

**BEFORE THE HEARINGS PANEL
FOR THE PROPOSED QUEENSTOWN LAKES DISTRICT PLAN**

IN THE MATTER of the Resource
Management Act 1991

AND

IN THE MATTER of Stage 3 of the
Proposed District Plan

**SECOND STATEMENT OF EVIDENCE OF ROBERT BOND
ON BEHALF OF QUEENSTOWN LAKES DISTRICT COUNCIL**

GEOTECHNICAL ENGINEERING – RURAL VISITOR ZONE - REZONINGS

18 March 2020



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1. INTRODUCTION

- 1.1 My full name is Robert Bond. I hold the qualification of Bachelor of Engineering in Industrial Geology. I am a registered and Chartered Engineer with Engineering New Zealand (formerly IPENZ) with specialist areas in geotechnical engineering and management and I have been employed as a Principal Engineer and Work Group Manager at WSP New Zealand (formerly Opus Consultants) since 1998.
- 1.2 I have worked in New Zealand for over 10 years, my recent experience in terms of natural hazard risk assessment and rockfall management includes providing site response to rockfall events and completing rockfall assessments on behalf of Christchurch City Council following the Christchurch Earthquake and providing, and leading, the Geotechnical response to NZ Transport Agency (**NZTA**) following the Kaikōura earthquake prior to the establishment of the North Canterbury Transport and Infrastructure Recovery (**NCTIR**).
- 1.3 I currently manage the Geotechnical team responsible for the data collection and management of natural hazard risks in Central Otago for the NZTA State Highway network and Queenstown Lakes District Council (**QLDC** or **Council**) local roading network and have advised other councils and regulatory authorities on natural hazard risk. I was the lead designer for the development of the Diana Falls rockfall mitigation scheme which led to the development of the current MBIE, NZTA and the NZ Geotechnical Society design guide (NZGS) on passive rockfall protection systems and have acted as geotechnical expert on rockfall assessments for residential, commercial and infrastructure schemes.
- 1.4 Although this is a Council hearing, I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and that I agree to comply with it. I confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express, and that this evidence is

within my area of expertise, except where I state that I am relying on the evidence of another person.

2. SCOPE

2.1 I have been asked to provide evidence in relation to ten submissions seeking site specific re-zoning to Rural Visitor Zone (**RVZ**). My evidence focuses on geotechnical and natural hazard issues and addresses the following submission sites:

Skippers

- (a) 1354 Skippers Road (**31015**)
- (b) 1352 Skippers Road (**31022**)
- (c) Moonlight Track (**31016**)

Upper Clutha

- (d) 93 Camp Hill Road (**31014**)
Mount Aspiring Road, Wanaka (**31053**)

Gibbston

- (e) Victoria Flats (**31039**)
- (f) Gibbston Valley (**31037 and 31039**)

Other

- (g) Loch Linnie Station (**31013**)
- (h) Lake Hawea Holiday Park (**31043**)
- (i) Walter Peak Station (**31024**).

2.2 I have provided my view on each of the submission requests as to whether I oppose the relief sought, or whether I do not oppose the relief sought in terms of geotechnical / natural hazard effects.

2.3 Due to the time available to prepare this evidence I have not undertaken site visits. In terms of flooding, I have not completed any detailed analysis of flood risks affecting the sites, or carried out any independent model assessments.

2.4 In assessing the geotechnical / natural hazard risks raised by the site specific submissions, I have considered the relevant technical information provided with the submissions (as detailed in the response

to each submission), a review of QLDC and Otago Regional Council available data relating to natural hazards, as well as WSP's (formerly Opus) available data.

2.5 I have also considered the Natural Hazards chapter of the Queenstown Lakes Proposed District Plan (**PDP**).

2.6 I have been advised that areas zoned RVZ could potentially enable a controlled activity consent to be sought and that Council would not be able to decline the application based on risks posed by natural hazards. I have therefore taken this advice into consideration in assessing the individual sites and have considered whether or not the RVZ is appropriate or not from a natural hazards point of view. Where appropriate to do so I have identified areas of the site where risks are likely to be sufficiently low that I believe the RVZ may be applied. These areas are shown on individual site plans presented in **Appendix 1**. I have also been advised that there is no minimum lot size for subdivision in the RVZ, so have not been provided with any yield likely to result from a rezoning.

2.7 Where I have recommended further work is required prior to confirming the rezoning to RVZ I would recommend the minimum extent of any detailed geotechnical assessment be as follows:

- (a) A full site reconnaissance by a suitably qualified geotechnical professional;
- (b) A detailed geological/geotechnical desk top study;
- (c) A qualitative risk assessment considering risk to property and site users;
- (d) If deemed necessary, a detailed quantitative risk assessment considering risk to property and site users;
- (e) Consideration of the effects of any proposed mitigation measures or risk reduction options; and
- (f) Any other works stipulated by the PDP (Chapter 28) and the Regional Policy Statement.

3. EXECUTIVE SUMMARY

3.1 I **oppose** the following submissions because the submitter has not provided any, or insufficient, technical assessment of geotechnical matters and I assess the qualitative level of risk as Moderate or High:

- (a) Brett Mills – 1354 Skippers Road (31015);
- (b) Malaghans Investments Ltd (31022);
- (c) Walter Peak Station (31024)
- (d) Blennerhassett – Mount Aspiring road (31053).

3.2 I **do not oppose the following submissions (in part)** because I assess the qualitative level of risk as Low for that part of the site, but consider a detailed geotechnical assessment of proposed development would be required: at resource consent stage to ensure that any proposed developments are unaffected by natural hazards or that the identified risks can be adequately mitigated. I oppose the rezoning for the rest of the respective sites:

- (a) Brett Mills – Moonlight Track (31016);
- (b) Loch Linnie Station (31013);
- (c) Gibbston Valley Station – Gibbston Valley (31037);
- (d) Cardrona Cattle Company – Victoria Flats (31039);
- (e) Heron Investments Ltd – 93 Camp Hill Road (31014).

3.3 I oppose the alternative relief sought for the Cardrona Cattle Company, where General Industrial Zone is sought, as no information relating to natural hazard risk has been provided for that land by the submitter.

3.4 I **do not oppose** the rezoning submission of Richard and Sarah Burdon, for the Lake Hawea Holiday Park.

SKIPPERS

4. BRETT MILLS - 1354 SKIPPERS ROAD (31015)

4.1 The submitter has sought a rezoning of the site located at 1354 Skippers Road from Rural Zone to RVZ.

- 4.2** It is my opinion that the site is likely to be affected by natural hazards. The key hazard identified is landslide risk.
- 4.3** Based on available information I have formulated a qualitative risk assessment in terms of risks posed to property as recommended in the Australian geomechanics Volume 42 March 2007 version of the Practice Note Guidelines for Landslide Management.
- 4.4** My assessment of the site is that parts of the site may be affected by landslides and that the qualitative level of risk is Moderate.
- 4.5** It is my opinion that the identification of a moderate level of risk requires further investigation to refine the level of risk that exists across the site for development anticipated by the RVZ. I recommend a detailed geotechnical assessment be completed to identify low-risk areas for development is undertaken prior to re-zoning being considered. I therefore oppose this rezoning.

5. MALAGHANS INVESTMENTS LTD – 1352 AND 1354 SKIPPERS ROAD (31022)

- 5.1** The submitter has sought a rezoning of the site located at 1352 and 1354 Skippers Road from Rural Zone to RVZ.
- 5.2** It is my opinion that the site is likely to be affected by natural hazards. The key hazard identified is landslide risk.
- 5.3** Based on available information I have formulated a qualitative risk assessment in terms of risks posed to property as recommended in the Australian geomechanics Volume 42 March 2007 version of the Practice Note Guidelines for Landslide Management.
- 5.4** My assessment of the site is that parts of the site may be affected by landslides and that the qualitative level of risk is Moderate.

5.5 It is my opinion that the identification of a moderate level of risk requires further investigation to refine the level of risk that exists across the site for development anticipated by the RVZ. I recommend a detailed geotechnical assessment be completed to identify low-risk areas for development is undertaken prior to re-zoning being considered. I therefore oppose this rezoning.

6. BRETT MILLS - MOONLIGHT TRACK (31016)

6.1 The submitter has sought a rezoning from Rural Zone to RVZ.

6.2 Based on my assessment of reviewed information it is my opinion that the site is likely to be affected by natural hazards. The key hazard identified is landslide risk.

6.3 Based on available information I have formulated a qualitative risk assessment in terms of risks posed to property as recommended in the Australian geomechanics Volume 42 March 2007 version of the Practice Note Guidelines for Landslide Management.

6.4 My assessment of the site is that parts of the site may be affected by landslides and that the qualitative level of risk is Low.

6.5 On this basis I have identified an area of the site that I would not oppose rezoning to RVZ when considering natural hazards (identified on the enclosed plan presented in **Appendix 1**).

6.6 It is my opinion however that a detailed geotechnical assessment of proposed development would be required for this site at resource consent stage to ensure that any proposed developments are unaffected by natural hazards or that the identified risks can be adequately mitigated.

UPPER CLUTHA

7. HERON INVESTMENTS LTD - 93 CAMP HILL ROAD (31014)

- 7.1** The submitter has sought a rezoning of the site located at 93 Camp Hill Road from Rural Zone to RVZ.
- 7.2** Based on my assessment of reviewed information I am of the opinion that the site is affected by one natural hazard feature that must be considered as part of the rezoning request.
- 7.3** The available information indicates that the site is crossed by the fault trace of the Cardrona Fault (GNS active fault reference #8968).
- 7.4** The fault is considered by GNS to be active with a low slip rate and a recurrence interval of 5-10,000 years.
- 7.5** The fault trace is however covered by surficial deposits and is therefore at depth below the site. However, during a large seismic shaking event the possibility of ground rupture associated with this fault cannot be overlooked.
- 7.6** The site is not considered to be at risk from any other natural hazard.
- 7.7** On this basis I have identified an area of the site that I would not oppose rezoning to RVZ when considering natural hazards (identified on the enclosed plan presented in **Appendix 1**). I otherwise oppose the rezoning request.

8. BLENNERHASSETT - MOUNT ASPIRING ROAD (31053)

- 8.1** The submitter has sought a rezoning of the site located at 280 Wanaka-Mt Aspiring Road from Rural to RVZ.
- 8.2** As part of my assessment I have considered published reports relating to active alluvial fans in Central Otago and reports produced by the

Otago Regional Council relating to Waterfall Creek and Stoney Creek debris flow events.

- 8.3** I have also considered the topography and geomorphology of the site areas and location in relation to both Stoney and Waterfall Creek and I am aware of the upstream mitigation works already completed by Otago Regional Council.
- 8.4** As part of my assessment I have completed a preliminary qualitative risk assessment in terms of risks posed to property in general accordance with the methodology proposed in the Australian geomechanics Volume 42 March 2007 version of the Practice Note Guidelines for Landslide Management, with due respect for the hazard type being debris flow.
- 8.5** My assessment is that the site is potentially affected by debris flows. The qualitative level of risk of this hazard affecting the submission site is High.
- 8.6** It is my opinion that the identification of a high level of risk requires further investigation to refine the level of risk that exists across the site for development anticipated by the RVZ. I recommend a detailed geotechnical assessment be completed to identify low-risk areas for development is undertaken prior to re-zoning being considered. I therefore oppose this rezoning request.

GIBBSTON

9. CARDRONA CATTLE COMPANY - VICTORIA FLATS (31039)

RVZ

- 9.1** The submitter has sought a rezoning of the site located at Victoria Flats at Gibbston, from part Rural Zone and part Gibbston Character Zone, to RVZ. There is also a second submission by the submitter to rezone a larger area General Industrial Zone (**GIZ**) (submission 3349).

- 9.2** It is my opinion that the site is likely to be affected by natural hazards. The key hazard identified is landslide risk.
- 9.3** Based on available information I have formulated a qualitative risk assessment in terms of risks posed to property as recommended in the Australian geomechanics Volume 42 March 2007 version of the Practice Note Guidelines for Landslide Management.
- 9.4** My assessment of the site is that parts of the site may be affected by landslides and that the qualitative level of risk posed is Low.
- 9.5** On this basis I have identified an area of the site that I would not oppose rezoning to RVZ when considering natural hazards (identified on the enclosed plan presented in **Appendix 1**).
- 9.6** It is my opinion however that a detailed geotechnical assessment of proposed development would be required on this part of the site at resource consent stage to ensure that any future development is unaffected by natural hazards or that the identified risks can be adequately mitigated.

Alternative relief – General Industrial Zone (GIZ)

- 9.7** Considering the GIZ zoning, I understand that the GIZ request is over a wider area of land than the RVZ request. I have not assessed the natural hazard risk of this part of the site, but note that this additional area of land is subject to other hazards; contaminated land aspects and HAIL activities and that there is the possible occurrence of soft ground and instability in close proximity to the Clutha River. Further assessment is required by the submitter of that land.

10. GIBBSTON VALLEY STATION - GIBBSTON VALLEY (31037)

- 10.1** The submitter has sought a rezoning of the site located at the western end of Gibbston Highway, at Gibbston, from part Rural Zone and part Gibbston Character Zone, to RVZ.

- 10.2** It is my opinion that the site is likely to be affected by natural hazards. The key hazard identified is landslide risk.
- 10.3** Based on available information I have formulated a qualitative risk assessment in terms of risks posed to property as recommended in the Australian geomechanics Volume 42 March 2007 version of the Practice Note Guidelines for Landslide Management.
- 10.4** My assessment of the site is that parts of the site may be affected by landslides and that the qualitative level of risk posed is Low.
- 10.5** On this basis I have identified an area of the site that I would not oppose rezoning to RVZ when considering natural hazards (identified on the enclosed plan presented in **Appendix 1**).
- 10.6** It is my opinion however that a detailed geotechnical assessment of proposed development on this part of the site would be required at resource consent stage to ensure that any future development is unaffected by natural hazards or that the identified risks can be adequately mitigated.

OTHER / RURAL

11. LOCH LINNIE STATION (31013)

- 11.1** The submitter has sought a rezoning of two sites adjacent to the Kingston Road (SH6), from Rural Zone to RVZ, for two distinct sites, one north, one south. The two sites are located 14km apart, at each end of the Station. The two sites are referred to as Wye Creek (northern site) and Homestead (southern site),
- 11.2** Based on the available information reviewed I have determined that both the Wye Creek and Homestead sites are potentially affected by natural hazards.
- 11.3** The key hazard affecting these sites is associated with Alluvial Fan hazards, namely debris flows.

- 11.4** Based on available information I have formulated a qualitative risk assessment in terms of risks posed to property as recommended in the Australian geomechanics Volume 42 March 2007 version of the Practice Note Guidelines for Landslide Management.
- 11.5** My assessment of the Wye Creek northern parcel of land is that the area is unlikely to be affected by debris flow. The qualitative level of risk of this hazard affecting the submission site is Very Low.
- 11.6** My assessment of the Homestead southern parcel of land is that the area is potentially at risk from a debris flow in limited areas of the site. The qualitative level of risk of this hazard poses to the site area has been assessed as Low and limited to distinct areas.
- 11.7** On this basis I have identified areas of each of the submission sites that I would not oppose rezoning to RVZ when considering natural hazards (identified on the enclosed plan presented in **Appendix 1**).
- 11.8** It is my opinion however that a detailed geotechnical assessment of proposed development would be required at resource consent stage to ensure that any future development on these parts of the sites is unaffected by natural hazards or that the identified risks can be adequately mitigated.

12. BURDON - LAKE HAWEA HOLIDAY PARK (31043)

- 12.1** The submitter has sought a rezoning of the Lake Hawea Holiday Park and adjacent lots from part Rural Zone and part Open Space and Community Purposes Zone to RVZ.
- 12.2** My limited assessment of the site has revealed a previous Geological assessment¹ of the site which considers the regional landslide status of the area and the potential for alluvial fan hazards to exist on the site.

¹ Geotechnical Hazards – Preliminary Assessment, Hawea Campground Area, Report prepared by GeoSolve Ltd for Paterson Pitts Group, August 2015, GeoSolve Ref: 150139, attached to Statement of Evidence of Duncan Lawrence White, 4 April 2017, for Stage 1 PDP Hearing <https://www.qldc.govt.nz/media/bfmpbivw/s0282-burdon-and-glen-dene-t12-whited-evidence.pdf>.

- 12.3** I am generally in agreement with the previous Geological study and concur that the qualitative risks posed to the site are more likely than not, Low.
- 12.4** On this basis and in terms of the risks posed by natural hazards it is my opinion that the site is considered suitable for rezoning to RVZ. I do not oppose the submission.

13. WALTER PEAK STATION (31024)

- 13.1** The submitter has sought to extend the notified Walter Peak RVZ to include the Beach Bay Reserve to the immediate south-east of the notified RVZ area.
- 13.2** My research of the site has identified various sources of information pertaining to natural hazard risks at this site. The site has been subject to previous assessment that concluded the site was at risk from debris flow hazards.
- 13.3** Mitigation and management of potential debris flows on the site have previously been undertaken with the development of earth bunds to control and direct any debris flows from identified stream lines.
- 13.4** My assessment of the submission site is that it is potentially affected by similar natural hazards associated with active alluvial fans and debris flow.
- 13.5** As part of my assessment I have completed a qualitative risk assessment in terms of risks posed to property in general accordance with the methodology proposed in the Practice Note Guidelines for Landslide Management, (Australian geomechanics Volume 42 March 2007) with consideration of the hazard type being debris flow.
- 13.6** The preliminary qualitative risk assessment considers the risk posed to property from the identified hazard to be High. The risk is therefore considered to be unacceptable without treatment to reduce the risks to Low.

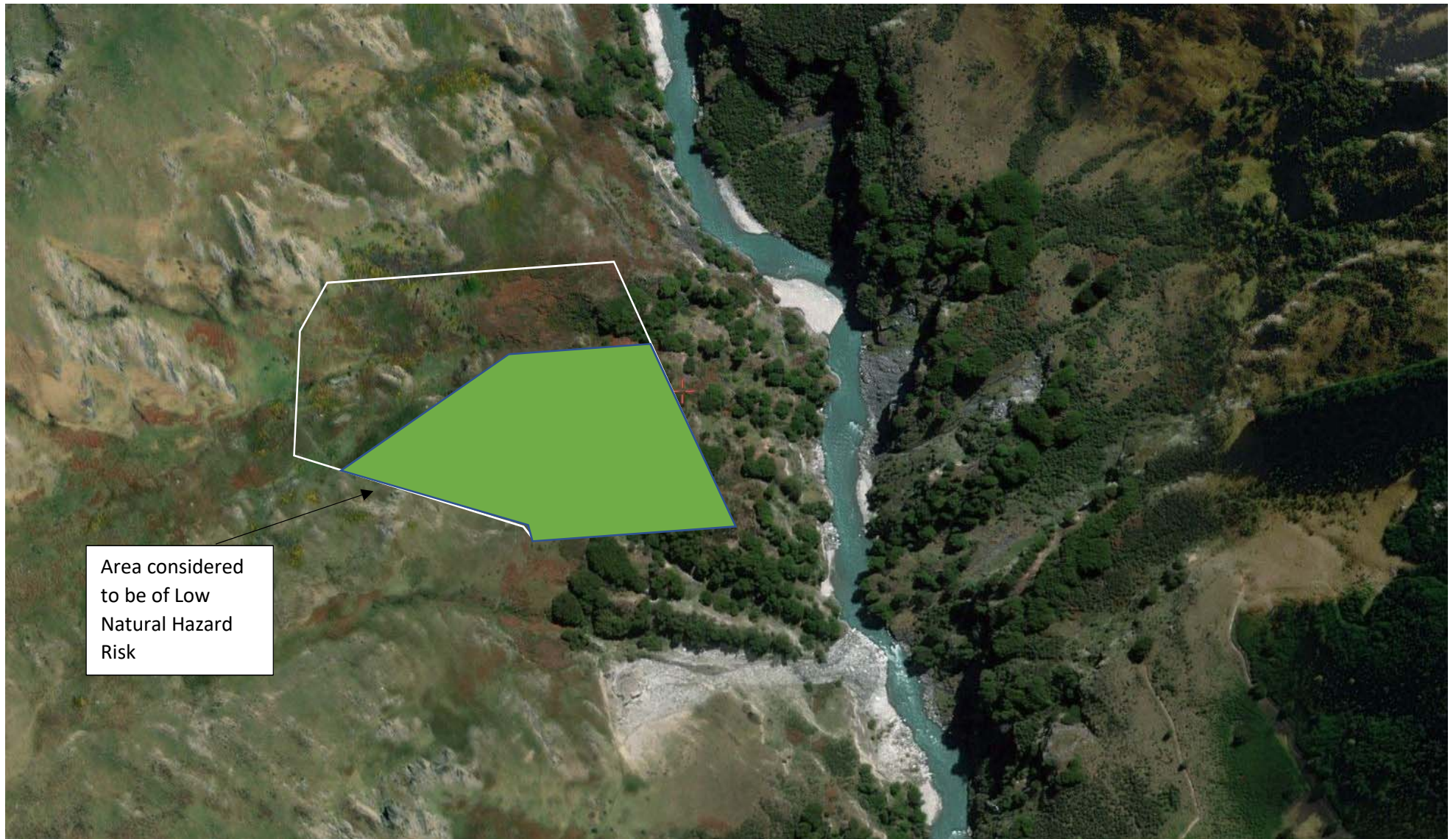
13.7 It is my opinion that the identification of a high level of risk requires further investigation to refine the level of risk that exists across the site for development anticipated by the RVZ. I recommend a detailed geotechnical assessment be completed by the submitter prior to any rezoning to identify low-risk areas for development. I therefore oppose this rezoning request.



Robert Bond
18 March 2020

APPENDIX 1

Plans Showing Extent of certain rezoning sites considered to be of Low Natural Hazard Risk



Area considered
to be of Low
Natural Hazard
Risk

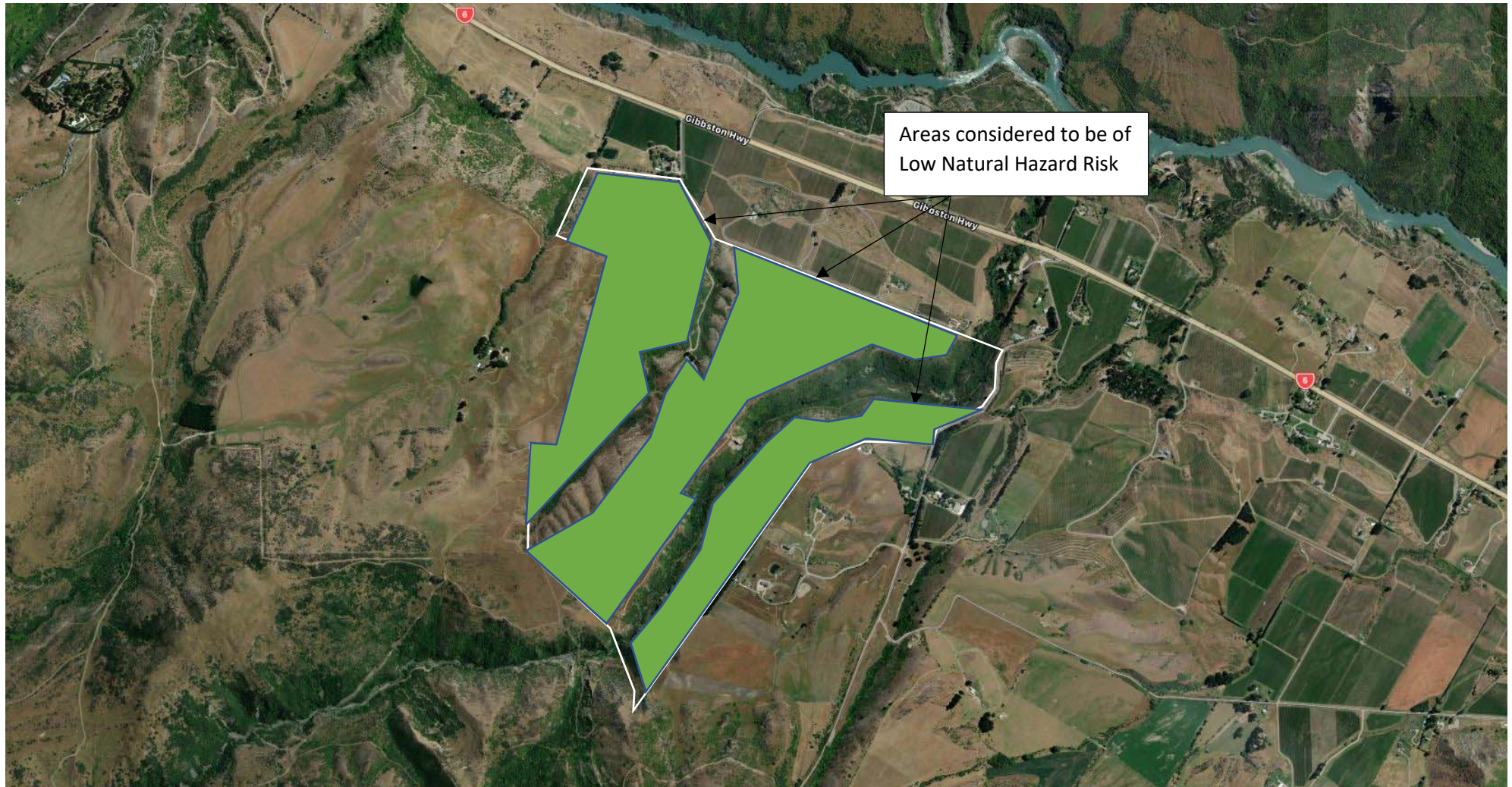
Plan showing Moonlight Track Site (31016) – Brett Mills
Highlighted area considered to be of low Natural Hazard risk



Plan showing 93 Camp Hill Road (31014) – Heron Investments
Highlighted Areas considered to be of Low Natural Hazard risk



Plan showing Victoria Flats Site (southern area) (31039) – Cardrona Cattle Company
Highlighted area considered to be of Low Natural Hazard risk



Plan showing Gibbston Valley Station (31037)
Highlighted areas considered to be of Low Natural Hazard Risk



Area considered to be of Low Natural Hazard Risk

Loch Linnie Station – Northern Site (31013)
Highlighted area considered to be of Low Natural Hazard risk



Areas considered to be of Low Natural Hazard risk

Loch Linnie Station – Southern Site (31013)
Highlighted area considered to be of Low Natural Hazard risk