Landslide Hazard & Climate Change

Review

Analysis

Ref	Source	Issues	Objective	Policy	Method	Rule	Tools	Dependencies	Outstanding Issues	Potential Improvements	Priority for Action	Likely Cost and Effectiveness*	Statutory Requirements and Reference Documents
Regional Policy Statement (RPS)	Chapters 3, 4, and 5	Regionally significant issues for Natural Hazards: 1. Effects of Natural Hazards - natural hazard events ... have an adverse impact on people and communities, businesses, property and infrastructure 2. Human actions can increase risk and consequences from natural hazards 3. Climate Change will increase both the magnitude and frequency of natural hazard events	Objective 18 - Risks and Consequences ... from natural hazards and climate change effects are reduced Objective 19 - Hazard mitigation measures ... do not increase the risk and consequences of natural hazard events Objective 20 - Communities are more resilient to natural hazard events, including the impacts of climate change...	Policy 28 - Avoiding subdivision and development in areas at high risk from natural hazards - district plans Policy 50 - Minimising the risks and consequences of natural hazards - consideration Policy 51 - Minimising adverse effects of hazard mitigation measures - consideration	> Collect and maintain information about natural hazards and climate change > Consider when resource consents, notices of requirement and when changing, varying or replacing plans > District Plan implementation > Allocation of responsibilities	N/A	Plans and actions must "give effect" to RPS	Requires collection and dissemination of information and advice, and regular updating of plans. Control of natural hazards in relation to land development is allocated as a district responsibility	High-level policy requirement. Needs ongoing monitoring for effectiveness against Anticipated Environmental Results (AER)	Need for GW to monitor effectively, and a range of enforcement/encouragement actions. Anticipated environmental results (AERs) can be clarified. No mention of monitoring of climate change effects - just effectiveness of policies	Moderate	?	N/A
Regional Soil Plan (RSP)	RPS001 Section 5.2	Soil Disturbance effects on slope stability - Slopes > 23 degrees in Area 1, or > 28 degrees in Area 2	Soil disturbance - Roading and Tracking Activities - of continuous length of more than 200m	Roading or tracking activities located in Area 1 or 2 under specified conditions given in Rule 1 paras (1) and (2), excluding activities undertaken in accordance with conditions on a subdivision consent is a Restricted Discretionary Activity	An application for a resource consent for an activity in accordance with Section 5.4 of the Plan, excluding when in accordance with conditions of a subdivision	Rule 1: Soil disturbance on erosion prone land, matter to which Council has discretion include - para (10) any steps to be taken to avoid, remedy or mitigate the effects of the activity on slope stability	> WCC has slope stability hazard maps, but not referenced > Monitoring the Effectiveness of the Plan (Section 9.2), including "Any risk to human life, property, or other aspects of the environment from natural hazards (particularly flooding and erosion)"	> Policy exclusions rely on adequate treatment of slope stability under (WCC) sub-division consent > Resource consent conditions under Section 5.4, including assessment of actual and potential effects on the environment	> Are Soil maps available, not referenced? > Policy Restricted to relatively large scale disturbances > No linkage to climate change > Primarily a soil health & erosion focus, does not specifically address land slip hazard / risk > Need to take account of site history and risk to life and property not just hazard	> Characterise relationship between soil stability and land slip hazard, with greater clarity in rules on the management of land-slip hazard > Clarify roles and responsibilities between WRC and WCC, and cross-reference related policies, methods and tools > Give consideration of a wider range of factors governing soil/land stability, including extreme rainfall events and hence climate change > Use of a more risk-based approach to mapping land-slip prone areas - Riskscape	Moderate	?	Relevant NZ Standards**
RSP	RPS002 Section 5.2	Soil disturbance effects on slope stability - Slopes > 23 degrees in Area 1, or > 28 degrees in Area 2	Soil disturbance on erosion prone land - involving equal or greater than 1000m3 soil within 10,000m2 area, etc	Any soil disturbance on erosion prone land under certain specific condition given in Rule 2 paras (1) and (2), excluding activities (a) associated with roading and tracking or (b) undertaken in accordance with conditions on a subdivision consent is a Restricted Discretionary Activity	An application for a resource consent for an activity in accordance with Section 5.4 of the Plan, excluding when associated with roading and tracking activities or when in accordance with conditions of a subdivision	Rule 2: Soil disturbance on erosion prone land , matter to which Council has discretion include - para (10) any steps to be taken to avoid, remedy or mitigate the effects of the activity on slope stability	> WCC has slope stability hazard maps, but not referenced > Monitoring the Effectiveness of the Plan (Section 9.2), including "Any risk to human life, property, or other aspects of the environment from natural hazards (particularly flooding and erosion)"	> Policy exclusions rely on adequate treatment of slope stability under (WCC) sub-division consent > Resource consent conditions under Section 5.4, including assessment of actual and potential effects on the environment	> Are Soil maps available, not referenced? > Policy Restricted to relatively large scale disturbances > No linkage to climate change > Primarily a soil health & erosion focus, does not specifically address land slip hazard / risk > Need to take account of site history and risk to life and property not just hazard	> Characterise relationship between soil stability and land slip hazard, with greater clarity in rules on the management of land-slip hazard > Clarify roles and responsibilities between WRC and WCC, and cross-reference related policies, methods and tools > Give consideration of a wider range of factors governing soil/land stability, including extreme rainfall events and hence climate change > Use of a more risk-based approach to mapping land-slip prone areas - Riskscape	Moderate	?	Relevant NZ Standards
RSP	RPS003 Section 5.3	Vegetation disturbance effects on slope stability - Slopes > 23 degrees in Area 1, or > 28 degrees in Area 2	Vegetation disturbance on erosion prone land of greater than 1 hectare	Vegetation disturbance on erosion prone land - provided for by Rule 3 Activity is a Permitted activity	An application for a resource consent for an activity in accordance with Section 5.4 of the Plan	Rule 3: Vegetation clearance of more than 1 hectare is a Permitted Activity provided certain conditions apply	> WCC has slope stability hazard maps, but not referenced > Monitoring the Effectiveness of the Plan (Section 9.2), including "Any risk to human life, property, or other aspects of the environment from natural hazards (particularly flooding and erosion)" > Best practice methods, e.g. NZ Forest Code of Practice 1993	> Policy exclusions rely on adequate treatment of slope stability under (WCC) sub-division consent > Resource consent conditions under Section 5.4, including assessment of actual and potential effects on the environment	> Are Soil maps available, not referenced? > Policy Restricted to relatively large scale disturbances > No linkage to climate change > Primarily a soil health & erosion focus, does not specifically address land slip hazard / risk > Need to take account of site history and risk to life and property not just hazard	> Characterise relationship between soil stability and land slip hazard, with greater clarity in rules on the management of land-slip hazard > Clarify roles and responsibilities between WRC and WCC, and cross-reference related policies, methods and tools > Give consideration of a wider range of factors governing soil/land stability, including extreme rainfall events and hence climate change > Use of a more risk-based approach to mapping land-slip prone areas - Riskscape	Moderate	?	Relevant NZ Standards
RSP	RPS004 Section 5.3	Vegetation disturbance effects on slope stability - Slopes > 23 degrees in Area 1, or > 28 degrees in Area 2	Vegetation disturbance on erosion prone land of greater than 1 hectare	Vegetation disturbance on erosion prone land - provided for by Rule 3 but does not comply with any of the conditions in Rule 3 is a Restricted Discretionary Activity	An application for a resource consent for an activity in accordance with Section 5.4 of the Plan	Rule 4: Vegetation disturbance on erosion prone land, matters to which Council has discretion include - para (11) any steps to be taken to avoid, remedy or mitigate the effects of activity on slope stability.	> WCC has slope stability hazard maps, but not referenced > Monitoring the Effectiveness of the Plan (Section 9.2), including "Any risk to human life, property, or other aspects of the environment from natural hazards (particularly flooding and erosion)	> Policy exclusions rely on adequate treatment of slope stability under (WCC) sub-division consent > Resource consent conditions under Section 5.4, including assessment of actual and potential effects on the environment	> Are Soil maps available, not referenced? > Policy Restricted to relatively large scale disturbances > No linkage to climate change > Primarily a soil health & erosion focus, does not specifically address land slip hazard / risk > Need to take account of site history and risk to life and property not just hazard	> Characterise relationship between soil stability and land slip hazard, with greater clarity in rules on the management of land-slip hazard > Clarify roles and responsibilities between WRC and WCC, and cross-reference related policies, methods and tools > Give consideration of a wider range of factors governing soil/land stability, including extreme rainfall events and hence climate change > Use of a more risk-based approach to mapping land-slip prone areas - Riskscape	Moderate	?	Relevant NZ Standards
Wellington City District Plan (WCDP)	Chapter 29, plus proposed District Plan Change 70 - Earthworks Publicly notified July 2009 Decision notified 1 June 2010 (effective immediately)	Earthworks stability - landslips more likely due to increasing frequency extreme weather events associated with climate change; public concern following high profile landslips; engineering design may not be to a standard that provides sufficient safety during earthquakes and extreme weather; lack of detailed mapping of riskier sites	Obj 29.2.1 provide for use, development and protection of land and physical resources while avoiding, remedying or mitigating any adverse effects of earthworks and associated structures on the environment	29.2.1.1 ensure design and assessment of earthworks and associated structures is co-oridinated with future land development and subdivision	Rules, Design Guides, Structure Plans	Rules 30.1.1-30.1.4 - Earthworks of specified dimensions, generally with cuts and/or fills less than 1.5m, on slopes less than 34 degrees, and areas less than 250m^2, more than a speficied distance from a wetland, stream, river, coastal marine area, identified ridgeline, or flood hazard zone, are permitted activities. Rule 30.2 - Earthworks which exceed permitted activity standards are restricted discretionary activities. Discretion is restricted to: > earthworks stability > erosion, dust and sediment control > visual amenity > flood hazard > effect on streams and coastal marine area > transport effects > heritage values. Rule 30.3.1 Earthworks in specified flood hazard areas are fully discretionary activities. Rule 30.3.2 Earthworks on specified ridgelines are fully discretionary activities.	Range of Design Guides. Some structure plans	Description and assesments of effects, information required in Chapter 3, and further information as the Council may require	No information identifying areas of vulnerability or circumstances of enhanced risk. No information relating to climate change	> Use of mapping and overlays to clarify most vulnerable areas. > Clarify information requirements (the guidelines in the Plan for Churton Park Concept Village provide a comprehensive list of information required with an application)	Moderate	?	Relevant NZ Standards
WCDP				29.2.1.2 provide for minor earthworks to allow the use and development of land where the risk of instability is minimal	Rules, Advocacy		Apply range of guidelines and standards	Description and assesments of effects, information required in Chapter 3, and further information as the Council may require	No real issues. Requires adequate information when consents sought	Not needed	Moderate	?	Relevant NZ Standards
WCDP				29.2.1.3 ensure that earthworks are designed to minimise the risk of instability	Rules, Advocacy		Apply range of guidelines and standards	Description and assesments of effects, information required in Chapter 3, and further information as the Council may require	No real issues. Requires adequate information when consents sought	Not needed	Moderate	?	Relevant NZ Standards
WCDP				29.2.1.4 require earthworks to be designed and managed to minimise erosion and the movement of dust and sediment beyond the area of the work, particularly to streams, wetlands and coastal waters	Rules, Design Guides, Technical Guide (GW E&S Ctrl Guide), WCC Code of Practice for Land Development		Apply range of guidelines and standards	Description and assesments of effects, information required in Chapter 3, and further information as the Council may require	No real issues. Requires adequate information when consents sought	Not needed	N/A	?	Relevant NZ Standards
WCDP				29.2.1.5 ensure earthworks and associated structures do not exacerbate flood events in Flood Hazard Areas	Rules, Code of Practice for Land Development		Flood hazard areas mapped in plan	Flood hazard areas identified	Continue to monitor	Clarify monitoring	N/A	?	Relevant NZ Standards
WCDP				29.2.1.6 protect and enhance character and amenity	Design Guides, Code of Practice for Land Development, Advocacy - disseminating info by GW publications		N/A	These (and subsequent policies) focus on visual and amenity aspects.	N/A	N/A - assuming above policies have same or greater weight	N/A	?	Relevant NZ Standards
WCDP				29.2.1.7 earthworks designed and landscaped to reflect natural landforms and reduce/soften visual impact on character and visual amenity of area	Rules, Design Guides		N/A	These (and subsequent policies) focus on visual and amenity aspects	N/A	N/A - assuming above policies have same or greater weight	N/A	?	Relevant NZ Standards
WCDP				292.1.10 ensure the design of structures used to retain or stabilise landslips, reflect the character and visual amenity of the local area	Rules, Design Guide		N/A	These (and subsequent policies) focus on visual and amenity aspects	N/A	N/A - assuming above policies have same or greater weight	N/A	?	Relevant NZ Standards
WCDP	Subdivision Design Guid	Loss of landform and landscape features during subdivision	Retain existing landform and landscape features during subdivision (summarised)	Specified requirements and guidelines	Design Guidance	Applied for all subdivision where a consent is needed	Matter of control as part of subdivision consent	N/A	Could be extended to include stability/safety	Could be extended to include stability/safety	Low	?	N/A
WCDP	Subdivision Design Guid	Loss of vegetation during dubdivision	Retain and utilise existing trees and plant new vegetation	Specified requirements and guidelines	Design Guidance	Applied for all subdivision where a consent is needed	Matter of control as part of subdivision consent. Otherwise no requirement or guidance	N/A	N/A	Could ensure new vegetation is suited to future climates	Low	?	
WCC Code of Practice for Land Development (Draft)	Part B - Earthworks Design and Construction	Changes due to land development	To ensure: > stability of land > geotechnical soundness of any development >control of sediment generated by the works > control of amount of sediment entering receiving environments > control of surface water flows during and after construction > no undue nuisance from silt, dust, noise or vegeation disposal > preservation of natural landform and its features	No specific policies	A mix of guidance and specific standards	A range of standards to be met - e.g. maximum steepness of batters, bending dimensions; compaction densities; testing requirements for fill	Same as rules. Refers to wide range of standards and guidelines	N/A - universal application	Not known	Monitoring of effectiveness can lead to review of parts of Code	N/A	N/A	Wide range of reference documents listed
RMA	Section 106 Provisions	Plan controls inadequate	"Backstop" protection of land and/or structures	Over-riding power to limit development and subdivision of at-risk land	A Consent authority may refuse subdivision consent in certain circumstances: (a) the land in respect of which a consent is sought or any structure on the land, is or is likely to be subject to material damage by erosion, falling debris, subsidence, slippage or inundation from any source; or (b) any subsequent use that is likely to be made of the land is likely to accelerate, worsen or result in material damage to the land, other land or structure by erosion failing debris, subsidence, slippage or inundation from any source; or (c) sufficient provision has not been made for legal and physical access to each allotment to be created by the subdivision	See method	New or unidentified risk is identified	Last resort protection	Power remains in RMA, but regarded as a last resort, and used less and less. Expectation is that district and/or regional plans will identify and limit development of such land	Continue efforts to identify and protect hazard - prone lands from development. Improving Climate Change information should feed into this ongoing requirement. Improve district plan provisions	N/A	N/A	N/A

BA	Sections 71 to 74	Plan controls inadequate	"Backstop" prohibition of consents for structures, or consent granted but issues and limitations noted on title	Over-riding power to limit buildings on at-risk land	A building consent authority must refuse to grant a building consent for construction of a building, or major alterations to a building if: (a) the land on which the building work is to be carried out is subject or is likely to be subject to 1 or more natural hazards; or (b) the building work is likely to accelerate, worsen, or result in a natural hazard on that land or any other property, unless: the building consent authority is satisfied that adequate provision has been or will be made to: (a) protect the land, building work, or other property referred to in that subsection from the natural hazard or hazards; or (b) restore any damage to that land or other property as a result of the building work. Natural hazard means any of the following: - erosion (including coastal erosion, bank erosion, and sheet erosion) - falling debris (including soil, rock, snow and ice) - subsidence - inundation (including flooding, overland flow, storm surge, tidal effects, and ponding) - slippage. If consent is granted, subject to conditions or limitations, the Surveyor General or Registrar of the Maori Land Court must be advised, and a notation is made on the land title.	See method	New or unidentified risk is identified		Power remains in BA, but is a last resort and rarely used. Expectation is that district and/or regional plans will identify and limit development of such land	Continue efforts to identify and protect hazard - prone lands from development. Improving Climate Change information should feed into this ongoing requirement. Improve district plan provisions	N/A	N/A	N/A

* Note: Costs should be estimated. In many cases, these are largely research plus administrative costs for a plan change. Once costs are estimated, the actions can be prioritised and included in the annual and or LTCCP.
** Particularly relevant are NZS4404:2010 Land Development and Subdivision Infrastructure and NZS4431: Code of Practice for Residential Earthworks.

Very High
High
Moderate
Low
Very Low
None
Not Applicable