulnerable (less resilient) and would not effectively avoid or mitigate risks of flooding and therefore would not meet proposed Objective 5.2.1 or Policy 3.24 in the WRPS. More information on the 1D modelled areas of the planning maps would be helpful and will possibly form the basis of further work. It does not, however, mean that there is reason to delay implementing this policy framework.

The information provided in Option 2 via new flood modelling adds significantly to the robustness of the approach. The Operative Plan was deficient in terms of the modelling and mapping of flood risk, which previously led to appeals to the Environment Court during the previous review process and added to lengthy debate over unsettled provisions. Further delay is not warranted.

Appropriateness

The proposed policy framework developed for Stage 2 works towards avoiding increase in risk to people's safety well-being and property.

The supporting rules and planning maps clearly define flood hazard areas where subdivision, use and development should be avoided (high hazard areas) and where mitigation is acceptable (the flood plain) - the policies effectively target the level of risk.

The policies and rules apply the most up to date information from a wide range of sources from other organisations and technical reports, including from WRC, DHI, MfE, and NIWA.

The information on flood hazard risk is applied using risk-based approaches. This includes 2D modelling of the most intensively developed parts of the district and separately identifying within the flood plain those areas at high flood risk.

The cost of a large flood hazard event can be substantial in terms of damage to property, clean-up time and time out of action. The financial cost of hazards can also, in part, be measured through insurance pay outs. However, there are also uninsured items (temporary accommodation, where homes become uninhabitable due to wet carpets and walls, exceeding the insurance policy allowances) social disruption, days lost when businesses cannot operate, and cost of civil defence responses, and there are intangibles such as unhappiness, stress, and psychological and physical health impacts (damp and mouldy homes).

Avoidance of development in flood hazard areas or those requiring mitigation (various forms: house tanking, raised floor levels, relocatability) can substantially reduce the costs associated with flood hazard events.

It is considered, overall, that the policy and rules framework developed to give effect to Objective 15.2.1 will be effective and efficient in avoiding increased risk from high flood hazards, and in mitigating flood risk within the floodplain generally and will result in a more resilient community.

It is also considered that, overall, the benefits of proposed Option 2 will outweigh the costs in comparison to implementing the other options and is the most appropriate to achieve Objective 15.2.1.

It is considered that the new overlay identifying the Flood Plain Management Area and the High Risk Flood Area will be more effective than the previous Operative Plan provisions (Option 1), as it better identifies those properties affected by the 1% AEP flood event.

Option 3 is only useful in conjunction with Option 2. It is acknowledged that flood hazard information is shared between the WRC, the Waikato District Council and adjoining councils, and this information increases preparedness for event. Coupled with CDEM and the Building Code, it is effective. However, it is not a solution in itself. If this option was implemented on its own without the proposed District Plan provisions, it would fail to meet the requirements of the higher order planning documents and would not give effect to the WRPS.

Option 3 would also leave the community largely at the mercy of a 1% AEP flood event, as the Building Code only requires floor levels to a 2% AEP. The non-regulatory approach does not effectively avoid or mitigate flood hazards risks.

5.2.2 Defended Areas

Policies relating to Defended Areas	
Provisions most appropriate	**Effectiveness, Efficiency, Benefits & Costs**
Policy 15.2.1.10 – Areas defended by stopbanks adjacent to the Waikato River (a) Control subdivision, use and development in areas identified as Defended Areas adjacent to the Waikato River by: (i) assessing the potential risk of overtopping or structural failure of the stopbanks, and overwhelming of associated flood protection structures, before subdivision and development occurs; and (ii) requiring that consideration be given to appropriate mitigation to reduce any residual risk identified; and (iii) ensuring that any residual risk is not transferred to neighbouring sites. (b) Specify minimum setbacks for buildings and earthworks from stopbanks to: (i) protect the structural integrity of the stopbanks; and (ii) provide a buffer to reduce the potential risk to life and damage to property from deep and fast-flowing flood waters in the event of a breach. **Relevant rules include:**	**<u>Effectiveness and Efficiency</u>** • The Defended Area policies and rules are new provisions (Option 2) and do not have equivalent policies and rules in the Operative Plan (Option 1). WRPS Policy 3.24 specifically states that the risks of natural hazards are to be reduced to an acceptable or tolerable level including by, amongst other things, minimising any increase in vulnerability due to residual risk (Policy 3.24 d)). Furthermore, Implementation Method 13.2.7 specifies that district plans shall implement residual risk zones and shall control subdivision, use and development within these zones so that residual risk is minimised. The method also requires regard be had to: o the level of service provided by the structural defences; o the physical, environmental and financial sustainability of the structural defences over a period of at least 100 years; o the impact caused by overwhelming or a structural failure of protection works; and o a reduction in the ability of a community to respond to and recover from a natural hazard event. • The Natural Hazard Stage 2 policies and rules relating to defended areas have been developed to give effect to the WRPS policy and method described above. To assist with the mapping of residual risk areas the WRC provided mapping of areas of the Waikato River defended by stopbanks (distilled from maps of benefit areas from the Lower Waikato Scheme), as per WRC residual risk guidance note5. Discussions with WRC also indicated that the preferred terminology was "defended areas". • Defended Areas are defined in the proposed provisions as "an area identified on the planning maps which would normally flood in a 1% AEP flood event but is protected

[5] Residual Risk Zones- Recommended Practice: correspondence from R Leifting to K Nicolson 03 October 2018

Rule 15.6 Defended Area (Residual Risk) • Rule 15.6.1 Permitted activities • Rule 15.6.2 Restricted Discretionary Activities **Planning maps** • Defended Area overlay	from flooding by a flood protection scheme managed by the Waikato Regional Council, the Waikato District Council or the Crown". The WRPS defines residual risk zones. The proposed definition of "defended area" is consistent with the WRPS definition. The definition also includes the design level of service of the defence structure (in this case 1% AEP). • The WRPS also states in Implementation Method 13.1.3 the need for long term community strategies to consider and address the implications of allowing development in residual risk zones. It is considered that the proposed policy and accompanying rule framework, while not an entire community strategy, will assist in achieving Implementation Method 13.1.3. • Policy 15.2.1.10 and Rule 15.6 will be effective in achieving Objective 15.2.1 as it will support improved community resilience by providing for assessment of the potential risk of overtopping or structural failure of the stopbanks located along the Waikato River, before subdivision and development occurs. The policies and rules also allow for appropriate setbacks to protect structural integrity of the stopbanks and allow a buffer area to reduce the potential risk to life from a high velocity water or depths during a breach. • The provisions are efficient in that they clearly signal the area close to the stopbanks of most concern through the setback area and the mapped Defended Area. • Option 2 therefore gives better effect to the WRPS and is more appropriate. Neither Option 1 nor Option 3 are able to effect to the WRPS requirement to include residual risk zones in the District Plan in order to ensure residual risk is minimised. • While warning systems, education, insurance and evacuation plans may help in situations of stopbank overtopping or stopbank failure, it is considered that this is not as effective or efficient in addressing residual risk of development protected by stopbanks on its own. The Edgecumbe disaster is a case in point. 6 The Panel stated in its summary "Residual risk to flood protection structures from variability in ground conditions should be taken into account in land use planning and emergency planning, including alert and evacuation procedures".

[6] Rangitaiki River Scheme Review, April 2017 Flood Event – Final report to Bay of Plenty Regional Council- Rangitaiki River Scheme Review Panel, 18 September 2017

	Benefits • The proposed policy and rules framework will enable assessment of whether the residual risk is acceptable and whether mitigation is required. The risk assessments required will ensure identification where a breach is likely and assist in decision-making for land in that category before it is developed. These are important considerations as currently no break-out modelling exists for the lower Waikato to assist land use planning. Overall, the proposed provisions will provide for greater community resilience and achieve Objective 15.2.1 more than the other two options. • Identifying Defended Areas will assist in reducing public perception and a false sense of security that the presence of the stopbank means there is no risk from flooding. • The setback provision will potentially prevent development that could undermine the structural integrity of the stopbank. It also provides an important buffer which could save lives if high velocities and depths occur close to the stop bank during a break out. **Costs** • The proposed option will increase compliance costs related to the need to obtain resource consents in the Defended Area and within the setbacks applied. In terms of subdivision, it is noted that the Proposed Plan already requires a restricted discretionary resource consent to be obtained, so the rule is effectively an additional set of matters the council will restrict its discretion to, including the need for assessment of the residual risk. This will require additional expert input not currently required through Option 1 in the Operative Plan. However, it is noted that natural hazards are an issue that is relevant for subdivision, and arguably such reports could be requested under the status quo. It is understood that assessment of residual risk from potential break out of the stopbanks was a relevant consideration in respect to the recent rezoning plan change at Ohinewai. • Requiring residual risk to be considered in resource consent applications may increase uncertainty for the developer, but will have longer term benefits in respect to risk management for people who work or live in these areas. • The setback requirement may also impose further restriction on the use of land, and could potentially lead to inefficient land use. However, it is considered that the

	purpose of this rule is to ensure appropriate assessment is provided and appropriate conditions are imposed when a developer wishes to locate inside the setback, rather than declining the application. In some rare circumstances the proposed location may be inappropriate but, overall, it is considered that the risk of inefficient use of land is small. • Warning systems, education and information provision (Option 3) are not without costs. Costs occur with both implementing advanced warning systems and on-going upkeep. These measures are not a complete solution in themselves and can give rise to a false sense of security. They can also result in liability for the agencies responsible for them if they fail. Overall, Option 3 on its own is not as efficient or effective as proposed Option 2.
Risks of acting or not acting	
It is considered that there is enough information on which to base the proposed policies and rules. The risk of not acting could be significant in terms of developing without appropriate assessment on land subject to risk of stopbank failure or overtopping. The community would be more vulnerable (less resilient) and would not effectively avoid or mitigate these risks and therefore would not meet proposed Objective 5.2.1, Policy 3.24 or Implementation Method 13.2.7 in the WRPS. Breakout modelling has not been completed for the Lower Waikato and would be helpful and will possibly form the basis of further work. It does not mean, however, that there is any reason to delay implementing this policy framework. Furthermore, it is understood that the WRC regularly maintains and monitors the stopbanks, and this contributes to the information base available for risk assessment. The Operative Plan has no similar provisions and consequently this risk was not being actively managed. There is now greater information available on residual risk and greater technical support from the WRC. Providing a policy framework and using the available information can now be used to manage that risk. Waiting for information and further modelling before developing these provisions is not efficient use of current technical knowledge and would not be appropriate.	
Appropriateness	
In terms of Option 1, there are no policies and rules related to defended areas (residual risk). Consequently, this option will not give effect to the WRPS. Option 3 does not address residual risk from a future land use planning perspective and therefore relies on response and readiness under the CDEM (largely after the fact). This option will also not give effect to the WRPS or assist in achieving Objective 15.2.1. The proposed policy and rule provision (Option2) gives effect to the WRPS and better achieves Objective 15.2.1 in terms of community resilience and appropriate mitigation of risk.	

5.2.3 Coastal Hazards

Policies relating to Coastal Hazards	
Provisions most appropriate	**Effectiveness, Efficiency, Benefits & Costs**
High Risk Coastal Hazard Areas (Erosion and Inundation)	
Policy 15.2.1.1 - New development in areas at significant risk from natural hazards (a) Avoid new subdivision, use and development where it will increase the risk to people's safety, well-being and property in the following areas identified as being at significant risk from natural hazards: (i) High Risk Flood Area; (ii) High Risk Coastal Hazard (Inundation) Area; (iii) High Risk Coastal Hazard (Erosion) Area. **Policy 15.2.1.2 – Changes to existing land use and development in areas at significant risk from natural hazards** (a) In areas of High Risk Flood, High Risk Coastal Hazard (Erosion) and High Risk Coastal Hazard (Inundation), ensure that when changes to existing land use activities and development occur, a range of risk reduction options are assessed, and development that would increase risk to people's safety, well-being and property is avoided. **Policy 15.2.1.3 – New emergency services and hospitals in areas at significant risk from natural**	**<u>Effectiveness and Efficiency</u>** • Option 2 introduces a new high risk coastal hazard area. The high risk coastal erosion area covers a total area of 22 hectares of land. The high risk coastal inundation area covers a total of 140 hectares of land, or 0.1% of the total land in the district (Appendix 5(j)). • Modelling of high coastal hazard areas has been confined to urban areas in Raglan, residential zoned properties at Whale Bay and the urban areas and sand spit at Port Waikato and are based on specified shorelines and contours for inundation areas and specified shorelines and slope analysis or other contour depending on the shoreline type for erosion areas (see criteria in Appendix A of the Waikato District Coastal Hazards Assessment and Addendums in Appendices 5(f), 5(h) and 5(i)). • There is no equivalent hazard area or policy framework to manage high risk coastal hazards in either section of the ODP. Option 1 is to retain the status quo provisions. • Policies 15.2.1.1; 15.2.1.2; 15.2.1.3; 15.2.1.4; 15.2.1.5; 15.2.1.11, rules in Chapter 15.9 High Risk Coastal Hazard (Erosion) Area and chapter 15.10 High Risk Coastal Hazard (Inundation) Area, as well as definitions and the high risk hazard areas shown on the planning maps, work together to manage risk in areas where subdivision, use and some types of development would be considered to be at significant risk of natural hazards and where serious injury or loss of life could occur. • High risk coastal hazard areas represent land that, in the absence of future intervention, could be impacted by coastal inundation or erosion with existing sea level and coastal processes (over approximately a 10-15 year timeframe). These

hazards (a) Avoid locating new emergency service facilities and hospitals in areas which are at significant risk from natural hazards, including High Risk Flood, High Risk Coastal Hazard (Inundation) and High Risk Coastal Hazard (Erosion), unless, considering engineering and technical constraints or functional and operational requirements, they cannot be reasonably located elsewhere and will not increase the risk to or vulnerability of people or communities. **Policy 15.2.1.4 – New infrastructure and utilities in areas subject to high risk natural hazards** (a) Enable the construction of new infrastructure and utilities in areas at significant risk from natural hazards, including High Risk Flood, High Risk Coastal Hazard (Inundation) and High Risk Coastal Hazard (Erosion) areas only where: (i) the infrastructure and utilities are technically, functionally or operationally required to locate in areas subject to natural hazards, or it is not reasonably practicable to be located elsewhere; and (ii) any increased risks to people, property and the environment are mitigated to the extent practicable; and (iii) the infrastructure and utilities are designed, maintained and managed, including provision of hazard mitigation works where appropriate, to function to the extent practicable during and after natural hazard events. **Policy 15.2.1.5 – Existing infrastructure and utilities in all areas subject to natural hazards**	areas have been assessed as areas of greatest risk and therefore of highest priority for coastal hazard management (Waikato District Coastal Hazards Assessment – Appendix 5(f)). • The policies and rules focus on specific land use, development and subdivision that are considered to be more vulnerable to significant risk such as buildings (buildings without floors and utilities excluded) and specifically new emergency services and hospitals, as well as subdivision that will introduce additional development pressures. It is considered that this type of development in these areas would pose an unacceptable or intolerable risk in these areas. Strong policy direction and non-complying activity rules for vulnerable activities is an effective means of natural hazards risk reduction and of increasing resilience. • Certain types of infrastructure and utilities may have a technical, functional or operational need to be located in high risk areas or that it is not reasonably practicable to be located elsewhere. Policy 15.2.1 4 acknowledges this by enabling less vulnerable and potentially necessary infrastructure and utilities where risk can be mitigated. • Policy 15.2.1.17 provides policy support for Stage 1 PDP rules requiring buildings to be set back a specified distance from the coast. These rules will apply in either the high risk coastal hazard area and in the coastal sensitivity areas and ensure there is a buffer between buildings and the coastal edge. This policy also works in conjunction with Policy 15.2.1.4 in that it includes exceptions for development that has a functional or operational need to be located at or near the coast. • Policy 15.2.1.2 recognises that there is existing development in high risk areas that may be at immediate risk, but where the land can continue to be utilised for some time. Rules do not prevent the opportunity for buildings to be relocated to, or reconstructed in, a less 'at risk' position within the same property so long as the buildings can be readily relocated to respond to future conditions. Examples of this situation are currently being experienced along the main beach at Port Waikato where the existing buildings are at immediate risk from coastal erosion, but the properties with deep sections allow the rest of the section to be utilised. • Linking the policies and rules to the mapped hazard areas on the planning maps (areas potentially affected by natural hazards) spatially limits where the rules apply.

(a) Provide for the operation, maintenance and minor upgrading of existing infrastructure and utilities in all areas subject to natural hazards **Policy 15.2.1.11 - New development that creates demand for new protection structures and works** (a) Avoid locating new subdivision, use and development in High Risk Flood, High Risk Coastal Hazard (Inundation) and High Risk Coastal Hazard (Erosion) Areas where a demand or need for new structural protection works will be required to reduce the risk from natural hazards to acceptable levels. **Policy 15.2.1.17- Setbacks from the coast** (a) Avoid increasing the risk from coastal hazards by requiring new built development to be setback from the coastal edge, unless there is a functional or operational need for facilities to be located at or near the coast. **Rules and other methods** Rules in 15.9 High Risk Coastal Hazard (Erosion) Area and 15.10 High Risk Coastal Hazard (Inundation) Area. **Rules in Stage 1 PDP – Building setbacks from waterbodies** • Residential Zone - Rule 16.3.9.3 • Business Zone – Rule 17.3.4.2 • Business Town Centre Zone – Rule 18.3.7 • Industrial Zone – Rule 20.3.4.2 • Industrial Zone Heavy – Rule 21.3.4.2 • Rural Zone – Rule 22.3.7.5	Identifying specific hazard areas and applying rules for specific types of development is a more efficient way to manage risk reduction as they are designed to target specific areas rather than applying more broadly across the entire district and place the burden of investigation on the applicant to prove if a hazard exists or not. • The policies, rules and maps apply to the most up-to-date information sourced from recent expert assessments and flood modelling, while taking direction from high level policy in the NZCPS and WRPS and technical information sourced from the WRC Regional hazards team. • The development of the policies, rules and mapping for managing natural hazards has been framed up using a risk-based approach where both the likelihood of a natural hazard event and its consequences are taken into account. An event of a specified magnitude, such as a 1% AEP storm event, would have intolerable or unacceptable consequences for certain types of development (more vulnerable activities and development). The policies and rules are therefore significantly more restrictive for these types of activities. It is more efficient to focus restrictive rules on the most vulnerable development and enabling less vulnerable activities where the risk can be mitigated or is considered to be tolerable or acceptable. • Restricting vulnerable development in high risk areas also reduces the demand for coastal hazard protection works to protect development that will be at risk with existing and future sea level and coastal processes. Rules allow for the maintenance and repair of existing, legally established coastal protection structures but new structures will need a discretionary resource consent. The evaluation of policies relating to coastal hazards mitigation works has been carried out separately (see hazard mitigation works for coastal hazards below). • The construction and ongoing maintenance and repair of protection structures placed in highly dynamic coastal environments are costly and inefficient when compared to ensuring new development is located outside of at-risk areas where future demand for protection will not be necessary and development can continue to be resilient. **Benefits** • The policies, rules and maps provide clear guidance for managing activities to ensure significant risk is either avoided or reduced to acceptable levels through mitigation.

• Country Living Zone – Rule 23.3.7.5 • Village Zone – Rule 24.3.6.3 • Reserve Zone – Rule 25.3.5.2 • Rangitahi Peninsula Zone – Rule 28.3.9.3 Note that Stage 1 PDP rules for building setback distances from the coast are not open for submissions under Stage 2 PDP. **Definitions** **Planning maps** High Risk Coastal Hazard (Erosion) Area High Risk Coastal Hazard (Inundation) Area	• Hazard modelling and mapping makes information available to all landowners and developers. By carrying out detailed mapping in urban areas where a higher level of development occurs, the need for site-specific coastal hazard assessments is minimised. • The proposed polices and rules (and maps) provide a level of detail that is sufficient to manage risk. High risk areas were not modelled in rural areas within the Aotea and Whaingaroa harbours, the Waikato river and along the open coastline as detailed modelling in areas with relatively low development pressures would be cost and time prohibitive and not an efficient use of Council's budget. • Future damage from natural hazards and/or the need for protection works are avoided by locating new subdivision, use and development away from areas of significant risk or by effective mitigation measures where development is able to proceed. • Risk avoidance and mitigation of risk (where effective and appropriate), will ensure development is resilient. Restrictions can reduce opportunities for land development, but can potentially prevent costly remediation, relocation or demolition of development in the future. • Mitigating or avoiding adverse effects of natural hazards through an effective and efficient policy framework increases certainty for land owners, infrastructure providers, the community and insurers and reduce the damage incurred during a significant hazard event. **Costs** • There is potential for loss of development capacity in areas subject to significant natural hazards. • There will be costs associated with resource consent applications and where relevant additional costs will be associated with geotechnical and other site-specific hazard information for subdivision and building. In some instances this cost can be passed on through increased values on land and buildings. • Potential impacts on insurance premiums or insurance excesses or the overall insurability of property. • Council (rate payers) bear the cost of technical advice, modelling, mapping,

	consultation with various agencies, updating policy documents with more up to date and technically robust natural hazards information. The more detailed the hazard modelling is the higher the costs. • The implementation, administration, monitoring and enforcement costs incurred as part of development proposals are, to a large extent, passed on to developers and property owners. Some costs cannot be passed on and are carried by council (ratepayers). • Ongoing monitoring costs are often passed on to developers/property owners through conditions of resource consent. **Opportunities for economic growth and employment** • The requirement for technical assessments and mitigation of risk are likely to increase employment opportunities with regards to engineering and coastal science and building design specialists. There is potential for this to contribute to economic growth related to these specialised areas. • It is considered that the overall long term community benefits of the proposed risk-based approach outweigh the potential increase in costs of implementation.
Risks of acting or not acting	
The high coastal hazard areas identify land that is at risk under current climatic conditions and coastal processes and, as such, there is a high level of certainty with regards to the spatial extent of these areas. The strict regulation of development in these areas is a priority. Not acting will potentially allow inappropriate development in high risk areas, which may place development, people and community, and the environment at risk.	
Coastal Sensitivity Areas (Erosion, Inundation and Open Coast)	
Policy 15.2.1.5 – Existing infrastructure and utilities in all areas subject to natural hazards (a) Provide for the operation, maintenance and minor upgrading of existing infrastructure and utilities in all areas subject to natural hazards.	**Overall approach** • Policies 15.2.1.5, 15.2.1.6, 15.2.1.16 and 15.2.1.17; the rules in Chapter 15.7 Coastal Sensitivity Area (Erosion) and Coastal Sensitivity Area (Open Coast) and Chapter 15.8 Coastal Sensitivity Area (Inundation); definitions and the mapped coastal sensitivity areas shown on the planning maps work together to manage development in areas that may be vulnerable to coastal erosion and/or inundation over the 100 year period to 2120, assuming 1 metre of sea level rise. • Policy 15.2.1.5 provides for existing infrastructure and utilities to continue to operate. Policies

Policy 15.2.1.6 - Risks from Natural Hazards outside High Risk Areas (a) Provide for rezoning, subdivision, use and development outside High Risk Areas where natural hazard risk has been appropriately identified and assessed and can be adequately avoided, remedied or mitigated and does not transfer or exacerbate risk to adjoining properties. **Policy 15.2.1.16 - Development in the Coastal Sensitivity Areas** (a) In Coastal Sensitive Areas identified on the planning maps, control subdivision, use and development by ensuring that the subdivision, use or development is: (i) supported by a detailed site-specific risk assessment, which includes measures to address the effects of climate change; and (ii) designed, constructed and located to minimise the level of risk to people, property and the environment. **Policy 15.2.1.17- Setbacks from the coast** (b) Avoid increasing the risk from coastal hazards by requiring new built development to be setback from the coastal edge, unless there is a functional or operational need for facilities to be located at or near the coast.	15.2.1.6 and 15.2.1.16 provide for rezoning, subdivision and development where natural hazard risk has been appropriately identified and assessed, and risk is either avoided, remedied or mitigated. • Policy 15.2.1.17 provides policy support for Stage 1 PDP rules that require buildings to be setback a specified distance from the coast. These rules will apply in the high risk coastal hazard area and in the coastal sensitivity areas and ensure there is a buffer between buildings and the coastal edge. • The purpose of the policies, rules and mapped coastal sensitivity areas is to provide a policy framework to manage the ongoing development of land in areas where there may be a risk from coastal inundation or erosion in the future. It is important to note that coastal sensitivity areas are not areas where coastal hazards have been identified, but rather, where further detailed investigation is required prior to new development or intensification of land use. • Rules require a restricted discretionary resource consent to ensure that when new development is proposed a site-specific hazard assessment is carried out. The assessment is required to determine a number of factors such as the suitability of the site for the proposed use, how the site may be affected by climate change over time, timeframes or triggers for the relocation of development, if applicable, measures to reduce risks identified in the coastal hazard assessment, including the structural design of the building, building materials, as well as setting of minimum floor levels if the site is, or is likely to be, subject to inundation. • The mapping of coastal sensitivity areas has been focused on the western coastline of the district. Detailed modelling to identify coastal sensitivity areas was focussed on urban areas in Raglan, Whaanga Coast, including Whale Bay, and Port Waikato, as these were the areas with the highest density of development and future development opportunities. Detailed mapping was also carried out along the Whaanga Coast Maori Freehold Land (MFL) blocks as current and proposed District Plan rules allow for a higher density of development on MFL through papakaainga development provisions. The landowners have current and future aspirations to develop within the development cells specified in the Pistrict Plan as well as in other areas. • All other areas of the open coastline, Aotea Harbour, Whaingaroa Harbour and the Waikato River mouth were modelled using a broad-scale approach that took into account the diverse range of coastal hazards, including dynamic and erodible shoreline types, wave runup effects, stream mouths and high cliffs and applied a 100 metre wide strip along the estuary coastlines and a 200 metre wide strip along the open coastline, and widening around the northern harbour entrances to account for the large dynamic and sometimes highly mobile sand dunes. (See criteria in Appendix A of the Waikato District Coastal Hazards Assessment and Addendums in Appendices 5(f), 5(h) and 5(i).) As

Rules and other methods Rules in Chapter 15.7 Coastal Sensitivity Area (Erosion) and Coastal Sensitivity Area (Open Coast) and Chapter 15.8 Coastal Sensitivity Area (Inundation). **Rules in Stage 1 PDP – Building setbacks from waterbodies** • Residential Zone - Rule 16.3.9.3 • Business Zone – Rule 17.3.4.2 • Business Town Centre Zone – Rule 18.3.7 • Industrial Zone – Rule 20.3.4.2 • Industrial Zone Heavy – Rule 21.3.4.2 • Rural Zone – Rule 22.3.7.5 • Country Living Zone – Rule 23.3.7.5 • Village Zone – Rule 24.3.6.3 • Reserve Zone – Rule 25.3.5.2 • Rangitahi Peninsula Zone – Rule 28.3.9.3 Note that Stage 1 PDP rules for building setback distances from the coast are not open for submissions under Stage 2 PDP. **Definitions**	a result of the broad-scale mapping, some rural coastal sensitivity areas may be excessively conservative. These areas are not specified as hazard areas, but rather areas where further investigation is required at the time of development. **Effectiveness** • The policy framework is considered to be the most effective way to manage future uncertainty as a result of climate change (particularly sea level rise), where the level of uncertainty increases significantly in the longer term. Site specific coastal hazards assessments and development that is designed to adapt to future conditions will ensure that development maintains a comfortable level of resilience for at least the next 100 years. • The policies and rules focus on specific land use, development and subdivision that are considered to be more vulnerable to coastal hazard risk such as buildings (minor additions to existing lawfully established buildings, buildings without floors and utilities excluded) and subdivision. It is this type of development that will be most at risk over time and which may be more difficult and costly to adapt if specific design considerations aren't implemented. For example, it is more costly to relocate or raise the floor level of a building that is constructed on a concrete slab foundation, and masonry cladding may need to be replaced, whereas buildings on pile foundations with more flexible cladding can be easily raised or relocated. **Efficiency** • Linking the policies and rules to the mapped coastal sensitivity areas spatially limits where the rules apply. Identifying specific hazard areas and applying rules for development that is considered to be vulnerable to coastal hazards is a more efficient way to manage the reduction of risk. • The policies, rules and maps apply to the most up to date information sourced from recent expert assessments and modelling along with direction-setting policy in the NZCPS and WRPS, developed in collaboration with the WRC regional hazards team. • Detailed mapping, along the entire rural coastline, was not carried out as it would be cost and time prohibitive and an inefficient use of council budget. There is not a high degree of development pressure in these areas and it is therefore more effective and efficient to identify a broad sensitivity area where detailed site-specific mapping is carried out as and when development is proposed. • Rules require resource consents where future mitigation or adaptive processes and triggers can be included as conditions of consent. This will allow future land owners to be fully aware of the potential for changes to be made in the future and what the triggers are. For example, consent

Planning maps Coastal Sensitivity Area (Erosion) Coastal Sensitivity Area (Open Coast) Coastal Sensitivity Area (Inundation) Policies 15.2.1.7, 15.2.1.8 and 15.2.1.9 also apply to the coastal sensitivity areas. However, these policies have been evaluated separately. See evaluations below.	conditions may require a building to be relocated back from an erosion scarp when the edge of the scarp is within a specified distance of the building. The specified distance will be based on the clearance required for machinery to access the building and safely remove it. • Rules allow for the maintenance and repair of existing, legally established coastal protection structures, but new structures will need a discretionary resource consent. Policies relating to coastal hazard mitigation works has been carried out separately (see hazard mitigation works for coastal hazards below). • The ongoing maintenance and repair of protection structures placed in a highly dynamic environment is costly and inefficient when compared to ensuring new development is located outside of at-risk areas where demand for protection will not be necessary. **Benefits** • The policies, rules and detailed maps provide clear guidance for addressing uncertainty around future risk. • Future risk and/or the need for protection works are avoided by ensuring new subdivision, use and development are appropriately assessed and designed to mitigate future risk through adaptive design methods. Risk avoidance and mitigation of risk will ensure development is resilient over time. Restrictions on the design of development can be more costly, but can potentially prevent costly remediation or relocation of less appropriately designed development in the future. • Mitigating or avoiding adverse effects of natural hazards through an effective and efficient policy framework increases certainty for land owners, infrastructure providers, the community and insurers. • It is considered that the overall long term community benefits of the proposed adaptive approach ensures that resilience is maintained over time by providing clear adaptive pathways and procedures through specific assessments, building design, and triggers outlined in resource consent conditions. Although there are added upfront costs to implementation this approach, the long term benefits outweigh the potential increase in costs. **Costs** • There will be costs associated with resource consent applications and, where relevant, the increased additional costs for geotechnical and other site-specific technical information required to investigate future risk and to identify appropriate mitigation and adaptation methods and triggers. In some instances, this cost may be passed on to future property owners as they may need to deal

	with future adaptation procedures. • Potential impacts on insurance premiums or insurance excesses. • Council (rate payers) bear the cost of technical advice, modelling, mapping, consultation with various agencies, updating policy documents with more up to date and technically robust natural hazards information. The more detailed the hazard modelling, the higher the costs. • The proposed polices and rules (and maps) provide a level of detail that is sufficient to manage risk. Detailed mapping in rural areas within the Aotea and Whaingaroa harbours and along the open coastline was not carried out as this would be cost and time prohibitive. As a result, individual property owners will need to pick up the cost of site-specific investigations to determine the actual extent of the coastal sensitivity area. • The implementation, administration, monitoring and enforcement costs incurred as part of development proposals are, to a large extent, passed on to developers and property owners. Some costs cannot be passed on and are carried by council (ratepayers). • Ongoing monitoring costs often passed on to developers/property owners through conditions of resource consent. • Possible reduction in land values as a result of hazard mapping, compliance costs and construction costs. • Possible loss in development opportunities. • Potential increase in insurance premiums over time. **Opportunities for economic growth and employment** • The requirement for technical assessments and mitigation of risk is likely to increase employment opportunities with regards to engineering and coastal science and building design. There is potential for this to contribute to economic growth related to these specialised areas. • Additional building designs may open up a new industry in design and construction of housing/buildings that are easily relocatable and adaptable. • Land within coastal sensitivity areas can continue to be developed over the short to medium term depending on the scale and timing of future climate impacts.

Risks of acting or not acting	
The coastal sensitivity areas identify land that may be impacted by coastal hazards over a period to 2120. Areas are based on the projected effects of climate change and current government guidelines. As the future effects of climate change are inherently difficult to predict, there is a large degree of uncertainty, especially over longer periods of time. Even with detailed investigation, the uncertainty may preclude accurate modelling of hazard areas. The risks of not acting due to insufficient information or uncertainty may be significant with possible injury to people and future damage to property. Uncertainty can be addressed through adaptable measures included in the design of new development and the resource consent conditions, where the site may be vulnerable over the next 100 years. This ensures that development can continue to be resilient over a longer timeframe and unacceptable costs are not transferred to future generations.	
Hazard mitigation works for coastal hazards	
Policy 15.2.1.7 - Protection from risks of coastal hazards (a) Recognise the importance of natural features and buffers, and soft hazard protection works, and prefer them wherever practicable over hard protection structures, where new hazard mitigation measures and/or works are required to protect people, property infrastructure and the environment from the risks of coastal hazards. **Policy 15.2.1.8 - Limitations on hard protection works for coastal hazard mitigation** (a) Ensure that where new hard protection structures and works are necessary to protect existing development on public or privately-owned land from coastal hazards, they are appropriately assessed and	**Overall Approach** • Policies 15.2.1.7 and 15.2.1.8 refer to hazard protection and specifically to soft and hard coastal protection works. The policies work together to support the discretionary activity rules regulating the construction of new coastal protection structures. • Soft coastal protection works such as beach nourishment or dune protection, while hard protection structures may include sea walls, groynes or rock revetments. • These policies recognise that hard protection structures can interfere with coastal processes and can impact severely on coastal character and amenity and public values and use of shorelines and can place a financial burden on current and future landowners and communities to maintain. • These policies also reflect national (NZCPS) and regional (WRPS) policy direction that recognises that in some cases, hard protection structures may be appropriate. **Effectiveness and Efficiency** • The policies refer to the coastal margins and provide guidance for proposals to construct hard protection structures, including under what conditions they may be considered appropriate. These polices incorporate national and regional policy direction and provide a much more efficient approach to assessing both beneficial and adverse effects. • Polices also allow for investigation of alternatives such as soft protection works or the consideration of natural features and buffers to provide protection

controlled and: (i) have primarily a public and/or environmental benefit when located on public land; (ii) are effective; (iii) the economic, social and environmental benefits outweigh costs; and (iv) do not transfer or increase risk to other people, property, infrastructure, the natural environment, historic heritage, or Maaori Sites and Areas of Significance. (b) Ensure that when new hard protection structures are to be located in an area where an adaptive management strategy has been prepared to manage coastal hazards, they are consistent with that strategy. **Rules in Coastal Sensitivity Areas - Erosion and Inundation and Open Coast; High Risk Coastal Hazard Areas - Erosion and Inundation** • **Rule 15.7.3 D1-** Construction of a new coastal protection structure. • **Rule 15.8.3 D1-** Construction of a new coastal protection structure. • **Rule 15.9.2 D4 -** Construction of a new coastal protection structure. • **Rule 15.10.2 D3 -** Construction of a new coastal protection structure.	**Benefits** • The policies provide efficiencies in terms of assessing any proposal to construct hazard protection works. This ensures that information and assessments can be targeted towards the matters that are important and provide clear guidance for land owners, the community and regulatory authorities. • Policies ensure that when hard coastal protection structures are approved, they must primarily have a public and/or environmental benefit and that the benefits outweigh the cost. **Costs** • Costs of consents and supporting technical information. • Costs of monitoring and compliance. • Effects on land values where protection structures are not supported. • It is considered the overall long term community benefits of the proposed risk-based approach outweigh the potential increase in costs of implementation. **Opportunities for economic growth and employment** • The requirement for technical assessments and mitigation of risk are likely to increase employment opportunities with regards to engineering and coastal science and structural design specialists.

Policy 15.2.1.9 - Natural features and buffers providing natural hazard protection (see 5.2.4 below)	
Risks of acting or not acting	
There is sufficient information and high level guidance from which to base the development of the proposed policies.	
Appropriateness	
The bundle of policies relating to high risk coastal hazards, coastal sensitivity areas and coastal protection works, provide a comprehensive policy framework for managing coastal hazard risk and increase the resilience of new land use and development and current and future communities, land owners, infrastructure providers and the natural environment. The effectiveness and efficiency and benefits and costs have been assessed and, on balance, the proposed policies to manage coastal hazard risk are considered to be the most appropriate way to achieve Objective 15.2.1.	

5.2.4 Natural Features and Buffers

Provisions most appropriate	Effectiveness and Efficiency
Policies relating to Natural Features and Buffers	
Policy 15.2.1.9 - Natural features and buffers providing natural hazard protection (a) Protect, maintain and, where appropriate, enhance the integrity of natural features and buffers which provide a natural defence against the effects of natural hazards and sea level rise, including natural ponding areas, coastal dunes, intertidal areas, wetlands, waterbody margins, riparian/coastal vegetation and floodways. **Rules in Flood Plain Management Area and Flood Ponding Areas; High Risk Coastal Hazard Areas – Erosion and**	**Overall Approach** • The purpose of Policy 15.2.1.9 recognises the role of natural features and buffers to provide natural hazards protection. The rules giving effect to this policy place limits on earthworks in the Flood Plain Management Area (including the High Risk Flood Area) and Flood Ponding Areas; High Risk Coastal Hazard Areas – Erosion and Inundation as well as requiring buildings to be set back a specified distance from waterbodies (Stage 1 PDP rules). **Effectiveness** • The protection and maintenance and, where appropriate, enhancement of

Inundation • **Rule 15.4.1 P6 - P8** – Earthworks (minimising the quantity of filling and excavation in the floodplain) • **Rule 15.4.2 RD1** – Earthworks not permitted • **Rule 15.9.1 P4** – Earthworks associated with Permitted Activities up to 10m3 and 0.5m excavation or filling above or below ground • **Rule 15.9.2 D1** – Earthworks that do not comply with permitted activity conditions • **Rule 15.10.1 P4** – Earthworks associated with Permitted Activities up to 10m3 and 0.5m excavation or filling above or below ground • **Rule 15.10.2 D1** – Earthworks that do not comply with conditions for permitted activity In addition to earthworks rules, restrictions on development in high risk areas helps to ensure natural features on river and coastal margins have minimal disturbance from development. **Rules in Stage 1 PDP – Building setbacks from waterbodies** • Residential Zone - Rule 16.3.9.3 • Business Zone – Rule 17.3.4.2 • Business Town Centre Zone – Rule 18.3.7 • Industrial Zone – Rule 20.3.4.2 • Industrial Zone Heavy – Rule 21.3.4.2 • Rural Zone – Rule 22.3.7.5	natural defence systems helps to maintain resilience to natural hazards in a cost-effective and more efficient manner. This can reduce the need for costly and often ineffective hard hazard mitigation works. **Efficiency** • The policy and rules protecting natural features, through limits on earthworks filling and excavation and buffers, can be provided through building setbacks from waterbodies. In the absence of assessing all natural features and buffers that provide natural protection and identifying these on the planning maps, providing limits on earthworks and restrictions on the location of development is the most efficient way to provide for the protection of these features. **Benefits** • Protecting and maintaining natural features and buffers is cost effective. • These features often play other roles in providing other ecosystem services, habitat and natural character and amenity. **Costs** • Costs of resource consents and any technical reports required to assess non-compliance with earthworks and building setback rules. • Compliance and monitoring costs. • Costs of enhancement works and protection through covenants (costs associated with optional methods).

• Country Living Zone – Rule 23.3.7.5 • Village Zone – Rule 24.3.6.3 • Reserve Zone – Rule 25.3.5.2 • Rangitahi Peninsula Zone – Rule 28.3.9.3 Note that Stage 1 PDP rules for building setback distances from the coast are not open for submissions under Stage 2 PDP.	
Risks of acting or not acting	
There is sufficient information from which to base the policies.	
Appropriateness	
The effectiveness and efficiency and benefits and costs of implementing this policy have been assessed and on balance it is considered that the implementation of the provisions relating to natural features and buffers are the most appropriate way to achieve Objective 15.2.1.	

5.2.5 Fire Risk, Land Instability and Subsidence and Mine Subsidence

Policies relating to Fire Risk, Land Instability and Subsidence and Mine Subsidence	
Provisions most appropriate	**Effectiveness, Efficiency, Costs & Benefits**
Fire Risk **Policy 15.2.1.18 – Residential development potentially subject to fire risk** (a) In areas assessed or identified as being potentially subject to elevated fire risk, ensure that an appropriate buffer area or setback is provided around new residential subdivision and development.	**Effectiveness** • Policy 15.2.1.18 provides guidance for an assessment of the risk of fire damage to residential development (including the location of a building platform identified during subdivision). This matter is important where residential development is located in close proximity to plantation and indigenous forestry. The policy supports the matters that discretion is restricted to, which have been introduced to Stage 1 PDP subdivision rules.

See Variation to Stage 1 PDP additional matters of discretion for Subdivision rules: **16.4.1 RD1, 22.4.1.2 RD1, Rule 23.4.2 RD1, 24.4.1 RD1, 24.4.1 RD2, 24.4.2 RD1 and 24.4.2 RD2** • Avoidance and mitigation of natural hazards, including fire risk • Natural hazard risk including fire risk • Subdivision Te Kowhai and Tuakau – Rule 24.4.2 RD1(b) (ix) and RD2 (b) (ix)	**Efficiency, costs and benefits** • The matters that discretion is restricted to ensure that this risk is considered when assessing a subdivision proposal. The policy ensures that any proposed building platform is located to reduce risk. This situation is more likely to occur in rural areas where water supply is not as plentiful and potentially inefficient for fighting fires. Reducing the risk can be achieved through subdivision design rather than technical expertise and can provide security for future land owners and insurance providers. • The policy is considered an effective and efficient way to assess and ensure new development is resilient in areas that have the potential to increase fire risk. **Opportunities for economic growth and employment** • The requirement for technical assessments and mitigation of risk are likely to increase employment opportunities with regards to engineering and coastal science and building design. There is potential for this to contribute to economic growth related to these specialised areas. It is considered the overall long term community benefits of the proposed risk-based approach outweigh the potential increase in the likely costs of implementation.
Risks of acting or not acting	
Elevated fire risk from wild fires is a matter that can be assessed and addressed through mitigation at the time of subdivision. Assessing the location of all potentially at-risk areas across the district is not required. The risks of not acting may be significant with possible injury to people and damage to property if the risk is not reduced.	
Land instability generally	
Policy 15.2.1.19 - Development on land subject to instability or subsidence (a) Avoid locating new subdivision, use and development, including rezoning, on land assessed as being subject to, or likely to be	**Overall Approach** • Policies 15.2.1.19 and 15.2.1.21 along with matters of discretion for earthworks and subdivision in RDA rules in Stage 1 PDP and rule 14.11.1 and 14.11.2 regulating stormwater disposal systems in Chapter 14 Stage 1 PDP (introduced

subject to, instability or subsidence, unless appropriate mitigation is provided and the activity does not increase the risk to people, property or infrastructure. **Policy 15.2.1.21 - Stormwater management in areas subject to risk of land instability or subsidence** (a) Avoid discharge of stormwater directly to ground on land that is potentially at risk of land instability or subsidence unless: (i) an assessment has been undertaken by an appropriately-qualified geotechnical specialist, indicating that the site is suitable for the proposed discharges; and (ii) any adverse effects on the site and receiving environment can be appropriately mitigated. **Rules and other methods** **Rules in Chapter 14 – Infrastructure and Energy** • **Rule 14.11.1 P1 – Stormwater systems for new development or subdivision - 14.11.1.1(vi) Activity specific conditions –** Stormwater discharge on land subject to instability only where the ground conditions have been identified as suitable to absorb discharge without causing, accelerating or contributing to land instability. **Rule 14.11.2 RD1 – Stormwater systems for new development or subdivision that do not comply with 14.11.1.P1** **Matters of discretion for earthworks and subdivision rules, included into Stage 1 through Variation 2** • **Earthworks General -** Matters of discretion for RDA rules in	to Stage 1 by way of Variation 2 to Stage 1 PDP - Appendix 4). **Effectiveness** • The proposed policies and matters of discretion are assessed during the geotechnical assessments required at the time of either subdivision application or restricted discretionary earthworks applications. • The policies provide policy support and clear guidance for assessments of resource consent applications. **Efficiency, and** • These policies and matter that discretion is restricted to apply where subdivision and earthworks activities are proposed. • They apply where resource consent is already required. **Benefits** • The policy framework ensures that new lots and in particular, proposed building platforms are geotechnically suitable for future development. • The policy framework ensures that future development is resilient and that land instability risk is not passed on to future land owners. **Costs** • Cost of technical assessment and mitigation measures where applicable. **Opportunities for economic growth and employment** • The requirement for technical assessments and mitigation of risk are likely to increase employment opportunities with regards to engineering and coastal science and building design. There is potential for this to contribute to economic growth related to these specialised areas.

Chapters 16 – 24, includes land instability and geotechnical stability. • **Subdivision General -** Matters of discretion for RDA rules in Chapters 16, 17, 18, 20, 21, 22, 23 and 24, includes land instability, geotechnical stability and/or avoidance and mitigation of natural hazards. • **Subdivision – Multi-unit development –** Matters of discretion for RDA rules in Chapters 16, 17 and 18 includes geotechnical suitability for buildings. • **Subdivision – Building Platform –** Matters of discretion for RDA rules in Chapters 16, 22, 23 and 24, include geotechnical suitability for buildings. • **Subdivision of land containing mapped off-road walkways –** Matters of discretion for RDA rules in Chapters 16, 23 and 24, include natural hazard risk including land stability. • **Subdivision – Te Kauwhata West Residential Area -** Matters of discretion for RDA rules in Chapters 16, including geotechnical suitability for building**.** • **Subdivision Lakeside General –** Matters of discretion for RDA rules in Chapters 16 and 17, including geotechnical suitability for building.	
Risks of acting or not acting	
Land instability and subsidence is a matter that can be assessed and addressed through mitigation at the time of subdivision. Assessing the location of all potentially at-risk areas across the district is not required. The risks of not acting may be significant with possible injury to people and damage to property if the risk is not reduced.	
Mine Subsidence	**Effectiveness**

Policy 15.2.1.20 - Development of land in the Mine Subsidence Risk Area (a) On land identified within the Mine Subsidence Risk Area, ensure that: (i) an assessment by an appropriately-qualified engineer occurs before subdivision, use or development takes place to confirm that the land is suitable for development; and (ii) buildings are designed and constructed, and uses appropriate materials, to effectively minimise the risk of damage to the building from ground subsidence. **Corresponding Policies** **Policy 15.2.1.19 - Development on land subject to instability or subsidence** (a) Avoid locating new subdivision, use and development, including rezoning, on land assessed as being subject to, or likely to be subject to, instability or subsidence, unless appropriate mitigation is provided and the activity does not increase the risk to people, property or infrastructure. **Policy 15.2.1.21 - Stormwater management in areas subject to risk of land instability or subsidence** (a) Avoid discharge of stormwater directly to ground on land that is potentially at risk of land instability or subsidence unless: (i) an assessment has been undertaken by an appropriately-qualified geotechnical specialist, indicating that the site is suitable for the proposed discharges; and (ii) any adverse effects on the site and receiving environment	• Policy 15.2.1.20 provides guidance for assessments of discretionary activity resource consents and provides a consistent approach to assessments as well as ensuring that the appropriate information is provided with development proposals. This is an effective way to ensure that proposals for subdivision, use and development are appropriately assessed for subsidence risks before development occurs. • Policy 15.2.1.20 works together with Policy 15.2.1.19 to ensure that development doesn't occur if risk is not assessed and/or appropriate mitigation is not provided. • In addition Policy 15.2.1.21 and Rules 14.11.1 P1 and 14.11.1 RD2 ensure that the ground conditions are assessed and it is determined that any discharge of stormwater will not increase the risk of land instability or subsidence. **Efficiency** • Development in the Huntly mine subsidence area (currently 125 hectares of land in north east Huntly) has been regulated through the District Plan since the 1990s following the collapse of underground mine workings in the Southern Headings of the Huntly East Mine in the late 1980s (Appendix 5(c)). • This area has been reassessed as part of Stage 2 of the District Plan Review, to ascertain whether further subsidence could occur as a result of the closure of the Huntly East Mine and subsequent flooding of the mine workings, and if so, what the extent of that hazard area would be. This assessment was followed up with a risk assessment to determine the likelihood and consequence of further subsidence and to investigate possible acceptable methods to mitigate risk (Appendix 5(e)). • The reassessment of this area has resulted in updated hazard information including a new mapped hazard area that has increased the current subsidence area by 12 hectares and has provided some effective mitigation measures that can be included as conditions for permitted activities and therefore enable a slightly more permissive regulatory framework for development. • Existing development has existing use rights. • The rules in chapter 15.11 are for new development and allow for some minor

can be appropriately mitigated. **Rules and other methods** **Rule15.11.1 Permitted Activities** Subject to activity-specific conditions: • Additions to an existing building. • Standalone garage • Construction, replacement, repair, minor upgrading, upgrading or maintenance of utilities. • Earthworks. **Rule 15.11.2 Restricted Discretionary Activities** • Earthworks larger than the permitted levels. **Rule 15.11.3 Discretionary Activities** • Buildings exceeding permitted standards • Subdivision to create additional lots (with exceptions for utility, access and reserve allotments) **Hazard mapping** **Rules in Chapter 14 – Infrastructure and Energy** **Rule 14.11.1 P1 – Stormwater systems for new development or subdivision - 14.11.1.1(vi) Activity**	development as a permitted activity including minor additions to existing buildings and standalone garages so long as no exterior wall exceeds 20m in length. Minor earthworks and utilities are also permitted. This gives a level of certainty for minor development proposals. Providing for permitted activities is more efficient as it avoids unnecessary applications for resource consent for low risk activities and developments. • Where the permitted standards are exceeded, consent is required and Policy 15.2.1.20 and (if relevant) the matters for which discretion is restricted to in Rule 15.11.2 RD1, provide guidance for assessments of applications for consent. This is considered an efficient way to approach applications for consent, as the current situation under the OPD does not provide any guidance as to what information is required and what information might be considered appropriate. • Assessments through the resource consent process ensure that subdivision, use and development can proceed only where risk has been appropriately assessed and can either be avoided, remedied or mitigated. **Costs** • There will be additional costs for obtaining technical expertise to assess development proposals for buildings, earthworks and subdivision. For buildings, this may include costs to assess the most appropriate building design and materials to mitigate the potential for differential subsidence through foundation design and the ability to re-level the building without it sustaining substantial damage. • However, currently subdivision, earthworks and building development in the area require input from technical experts, but without any guidance on appropriate expertise and little to no confidence that development will be approved. This situation has stalled any opportunities for development and has resulted in costs to land owners and developers. **Benefits** • There is a lot more certainty with regards to the type and level of detail of assessments required to assess a development proposal.

specific conditions – Stormwater discharge on land subject to instability only where the ground conditions have been identified as suitable to absorb discharge without causing, accelerating or contributing to land instability. **Rule 14.11.2 RD1 – Stormwater systems for new development or subdivision that do not comply with 14.11.1.P1** **Matters of Restricted Discretion** • The likely effectiveness of the system to avoid flooding, nuisance or damage to other buildings and sites • The capacity of the system and suitability to manage stormwater	• Decision makers will benefit from better information and guidance on appropriate technical information to inform their decisions. • Permits low-risk activities to proceed without resource consent, including utilities conferring benefits on the community. • Updated information and maps communicate the existence and extent of the risk to the community, prospective purchasers and developers. • New buildings and stormwater systems that have been designed and constructed specifically for their site to ensure that risk of damage from ground subsidence is minimised, provide more certainty for current and future land owners and insurance providers. This will increase community resilience to the risk of future subsidence. **Opportunities for economic growth and employment** • The requirement for technical assessments and mitigation of risk are likely to increase employment opportunities with regards to engineering and coastal science and building design. There is potential for this to contribute to economic growth related to these specialised areas. • It is considered that the overall long term community benefits of the proposed risk-based approach outweigh the potential increase in the likely costs of implementation.

Risks of acting or not acting

There is a moderate degree of uncertainty about subsidence risks in this area as there is never any way to categorically confirm a future subsidence scenario, such as where it may occur and to what degree the land will subside.

Expert analysis has identified that within the risk area there will be broad areas where subsidence is less likely to occur due to depth of mine workings and the size of the pillars that resist the pressure of the ground above the tunnels. Conversely, there are other broad areas where subsidence has occurred in the past and where further subsidence is considered more plausible as the mine workings are not as deep, the pillars narrow and the tunnels are more extensive (Appendix 5(c) and 5(e)).

However, it is considered that there is sufficient information from which to develop the policy and rule framework for regulating subdivision, use and development.

The risks of not acting due to not having a high degree of certainty of the risk may be significant with possible injury to people and damage to property

and infrastructure if the risk is not reduced. The vulnerability of that community may increase over time where there is no regulation to ensure risk to new development is reduced.
Appropriateness
The effectiveness and efficiency and benefits and costs of implementing the policies for managing fire risk, land instability and subsidence and mine subsidence have been assessed and on balance it is considered that the implementation of the provisions relating to natural features and buffers are the most appropriate way to achieve Objective 15.2.1.

5.2.6 Liquefaction Risk

Policies relating to Liquefaction Risk	
Provisions most appropriate	**Effectiveness and Efficiency**
Policy 15.2.1.22 - Liquefaction-prone land risk assessment (a) On land potentially prone to liquefaction, ensure that: (i) an assessment by a geotechnical specialist occurs before new subdivision, use or development takes place; and (ii) the level of assessment reflects the type and scale of the subdivision, use or development and the overall vulnerability of the activity to the effects of liquefaction. **Policy 15.2.1.23 – Control activities on land susceptible to damage from liquefaction** (a) Control subdivision, use and development on land assessed as being susceptible to liquefaction-induced ground damage, to ensure appropriate mitigation is provided so that the level of risk to people, property, infrastructure and the environment is acceptable.	• It is noted that there are no specific provisions in the Operative Plan (Option 1) in either the Franklin or Waikato Sections in relation to liquefaction. In terms of Option 3, information and guidelines are considered to be an effective means of addressing liquefaction hazards. MBIE has produced guidelines for addressing the Building Code requirements in dealing with liquefaction risks. These originally applied to the Canterbury Region after the Canterbury Earthquake sequence (2010-2011) but are now being extended to all of New Zealand. • The proposed provisions (Option 2) include policies and matters of discretion that the council will consider in subdivision applications and some land uses (e.g. multi-unit development). No mapping is provided and no specific rules. The rules that apply already exist in Stage 1. This approach is considered to be an effective way to clarify the requirements for assessment of land prone to liquefaction in the district. The provisions are considered appropriate to achieve a more resilient community as required by Objective 15.2.1. The proposed policy and assessment matter framework, works together with the information guidelines provided by MBIE and MfE. The WRPS also requires

General natural hazard policy also applies: **Policy 15.2.1.6 - Managing natural hazard risk generally** (a) Provide for rezoning, subdivision, use and development outside High Risk Flood, High Risk Coastal Hazard (Inundation) and High Risk Coastal Hazard (Erosion) Areas where natural hazard risk has been appropriately identified and assessed and can be adequately avoided, remedied or mitigated and does not transfer or exacerbate risk to adjoining properties. **Variation to Stage 1** The matters below work with Variation 2 to Stage 1 where liquefaction risk was added for specified rules relating to subdivision and multi-unit development etc. in the Zone provisions (see list of relevant rules in the Cascade Table in Appendix 1). **Relevant Rules– Matters of discretion** **15.12.2 Additional matters of restricted discretion for subdivision to create one or more additional vacant lots – liquefaction risk** (1) Where potential liquefaction risk is identified as a matter…the Council restricts its discretion to the following additional matters: (a) Geotechnical assessment and/or investigation of any potential liquefaction hazard… (b) Measures proposed to mitigate the effects of liquefaction	consideration be given in district plans to liquefaction. Implementation Method 13.2.8 requires control of subdivision, use and development for other natural hazards and associated risk not already specifically mentioned by other policies and methods. The explanation makes it clear that this includes liquefaction: *"The methods of this policy are predominantly focused towards identified hazard areas, including Primary Hazard Zones, Flood Risk Zones, areas at high risk of coastal hazards and Residual Risk Zones. Method 13.2.8 recognises that there are other natural hazards that may be relevant in particular areas e.g. coastal erosion, coastal flooding or **liquefaction risk**, and that development in these areas needs to be managed to ensure that the risk from these natural hazards does not exceed an acceptable level."* [WRPS, page 13-6] [bold underline, our emphasis]. • The lower level of control through policies and additional matters of discretion provide for assessment of liquefaction-prone land. The provisions take into consideration the risk-based approach (probability of occurrence and consequences) and also the level of information available. Liquefaction risk has not been mapped in the district at this time. • This work is progressing with recent changes to the Building Code requiring liquefaction-prone ground within districts to be mapped.[7] *"The current Building Code solutions to 'good ground' in B1/AS1 will continue to comply until 28 November 2021. This change requires councils and territorial authorities to complete liquefaction mapping within the two years.* **Benefits**

[7] https://www.building.govt.nz/building-code-compliance/biannual-building-code-updates/november-2019-building-code-update/#jumpto-liquefaction__002dprone-ground

hazard, if present, including: (i) Location, size and layout of allotments, structures and building platforms… (ii) Location, timing and scale and nature of earthworks; (iii) Provision of ground strengthening… (iv) Provision of resilient services… (v) Setbacks… (vi) Effects on adjoining properties **15.12.3 Additional matters of restricted discretion for new land use (e.g. multi-unit development) – liquefaction risk** (1) Where potential liquefaction risk is identified as a matter…the Council restricts its discretion to the following additional matters: (a) Geotechnical assessment and/or investigation of any potential liquefaction hazard… (b) Measures proposed to mitigate the effects of liquefaction hazard, if present, including: (i) Location, size and layout and design of buildings, structures, carparking… (ii) Location, timing and scale and nature of earthworks; (iii) Provision of ground strengthening… (iv) Setbacks… (v) Consideration given to ease of repair… (vi) Effects on adjoining properties	• It is considered that the liquefaction risk assessment required will result in mitigation being proposed for subdivision and developments such as ground improvement and building techniques (e.g. rib-raft, lighter structures etc). Better engineering design will reduce the likelihood and consequences of liquefaction and hence reduce risk. This will give effect to Policy 3.24 of the WRPS, and also assist in achieving a more resilient community and appropriate mitigation of liquefaction risk (Objective 15.2.1). • It is considered that the proposed policies and assessment matters will provide a more formalised and comprehensive approach to geotechnical assessment than the status quo. • The proposed provisions better reflect current thinking and best practice in this field and reflect well-established and accepted general approaches to defining hazard risk and managing it. • The provisions also have regard to the Royal Commission of Inquiry into the Canterbury Earthquake Reports (Vol 5, Summary and Recommendations), which recommended that the potential effect of earthquakes, liquefaction and lateral spread be taken into account in zoning and in land use and subdivision consents. This explicit recognition of liquefaction in the proposed provisions compared with the status quo in the Operative Plan is therefore considered appropriate. • Further benefits include potentially increased employment opportunities for geoscientists in the region and potentially increased education and training needs locally and regionally. **<u>Costs</u>** • The level of intervention required by the proposed provisions is greater than in the Operative Plan (Option 1) (where the word liquefaction is difficult to find). • Costs to prepare geotechnical reports may be higher and proposed mitigation may also be costly. However, it is understood that most of the assessments and mitigation are already being required for subdivision under s106 of the RMA in areas of the district where liquefaction is suspected.

	• Costs to the council and the community for liquefaction information and advice will increase, but this is considered to be greatly outweighed by the benefits of appropriate awareness, mitigation and robust regulatory planning for liquefaction hazards.
Risk of acting or not acting	
It is considered that there is enough information on which to base the proposed policies and matters of discretion. The risk of not acting, could be significant in terms of allowing development of land subject to liquefaction without proper assessment, including significant damage to property should an earthquake occur causing liquefaction in the district. The community would be more vulnerable (less resilient) and would not effectively avoid or mitigate risks of liquefaction and therefore would not meet proposed Objective 5.2.1 or Policy 3.24 and method 13.2.8 of the WRPS. However, it is considered that at this time, further information in the form of mapping of the liquefaction risk areas of the district would provide for a more complete level of information on which to provide a comprehensive set of provisions for the District Plan.	
Appropriateness	
The proposed policies and assessment matters will require the most up to date geotechnical information from a wide range of sources including WRC, MfE, MBIE, NZ Geotechnical Society, GNS and Risk Management literature to provide robust liquefaction risk assessment on land before it is rezoned or developed. The approach is considered appropriate to give effect to Policy 3.24 and Implementation Method 13.2.8 of the WRPS and to achieve Objective 15.2.1.	

5.2.7 Natural Hazard Awareness

Provisions (Policies, Rules, Methods) most appropriate way to achieve the objective
Objective 15.2.2 - A well-informed community that: (a) is aware of, and understands, which natural hazards affect the district; and (b) is able to effectively and efficiently respond to, and recover from, natural hazard events.

Evaluation of Option 2: Provide natural hazard information to strengthen and reflect new information and updated statutory directions.

Provisions (Policies, Rules, Methods) most appropriate way to achieve the objective	
Objective 15.2.2 - A well-informed community that: (a) is aware of, and understands, which natural hazards affect the district; and (b) is able to effectively and efficiently respond to, and recover from, natural hazard events.	
Policies relating to Awareness of Natural Hazard Risk	
Provisions most appropriate	**Effectiveness, Efficiency, Benefits and Costs**
Policy 15.2.2.1 - Natural hazard risk information (a) Enable people to be informed and have access to information on the natural hazards affecting their properties and surrounding area, including through: (i) provision of Land Information Memoranda; (ii) natural hazard technical information, risk registers and mapping on the Council's website, the Waikato Regional Council Hazards Portal, this district plan and accompanying planning maps; (iii) education, provision of information and community engagement; and (iv) alignment with the work of other agencies including iwi and the Waikato Regional Council. **Policy 15.2.2.2 - Awareness of Civil Defence plans** Improve response to and recovery from natural hazard events by encouraging community awareness and use of information and methods contained in Community Response Plans.	**Effectiveness and Efficiency** • Policy 15.2.2.1 directs council to make natural hazard information publically available through methods and processes such as LIM reports, the hazards register, Stormwater Catchment Management Plans, district planning maps, Regional Hazards Portal, signage, education, and community engagement. This policy also promotes alignment with other agencies and is consistent with the policy direction in Policy 13.1 and Implementation Method 13.1.5 of the WRPS. • In addition, Policy 15.2.2.2 provides for better community awareness of CDEM Community Response Plans to improve response to and recovery from natural hazard events, which gives effect to Policy 13.1(f) of the WRPS. • Together, the proposed policies provide an efficient and effective way to achieve Objective 15.2.2 through contributing to community knowledge of natural hazards and assisting with an efficient means to access a consistent body of information to the community, individual land owners, future property purchasers and land developers. • Making information that the council collects through numerous processes available to the public is efficient in that the information is available to all and can provide the broad bases for site-specific assessments for specific development proposals and may reduce the

	need for duplication. • It is more efficient and cost effective for council and the community when council carry out hazard and stormwater modelling; collect and store hazard information; develop community response plans and make all information available to the public so all parties have access to the same information. **Costs** • Making information available will likely be acceptable to all stakeholders. While LIM reports can be controversial, it is important for anyone wishing to purchase property to have access to information that council holds. • Engagement with communities on the district planning maps will assist to increase knowledge about hazards and risk. • There may be short-term costs in developing land where hazards exist, or where risk is significant, the land may not be able to be developed. Awareness of natural hazard risks increases may result in market correction of property values in some cases, with loss to existing landowners, offset by future landowners avoiding any such losses (Appendix 5(j)). • There may be difficult adjustments to be made, including in cases where sites of significance to Maaori are found to be subject to natural hazards, including new risks due to climate change. **Benefits** • The main benefits from the implementation of the proposed policies are that they ensure the community has access to information and is then better informed about the nature and extent of natural hazards. They will be in a better position to make rational decisions about their future investment and development activities. Increasing awareness of natural hazards can contribute to the health and safety of the community. • Improved community information has economic advantages long term, in that development and long-term investment decisions will be rationally

	influenced to mitigate risks arising from natural hazards. • Increased knowledge of the extent of future natural hazards impacted by climate change will assist communities to be aware of and prepare for possible future scenarios.
Risk of acting or not acting	
There are inherent uncertainties and information gaps around the risks of natural hazards, in particular, the evolving risks due to climate change. District plan rules may lag in this context, and ongoing public education is the best way to ensure new risks can be responded to and addressed efficiently.	
Appropriateness	
It is considered that the recommended policies 15.2.2.1 and 15.2.2.2 and methods outlined above are the most appropriate way for achieving Objective 15.2.2, having considered: • other reasonably practicable options for achieving the objectives; • evaluating the preferred option (option 2) in terms of assessing the efficiency and effectiveness of the provisions in achieving the objective as well as assessing the benefits and costs and opportunities for economic growth and employment; These policies provide effective and efficient opportunities to improve community knowledge of natural hazards through provision of information sharing. Option 1 ("Status Quo") was discarded as being an ineffective approach to creating a well-informed community.	

5.2.8 Climate Change

Provisions (Policies, Rules, Methods) most appropriate way to achieve the objective
Objective 15.2.3 - Climate change A well-prepared community that: (a) is able to adapt to the effects of climate change; and (b) has transitioned to development that prioritises lower greenhouse gas emissions.

Evaluation of Option 2: Provide natural hazard information to strengthen and reflect new information and updated statutory directions.

Policies relating to Climate Change	
Provisions most appropriate	**Effectiveness and Efficiency**
Policy 15.2.3.1 - Effects of climate change on new subdivision and development (a) Ensure that adequate allowances are made for the projected effects of climate change in the design and location of new subdivision and development throughout the district, including undertaking assessments where relevant that provide for: (i) the projected increase in rainfall intensity, as determined by national guidance, but being not less than 2.3°C by 2120; (ii) the projected increase in sea level, where relevant, as determined by national guidance, but being not less than 1m by 2120; (iii) stress testing under the RCP 8.5 scenario for rainfall[8] and RCP 8.5H+ for sea level rise[9]; and (iv) in respect to the coastal environment, increases in storm surge, waves and wind. **Policy 15.2.3.2 - Future land use planning and climate change** (a) Increase the ability of the community to adapt to the effects of climate change when undertaking future land use planning by:	**Overall Approach** • Policies 15.2.3.1; 15.2.3.2; 15.2.3.3; 15.2.3.4 and 15.2.3.5 work together to provide guidance with regards to appropriate climate change mitigation measures and adaptation as well as guidance for assessments that are required to take into account the projected effects of climate change. • Policies 15.2.3.1 and 15.2.3.5 specify the requirements for assessing the projected effects of climate change. The allowances stipulated in Policy 15.2.3.1(a)(i)-(iii) are based on the latest available national and regional guidance. • Policy 15.2.3.5(a)-(c) provides guidance for assessments and when they are required. • Policy 15.2.3.2 provides guidance when assessing the impacts of climate change on future land use planning including consideration of adaptation measures including facilitation of discussions with communities on adaptive pathway planning. • Policy 15.2.3.3 supports a precautionary approach when dealing with the uncertainty of the projected effects of climate change. • Policy 15.2.3.4 ensures consideration of appropriate building setbacks

[8] Ministry for the Environment, 2018: Climate Change Projections for New Zealand. September 2018. Publication No. MFE 1385.
[9] Ministry for the Environment, 2017: Coastal Hazards and Climate Change – Guidance for Local Government. December 2017. Publication No. ME 1341.

(i) taking into consideration the potential environmental and social costs of climate change, including effects on indigenous biodiversity (inland migration), historic heritage, mahinga kai, public health and safety, public access to the coast and waterway margins, and the built environment. (ii) encouraging the incorporation of sustainable design measures within new subdivision, landuse and development, including: (A) low impact, stormwater management, urban design and green infrastructure; (B) use of relocatable buildings and structures in areas potentially at risk due to sea level rise or increased flood levels; (C) efficient water storage; (D) provision of renewable energy generation; and (E) transferring to activities with lower greenhouse gas emissions. (iii) providing on-going monitoring of changes to the environment due to climate change; and (iv) facilitating community discussion on adaptive pathways to manage the risks associated with climate change and incorporating them, where appropriate, into the District Plan through plan changes. **Policy 15.2.3.3 - Precautionary approach for dealing with uncertainty** (a) In areas throughout the district likely to be affected by climate change over the next 100 years, adopt a precautionary approach towards new subdivision, use and development which may have potentially significant or irreversible adverse effects, but for which there is incomplete or uncertain information. **Policy 15.2.3.4 - Provide sufficient setbacks for new development**	to protect people and property from the adverse effects of climate change, including sea level rise, while at the same time, considering matters such as natural ecosystems and provision for the inland migration of coastal habitats, natural defences and public access to the coast. **Effectiveness** • Climate change poses challenges, especially for development along the coast where impacts such as sea level rise will likely require complex adaptive management processes such as adaptive pathways planning and other mitigation measures to address risk to both existing and future development. These measures will provide for continued use of coastal land while ensuring that new development is reasonably able to adapt to any future sea level rise scenario. • Where existing development becomes increasingly vulnerable to coastal inundation and/or erosion, adaptive measures will need to be considered. Where a number of properties or a large segment of a community become increasingly vulnerable, community adaptive management strategies will be required to investigate possible pathways to reduce risk. • An adaptive pathways approach could include any number of adaptive measures including interim mitigation measures, coastal retreat or coastal protection works where appropriate. • Adaptive planning is a process that operates outside of the district plan processes. However, it is important to note that the proposed polices and rules support adaptive planning processes by allowing for interim measures and adaptive pathways to be considered through resource consent applications and conditions. Consent conditions can document adaptive pathways such as specifying triggers to prompt a condition stipulated in the consent. For example, requiring removal or relocation of a building when an erosion scarp, or coastal flooding is within a specified distance from the building. • The uncertainty around future climatic conditions and the degree of sea

(a) Protect people, property and the environment from the projected adverse effects of climate change, including sea level rise, by providing sufficient setbacks from water bodies and the coast when assessing new development. (b) Ensure that, in establishing development setbacks, adequate consideration is given to: (i) the protection of natural ecosystems, including opportunities for the inland migration of coastal habitats; (ii) the vulnerability of the community; (iii) the maintenance and enhancement of public access to the coast and public open space; (iv) the requirements of infrastructure; and (v) natural hazard mitigation provision, including the protection of natural defences. **Policy 15.2.3.5 - Assess the impact of climate change on the level of natural hazard risks** (a) For all new subdivision, use and development requiring rezoning or a resource consent, ensure that account is taken of the projected effects of climate change over the next 100 years when assessing any identified risks from natural hazards, and their effects on people, property, infrastructure and the environment. (b) Ensure that, when assessing the effects of climate change on the level of natural hazard risk in accordance with Policy 15.2.3.5(a) above, the allowances in Policy 15.2.3.1(a)(i)-(iv) are applied. (c) Where the assessment required by Policy 15.2.3.5(a) and Policy 15.2.3.5(b) above indicates that natural hazards are likely to be exacerbated by climate change, ensure that subdivision and development are designed and located to avoid, or appropriately mitigate, any increased and cumulative risk, including increased risk of	level rise that will occur make adaptive planning the most effective management option. • Where new subdivision occurs such as greenfields development that could result in significant or irreversible adverse effects from climate-related hazards, but for which there is insufficient or uncertain information, a precautionary approach should be taken. • Factoring in the projected effects of climate change, based on national guidance, into flood and coastal hazard modelling will be the most effective method for understanding future impacts of climate change. • Potential mitigation measures for other climate change impacts such as elevated fire risk, the inland migration of coastal habitats, public access to the coast and public open space can be considered, where applicable, at the time of subdivision and developments that require resource consent. **Efficiency** • Considering the effects of climate change when undertaking development that requires resource consent provides for an efficient process that can stipulate either one-off or ongoing conditions that are then attached to the property file. This allows for more transparency and accessibility of information with regards to any future adaptive measures required by consent conditions that future owners may be responsible for. • Adaptive planning pathways contained in resource consent conditions are easier to monitor. • Flood and coastal hazard modelling provided for at a scale suitable for land use planning and included in the district planning maps is a more efficient way to provide information to the community and increase awareness of natural hazards. • Applying a regulatory method to mapped hazard areas that focusses on risk reduction through avoidance, mitigation or remediation is more efficient than not identifying hazard areas and requiring hazard

flooding, liquefaction, coastal inundation, coastal erosion, slope instability, fire, and drought. **Supporting Policy** **Policy 15.2.1.8 - Limitations on hard protection works for coastal hazard mitigation** (a) Ensure that where new hard protection structures and works are necessary to protect existing development on public or privately-owned land from coastal hazards, they are appropriately assessed and controlled and: (i) have primarily a public and/or environmental benefit when located on public land; (ii) are effective; (iii) the economic, social and environmental benefits outweigh costs; and (iv) do not transfer or increase risk to other people, property, infrastructure, the natural environment, historic heritage, or Maaori Sites and Areas of Significance. (b) Ensure that when new hard protection structures are to be located in an area where an adaptive management strategy has been prepared to manage coastal hazards, they are consistent with that strategy. **Policy 15.2.1.18 – Residential development potentially subject to fire risk** (a) In areas assessed or identified as being potentially subject to elevated fire risk, ensure that an appropriate buffer area or setback is provided around new residential subdivision and development.	modelling to be carried out in an ad hoc manner. This is especially the case with flood modelling that takes into account the wider catchment and would be particular cost inefficient for property owners to carry out individually. **Costs** • Additional upfront costs for assessing hazard risk, impacts of climate change, engineering and structural design, and raised floor levels. • Costs to future land owners to apply adaptive measures. • Cost to council (rate payers) to develop adaptive management strategies for vulnerable communities. • Costs associated with monitoring, hazard modelling, hazard assessments and future plan changes. **Benefits** • The overall long term community benefits of an adaptive pathways approach ensures that resilience is maintained over time by providing clear information and procedures through specific assessments, building design, and triggers outlined in resource consent conditions. Although there are added upfront costs to implement this approach, the long term benefits are considered to outweigh any increase in costs. • Community safety and wellbeing. • Reduced disruptions to economic activity and services over time due to increasing risk of natural hazards. • Adaptive planning provides communities with knowledge/awareness of possible future scenarios and adaptive pathways to reduce risk. • More resilient communities. • Resilient development safeguards insurability over the long term.

Rules and other methods	**Opportunities for economic growth and employment**
Rules in Flood Plain Management Area and Flood Ponding Areas; High Risk Flood Area; Coastal Sensitivity Areas – Erosion and Inundation. • Rule 15.4.3 • Rule 15.5.3 • Rule 15.5.4 • Rule 15.7.2 • Rule 15.7.3 • Rule 15.8.2 • Rule 15.8.3 • Rule 15.9.2 • Rule 15.9.3 • Rule 15.10.2 • Rule 15.10.3 **Stage 1 PDP Zone Chapter rules** Rules in Stage 1 PDP – Building setbacks from waterbodies • Residential Zone - Rule 16.3.9.3 • Business Zone – Rule 17.3.4.2 • Business Town Centre Zone – Rule 18.3.7 • Industrial Zone – Rule 20.3.4.2 • Industrial Zone Heavy – Rule 21.3.4.2 • Rural Zone – Rule 22.3.7.5 • Country Living Zone – Rule 23.3.7.5	The requirement for technical assessments and mitigation of risk are likely to increase employment opportunities with regards to engineering and coastal science and building design. There is potential for this to contribute to economic growth related to these specialised areas. It is considered the overall long term community benefits of the proposed risk-based approach outweigh the potential increase in the likely costs of implementation.

• Village Zone – Rule 24.3.6.3 • Reserve Zone – Rule 25.3.5.2 • Rangitahi Peninsular Zone – Rule 28.3.9.3 • **Flood modelling** from Horotiu - Huntly - Ohinewai incorporate climate change 2.3 degrees increase in temperature and shown on planning maps as Floodplain, High Risk Flood Area and Ponding area. • **Mapping** for coastal erosion/inundation sensitivity overlay areas include 1m sea level rise to 2120, allowance. • Adaptive management planning and development of adaptive management strategies for vulnerable communities, including identifying adaptive pathways • This policy is relevant to any proposed rezoning and any subdivision proposals in any of the natural hazard overlays i.e greenfields development, • Policy 15.2.3.2(1)(a) and (b) will be relevant to any discretionary or non-complying activities and also some RDA's which have climate change as a consideration. **See Variation 2 to Stage 1 PDP additional matters of discretion for Subdivision:** 16.4.1 RD1, 22.4.1.2 RD1, Rule 23.4.2 RD1, 24.4.1 RD1, 24.4.1 RD2, 24.4.2 RD1 and 24.4.2 RD2 • Avoidance and mitigation of natural hazards, including fire risk • Natural hazard risk including fire risk • Subdivision Te Kowhai and Tuakau – Rule 24.4.2 RD1(b) (ix) and RD2 (b) (ix)	

Risks of acting or not acting
There are inherent uncertainties and information gaps around the risks of natural hazards, in particular, the evolving risks due to climate change. Hazard modelling, including the projected effects of climate change, are based on current government guidelines. As the future effects of climate change are inherently difficult to predict, there is a large degree of uncertainty, especially over longer periods of time. Even with detailed investigation, the uncertainty may preclude accurate modelling of hazard areas. The risks of not acting due to insufficient information or uncertainty may be significant with possible injury to people and future damage to development in at-risk areas. Uncertainty can be addressed through adaptable measures included in the design new development and the resource consent conditions where the site may be vulnerable over the next 100 years. This ensures that development can continue to be resilient over a longer timeframe and unacceptable costs are not transferred to future generations.
Appropriateness
It is considered that the recommended policies 15.2.3.1 - 15.2.3.5 and methods outlined above are the most appropriate way to achieve Objective 15.2.3, having considered: • other reasonably practicable options for achieving the objectives; • evaluating the preferred option (option 2) in terms of assessing the efficiency and effectiveness of the provisions in achieving the objective as well as assessing the benefits and costs and opportunities for economic growth and employment; These policies provide effective and efficient means to address the projected effects of climate change, given the level of uncertainty of the scale and timing of future effects. Option 1 ("Status Quo") was discarded as being an ineffective approach as the provisions in the Franklin Section and the Waikato Section of the ODP are largely silent on climate change and do not include effective provisions for managing increasing risk over time. The current Operative District Plan does not include coastal hazard modelling or flood modelling that incorporates climate change scenarios.