

To: Minister for Canterbury Earthquake Recovery



IN CONFIDENCE

Cliff Collapse in the Port Hills

Date	1 June 2012	Priority	High
Report No	M/12/0409	File Reference	

Action Sought

		Deadline
Hon Gerry Brownlee <i>Minister for Canterbury Earthquake Recovery</i>	Direct officials to work with your office to prepare materials to support a meeting with the Mayor of Christchurch and senior CERA and Christchurch City Council representatives	5 June

Contact for Telephone Discussion (if required)

Name	Position	Telephone	1st Contact
Diane Turner	General Manager, Strategy Planning and Policy		<input checked="" type="checkbox"/>
John WA Scott	Senior Advisor, Policy	Withheld under section 9(2)(a)	
	Withheld under section 9(2)(g)(i)		

Minister's office comments

<input type="checkbox"/> Noted <input type="checkbox"/> Seen <input type="checkbox"/> Approved <input type="checkbox"/> Needs change <input type="checkbox"/> Withdrawn <input type="checkbox"/> Not seen by Minister <input type="checkbox"/> Overtaken by events <input type="checkbox"/> Referred to	Comments
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Cliff Collapse in the Port Hills

Executive Summary

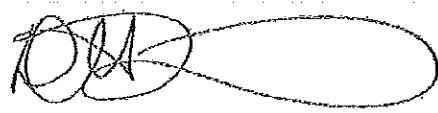
- 1 There are a number of properties with cliff collapse risks for which retreat appears to be the best option. The bulk of these properties have life risks associated with them. In addition to these, some properties in the broader "cliff collapse" category are on land that has suffered damage in the way of earthquake-related cracks. Where there has been significant damage to these properties (or the supporting infrastructure), retreat also appears to be the best option.
- 2 Based on current information, it is estimated that between 150 and 200 properties fall within these broad definitions. These properties are likely to have an aggregate value – using pre-earthquake valuations – of more than \$100 million (and perhaps significantly more than this figure). Information on the number and value of properties for which retreat appears to be the most appropriate action is likely to be firmed up relatively quickly. The issue of financial assistance to affected property owners becomes relevant, and the precedent set by the red zone offer on the flat residential land will be hard to avoid.
- 3 There are also perhaps 100 properties that have some cliff collapse-related damage associated with them, which are neither in need of major repair, nor have any significant risks to life associated with them. These properties can continue to be occupied. Current thinking is that they should be managed through normal hazard management procedures.
- 4 It is critical that central government and the Council have a joined-up approach to managing cliff collapse issues. Senior Council representatives have expressed a desire to meet with you at an appropriate time to discuss the relevant issues. We concur with this view.

Recommendations

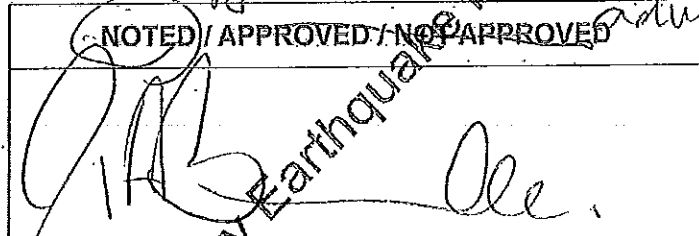
- 5 It is recommended that you direct officials to work with your office to prepare materials to support a meeting between yourself, the Mayor of Christchurch and senior CERA and Christchurch City Council representatives.

YES/NO

I would want briefings well prior to any joint mtg and would expect CERA and Council officials to have consistent advice



Diane Turner
General Manager – Strategy, Planning and Policy

NOTED / APPROVED / NOT APPROVED

Hon Gerry Brownlee Minister for Canterbury Earthquake Recovery
Date: 16 / 2012

Attachment A: Graphical Representation of Cliff Collapse, Debris Inundation and Land Cracking in the Port Hills

Released by the Minister for Canterbury Earthquake Recovery

Purpose

- 6 This report provides you with information pertaining to properties affected by significant cliff collapse, debris inundation and land cracking in the Port Hills, and identifies some options for managing these risks. Policy decisions are not sought at this stage because (1) the geotechnical work underpinning the analysis is not yet complete, and (2) it is recommended that you consult with the Christchurch City Council (Council) at a senior level prior to decisions being made.

Background

- 7 On 27 June 2011, Cabinet noted the issues on the Port Hills are of a different nature to the low-lying areas [CAB Min (11) 24/15 refers]. On the flat land, land damage is largely a result of thin crust, liquefaction and lateral spreading. In the Port Hills, in addition to the physical land damage in some areas, the increased instability of cliffs, land and rocks mean that there is an increased risk to life on some properties.
- 8 On 1 July 2011, the Port Hills was zoned white whilst assessments were undertaken. Three studies on life-safety risks associated with rock roll and cliff collapse were undertaken by the Institute of Geological and Nuclear Sciences (GNS) for Council. A "ground truthing" of this GNS model by the Port Hills Geotechnical Group (PHGG) was undertaken, and a 3D rock roll study by Geovert for CERA has also been prepared. Approximately 1,700 Port Hills properties remain in the White Zone.
- 9 The Council has applied notices to restrict access to properties under s124 of the Building Act. These have been applied to properties where the Council considers there is a potential danger from falling rocks, cliff collapse, debris inundation and land movement. Approximately 530 s124 notices have been issued in the Port Hills. Of these, roughly 150 are placed on properties which have cliff collapse-related risks. (All of the figures in this report are indicative. It is expected that near finalised figures will be available within a week.)
- 10 In addition to risks to property, there are roads and infrastructure below cliff collapse areas of potential danger. These have constrained or no access due to temporary protection measures, such as shipping containers along road sides. (Advice on these issues is being prepared; this paper deals with residential properties).
- 11 GNS are in the process of finalising their advice to Council and CERA for areas impacted by significant cliff collapse, debris inundation and land cracking in the Port Hills. This briefing note identifies options to deal with these areas, and has been sent to you alongside a second, companion paper providing options for managing rock roll areas in the Port Hills. A third paper is being developed on landslips. This will be provided to you by mid-June, at the latest.

Geotechnical Information

- 12 The GNS study assessing life-safety risk from cliff collapse states that there are a number of sites affected by significant cliff collapse and debris inundation in the Port Hills. The five worst-affected sites are in Redcliffs, Peacock's Gallop / Shag Rock Reserve, Nayland Street, Wakefield Avenue and Whitewash Head.

¹ This paper uses the term cliff collapse to mean risks at both the top (actual collapse of the cliff) and the bottom (debris inundation) of the cliff.

- 13 As part of this study, GNS and the PHGG conducted in-depth investigations into the stability of cliffs in these areas, mapping the annual individual fatality risks (AIFR) to residents of houses in cliff collapse and debris inundation areas. Remediation options that would stabilize the cliffs have not been able to be identified.
- 14 There are two broad categories of properties at risk of cliff collapse (both are covered by s124 notices). The first is where the GNS report has indicated there are immediate, quantified risks to life associated with the property (the most recent data available to CERA suggests that well over 100 properties fall into this category). These tend to be the properties closest to the cliffs (either top or bottom).
- 15 A further 100 (approximately) properties have, according to the geo-technical reports, a relatively low risk to life associated with them in the short term but are situated between the cliff edge and cracks in the land. The land cracking that has occurred may affect these properties at some stage in the next 50 years. Some of the buildings on these properties have suffered significant damage as a result of the Christchurch earthquakes, and in some cases, there has been damage to the infrastructure that serves the properties.
- 16 CERA's understanding is that it is unlikely building consents would be issued for properties situated on land cracks that cannot be remediated, or between such cracks and cliff edges.
- 17 In addition to the residential challenges involved, cliff collapse affects critical infrastructure in the Port Hills, most importantly Main Road which provides the primary route into Sumner. Due to the critical nature and the amount of damage to this route, the Stronger Christchurch Infrastructure Rebuild Team (SCIRT) is currently evaluating remediation options for the portion of the road between Ferrymead Bridge and Sumner for delivery within their first eighteen month programme of work.

Options for Policy Response

- 18 There are a number of parallels that can be drawn between the residential flat land red zone and areas of the Port Hills affected by cliff collapse. Cliff collapse properties fit neatly within the criteria developed for the residential flat land red zone (repeated below for convenience):
- 18.1 there is area-wide land damage, thereby implying some sort of area-wide solution; and
- 18.2 an engineering solution to remediate the land damage would;
- 18.2.1 be uncertain in terms of detailed design, its success and its possible commencement, given the ongoing seismic activity;
- 18.2.2 be disruptive for landowners, as the commencement date is uncertain (both in terms of confidence in the land settling sufficiently to begin remediation and the need to sequence the many areas where remediation would be required), and the length of time they would need to be out of their homes to allow remediation to occur and new homes built;
- 18.2.3 not be timely; for example there is also substantial replacement of infrastructure required and/or the land level needs to be significantly lifted effectively requiring work equivalent to the development of a new subdivision, and would probably lead to significant social dislocation for those communities in the short-to-medium term;

18.2.4 *not be cost effective: the cost of remediation is greater than the value of the land;*
and

18.3 *The health and wellbeing of residents is at risk from remaining in the area for prolonged periods.*

- 19 Notwithstanding the similarities, there are some differences. These reflect the immediacy of the risks and costs to properties. Reflecting this, officials have developed two groups of properties for analytical purposes.
- 20 Group One comprises properties that:
- have a relatively high Annual Individual Fatality Risk (AIFR) associated with them that cannot be remediated; and / or
 - have suffered significant land damage as a result of the earthquakes that cannot be remediated (or building damage that cannot be easily remediated); and / or
 - where there are high costs for the on-going provision of horizontal infrastructure.
- 21 For these Group One properties, retreat appears to be an appropriate solution. The rationale for this is either a life-safety issue, or, where life safety is not an issue, a recognition that it is not worth investing significant amounts of money in repairing damage to either property or infrastructure that will only worsen in the medium term.
- 22 The policy issues that relate to Group One properties include the determination of specific criteria, which will allow for the assessment of properties that fall into this group, the nature of any potential acquisition mechanism (this includes the legal mechanism to be used), and the nature of any financial assistance package that might be offered. On the last of these points, the precedent set on the residential flat land is likely to be very strong from the viewpoint of property owners (albeit that it can be argued that some of the funding could come from the Council as opposed to 100% from the Crown).²
- 23 CERA and the Council have been working to identify the properties that would fall into Group One. This work is not yet complete, but the work done to date suggests that there are between 150 and 200 properties with these characteristics. The value of these properties (as per the most recent pre-earthquake rating valuation) is expected to be more than \$100m – and perhaps significantly more than this figure.
- 24 There are potentially up to 100 properties with associated cliff collapse damage that would not fall into Group One. For these properties (Group Two), there is little immediate risk to life and the properties (and supporting infrastructure) have not suffered significant damage as a result of the earthquakes. There is no reason why these properties should be abandoned now, albeit that retreat might be required at some point over the next 50 years (monitoring of ongoing risk to these properties becomes a necessity).
- 25 Current thinking is that no offer of financial assistance should be made to parties in Group Two, and that these properties should be managed through normal natural hazard processes as much as possible. Properties in this category have characteristics that are very similar to properties at risk of coastal erosion, or at risk from landslips. If there were to be a future

² In New Zealand, natural-hazard management is the responsibility of local as opposed to central government. A financial contribution from the Council would be an acknowledgement of this and would assist in managing precedent risks.

event that required retreat from these properties, then a decision to provide assistance could be made at that point, should this be desirable.³

Next Steps

- 26 A significant effort is underway to finalise the geotechnical work that underpins this analysis. All going well, this analysis will be completed very early in June. (Finalised geotechnical work is likely to change the numbers of properties in different categories but will not change the generality of the arguments – so progress can be made in the interim.) In addition to this, further information is being gathered in a number of areas, such as the availability of insurance in the future, the costs of remediating (and maintaining) horizontal infrastructure in areas affected by cliff collapse and land cracking, and the nature of Council's future hazard-management and monitoring tools (including potentially building line restrictions, and the use of time-limited building consents).
- 27 It is critical that central government and the Council have a joined-up approach to managing cliff collapse. With this in mind, Council senior representatives have expressed a desire to meet with you at an appropriate time to discuss the relevant issues. CERA concurs with this view. We propose that you direct CERA officials to work with your office to prepare materials to support a meeting between yourself, the Mayor of Christchurch and senior CERA and Council representatives in order to advance these issues.

Consultation

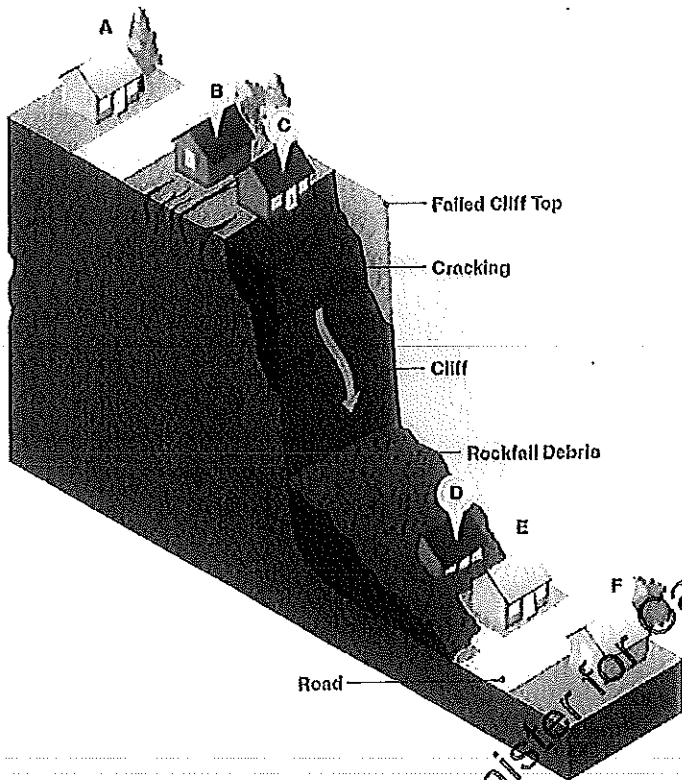
- 28 Treasury, the Departments of Building and Housing and Internal Affairs, the Ministry for the Environment, the New Zealand Transport Agency and the Christchurch City Council have been consulted in the preparation of this paper. The Department of Prime Minister and Cabinet have been informed.

Financial implications

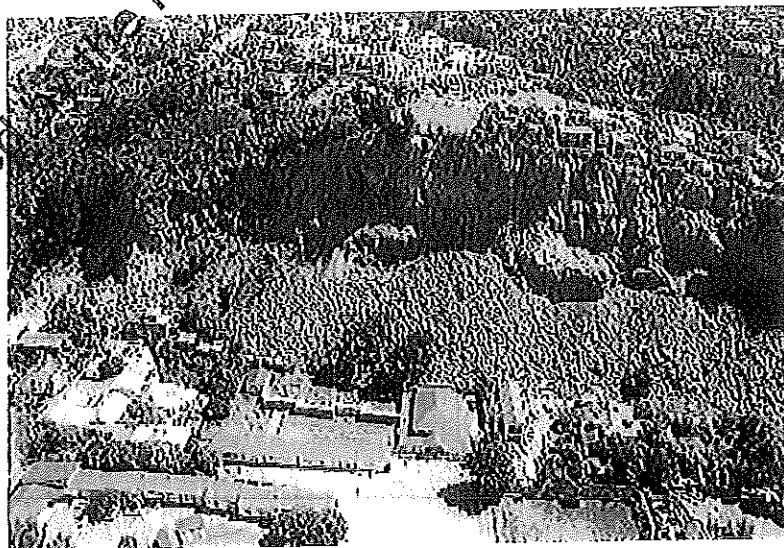
- 29 This paper has no direct financial implications.

³ To make an offer would create a precedent that may become very difficult to manage elsewhere in New Zealand. Having said this, not making an offer would raise equity issues over time if – as expected in some cases at least – retreat is required in the medium term.

Graphical Representation of Cliff Collapse,
Debris Inundation and Land Cracking in the Port Hills



House	Description
A	<ul style="list-style-type: none"> •Some or minor land damage •Little risk of further land damage
B	<ul style="list-style-type: none"> •Significant land damage from cracking •Risk of further collapse •May not be economically viable or practical to remediate
C	<ul style="list-style-type: none"> •Significant land damage •High risk of further collapse •Not economically viable or practical to remediate
D	<ul style="list-style-type: none"> •Inundated by debris •Not economically viable or practical to remediate
E	<ul style="list-style-type: none"> •Little or no land damage now •High risk of inundation from further events
F	<ul style="list-style-type: none"> •No land damage, and not directly exposed to risk



Redcliffs,
Port Hills

Released by the Minister for Canterbury Earthquake Recovery