

Before Queenstown Lakes District Council

In the matter of The Resource Management Act 1991

And The Queenstown Lakes District proposed District Plan Topic 09
Resort Zones

STATEMENT OF EVIDENCE OF DAVID RIDER FOR

Jack's Point Residential No.2 Ltd, Jack's Point Village Holdings Ltd, Jack's Point Developments Limited, Jack's Point Land Limited, Jack's Point Land No. 2 Limited, Jack's Point Management Limited, Henley Downs Land Holdings Limited, Henley Downs Farm Holdings Limited, Coneburn Preserve Holdings Limited, Willow Pond Farm Limited (#762, #856 and #1275)

Jack's Point Residents and Owners Association (#765, and #1277)

Dated 3 February 2017

Solicitors

Anderson Lloyd
M A Baker-Galloway | R E Hill
Level 2, 13 Camp Street, Queenstown 9300
PO Box 201, Queenstown 9348
DX Box ZP95010 Queenstown
p + 64 3 450 0700 | f + 64 3 450 0799
maree.baker-galloway@al.nz | rosie.hill@al.nz

**anderson
lloyd.**

QUALIFICATIONS AND EXPERIENCE

- 1 My full name is David Winston Rider.
- 2 I am the Senior Engineering Geologist/Geo-professional with RDAgritech Ltd.
- 3 I hold a Bachelor of Science in Geology. I have been a practicing Engineering Geologist since 1997 and hold current memberships and affiliations with the following professional Organisations:
 - (a) New Zealand Geotechnical society (NZGS);
 - (b) International Association of Engineering Geology (IAEG);
 - (c) International Society for Rock Mechanics (ISRM);
 - (d) International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE);
 - (e) New Zealand Society for Earthquake Engineering (NZSEE);
 - (f) Structural Engineering Society of New Zealand (SESOC); and
 - (g) Civil Engineering and Testing Association of New Zealand (CETANZ).
- 4 During the past 20 years I have been involved in Natural Hazard assessments, Geotechnical design and assessments, Wastewater design and assessments, Stormwater design and assessments. Tender preparations and assessments, contract document preparation and management, Resource consent applications and assessment of effects associated with the aspects of my scope. I am a practising Geo-professional in accordance with NZS4404:2010 and an inspecting engineer in accordance NZS4431:1989 and its amendments.
- 5 I have conducted several geotechnical hazard assessments within the existing Jack's point zone over the last 10 years and performed numerous geotechnical investigations and hazard assessments of the wider Jack's point subdivision area.
- 6 In preparing this evidence I have reviewed the reports and statements of evidence of other experts giving evidence relevant to my area of expertise, listed in the appended reference list:
- 7 I conducted a site walkover of the State Highway 6 alignment covering the area between Woolshed Road turn off and the N Zone Skydiving access road.
- 8 I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note. This evidence has been prepared in accordance with it and I agree to comply with it. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

- 9 I have been asked by Jack's Point Village holdings Ltd to prepare evidence in relation to the Natural Hazards in respect of areas (as notified) Fp-1, FP-2, EIC, R(HD)F, R(HD)G, R (SH) 1 and 2, V and E. FP 1 and 2 are now proposed as Homesites. EIC is now proposed as R(HD SH) 3 and V and E are merged into one V.
- 10 This has involved a desktop review of all supplied hazard reporting and specifically includes:
- (a) Ground shaking from seismic hazards (including liquefaction potential);
 - (b) Depositional Alluvial Fan Hazards- (including Debris flow);
 - (c) Flooding Hazards; and
 - (d) Other hazards potentially discovered as part of this evidence preparation.

EXECUTIVE SUMMARY

- 11 During my review of the evidence provided and obtained I determined the following natural hazards potentially affect the site. Each of the natural hazards identified either are currently mitigated or able to be mitigated so as to not preclude development.
- (a) Seismic Ground Shaking, Liquefaction, Flooding, Debris Flows, Alluvial fan hazards and Rock fall from the Remarkables range.
- 12 Each of the natural hazards Identified vary in their potential to affect the development area.

EVIDENTIAL STATEMENT

- 13 This evidence is within my area of expertise and I have relied on the information supplied above to prepare it.
- 14 The information contained or observed in 5 to 7 above is what I have considered in forming my opinions and evidential statement. I have considered that all documents in the attached references above have been read and understood by the Parties involved.
- 15 The Natural Hazards Identified during my review are as follows:
- (a) Seismic Shaking (Earthquakes);
 - (b) Liquefaction;
 - (c) Flooding;
 - (d) Debris flows;

- (e) Alluvial Fans;
- (f) Rock Falls from the Remarkables Range; and
- (g) Slope instability.

TOPIC SEISMIC SHAKING

- 16 Seismic ground shaking for the site and wider Wakatipu area is a known natural hazard. Mitigation by investigation, design, construction and certification of the relevant subdivision development and final buildings in accordance with current development and building codes, standards and best industry practices have shown to mitigate this natural hazard risk across New Zealand and would be expected to mitigate the hazard within the plan change area.
- 17 There are no mapped active faults within the plan change area so no fault rupture risk setback zones are expected.

TOPIC LIQUEFACTION

- 18 Liquefaction is a known natural hazard for the area. The plan change areas have had varying degrees of liquefaction assessment conducted across it for separate consent applications.
- 19 The various assessment reports across the plan change area indicate that generally the liquefaction risk is nil to low with small areas identified as moderate.
- 20 Prudent investigation and assessment for this hazard is expected to be conducted for each subdivision application submitted as the site as a whole has a liquefaction hazard assigned to it by QLDC as part of the regional Hazards framework.
- 21 Provided QLDC assesses this hazard as part of the Code of Practice for Subdivision in QLDC in accordance with NZS4404:2010 and obtain the required Geotechnical Investigation and Completion Reporting detailed in the Standard, I do not envisage liquefaction effects would preclude development.
- 22 Should liquefaction be identified as a risk to an area of development it is expected that design and construction in accordance with current development and building codes, standards and best industry practices would mitigate this natural hazard risk for the particular section of site affected.

TOPIC FLOODING

- 23 Portions of the site have been identified to be subject to potential flooding during high rainfall events within the existing drainage path of woolshed creek, the reporting reviewed has identified mitigation measures for the woolshed stream catchment area and this

design has been peer reviewed by another expert. I would concur with the experts and agree the flood mitigations options as reviewed would be a suitable mitigation option for the flooding hazard.

- 24 The extensive and peer reviewed reporting supplied by Mr Dent and the peer reviewer Mr Stocker from Geosolve for separate resource consents for RCL confirm the flooding risk from external and above the site would be mitigated via the creation of a new upgraded flow path via detention and buffer storage ponds incorporated as part of the design. This reporting has also been approved by Council's consultant engineer Mr Hopkins.

TOPIC DEBRIS FLOWS

- 25 Debris flows would typically occur in conjunction with high rainfall and flooding events with aggradation and potential breakout of the formed catchment channels below the hydrological apex of the source fan.
- 26 The Fluent solutions reporting by Mr Dent summarises that due to the concave and convex nature of the fans, debris is unlikely to reach the highway boundaries due to the distance from the source areas. I would concur and would agree any channel breakout is likely to be dissipated prior to reaching the development area.
- 27 However if in unlikely scenario that a flow was able to reach the highway the existing flow paths and proposed highway widening and access road installation would be expected to mitigate these by channelling it to the proposed flood mitigation works or down toward woolshed road, I would consider this to be a very low risk to nil of occurring within the foreseeable future.

TOPIC ALLUVIAL FAN HAZARD

- 28 I consider that the reporting provided by My Dent and Mr Thompson adequately addresses the alluvial fan hazards present above the site.
- 29 The existing topography and channels as well as the proposed flood mitigation works for Woolshed Creek and the widening of the highway, creation of the new subdivision access point as well as the proposed visibility landscaping mound, are expected to mitigate potential hazards that may arise in the unlikely situation of from this natural hazard.
- 30 The alluvial fan source material is largely depleted and only geologically small source rock volumes are available on the Remarkables range, hence it is considered that the fans present are not expected to reactivate in the foreseeable future of development within the basin.
- 31 Reactivation of the alluvial fans depositional nature is only likely during geologically significant events such as a return to glaciation within the Wakatipu valley. I would not expect this to occur within humans current generational life spans.

- 32 The flooding mitigation works proposed would double as mitigation for debris flows that could potentially overtop the highway in extreme weather events if the existing alluvial fan channels suffers break out.

TOPIC ROCK FALL HAZARDS

- 33 Due to the very steep faces present of the Remarkables range, known seismic activity and risk for the region, attenuation of peak ground accelerations at mountain range crests and the fractured planer controlled schistosity of the underlying metamorphic rock, that forms the Remarkables range, it is almost a certainty that some sections of the range will eventually succumb to instability and fail downslope, particularly during seismic shaking events.
- 34 Evidence of rock falls litter the underlying farm land above the State highway
- 35 These range from small (less than 0.5m across) to large (greater than 10m across) blocks/boulders. With the smaller boulders furthest away from the point source and the larger blocks closer to the steeper terrain.
- 36 Similar sized blocks are present across the Plan change 44 area, however they are attributed to glacial retreat and drop out deposition as ice melt occurred, rather than rock fall from the Remarkables range
- 37 Rock Fall hazard from the notified FP-2 are, now OSLarea to the north is not considered to pose a risk of rock fall to the lower lying sections of the site. As glacial scouring has plucked potentially unstable blocks from the slopes.

TOPIC SLOPE STABILITY HAZARDS

- 38 The elevated slopes of where the new Homesites are proposed (ex FP-1 and FP-2) above the lower lying areas do contain localised areas of steep rock bluffs and soil slopes. No evidence was observed to indicate instability such as landsliding or slippage was present that would affect the low lying sections of the site.

CONCLUSION

- 39 Where areas of the plan change area have not had detailed natural hazard assessments completed at this stage, the list of potential hazards have been identified and it would be part of any specific consent process for these to be addressed.
- 40 I would surmise that the natural hazards external to the site have been adequately addressed and where present suitably mitigated to prevent undue adverse effects on the proposed development area.
- 41 Natural hazards internal to the site area are limited to seismic ground shaking, liquefaction and flooding. It is my expectation that provided the QLDC assess these

hazards in accordance with their Code of Practice for Subdivision and NZS4404:2010 then adequate mechanisms are in place for these hazards to be mitigated.

DATED this 3rd day of February 2017

David Rider

REFERENCES

- (a) Otago Regional Council Request for Information response to Consent RM16.168.01
- (b) RFI response to ORC in respect of RM16.168.01
- (c) PC44 evidence. Gary Dent Stormwater Dated 01 July 2005
- (d) PC 44 evidence Gary-Dent-Attachment-1 Dated 01 July 2005
- (e) PC 44 evidence Gary-Dent-Attachment-2 Dated 01 July 2005
- (f) PC 44 evidence Gary-Dent-Attachment-3 Dated 01 July 2005
- (g) PC 44 evidence Gary-Dent-Attachment-4 Dated 01 July 2005
- (h) Fluent solutions report dated 08 June 2016 prepared for RM160562
- (i) QLDC Engineering report in respect of RM160562
- (j) Engineering feasibility assessment dated June 2016 for consent application RM160562
- (k) Requests for information and responses in respect of consent application RM160562
- (l) Thomson R Geological Appraisal in respect of development on Lot 3 Hanley Downs 16 Oct 2014
- (m) Thomson R Geological Appraisal in respect of development on Lot 3 Hanley Downs CV and Maps Oct 2014
- (n) Royden Thompson Test pit results Oct 2014 (most recent) in respect of development on Lot 3 Hanley Downs
- (o) RM160171 Opus Hanley Downs SH6 Access Road Intersection Design, dated February 2016
- (p) Blakely Wallace Associates Highway Screening Plan revision 3 Dated 31 May 2016 in respect of RM160562
- (q) Geosolve Addendum Report- Liquefaction Assessment Review, -DP3 Hanley Downs Subdivision. Ref 150752.02 dated 22 September 2016.
- (r) Geosolve Addendum Report – Liquefaction Assessment Review DP1, Henley Downs Subdivision Ref 150751 dated 16 May 2016.