

To: Minister for Canterbury Earthquake Recovery



Port Hills Zoning Review Advisory Group minutes

Date	22 February 2013	Priority	Medium
Report No	M12-13/284	File Reference	M12-13/284

Action Sought	Deadline
<p>Hon Gerry Brownlee Minister for Canterbury Earthquake Recovery</p> <p>Note the attached Port Hills Zoning Review Advisory Group minutes and addendum</p> <p>Note that CERA officials will provide you with advice on the Advisory Group's recommendations by 8 March 2013</p>	8 March 2013

Contact for Telephone Discussion (if required)

Name	Position	Telephone	1st Contact
Benesia Smith	Deputy Chief Executive, Corporate and Governance	withheld under section 9(2)(a)	<input checked="" type="checkbox"/>
Amanda Shaw	Senior Advisor, Office of the Chief Executive		

Minister's office comments

- Noted
- Seen
- Approved
- Needs change
- Withdrawn
- Not seen by Minister
- Overtaken by events
- Referred to

Comments

Port Hills Zoning Review Advisory Group minutes

Purpose

- 1 This report provides you with a copy of the Port Hills Zoning Review Advisory Group's minutes and addendum.

Background

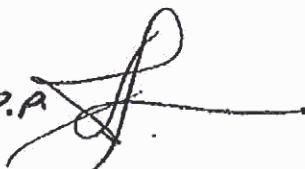
- 2 On 14 February 2013 you met with representatives of the Port Hills Zoning Review Advisory Group (Advisory Group) to discuss their approach to the Port Hills Zoning Review and the basis for their recommendations.
- 3 At that meeting you requested that the Advisory Group ensure that its minutes clearly articulate the grounds for the recommendations and where special considerations have been taken into account.

Comment / Discussion

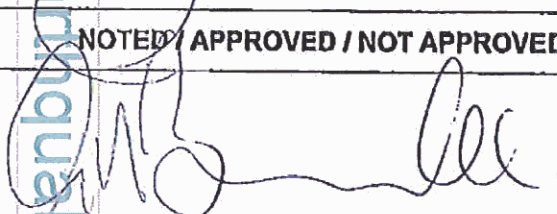
- 4 The Advisory Group has provided its minutes for forwarding to you (Attachment A). The minutes include an addendum providing further information on the reasons for their decisions in relation to particular properties (Attachment B). The minutes and addendum have been approved by the Panel Chair, Dr Keith Turner.
- 5 CERA officials are currently considering the recommendations of the Advisory Group and will provide you with advice by 8 March 2013.

Recommendations

- 6 It is recommended that you:
 - 1 Note the attached Port Hills Zoning Review Advisory Group minutes and addendum
 - 2 Note that CERA officials will provide you with advice on the Advisory Group's recommendations by 8 March 2013.

P.P.


Benesia Smith
 Deputy Chief Executive, Corporate
 and Governance

NOTED / APPROVED / NOT APPROVED

Hon Gerry Brownlee Minister for Canterbury Earthquake Recovery
Date: 25/02/2013

Attachment A – Port Hills Zoning Review Advisory Group minutes dated 18 February 2013

Attachment B - Addendum to Port Hills Zoning Review Advisory Group minutes.

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Port Hills Zoning Review Advisory Group



Date & Time	9.00 am – 5.30 pm Monday 26 November 2012, 8.30am – 7.00pm Tuesday 27 November, 8.30am – 7.00pm Wednesday 28 November, 8.30am – 7.00pm Thursday 29 November, 3.30pm – 5.30pm 11 December, 2.00pm – 4.00pm 17 December, 12.00pm – 1.30pm 19 December 2012 ¹
Location	CERA Offices, Christchurch
Meeting	<p>Advisory Group:</p> <ul style="list-style-type: none"> - Dr Keith Turner – Independent Chair - Diane Turner – Deputy Chief Executive, Recovery Strategy, Planning and Policy, CERA - Kevin Locke – General Manager, Capital Programme, CCC - David Jennings – Independent Geotechnical Engineer - Patricia Noble – Senior Legal Advisor, CERA <p>Attendees:</p> <ul style="list-style-type: none"> - Dr Jan Kupec – CERA - John Scott – CERA - Chris Massey – GNS Science - Don Macfarlane – CCC/PHGG - Ethan Stetson – CCC - John WA Scott – CERA - [redacted] – CERA - [redacted] – CCC/PHGG
Background Papers	<ul style="list-style-type: none"> ▪ Terms of Reference for the Port Hills Zoning Review Advisory Group ▪ Overview map of Port Hills showing review requests ▪ Cabinet Paper and Recommendations - Port Hills Zoning Review Framework October 2012 ▪ Cabinet Minute - Port Hills Zoning Review Framework October 2012 ▪ Joint Ministers Paper - Rezoning Lucas Lane October 2012 ▪ Joint Ministers Paper - Rezoning White Zone Rock Roll Properties in the Port Hills August 2012 ▪ Joint Ministers Paper - Rezoning properties in Horotane Valley and Bridle Path Road September 2012 ▪ Briefing Note - Mitigation Measures for Horotane Valley and Bridle Path Road August 2012 ▪ Briefing Note - White Zone Rock Roll Properties - Zoning Considerations August 2012 ▪ Briefing Note - Process and Timeline Going Forwards on the Port Hills July 2012 ▪ Joint Ministers Paper - Rezoning in the Port Hills June 2012 ▪ Briefing Note - Cliff Collapse in the Port Hills June 2012 ▪ Joint Ministers Paper - Rezoning Some White Zone Properties in the Port Hills Green May 2012

¹ Kevin Locke was not in attendance for the 19 December meeting of the Group.

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- Briefing Note - Initial Considerations Following Receipt of Geotechnical Reports in the Port Hills May 2012
- Briefing Note - Port Hills White Zone - Update January 2012
- Briefing Note - Port Hills White Zone - Indicative Timeline January 2012
- Cabinet Minute and Paper - Port Hills White Zone: Some Further Green Zoning December 2011
- Briefing Note - Initial red zoning of white residential land in the Port Hills November 2011
- Cabinet Minute and Paper - Canterbury Earthquake Recovery: Rezoning of White (Unzoned) Non-Residential Land November 2011
- Briefing Note - Port Hills White Zone Update and Decision Process October 2011
- Joint Ministers Paper - Decisions on Canterbury Land - Green Zones for Banks Peninsula October 2011
- Joint Ministers Paper - Initial Green Zones for the Port Hills September 2011
- Cabinet Paper - Land Damage from the Canterbury Earthquakes June 2011
- Institute of Geological and Nuclear Sciences (GNS Science) reports:
 - Canterbury Earthquakes 2010/2011 Port Hills Slope Stability: Geomorphology mapping for rockfall risk assessment
 - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Principles and criteria for the assessment of risk from slope instability in the Port Hills, Christchurch
 - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Pilot study for assessing life-safety risk from cliff collapse
 - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Life-safety risk from cliff collapse in the Port Hills
 - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Additional assessment of the life-safety risk from rockfalls (boulder rolls)
 - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Pilot study for assessing life-safety risk from rockfalls (boulder roll)
 - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Life-safety risk from rockfalls (boulder roll) in the Port Hills
- Three summaries of GNS Science reports on the Port Hills
- GIS map system containing CERA zoning, GNS Science, Port Hills Geotechnical Group (PHGG) and 3D rock roll model information for the Port Hills as at 26 November 2012
- All zoning application forms and additional information provided by property owners requesting a zoning review

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PHZRAG objectives	<ol style="list-style-type: none"> 1. Consider all applications from property owners in the former Port Hills White Zone who wish to have their zoning reassessed. 2. Make recommendations to the Minister for Canterbury Earthquake Recovery for changes where it is found that in the judgement of the PHZRAG (the Group): <ol style="list-style-type: none"> a. The zoning of a property is inconsistent with the criteria agreed by Cabinet; OR b. There are anomalies in the zoning of a property because: <ol style="list-style-type: none"> i. The boundary lines have not been drawn sensibly; and/or ii. The green zoning of an individual property, or a small number of properties, would result in clearly not viable infrastructure servicing costs. (This would typically be because such properties are serviced by infrastructure wholly or partly in a red zone, or the main purpose of the infrastructure is to service properties in a red zone.)
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Subject	ACTION / Issues
Introduction	<ol style="list-style-type: none"> 1. The purpose of the Group is to check that: <ul style="list-style-type: none"> • The red/green zoning criteria have been consistently applied; and • Boundary lines have been drawn sensibly (in accordance with the criteria taking into account existing boundaries). 2. The Group must reach a joint recommendation; Dr Keith Turner (Chair) has a casting vote if required. 3. The Group will report its findings to the Minister for Canterbury Earthquake Recovery.
Background – Policy	<p>Overview of the policy framework for zoning and issues pertaining to the Port Hills. Please find the Terms of Reference for the Group attached. (Appendix 1)</p> <p><i>Presentation provided by:</i></p> <ul style="list-style-type: none"> - John WA Scott, Principal Policy Advisor, CERA
Background – Geotechnical Data	<p>Overview of the background and methodology used in the Institute of Geological and Nuclear Sciences' (GNS Science) reports, the Port Hills Geotechnical Group's (PHGG) work, Geovert's 3D rock roll modelling and geotechnical assessments, which informed the Government's zoning decisions. Summary data was available for each area and was discussed.</p>

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	<p>GNS Science's life risk, rock roll and cliff collapse studies and associated models have been independently peer reviewed by internationally-recognised experts Tony Taig, Laurie Richards and Fred Baynes. GNS Science's normal internal review processes have been followed.</p> <p><i>Presentations provided by:</i></p> <ul style="list-style-type: none"> - Dr Chris Massey, GNS Science - Don Macfarlane, PHGG/ Christchurch City Council (CCC) - Dr Jan Kupec, Geotechnical Advisor, CERA
<p>Background – Infrastructure Considerations</p>	<p>CCC has not identified any areas where the green zoning of an individual property, or a small number of properties, would result in clearly not viable infrastructure servicing costs (comprising the three waters and the roading system).</p> <p><i>Presentation provided by:</i></p> <ul style="list-style-type: none"> - John WA Scott, Principal Policy Advisor, CERA
<p>Site visits</p>	<p>Prior to beginning the detailed assessment of all applications for review, the Group made site visits to a range of green zone and red zone areas that are representative of the areas under review. This enabled the Group to understand through field observation the geotechnical factors affecting zoned and review properties, and included the majority of areas where the available data indicated that a possible change in zoning should be given careful consideration. Following the review, the Group undertook a second round of site visits to most areas, to confirm that field conditions matched the Group's recommendations.</p>
<p>General Observations</p>	<p>Through discussions with GNS Science and PHGG representatives, the Group gained an understanding of how the GNS Science studies assessed future Annual Individual Fatality Risk (AIFR) in the Port Hills based on seismicity; weather; geological and topographic conditions; boulder roll and cliff collapse data collected between 2010 and 2012; and, ground truthing by the PHGG. [GNS Science in most cases adjusted its life-risk models on the basis of this ground truthing.] GNS Science reports have been peer reviewed by independent, internationally-recognised geotechnical and life-risk experts.</p> <p>The Group acknowledged that the GNS Science studies on rock roll, cliff collapse and life risk constitute the most robust and consistent information available on geotechnical hazards in the Port Hills, and formed the primary basis for red and green zoning decisions.</p> <p>The Group accepted the GNS Science reports as the primary geotechnical</p>

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resource to support its review of zoning decisions. The Group also agreed to consider new geotechnical information furnished by GNS Science, or where relevant, advice and information derived from the PHGG, CCC and other experts, and results from the Geovert 3D (3D) rock roll study.

The Group noted some limitations in the GNS Science model, which underscored the need to exercise judgement in forming zoning recommendations:

- The GNS Science model often related to the use of suburb-wide averages to predict rock roll. While generally appropriate, the GNS Science model may locally over or understate life risk for particular properties, due to localised effects that were averaged out by the area-wide models.
- GNS Science's cliff collapse studies have not assessed cliffs less than 10 metres in height or at angles of less than 45 degrees, man-made cliffs in areas without pre-existing slopes, slopes that were not formerly coastal cliffs, or soil cliffs.
- GNS Science' assessment of life risk on cliff tops has been based on observations from recent earthquakes, and the application of these observations to other geologically and topographically similar slopes in the Port Hills. In some areas, GNS Science reports, PHGG reports and the 3D model have under predicted boulder run out distances and/or bounce heights. This is due to site-specific variations in some areas, such as the shape of slopes, the size/shape of boulders, and the nature of the materials and vegetation along the rockfall paths.
- It was noted for the Group that the 3D model was commissioned by CERA in order to provide a separate report based on a different methodology from GNS Science models and PHGG reports. This 3D report was intended to serve as a counterpoint and secondary resource. It is comparable to preliminary design-level data, and was not internationally peer reviewed. In some cases there were marked differences between the GNS Science and 3D model results; the Group relied primarily on the GNS Science results in these cases.
- In some instances the GNS Science model may have overstated the risk to life from cliffs, where the cliffs modelled are on the boundary of the acceptance criteria used, i.e. just over 10 metres in height or just over 45 degrees in slope angle.
- In some areas the GNS Science model has boundary or edge effects, where risks at the outside extent of rock roll or cliff collapse-affected areas may be over or understated.
- As part of initial zoning work, CERA and CCC commissioned engineering-firm Aurecon to identify ground damage features (possibly new or reactivated landslides or 'just' highly-fractured ground) that potentially carried life risk in the Port Hills, which led to the identification

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of Lucas Lane and Clifton Terrace as areas with life risk. As part of CCC's responsibility for natural hazard management, CCC has commissioned GNS Science to undertake further investigations in the Port Hills into land damage areas in a number of localities. These investigations are expected to continue for a number of years, and are outside the scope of the review.

- The Group has considered all of the information made available to it from GNS Science as at 26 November 2012.

The Group noted that while there was generally good agreement between CERA zoning and geotechnically-related section 124 notices under the Building Act 2004 (s124 notices), they do not fully align. The Group did not set out to reconcile these processes. The Group noted that there were some green zoned properties with geotechnically-related s124 notices in the Port Hills; the Group was advised that in some of these cases, there was no straightforward remedy available to these property owners to address the geotechnical hazard.

All information provided to the Group with regard to the status of s124 notices was correct as at 26 November 2012.

The Group affirmed that the key factor in the Port Hills zoning criteria is immediate risk to life associated with geotechnical hazards caused or accentuated by the Canterbury earthquakes. The Group reviewed the Port Hills, area by area. The Group sought advice from experts where new geotechnical information needed to be considered, and where the GNS Science model outcomes had the potential to over or understate life risks. The Group then reviewed zoning in that area, and examined individual properties.

The Group took into account in its decisions that for those red zone property owners who are interested in effecting a boundary adjustment or subdividing their red zoned property, or relocating/rebuilding the dwelling on their red zoned property, a mechanism may become available through CCC to enable this to occur.

In the course of its work, the Group developed a number of guiding considerations that it applied consistently across the Port Hills:

- The Group agreed that a rock roll-affected property zoned for residential use would typically be recommended for red zoning if the dwelling was entirely within or substantially intersected by the 1 in 10,000 2016 AIFR line as defined by GNS Science (67% occupancy model with the effect of aftershocks removed).
- Commercial properties where buildings were within or substantially

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	<p>intersected by the 1 in 10,000 2016 AIFR line typically have been recommended for red zoning.</p> <ul style="list-style-type: none"> • Properties that are zoned rural under the CCC's City Plan and the Banks Peninsula District Plan are generally recommended for green zoning. Rural properties have been recommended for red zoning where they are included in the GNS Science rock roll or cliff collapse models, are part of the residential settlement pattern for the area, have met the red zoning criteria, and the Group has applied its guiding considerations in a consistent manner. • Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red. <p>The Group understood that the zoning review Cabinet Minute identified that area-wide engineering solutions for rock roll mitigation were judged not to be desirable due to uncertainty, disruption, timeliness and cost-effectiveness.</p> <p>The Group noted that a considerable amount of work has taken place to evaluate the feasibility of area-wide rock roll mitigation, as part of the zoning decision-making process. The Group received expert advice that rock roll mitigation could include "at source" treatment (primary mitigation), mid-path mitigation through fences and bunds (secondary mitigation), and dwelling design and vegetation measures, such as the planting of forests between rockfall sources and dwellings (tertiary mitigation). In the case of the Port Hills, such options must be able to account for vertical and horizontal acceleration caused by earthquakes leading to significant boulder flux (i.e. multiple boulder strikes in the same location within a short space of time) in many areas. It was also noted that tertiary mitigation in the form of forests is not a permanent solution, as trees need to be actively managed, and may be lost to fire or harvested at any time.</p> <p>The Group did not consider options for either area-wide or individual mitigation measures in its decision-making. The Group understood that in some cases property owners may be interested in constructing individual mitigation solutions. This is a course of action they can pursue with CCC.</p> <p>The Group was advised that the Government has decided to remove a hazard posing an immediate life risk to properties on Lucas Lane, and that the properties affected have been zoned green.</p>
<p>Review Applications</p>	<p>All information supplied by property owners who applied to have their zoning reviewed was read and considered by the Group.</p> <p>Within each of the areas, as set out below, each of the review applications was considered. As a general rule, the Group considered the area-wide</p>

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	<p>geotechnical features and risks first, before considering how they impacted on each specific review application property. The Group was acutely aware that the review was very important to each applicant, and applied itself to the review task with considerable care to ensure all factors were considered in making its recommendations.</p>
<p>Findings</p>	
<p>Area 1 Whitewash Head/ Scarborough Maps 26 and 27</p>	<p>The Group reviewed the key geotechnical issues for Whitewash Head/ Scarborough, which showed that:</p> <ul style="list-style-type: none"> • The area is exposed to cliff collapse and land damage risks, particularly on the north eastern cliff, which has a complex geology of interlayered basaltic lava and other material of volcanic origin. Cliff height is generally between 100m to 120m in this section of Whitewash Head. Approximately 450m of the cliff side had failed, up to 17m back from the original edge, during the recent earthquakes and aftershocks, resulting in the loss of an estimated 150,000m³ of cliff material. Significant ground displacement (mass movement) towards the new cliff line has been observed, as evidenced by ground cracking, generally located within 30m to 40m of the cliff line. The cliff is expected to retreat in portions, but large amounts have been known to collapse at one time, beyond the first line of cracking. • Based on the available geotechnical data, the Group considered that the properties in this area have the potential for immediate cliff collapse with an associated risk to life. • The south eastern cliff (vicinity of Tirohanga Lane and further south) is subject to a different topography and geology, and is not as prone to failure. There has been only minor loss at the cliff top. Based on the available geotechnical data, the Group observed that the properties in this area are set back from the cliff edge, and also that there is no immediate elevated risk to life on these properties. • In other green zone areas, some cliff collapse and land cracking was observed. The land damage in these areas does not have an associated elevated risk to life. • The western side of Whitewash Head is subject to localised rock roll. There is no reported geotechnical evidence demonstrating an elevated risk to life.

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	<p>RECOMMENDATIONS:</p> <p>1. <i>THAT 25A Taylors Mistake Road be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>25A Taylors Mistake Road has the potential for immediate cliff collapse and this carries an immediate risk to life.</p> <p>2. <i>THAT no other changes be made to zoning in Whitewash Head/ Scarborough</i></p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse with associated risk to life.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life.</p>
<p>Area 2 Clifton (Peacocks Gallop – Shag Rock Reserve) Map 19</p>	<p>The Group reviewed the key geotechnical issues for Clifton, which showed that:</p> <ul style="list-style-type: none"> • The area is exposed to cliff collapse and land damage risks. • The cliff in this area has a complex geology of interlayered basaltic lava and other material of volcanic origin, together with windblown soils. • The cliff height is approximately 70m to 80m over the majority of its 300m length, above the Shag Rock reserve. Approximately 200m of the cliff edge had failed, up to 13m back from the original edge, during the recent earthquakes and aftershocks. Significant cliff collapse debris (talus) was observed at the base of the cliff, and has extended up to 60m away from the cliff bottom. • Significant ground displacement (mass movement) was observed at the eastern and western ends of the cliff, as evidenced by ground cracking, generally located within 30m to 40m of the cliff line. CCC has commissioned GNS Science to investigate these two mass movement areas as a matter of priority, as part of the CCC's responsibility to manage natural hazards. • Cliff top properties are exposed to immediate cliff collapse and mass movement, with associated risks to life. Properties at the base of the

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	<p>cliff are exposed to debris inundation with associated elevated risks to life.</p> <p>RECOMMENDATIONS:</p> <p>1. <i>THAT 4 The Spur be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>There is the potential for immediate cliff collapse at this property, and this carries an immediate risk to life.</p> <p>2. <i>THAT no other changes be made to zoning in Clifton (Peacocks Gallop- Shag Rock Reserve)</i></p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse and land slip with associated risk to life. Of note, GNS has also advised that the eastern mass movement area around the intersection of Kinsey and Clifton Terraces had moved approximately 1m over three earthquake events.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life.</p>
<p>Area 3 Richmond Hill Map 20</p>	<p>The Group reviewed the key geotechnical issues for Richmond Hill, which showed that:</p> <ul style="list-style-type: none"> • The area at the top of the cliff (Richmond Hill Road) is exposed to cliff collapse and land damage risks. • Cliff top properties are exposed to immediate cliff collapse and mass movement, with associated risks to life. • The cliffs in this area have a complex geology of interlayered basaltic lava and other material of volcanic origin, with cliff collapse debris (talus) at the base of cliffs. • The cliff height below Richmond Hill Road is approximately 70m to 80m over the majority of the area. Approximately 150m of the cliff sides had failed, up to 5m back from the original edge, during the recent earthquakes and aftershocks. These cliffs have an extensive zone of low strength material running through the exposed cliffs at mid-height. • Significant ground displacement towards the new cliff line was

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	<p>observed, as evidenced by ground cracking. Some movement has been recorded locally since the earthquakes.</p> <ul style="list-style-type: none"> The geology in this area suggests there is the potential for significant cliff failure, and the GNS Science earthquake retreat lines may not represent the full extent of possible failure. Ground displacement (mass movement) was observed at the south eastern end of the cliff top, as evidenced by ground cracking, generally located within 30m to 40m of the cliff edge. This mass movement area is under further investigation as a matter of priority by CCC/GNS Science. <p>RECOMMENDATION:</p> <p><i>1. THAT no changes be made to zoning in Richmond Hill</i></p> <p>Reasons for Decision:</p> <p>For all properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse and land slip with associated risk to life.</p> <p>For all properties currently zoned green, the geotechnical data and expert advice shows that they meet green zone criteria, and the Group observed that there is no reported evidence of land damage with an associated risk to life.</p>
<p>Area 4 Redcliffs Maps 16 and 17</p>	<p>The Group reviewed the key geotechnical issues for Redcliffs, which showed that:</p> <ul style="list-style-type: none"> The area is exposed to cliff collapse and land damage risks. The cliffs in this area have a complex geology of interlayered basaltic lava and other material of volcanic origin, together with windblown soils and cliff collapse debris (talus) at the base of the cliff. The cliff height is approximately 70m to 80m over the majority of its length. Approximately 150m of the cliff sides had failed, up to 5m back from the original edge, during the recent earthquakes and aftershocks. Significant ground displacement (mass movement) was observed close to the cliff edge, as evidenced by ground cracking, generally located within 30m to 40m of the cliff line, but extended to 50m in some cases. Debris that fell from the cliff ran out approximately 50m on to the level terrain below the cliff. Two individuals lost their lives in this area during the 22 February 2011 event due to debris inundation. The southern section of this cliff area (i.e. around Defender Lane) is

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	<p>affected by cliff collapse and ground damage. Cliff top properties are exposed to immediate cliff collapse and mass movement, with associated risks to life. Properties at the base of the cliff are exposed to debris inundation with associated risks to life.</p> <p>RECOMMENDATIONS:</p> <p>1. <i>THAT 124A Main Road be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>124A Main Road has the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.</p> <p>2. <i>THAT no other changes be made to zoning in Redcliffs</i></p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse and land slip with associated risk to life.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life.</p>
<p>Area 5 Avoca Valley, Hillsborough Maps 6 and 7</p>	<p>The Group reviewed the key geotechnical issues for Avoca Valley, which showed that:</p> <ul style="list-style-type: none"> • The area is exposed to rock roll risks. • There are several continuous moderately sized rock bluffs running along the ridge line on the western edge of the valley, which decrease in size and continuity near the northern end of the valley. • GNS Science mapped approximately 250 boulder falls in the western side of this valley, predominately triggered by the 22 February 2011 event. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data. A significant percentage of these boulders rolled down to the residential properties near the base of the valley. • At the northern end of the valley, there are smaller sized rock bluffs, and some local topographical features (including an old loess quarry) that may offer limited protection from rock roll. <p>Other points of note:</p>

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	<ul style="list-style-type: none"> GNS Science advised that its rock roll risk model overstates the risk to properties on the north eastern side of Avoca Valley Road. This is due to the benching effect of the road and the reduction in slope gradient, which means that the risk level decreases rapidly. While properties in this location are touched by the Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 line, this is within the model's 10m uncertainty buffer applicable to this specific area. <p>RECOMMENDATIONS:</p> <ol style="list-style-type: none"> <i>THAT 275 Port Hills Road, and 2, 4A, 4B and 6 Avoca Valley Road be rezoned from green to red</i> <p>Reasons for Decision:</p> <p>Following a close examination of the GNS Science rock roll model, it was determined that the dwellings at 4A, 4B and 6 Avoca Valley Road are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016.</p> <p>Due to uncertainty in the GNS Science model for this location, and the Group's mandate to ensure that zoning boundary lines are drawn sensibly, 2 Avoca Valley Road and 275 Main Road met the criteria to be zoned red.</p> <ol style="list-style-type: none"> <i>THAT 301 and 311 Port Hills Road be rezoned from green to red</i> <p>Reason for Decision:</p> <p>These properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <ol style="list-style-type: none"> <i>THAT no other changes be made to zoning in Avoca Valley</i> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
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<p>Area 6 Horotane Valley, Heathcote Map 8</p>	<p>The Group reviewed the key geotechnical issues for Horotane Valley, which showed that:</p> <ul style="list-style-type: none"> • The southern end of Horotane Valley Road is exposed to rock-roll risks. • Continuous moderately-sized rock bluffs run along the two ridge lines bordering the valley area. These decrease in size and continuity near the northern end of the valley. Castle Rock is also a rockfall source for this valley. • GNS Science mapped over 2,500 boulder falls in the Horotane and Morgans Valley/Bridle Path Road area, predominately triggered by the 22 February 2011 event. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data. • A significant percentage of these boulders rolled down to the residential properties near the base of the valley, at the end of Horotane Valley Road. • The GNS Science risk model in this area has recently been modified to account for diminished rockfall sources near the western end of the ridge line, and topographical features below this ridge line, which reduces the risk slightly in this section of the valley. <p>RECOMMENDATIONS:</p> <p style="padding-left: 40px;">1. THAT 48 Horotane Valley Road be rezoned from red to green</p> <p>Reason for Decision:</p> <p>As a result of further information on the GNS Science rock roll model, it was determined that 48 Horotane Valley Road is exposed to an Annual Individual Fatality Risk of less than 1 in 10,000 in 2016.</p> <p style="padding-left: 40px;">2. THAT no other changes be made to zoning in Horotane Valley</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p>

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	<p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
<p>Area 7 Morgans Valley, Heathcote Maps 9 and 10</p>	<p>The Group reviewed the key geotechnical issues for Morgans Valley, which showed that:</p> <ul style="list-style-type: none"> • The eastern portion of Morgans Valley is exposed to rock-roll risks. • There are numerous continuous large rock bluffs around the semi-circular shaped ridgeline that borders this valley area. The semi-circular valley profile means that properties at the valley base are surrounded by numerous potential rock fall sources. • GNS Science mapped over 2,500 boulder falls in the Horotane and Morgans Valley/Bridle Path Road area, predominately triggered by the 22 February 2011 event. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data. • A large percentage of the boulders that fell in this valley appeared to originate from discrete rock bluffs that failed in large volumes, meaning that the size of boulders was larger than the average size recorded elsewhere in the Port Hills. Several homes in this valley were either hit or penetrated by boulders, and there were numerous near misses. • As a result of their large size, these boulders travelled significantly further than the 3D rock roll modelling had predicted (which used a smaller average boulder size to predict run-out distances). <p>RECOMMENDATIONS:</p> <p>1. THAT 24 Bridle Path Road be rezoned from green to red</p> <p>Reason for Decision:</p> <p>The dwelling at 24 Bridle Path Road is clipped by the 1 in 10,000 in 2016 Annual Individual Fatality Risk line as defined by GNS Science risk modelling. The Group accepted the expert advice that the model is slightly anomalous in this instance, and the risk to occupants may be higher.</p> <p>2. THAT no other changes be made to zoning in Morgans Valley</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk</p>

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	<p>modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
<p>Area 8 Bridle Path Road, Heathcote Valley Maps 11 and 12</p>	<p>The Group reviewed the key geotechnical issues for the Bridle Path Road area, which showed that:</p> <ul style="list-style-type: none"> • This area is exposed to rock roll risks. • There are numerous continuous medium-sized rock bluffs running along the ridge line parallel to Bridle Path Road. Some of these rock bluffs (located above Hammerton Lane) are related to historic quarrying activities. • GNS Science mapped over 2,500 boulder falls in the Horotane and Morgans Valley/Bridle Path Road area, predominately triggered by the 22 February 2011 event. A large percentage of these boulders fell in the Bridle Path Road area. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data. • Several homes were hit by boulders, and a number of boulders passed just beside dwellings. Several boulders rolled down to Bridle Path Road itself. • GNS had revised the boulder roll risk model in select areas of Bridle Path Road to account for a previous anomaly in this area that understated the risk from rock roll. <p>RECOMMENDATIONS:</p> <p>1. <i>THAT a lot (Lot 1-DP 403583) associated with 112 Bridle Path Road be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>The zoning boundary lines for 112 Bridle Path Road had not been drawn sensibly to include all land in the title.</p> <p>2. <i>THAT no other changes be made to zoning in the Bridle Path Road area</i></p> <p>Reasons for Decision:</p>

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	<p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
<p>Area 9 Lyttelton Maps 31, 32, 33, 34, 35 and 37</p>	<p>The Group reviewed the key geotechnical issues for Lyttelton, which showed that:</p> <ul style="list-style-type: none"> • There are numerous continuous large-sized rock bluffs in the Lyttelton area, and elevated areas are exposed to boulder roll risks. • Lyttelton is exposed to cliff collapse risks in the lower coastal areas, particularly surrounding the Port of Lyttelton. These are believed to be both natural and man-made cliffs. • The topography in the elevated areas is complex, with numerous deeply incised valleys. The GNS Science rock roll model required an extensive amount of PHGG ground truthing and judgment to ensure that the GNS Science model depicted this complex terrain as accurately as possible. • GNS Science mapped about 550 boulder falls in this area, predominately triggered by the 22 February 2011 event, although about 20% of boulder fall occurred on 13 June 2011. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data. • The GNS Science risk model in this area has recently been modified to more accurately account for the diminished rockfall sources in select elevated locations in Lyttelton, which reduces the risk in these areas (i.e. near Walkers Road, Harmans Road and Gilmour Terrace). <p>RECOMMENDATIONS:</p> <ol style="list-style-type: none"> 1. <i>THAT 46A, 50, 52 and 54 Voelas Road, 10 Harmans Road, and 27, 25, 25A, 25B, 25C, 25D, 25E, 25F, 25K and 25L Walkers Road be rezoned from red to green</i> <p>Reason for Decision:</p> <p>As a result of further information on the GNS Science rock roll model, it was determined that these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>

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- 2. THAT 14, 16 and 18 Gilmour Terrace be rezoned from red to green**

Reason for Decision:

As a result of further information on the GNS Science rock roll model in the Gilmour Terrace area, it was determined that these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.

- 3. THAT the property located at 73 Hawkhurst Road (being the portion of Part RS 266 having the area of 0.4046 hectares more or less, contained in certificate of title CB2C/1236) retain its red zoning, and that the balance of the land contained in certificate of title CB2C/1236 remain green zoned contingent on a separate certificate of title being issued for that land (map 34)**

Reason for Decision:

The property located at 73 Hawkhurst Road (being the portion of Part RS 266 having the area of 0.4046 hectares more or less, contained in certificate of title CB2C/1236) is exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling. A separation enables an offer to be made for the residential portion on this title.

- 4. THAT 66 Hawkhurst Road be rezoned from red to green**

Reason for Decision:

This property is exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock-roll as defined by GNS Science risk modelling.

- 5. THAT 19 College Road be rezoned from red to green**

Reason for Decision:

The Group agreed that the risk as shown in GNS Science's risk maps is slightly overstated for this property. Thus it is judged that the dwelling is exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.

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6. THAT 7 Endeavour Place be rezoned from red to green

Reason for Decision:

The risk as shown in GNS Science's risk maps is slightly overstated for this property, and it is judged that the property is exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.

7. THAT a lot (Lot 1 DP 10943) associated with 33 Brenchley Road be rezoned from green to red

Reason for Decision:

The zoning boundary lines for 33 Brenchley Road had not been drawn sensibly to include all land in the title.

8. THAT the Naval Point Club be rezoned from green to red

Reason for Decision:

This building is located on Erskine Point, Charlotte Jane Quay. It has the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.

9. THAT 37 Ross Terrace be rezoned from green to red

Reason for Decision:

This property is exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.

10. THAT no other changes be made to zoning in Lyttelton

Reasons for Decision:

For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse with associated risk to life, and/or that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.

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	<p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>The Group noted that parts of Lyttelton Port Company Limited-owned properties are exposed to the potential for immediate debris inundation from cliff collapse, and carry an associated risk to life. The Group did not recommend red zoning any of these properties, on the understanding that the Lyttelton Port Company Limited will manage the impact of any risk to its operation.</p>
<p>Area 10 Rapaki Map 39</p>	<p>The Group reviewed the key geotechnical issues for Rapaki area, which showed that:</p> <ul style="list-style-type: none"> • The small residential area zoned Papakāinga in the Banks Peninsula District Plan below and to the southeast of Tamatea (the peak above Rapaki) is exposed to boulder roll risks. • The boulders originate from a large rock outcrop at the top of Tamatea. GNS Science mapped over 300 boulder falls in this area, predominately triggered by the 22 February 2011 event, although approximately 10% were generated during the 13 June 2011 earthquake event. • The average boulder size that was generated from this rock outcrop was significantly larger than the Port Hills average boulder size. As a result, these boulders travelled significantly further than the 3D rock roll modelling had predicted (which used a smaller average boulder size to predict run-out distances). • Two houses were hit or penetrated by boulders in Rapaki, and in one case, two large boulders passed completely through a dwelling and travelled some distance downslope. <p>RECOMMENDATIONS:</p> <p><i>1. THAT 253 and 239 Governors Bay Road, and 9 Omaru Road, be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>These properties are zoned Papakāinga in the Banks Peninsula District Plan and are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p><i>2. THAT no other changes be made to zoning in the Rapaki area</i></p>

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	<p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
<p>Area 11 Corsair Bay/ Cass Bay Maps 36 and 38</p>	<p>The Group reviewed the key geotechnical issues for Corsair Bay/Cass Bay area, which showed that:</p> <ul style="list-style-type: none"> • Cass Bay is at the intersection of three valleys; the associated valley ridges generally have non-continuous minor rockfall sources. This area is exposed to rock roll risks. • GNS Science/PHGG have mapped several boulder falls in this area. • The existence of narrow valleys has the potential to focus boulders in specific areas. • The GNS Science risk model in this area has recently been modified to account for diminished rockfall sources in select locations above Mariners Cove, which reduces the risk in these areas. <p>RECOMMENDATIONS:</p> <p>1. <i>THAT 26 Mariners Cove be rezoned from red to green</i></p> <p>Reason for Decision:</p> <p>As a result of further information on the GNS Science rock roll model, it was determined that this property is exposed to an Annual Individual Fatality Risk of less than 1 in 10,000 in 2016 due to rock roll.</p> <p>2. <i>THAT 21 and 23 Buxtons Road be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>These properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>3. <i>THAT no other changes be made to zoning in the Corsair Bay and Cass Bay area</i></p> <p>Reasons for Decision:</p>

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	<p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
<p>Area 12 Governors Bay Maps 40, 41, 42 and 43</p>	<p>The Group reviewed the key geotechnical issues for the Governors Bay area, which showed that:</p> <ul style="list-style-type: none"> • Governors Bay is situated at the intersection of a number of valleys. • The higher elevations of this area are exposed to rock roll risks, although many residential buildings are sited on ridge lines. • Rock roll risks also affect some properties at lower elevations. • Small developed areas at lower elevations close to the coast line are exposed to cliff collapse risks. • GNS Science/CCC mapped some boulder falls in this area, but Governors Bay is some distance from recent earthquake event epicentres and so was not shaken as severely as other areas. <p>RECOMMENDATIONS:</p> <p><i>1. THAT 3 Leading Light Lane, and 41 and 43 The Terrace be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>These properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p><i>2. THAT 1, 2, 3 and 4 Maori Gardens be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>These buildings have the potential for immediate debris inundation from cliff collapse, and carry an immediate risk to life.</p> <p><i>3. THAT 58 Zephyr Terrace be rezoned from green to red</i></p> <p>Reason for Decision:</p>

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	<p>The dwelling on this property is exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>4. THAT 56 Zephyr Terrace be rezoned from green to red</p> <p>Reason for Decision:</p> <p>This property is exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>5. THAT no other changes be made to zoning in the Governors Bay area</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll, and there is no reported evidence of land damage with an associated risk to life.</p>
<p>Area 13 Charteris Bay Map 44</p>	<p>The Group reviewed the key geotechnical issues for the Charteris Bay area, which showed that:</p> <ul style="list-style-type: none"> • Charteris Bay is outside the area covered by the GNS Science risk model and 3D model, as there is no Light Detection and Ranging (LIDAR) data for this area. • PHGG/CCC advisors have noted that rock outcrops directly above select properties were weakened and fractured during recent earthquakes. As a result, these properties are exposed to significant rock roll hazard. <p>RECOMMENDATIONS:</p> <p>1. THAT 332, 334 and 342 Marine Drive be rezoned from green to red</p> <p>Reasons for Decision:</p>

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	<p>There is a significantly elevated hazard to life on these properties due to rock roll, such that the risk is comparable to red zoned properties within GNS Science-modelled areas. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.</p> <p style="text-align: center;">2. THAT 336 Marine Drive be rezoned from green to red</p> <p>Reasons for Decision:</p> <p>There is a significantly elevated hazard to life on the property due to rock roll, such that the risk is comparable to red zoned properties within GNS Science-modelled areas. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.</p> <p style="text-align: center;">3. THAT no other changes be made to zoning in the Charteris Bay area</p> <p>Reason for Decision:</p> <p>For all other properties currently zoned green, they meet green zone criteria, as land damage and any life risk can be addressed on an individual basis.</p>
<p>Area 14 Heberden Avenue Area Maps 23, 24 and 25</p>	<p>The Group reviewed the key geotechnical issues for the Heberden Avenue area, which showed that</p> <ul style="list-style-type: none"> • Continuous medium and minor sized rock bluffs run along the ridge line above Heberden Avenue. • North of Awaroa Lane there are also numerous medium-sized cliffs on the eastern side of the road. Properties adjacent to these cliffs are exposed to both cliff collapse and boulder roll risks. • South of Awaroa Lane, residential dwellings extend into reasonably steep terrain. • Some properties are below a narrow pine forestry belt, which stops above the Evans Pass Road and Sumnervale Drive area. This has provided some protection for properties downslope, but a significant percentage of boulders penetrated the tree line and went on to the land below. • Where the tree line was absent, boulders travelled further down slope, suggesting vegetation does provide some mitigating effect on boulder roll risk, albeit not a permanent one. • GNS Science recorded approximately 400 boulder falls in this area, predominately triggered by the 22 February 2011 and 13 June 2011

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	<p>earthquake events.</p> <ul style="list-style-type: none"> The cliff collapse areas do not generally extend to the western edge of Heberden Avenue, except near the Colenso, Nayland Street and Wiggins Street intersections. <p>Other points of note:</p> <ul style="list-style-type: none"> The GNS Science risk model in this area has recently been modified to more accurately account for more prevalent rockfall sources in select locations, and longer boulder roll paths than the suburb-wide average in other locations. <p>RECOMMENDATIONS:</p> <ol style="list-style-type: none"> THAT 141 Nayland Street be rezoned from green to red <p>Reason for Decision:</p> <p>141 Nayland Street has the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.</p> <ol style="list-style-type: none"> THAT 71 Heberden Avenue be rezoned from green to red <p>Reasons for Decision:</p> <p>This property is exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling. 71 Heberden Avenue also has the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.</p> <ol style="list-style-type: none"> THAT 48, 50 and 64 Heberden Avenue be rezoned from green to red <p>Reason for Decision:</p> <p>For 48, 50 and 64 Heberden Avenue, the geotechnical data shows that the dwellings located on these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <ol style="list-style-type: none"> THAT 47 Truro Street be rezoned from green to red <p>Reason for Decision:</p>
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	<p>The geotechnical data shows that 47 Truro Street is exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>5. THAT 110 and 102 Sumnervale Drive, and 43, 45 and 47 Ocean View Terrace be rezoned from green to red</p> <p>Reason for Decision:</p> <p>As a result of further information on the GNS Science rock roll model, it was determined that these dwellings are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 or greater due to rock roll.</p> <p>6. THAT 27 Ocean View Terrace, and 98, 1/104, 2/104, 106 and 114 Sumnervale Drive be rezoned from green to red</p> <p>Reason for Decision:</p> <p>Further consideration indicated that the GNS Science rock roll model for this area may have underestimated the risk for these properties through suburb-wide averaging. The dwellings on these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 or greater due to rock roll.</p> <p>7. THAT no other changes be made to zoning in the Heberden Avenue area</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse with associated risk to life, and/or these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk of less than 1 in 10,000 due to rock roll as defined by GNS Science risk modelling.</p>
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<p>Area 15 Wakefield Avenue North and Nayland Street (North of Arnold Street) Maps 20 and 21</p>	<p>The Group reviewed the key geotechnical issues for Wakefield Avenue North and Nayland Street, which showed that:</p> <ul style="list-style-type: none"> • The area at the base of the cliff parallel to Wakefield Avenue and Nayland Street is exposed to debris inundation from cliff collapse. • The cliffs in this area have a complex geology of interlayered basaltic lava and other material of volcanic origin together and cliff collapse debris (talus) at the base of cliffs. • The cliff height is approximately 70m to 80m over the majority of the area above Wakefield Avenue but reduces to about half of this at the northern end beside Nayland Street. Approximately 150m of the cliff sides had failed, up to 5m back from the original edge, during the recent earthquakes and aftershocks. These cliffs have an extensive zone of low strength material running through the exposed cliffs at mid-height. • Nayland Street at the north end of Wakefield Avenue and below Richmond Hill is exposed to cliff collapse risks. • The elevated risk zone extends generally to the south side on Nayland Street at its maximum, but reduces in extent to the west as the cliff reduces in height. • Debris that fell from the cliff near Wakefield Avenue ran out approximately 50m on to the level terrain below the cliff. One fatality was recorded in this area (northern end immediately adjacent to the base of the cliff beside Wakefield Avenue) during the 22 February 2011 event due to debris inundation. • The GNS Science cliff collapse model shows that the area immediately adjacent to the base of the cliff is in an elevated risk zone but this reduces quickly to lower risk levels by the eastern side of Wakefield Avenue. <p>RECOMMENDATION:</p> <p>1. THAT no changes be made to zoning in Wakefield Avenue North and Nayland Street</p> <p>Reasons for Decision:</p> <p>For all properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse and land slip with associated risk to life.</p> <p>For all properties zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life.</p>
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<p>Area 16 Wakefield Avenue South (South of Arnold Street) Maps 21 and 22</p>	<p>The Group reviewed the key geotechnical issues for the Wakefield Avenue South area, which showed that:</p> <ul style="list-style-type: none"> • A continuous large rock bluff runs just below the Sumner Valley ridge in the southern Wakefield Avenue area. • The north portion of this area has a series of moderately (about 40m high) sized cliffs, the proximity of which to Wakefield Avenue varies at different locations. • The northern part of this area (between Paisley and Arnold Streets) • is exposed to both boulder roll and cliff collapse risks, although the cliffs are smaller in this area than in northern portions of Wakefield Avenue. • The southern portion of this area (south of Paisley Street) is exposed to boulder roll risks. • GNS Science mapped approximately 800 boulder falls in this area, predominately triggered by the 22 February 2011 event, although a small percentage of the total boulder fall occurred on 13 June 2011. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data. <p>RECOMMENDATIONS:</p> <ol style="list-style-type: none"> 1. <i>THAT 122 Wakefield Avenue be rezoned from green to red</i> <p>Reason for Decision:</p> <p>The geotechnical data shows that this property is exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <ol style="list-style-type: none"> 2. <i>THAT 2/110 Wakefield Avenue be rezoned from green to red, and that 1/110 Wakefield Avenue remain green zoned contingent on a fee simple subdivision taking place, having the effect of creating fee simple titles for these two properties, in place of the existing cross-lease titles from 2/110 Wakefield Avenue</i> <p>Reasons for Decision:</p> <p>The geotechnical data shows that the dwelling at 2/110 Wakefield Avenue is exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>The dwelling located at 1/110 Wakefield Avenue is not exposed to an</p>
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	<p>Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling. A fee simple title subdivision is required for the zoning recommendations to be realised.</p> <p>3. THAT 4 Campbell Street and 2 Denman Street be rezoned from red to green</p> <p>Reasons for Decision:</p> <p>Following detailed consideration, the Group was advised that the GNS Science rock roll model for this area has, on balance, overestimated the risk for these properties from suburb-wide averaging through the benching effect provided by adjacent land and the road. The dwellings on these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p> <p>4. THAT the property located at 70 Wakefield Avenue (being Lot 6 DP331163, contained in certificate of title 523222) be rezoned from green to red, and that the balance of the land contained in certificate of title 523222 (being Lot 500 DP431936 and Lot 404 DP374322) remain green zoned, contingent on a separate certificate of title being issued for that land</p> <p>Reasons for Decision:</p> <p>The property located at 70 Wakefield Avenue is exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For the balance of the land contained in certificate of title 523222 (Lot 500 DP431936 and Lot 404 DP374322) there is no reported evidence of land damage with an associated risk to life, and it is not exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>5. THAT 104B Wakefield Avenue and 48 Sumnervale Drive be rezoned from green to red</p> <p>Reason for Decision:</p>
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	<p>These properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>6. THAT no other changes be made to zoning in the Wakefield Avenue South area</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse with associated risk to life, and/or these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p>
<p>Area 17 Taylors Mistake/ Boulder Bay Maps 28, 29 and 30</p>	<p>The Group reviewed the geotechnical issues for Taylors Mistake and Boulder Bay area, which showed that:</p> <ul style="list-style-type: none"> • Areas on or near the shoreline of Taylor Mistake Bay and Boulder Bay are subject to elevated life risk from cliff collapse. • Areas to the north and south of Taylors Mistake Bay are also subject to boulder roll. <p>RECOMMENDATIONS:</p> <p>1. THAT 1, 2, 4, 8, 9 and 10 Boulder Bay be rezoned from green to red</p> <p>Reason for Decision:</p> <p>These structures have the potential for immediate debris inundation from cliff collapse, and carry an immediate risk to life.</p> <p>2. THAT 30, 31, 32 and 33 Taylors Mistake Bay be rezoned from green</p>

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	<p style="text-align: center;"><i>to red</i></p> <p>Reasons for Decision:</p> <p>The geotechnical data shows that these structures are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling. 30 Taylors Mistake Bay is also exposed to the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.</p> <p style="text-align: center;">3. THAT 28 Taylors Mistake Bay be rezoned from green to red</p> <p>Reason for Decision:</p> <p>This structure is located on a cliff top, and is exposed to the potential for immediate cliff collapse, and carries an immediate risk to life.</p> <p style="text-align: center;">4. THAT 55, 56, 57, 58, 59, 60, 62, 63, 64, 67, 68 and 69 Taylors Mistake Bay be rezoned from green to red</p> <p>Reason for Decision:</p> <p>These structures are exposed to the potential for immediate debris inundation from cliff collapse, and carry an immediate risk to life.</p> <p style="text-align: center;">5. THAT no other changes be made to zoning in the Taylors Mistake/ Boulder Bay area</p> <p>Reasons for Decision:</p> <p>For all other properties zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p>
<p>Area 18 Ferrymead, St Andrews Hill Road & Quarry Road Map 13</p>	<p>The Group reviewed the key geotechnical issues for the Ferrymead, St Andrews Hill Road and Quarry Road area, which showed that:</p> <ul style="list-style-type: none"> • This area has a complex terrain with a number of small cliffs (in some cases man-made) bordering Main Road, and man-made cliffs around Quarry Road and the CCC reservoir. • The cliffs comprise rock in some areas, and loess soils in others. • This area is exposed to cliff collapse risks and has experienced significant land damage; the cliffs bordering Main Road have been

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	<p>modelled by GNS Science, but other cliffs and slopes in this area do not meet the criteria to be included in the model.</p> <ul style="list-style-type: none"> • Ground cracking near Main Road is most likely related to the effects of liquefaction. • The cause of the ground cracking to the west of King Park is related to the effect of earthquakes on the steep loess cliffs that border Quarry Road in this area. <p>RECOMMENDATIONS:</p> <p><i>1. THAT 62 Main Road be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>As defined by GNS Science risk modelling, 62 Main Road has the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.</p> <p><i>2. THAT 10 Quarry Road, 2/51A and 51C St Andrews Hill Road be rezoned from green to red</i></p> <p>Reasons for Decision:</p> <p>Further consideration and expert advice indicated that 10 Quarry Road, and 2/51A and 51C St Andrews Hill Road are exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.</p> <p><i>3. THAT 39 Mount Pleasant Road be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>As defined by GNS Science risk modelling, 39 Mount Pleasant Road has the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.</p> <p><i>4. THAT no other changes be made to zoning in the Ferrymead, St Andrews Hill Road and Quarry Road area</i></p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that</p>
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	<p>there is the potential for immediate cliff collapse or land slip with associated risk to life.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life.</p>
<p>Area 19 McCormacks Bay, including the Balmoral Hill Area Maps 14, 15 and 16</p>	<p>The Group reviewed the key geotechnical issues for the McCormacks Bay Road area, including the Balmoral Hill area, which showed that:</p> <ul style="list-style-type: none"> • The Balmoral Hill area is on a ridge line, or knoll, located between a series of variable height cliffs abutting McCormacks Bay to the west, Main Road to the north and Redcliffs to the east. Access to this area is via Glenstrae Road to the south, and via Balmoral Lane from McCormacks Bay road. • The cliffs to the west and north vary in height, starting from about 15m. The lower portion of the Redcliffs area is a sea-cut cliff up to 50m in height. • Pockets of medium-sized cliffs border the eastern side of McCormacks Bay Road where material fell on to or beside adjacent houses. Towards the north the cliffs increase in height (between McCormacks Bay Road and Glenstrae Road) and generally more rock debris fell from the higher cliffs. • This area is exposed to cliff collapse risk. The Group agreed that, based on feedback received from PHGG and GNS Science, life risk associated with cliff collapse is underestimated in select areas and that the cliffs have shown signs of on-going deterioration. <p>RECOMMENDATIONS:</p> <p>1. <i>THAT 120A and 120B McCormacks Bay Road be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>120A and 120B McCormacks Bay Road have the potential for immediate debris inundation from cliff collapse, and carry an immediate risk to life.</p> <p>2. <i>THAT 6 and 8 Balmoral Lane, and 156 and 156A McCormacks Bay Road, be rezoned from green to red</i></p>

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	<p>Reasons for Decision:</p> <p>The Group agreed that the GNS Science cliff collapse model for this area understates the risk to these dwellings. 156 and 156A McCormacks Bay Road have the potential for immediate debris inundation from cliff collapse, and carry an immediate risk to life. 6 and 8 Balmoral Lane have the potential for immediate cliff collapse, and carry an immediate risk to life. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.</p> <p>3. THAT 76 McCormacks Bay Road be rezoned from green to red</p> <p>Reasons for Decision:</p> <p>Further consideration and expert advice indicated that the property is exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.</p> <p>4. THAT no other changes be made to zoning in the McCormacks Bay and Balmoral Hill area</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse or land slip with associated risk to life, and/or these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 due to rock roll as defined by GNS Science risk modelling.</p>
<p>Area 20 Moncks Bay Maps 17 and 18</p>	<p>The Group reviewed the key geotechnical issues for the Moncks Bay area, which showed that:</p> <ul style="list-style-type: none"> • Moncks Spur is a north-south running narrow ridgeline, the north end of which finishes just before Main Road. • There is a small sea-cut rock cliff at the end of the ridge which is included in the GNS cliff model. The remaining ridge line is covered

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	<p>in a loess blanket of variable thickness.</p> <ul style="list-style-type: none"> • The loess banks behind two properties immediately south of the end of the spur partly failed during the earthquakes, and as a result, CCC issued s124 notices on both properties. • The area around Red Rock Lane and Bay View Road had isolated rock outcrops, many of which have recently had remedial works undertaken on them. Together with topography effects, this indicates that GNS risk maps overstate the rock roll risk in this area. <p>RECOMMENDATIONS:</p> <p>1. <i>THAT 4 and 8 Moncks Spur be rezoned from green to red</i></p> <p>Reasons for Decision:</p> <p>Further consideration and expert advice indicated that these properties are exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.</p> <p>2. <i>THAT 69A Bay View Road be rezoned from red to green</i></p> <p>Reason for Decision:</p> <p>The Group agreed that the GNS Science rock roll model has overestimated the risk for this property. Thus, it is judged that the dwelling on this property is exposed to an Annual Individual Fatality Risk of less than 1 in 10,000 in 2016 due to rock roll.</p> <p>3. <i>THAT a lot (Lot 1 DP 48814) associated with 14 Cliff Street be rezoned from red to green</i></p> <p>Reason for Decision:</p> <p>The zoning boundary lines for 14 Cliff Street had not been drawn sensibly to include all land in the title.</p> <p>4. <i>THAT no other changes be made to zoning in the Moncks Bay area</i></p> <p>Reasons for Decision:</p>
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	<p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse or land slip with associated risk to life, and/or these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p>
<p>Area 21 Beckenham, Cashmere, Cashmere Hills, Hillsborough and Huntsbury Maps 1, 2, 3, 4 and 5</p>	<p>The Group reviewed the key geotechnical issues for the Beckenham, Cashmere, Cashmere Hills Hillsborough and Huntsbury areas, which showed that:</p> <ul style="list-style-type: none"> • This area generally comprises several north-south running valleys with discontinuous rock outcrops running near the crest of these valleys and occasional localised small cliffs. • The cliffs comprise rock in some areas, loess soils in others, and a number are man-made. • The properties in the upper and mid-slopes of these long valleys that have rock outcrops above them are exposed to rock fall risks. • Properties above and below some of the localised cliffs and steep slopes are exposed to localised cliff collapse risks (e.g. View Terrace and Port Hills Road). • Approximately 200 fallen boulders were mapped in these areas, reflecting smaller, less continuous rockfall source areas and the greater distance from the earthquake epicentres. • Pockets of ground cracking damage occurred in this area, focused around small man-made cliffs in some cases, and on the lower valley slopes where they abut level ground at the valley base. This slope damage is probably due, in part, to liquefaction and lateral spreading in the valley base. • Part of the Lucas Lane area is exposed to a landslide risk with an associated risk to life, and remedial works are being designed to address this issue. <p>RECOMMENDATIONS:</p> <ol style="list-style-type: none"> 1. <i>THAT 5 Reservoir Lane, 68 Rapaki Track, 212A Centaurus Road and 79 Bowenvale Avenue be rezoned from green to red</i> <p>Reason for Decision:</p>

Reservoir Lane, 68 Rapaki Track, 212A Centaurus Road and 79 Bowenvale Avenue

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	<p>The geotechnical data shows that the dwellings on these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>2. THAT no other changes be made to zoning in the Beckenham, Cashmere, Cashmere Hills Hillsborough and Huntsbury area</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse or land slip with associated risk to life, and/or these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p>
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Appendix 1 – Terms of Reference for the Port Hills Zoning Review Advisory Group

Appendix 2 – Overview map

Appendix 3 – Full list of property addresses

Appendix 4 – Recommended changes map

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Addendum:

Port Hills Zoning Review Advisory Group



Subject	ACTION / Issues
<p>Introduction</p>	<p>In the week of 11 February 2013 the CERA policy officials working on the advice to the Minister for Canterbury Earthquake Recovery met with him to discuss our Review Minutes/Recommendations.</p> <p>As a result of that meeting the Minister asked to meet with the Chair to seek clarification on our findings. To this end Keith Turner, David Jennings and Diane Tuner represented the Group at the meeting with the Minister at 9am on Thursday 14 February. Irfon Jones also attended to provide technical support as the issues are easier represented on screen rather than hard copy maps.</p> <p>Keith provided a summary of how the Group had gone about its task. At that meeting the Minister sought clarification on a three matters. The section below deals with those questions.</p> <p>All members of the PHZRAG were provided with the information in the following section. They subsequently indicated their agreement with the statements. There was no change to the Minutes.</p> <p>The Minister also requested that the Minutes include a map reference number. This was done and a revised set of Minutes were prepared.</p>
<p>Additional information as requested</p>	<p>1/91, 93 and 97 Wakefield Avenue and 2 Denman Street (map 21):</p> <p>At the request of the PHZRAG a review of the risk profile for this area (including a site visit) was conducted by GNS and PHGG. They advised that the rock roll risk should be reduced in the area, as the rock roll source areas in this area were less significant than the suburb average used in the risk models. This affects the properties located at 67, 69, 81, 83, and Wakefield Avenue and 2 Denman Street. GNS identified that the rock roll risk to these properties is between 10-4 and 10-5, which is less than the Annual Individual Fatality Risk of 1 in 10,000 or greater at 2016. On balance of the available information, the panel agreed that the property be rezoned from red to green.</p> <p>97 Wakefield Avenue is located on the edge of the zone affected by the reduced source which had resulted in an overstatement of the risk in this particular area. On balance the panel agreed that the property should remain green.</p> <p>69A Bay View Road and 6 Red Rock Lane (map 18):</p> <p>The PHZRAG were advised by CERA's Chief Geotechnical Advisor (after site inspections and discussions with members of PHGG and GNS), the life risk affecting 69A Bay View Road was overstated. The rock roll source area is diminished as a result of works that had been undertaken by the land owner to reduce the size of the source area and risk from rock roll. On consideration of the available information, the Panel agreed that on balance</p>

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Addendum:
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	<p>the GNS rock roll model overestimated the risk to 69A Bay View Road and that it be rezoned from red to green.</p> <p>The property at 6 Red Rock Lane has a small, localised source area which was located on the building platform. Work associated with the construction of the foundations for a dwelling on this site will remove this issue. The modelling for this property was considered to be an anomaly. The panel agreed that no change is recommended to the zoning of this property.</p> <p>4 and 8 Monks Spur Lane (map 17):</p> <p>The eight metre near vertical loess cliff adjacent to the properties at 4 and 8 Moncks Spur Lane was not included in the GNS model as it generally included sea-cut rock cliffs only.</p> <p>The PHZRAG was advised by CERA's Chief Geotechnical Advisor that the loess cliff presented an immediate life safety hazard, caused or accentuated by the earthquakes. In several areas the cliff failed and impacted the dwellings at 4 and 8 Moncks Spur. Remediation of the cliff would require both buildings to be demolished.</p> <p>On balance, the Group agreed that while the properties did not meet the red zoning criteria, they did meet the intent of the criteria and the risk to life is such that the panel recommended they be rezoned from green to red.</p>
<p>Issues arising subsequent to the meeting with the Minister for Canterbury Earthquake Recovery</p>	<p>Following the meeting with the Minister, officials identified that one property that had been recommended by the Group to be rezoned from green to red had a section 124 – 21 Harmans Road. Correspondence with CCC/PHGG has indicated that although the revised GNS risk line showed that the property is outside the risk line, that CCC/PHGG would not be lifting the s124 notice off 21 Harmans Road as the house was hit by a rock as a result of the earthquake and the identified rock source above the house (east side) is in poor condition. In this case the Group agreed that CCC/PHGG is saying that the ground truthing does not support the model for this property.</p> <p>Accordingly the Group reviewed their initial recommendation and agreed that it was no longer appropriate. The Group recommends that the property at 21 Harmans Road retains the red zoning.</p> <p>This recommendation is reflected in the Port Hills Zoning Review Advisory Group minutes issued on 18 February 2013, and accompanying maps.</p>

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