

**QLDC Council**  
**30 June 2022****Report for Agenda Item | Rīpoata moto e Rāraki take [10]****Department: Planning & Development****Title | Taitara Gorge Road natural hazards preferred response package****PURPOSE OF THE REPORT | TE TAKE MŌ TE PŪRONGO**

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- 1 The purpose of this report is to seek endorsement of a preferred package to respond to the elevated levels of risk on the Reavers Lane and Brewery Creek alluvial fans. Endorsement of the preferred package would confirm the focus for further work to better understand the costs and benefits of the preferred package and the path to implementation.

**EXECUTIVE SUMMARY | WHAKARĀPOPOTOTANGA MATUA**

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- 2 A preferred response package has been developed to respond to elevated levels of risk from debris flow and rockfall hazards on the Reavers Lane and Brewery Creek alluvial fans, located close to the Queenstown town centre. This preferred package responds to the feedback received during community consultation, advice from Council's technical experts, as well as national, regional and district level policy direction.
- 3 The preferred package recommends the construction of engineering structures (rockfall fences and mesh) to address rockfall risk. For debris flow risk the package recommends moving people away from areas of significant risk and applying land use rules in areas of tolerable risk. The package also includes possible intensification of areas not subject to elevated risk from rockfall and debris flow.
- 4 Ahead of any future implementation, a programme of further work is recommended to define the specific risk thresholds for significant, tolerable and acceptable levels of risk, and to fully understand the costs and benefits of the preferred package. This further work would address engineering, legal, financial and funding matters, as well as responsibilities for, and timing of, implementation. Council endorsement of the preferred package is sought before embarking on the further work programme, given the resource implications of the further work. Future Council decisions would be sought before the implementation of any preferred package.

**RECOMMENDATION | NGĀ TŪOHUNGA**

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That Council:

1. **Note** the contents of this report and attached consultation report;
2. **Endorse** the preferred package to respond to elevated levels of debris flow and rockfall risk on Reavers Lane and Brewery Creek alluvial fans, which includes a combination of measures:

- a) engineering structures (rockfall fences and mesh),
- b) reduce (removing people and property from areas of significant debris flow risk),
- c) manage (applying land use planning rules to control future development in areas of tolerable debris flow risk), and
- d) intensify (applying land use planning rules to areas of low/acceptable levels of debris flow risk),

so that further work to better understand the costs, benefits and implementation requirements of the package can be progressed.

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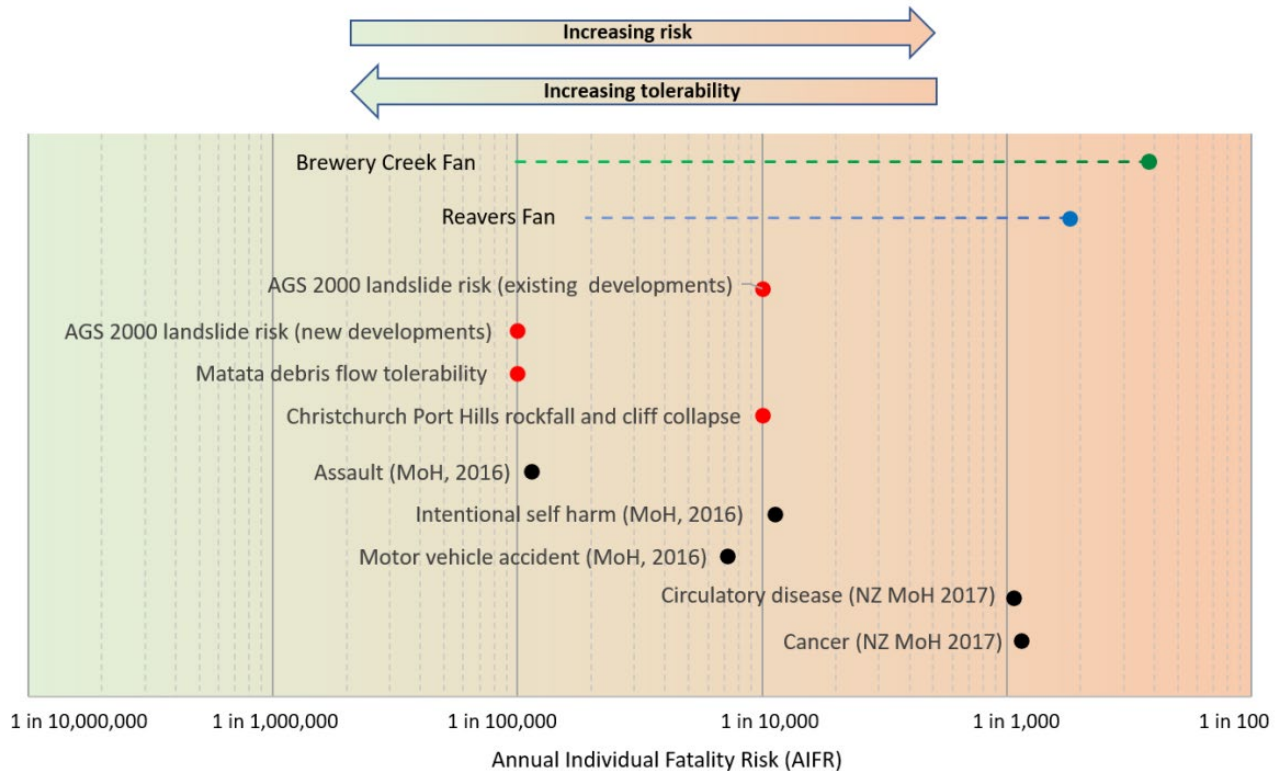
**CONTEXT | HOROPAKI**

- 5 This report seeks Council endorsement for a preferred response package for addressing elevated levels of risk from debris flow and rockfall hazards in two areas near Gorge Road, Queenstown. The two areas are referred to as Reavers Lane and Brewery Creek alluvial fans, and are shown on the map in Attachment A. They are already developed urban areas with a mixture of residential and commercial land uses. Any response package to manage risk levels will have an impact on those who live, work and own property in the areas.
- 6 The Gorge Road Natural Hazards Review has been a District Plan review project, considering how land use controls can manage risk levels. However, high levels of risk to life and property have been identified, and options in addition to District Plan provisions are now being considered to manage the levels of risk.
- 7 The outcome of the risk assessment for the Reavers Lane and Brewery Creek fans was presented to Council in September 2021. In summary, risk from debris flow and rockfall hazards ranges across the two fans. The range of Annual Individual Fatality Risk (**AIFR**) or life risk levels is shown on the risk contour maps in Attachment B (the lower the integer number, the high the risk, i.e.  $10^{-3}$  is higher risk than  $10^{-6}$ ). Both fans have areas of high risk to life that exceed guidance levels, both in the Australian Geomechanics Society Guidelines (**AGS**), the Proposed Otago Regional Policy Statement 2021 (**RPS**), and the Natural Hazards chapter of the Proposed District Plan (**PDP**) (which requires risk to be managed to tolerable levels). Levels of risk to life are high enough to warrant consideration of options to manage the risk levels, including options to reduce risk to tolerable levels.
- 8 Table 1 below shows the different ways that the risk probabilities present across Brewery Creek and Reavers Lane can be understood.

Probability 1 in... (per year)	Is the same as (per year)	Is the same as (per year)	Is the same as (per year)	Is the same as (over lifetime)
1,000	$10^{-3}$	0.001	0.1%	8%
10,000	$10^{-4}$	0.0001	0.01%	0.8%
100,000	$10^{-5}$	0.00001	0.001%	0.08%
1,000,000	$10^{-6}$	0.000001	0.0001%	0.008%

**Table 1:** Ways of expressing risk probabilities.

- 9 Figure 1 below illustrates the range of risk levels that have been identified across Brewery Creek and Reavers Lane, as well as a range of other established life risk guidelines and tolerability limits. The broken green line illustrates the range of risk levels across Brewery Creek while the broken blue line illustrates the range of risk levels across Reavers Lane. Figure 1 shows that risk levels on some parts of Brewery Creek and Reavers Lane exceed tolerability limits that have been set elsewhere.



**Figure 1:** An illustration of the range of risk levels present across Brewery Creek and Reavers Lane, including a comparison of common risks and tolerability guidance.

10 Officers developed four high-level options to respond to the risk, which were also presented to Council in September 2021. These options included:

- **Status quo:** a continuation of the current approach to managing risk. Risk would not be considered unless a resource consent was required, and the activity status or matters of control or discretion enabled hazards to be considered.
- **Engineering:** construction of physical engineering structures to deflect or contain rocks or debris to reduce life risk. Zoning and planning controls would be the same as the status quo option.
- **Manage:** apply land use rules in the District Plan to apply responses specific to the different levels of risk. More restrictive rules would apply in higher risk areas, while less restrictive rules would apply in areas of lower risk.
- **Reduce:** would ensure risk levels are reduced where they are significant or intolerable. This would require managing existing use rights in higher risk areas, possibly by removing people and built form.

11 Technical assessments were undertaken to provide an understanding of the social and economic costs and benefits of implementing the options. These assessments were also presented to Council in September 2021. They found that each option had a unique set of costs and benefits.

- 12 In September 2021, Council approved consultation on the options with the affected community. The purpose of the consultation was to share information about the hazard and risk, let people know about the costs and benefits of the response options, and seek feedback on views and preferences from those affected by the hazard and management options. The consultation took place in November and December 2021. A report on the consultation and its outcomes is included as Attachment C.
- 13 The consultation provided meaningful and useful feedback to inform the development of a preferred response package. Key findings from those consulted included:
- There was considerable concern about the risk, and almost no one considered it to be acceptable.
  - There was general acceptance that QLDC will need to act to manage the risk, but it was considered that the response should be proportional.
  - None of the four options were positively viewed by everyone.
  - Status quo was the least preferred option, and engineering was the most preferred option.
  - The reduce option was regarded as a last resort.
  - The manage response was not favoured as a means of protecting the existing community as it does nothing tangible for those currently living and owning property in the area.
  - There was a degree of uncertainty about what each of the options would look like and what it might cost to implement them.
- 14 This feedback, as well as the technical assessments and overarching policy direction, have been considered in the development of the preferred response package. There is no officer recommendation to take one of the four high-level options forward. Rather, in response to the community consultation, the preferred package officers are recommending is a combination of aspects of the original options.

## ANALYSIS AND ADVICE | TATĀRITANGA ME NGĀ TOHUTOHU

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### Overview of preferred package

- 15 Development of the preferred response package has taken into account a number of factors, including:
- Technical advice on risk, engineering options, loss modelling, and social and economic impact assessments.
  - Feedback received from the community consultation undertaken in November and December 2021.

- Policy direction in the Resource Management Act (**RMA**), RPS, and the PDP.

These factors are further discussed below.

***Policy direction: what does the risk response package need to achieve?***

- 16 It is important to understand what needs to be achieved by the response package. Direction on this comes from the RMA documents that place obligations on Council. In summary, the RMA identifies the management of significant risk from natural hazards as a matter of national importance Council must recognise and provide for. The PDP applies this direction by requiring the avoidance of activities that result in significant risk, and has an overall objective to manage risk to tolerable levels (tolerable being a lower level of risk than significant). The PDP also requires risk in already developed areas to be minimised.
- 17 The Otago Regional Policy Statement is undergoing review. The key objective of the proposed RPS is that risk to people, properties and communities does not exceed a tolerable level. The proposed RPS also provides guidance for what significant risk and tolerable risk mean in relation to AIFR/life risk. For areas with existing development such as that at Brewery Creek and Reavers Lane, the proposed RPS states that risk levels greater than  $1 \times 10^{-4}$  be categorised as significant, risk levels between  $1 \times 10^{-5}$  and  $1 \times 10^{-4}$  be categorised as tolerable, and that risk levels less than  $1 \times 10^{-5}$  be categorised as acceptable. There are areas on both fans that have significant risk, and tolerable risk, according to the proposed RPS. These proposed thresholds will need careful consideration in making a choice about where to apply significant and tolerable risk. Council is required to have regard to these definitions, but is not bound to them at this stage because the proposed RPS has not yet been through a hearing at this time. However, these definitions align with guidance provided by the AGS, which has been used in New Zealand to understand tolerable levels of risk. The maps in Attachment D show the areas of tolerable risk in accordance with the AGS guidance.
- 18 Therefore, the outcome the response package needs to achieve is that risk is tolerable or lower. This means reducing risk in areas where it is significant, and ensuring that where risk is currently tolerable or lower, it does not increase and become significant. Council has flexibility about what measures are applied to achieve these outcomes and in specifying the spatial extent of where the measures are applied. The further work programme set out later in this report, is recommended to be undertaken before advice can be provided on the specific AIFR/life risk thresholds to be applied to significant, tolerable and acceptable risk, the spatial extent of the different elements that make up the preferred package, and before the costs and benefits of the preferred package are fully understood.

***Key considerations in developing the response package***

- 19 Feedback from those who attended the community consultation was that something should be done to manage risk. As well as the protection of life and property for those currently living in the area, action to address the risk was considered important in order to manage the perceived impact on property values of the 'stigma' associated with having a risk annotation attached to the properties.

- 20 Another key finding is that there is no one preferred option to address risk. Each of the four options has its own set of disadvantages or costs, and these costs do not outweigh the benefits in all situations. However, there are advantages or benefits associated with aspects of the options. It is these advantages or benefits that have been considered and taken forward into the preferred package.
- 21 Feedback from those who attended the community consultation has been a key consideration in developing the preferred response package. Officers acknowledge that the consultation process heard mainly from landowners despite a large number of properties being rented for residential or business purposes. However, the quality of the feedback from those who participated was insightful and genuine, and the results are representative of a process which first sought to inform the community of the natural hazard risk present across the areas, the options (original options) available to manage the risk, and their associated costs and benefits.
- 22 A key piece of information from the technical assessments is that, for debris flow hazards, there is no engineering option that can reduce risk to tolerable levels. This means alternatives to engineering intervention need to be considered to manage the risk from debris flow events.
- 23 The alternatives to engineering intervention are the status quo, the manage, and the reduce options. For areas of significant risk from debris flow, the reduce option is preferred over status quo and manage, for the following reasons:
- a. The status quo option only allows risk to be considered when resource consents for larger-scale developments are applied for and is not a pro-active approach to risk management. The status quo is not considered comprehensive enough to address risk to the whole of the existing community.
  - b. The manage option, which applies a planning response using land use rules in the PDP, was not favoured by those who attended the community consultation. This is because, in the highest areas of risk, the original manage option prohibited all further development, holding levels of development as they currently are. This would impose a burden on the existing community by restricting development without any benefit to the existing community. In addition, the details of the option were not well understood. The manage option can stop risk getting worse/increasing by limiting future development, but it cannot reduce the risk or provide protection for the existing buildings and community. Officers consider that this is not a satisfactory option in areas of significant risk, because it would offer no protection to people in areas of significant risk, contrary to the planning direction. In lower areas of risk, the manage option does have the ability to stop risk increasing and exceeding tolerable levels.
  - c. The reduce option is effective at reducing significant risk, as it removes people and properties from harm's way. During the community consultation, there was reluctant acknowledgement that the reduce option has benefits for risk reduction, but it was also clear that it should be a last resort. The reduce option was not

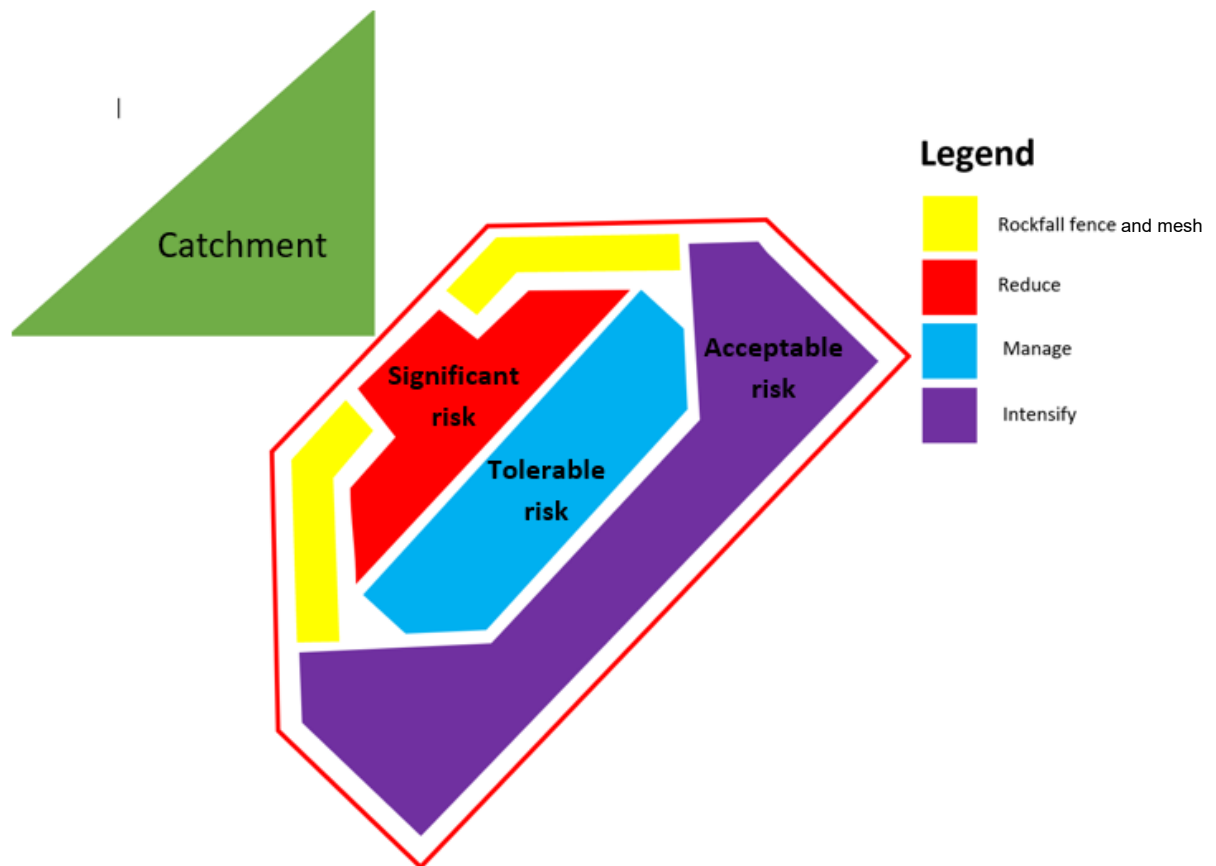
preferred. This option has the biggest social and economic costs, for the community and Council, as well as the biggest benefits.

- 24 While there is no effective engineering option to manage debris flow risk, the technical advice identifies an engineering option that reduces risk from rockfall to tolerable levels. This option is to construct rockfall fences and mesh across the base of the slopes above the two fans. The option of constructing rockfall fences and mesh was supported during the community consultation.
- 25 The preferred package is therefore a combination of the four individual original options that have been considered and assessed to-date. It is a split response, which proposes different measures to manage risk from the two different hazards to tolerable levels.
- 26 Consideration has been given to the role that emergency management arrangements, such as a warning system, could play in the management of the debris flow and rockfall risk. Advice to-date is that a warning system would not be helpful in this situation, as not enough is known about the parameters of a heavy rainfall event that could trigger a debris flow event, and the small size of the catchments mean there would not be a lot of time between generation of a debris flow and its arrival on the fan. Natural warnings, such as unusual noises in the catchment or strong earthquake shaking, need to be relied on to indicate people might need to move out of the risk area. A Community Response Plan for the town centre and surrounding area (including Reavers Lane and Brewery Creek) is due to be developed by Civil Defence and Emergency Management. Development of this plan will allow consideration of community education and emergency response measures that can be put in place to help the community get prepared for, and respond to, a natural hazard event.

### **Specific elements of the Preferred Response package**

- 27 As noted above, the preferred package combines different elements of the four original risk management options. Figure 2 below provides a conceptual illustration of these different elements which include intensify, engineering (rockfall fences and mesh), reduce and manage.
- 28 The proceeding sections of this report describe these different elements in more detail, their effect on risk levels, what we know to date about their costs and benefits, and how they respond to the feedback received from the community consultation.





**Figure 2:** A conceptual representation of the preferred response package.

***Intensify***

29 Refinement of the risk assessment has resulted in a smaller area identified as being subject to elevated levels of risk. This means that a large part of the original study area is no longer considered to be subject to elevated levels of risk from debris flow and rockfall. As such, there is no reason to delay the review of the zoning of these areas due to natural hazard issues.

30 Review of the zoning of these areas can proceed, in order to bring the land into the PDP. If supported by appropriate assessments, a possible result is the intensification of these areas, either through the National Policy Statement on Urban Development (**NPS-UD**) process or up-zoning through the usual district plan review process.

***Rockfall fences and rockfall mesh***

31 The rockfall fence and mesh structures would be constructed across the upper areas of both Reavers Lane and Brewery Creek where the fans meet the slopes and rock outcrops of the catchments above. Some properties in this area are subject to significant levels of rockfall risk due to their proximity to the catchment slopes and rock outcrops.

- 32 This response comprises one part of the original 'engineering' option previously presented to Councillors, and recently discussed with the Brewery Creek and Reavers Lane communities.
- 33 Beca was commissioned to develop conceptual level engineering responses to manage rockfall risk. Their assessment has shown that rockfall fences and rockfall mesh are capable of reducing risk from rockfall hazard to tolerable levels. Rockfall fences achieve this risk reduction by retaining 95% of all rocks anticipated to be released during modelled rockfall events. The rockfall mesh structures achieve risk reduction by controlling the release of rocks from cliff outcrops located immediately behind properties.
- 34 At Brewery Creek, Beca recommends the construction of 240 metres of rockfall fences with a height of 3 metres, as well as 205 metres of rockfall mesh<sup>1</sup>. At Reavers Lane, Beca recommends the construction of 1400 metres of rockfall fences with heights varying between 3 metres and 4 metres<sup>2</sup>. Plans showing the recommended locations of the conceptual fences and mesh are included in Appendix C – Rockfall of Beca's Engineering Options report.
- 35 Beca's engineering options report provided conceptual level cost estimates for construction of the recommended rockfall fence and mesh structures<sup>3</sup>. These range from \$690,000 – \$1.61 million at Brewery Creek to \$550,000 - \$1.29 Million at Reavers Lane. These estimates exclude ongoing maintenance and operational costs.
- 36 As noted above, Beca's engineering options report provided a high-level conceptual assessment of the types of structures that could reduce rockfall risk. While the effectiveness of the structures has been modelled and is suitably robust for the purpose of developing the preferred response package, further detailed design and costings of the recommended structures will need to take place as part of the next steps of finalising a response package.
- 37 This part of the preferred response package would also involve developing companion land use planning methods to a) protect the ongoing function of the rockfall fences and mesh and, b) enable further land use and development to take place within those properties that have been protected from rockfall risk. These rules would therefore enable further development of protected properties. Properties that are also subject to elevated levels of debris flow risk would be treated differently by the preferred response package as described below.
- 38 The findings of Council's consultation illustrates a clear preference for an engineering option, in particular for Beca's recommended rockfall interventions. It was considered most positively by those who attended the community consultation in terms of risk management outcomes and the impacts of its implementation. They expressed a view that QLDC should further explore the option to help clarify its costs and how it would be paid for.

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<sup>1</sup> Table 2, Beca Engineering Options report, 2021

<sup>2</sup> Table 4, Beca Engineering Options report, 2021

<sup>3</sup> Table 14, Beca Engineering Options report, 2021

39 Overall, based on the information produced to date, it is considered that the benefits of the rockfall fences and rockfall mesh outweigh their associated costs. Beca have illustrated that they can reliably reduce rockfall risk to tolerable levels, the community consultation illustrated a preference for this response, and they would provide certainty for ongoing land use development. Some negotiation with landowners would be required to construct and maintain the structures, but it is considered that the option would be relatively straightforward to implement. While further detailed technical design, costing and financing methodology would need to be developed, officers consider rockfall fences and mesh to be an efficient and effective method to manage rockfall risk.

### ***Manage***

- 40 The 'manage' approach is recommended across those areas that are identified as having elevated levels of risk from debris flow hazard. This elevated risk area contains different bands of risk. The preferred package recommends applying a manage approach across those bands of risk that are above the upper limit of what is considered 'acceptable risk' (i.e. risk which does not require intervention), but below the lower limit of what is considered 'significant risk' (i.e. levels of risk which need to be reduced). This 'middle ground' constitutes what is considered 'tolerable risk'. Tolerable risk is a level of risk that communities are willing to live with, considering the costs of hazard events and the benefits of continuing to live in the location. It does however require some level of intervention to ensure risk levels do not exceed tolerable overtime, and thereby becoming significant.
- 41 The primary purpose of the manage approach is to ensure risk from debris flow hazard does not exceed tolerable levels. Planning rules manage those specific elements of land use which contribute to increasing levels of risk. These elements include site coverage, building height, subdivision, density, and the vulnerability characteristics of activities (i.e. who and how many people the activity is intended to accommodate). The manage approach places specific limits on these land use elements to manage changes in risk overtime.
- 42 Because the manage approach enables properties to continue to be used and developed overtime, it would provide for further development in areas subject to elevated debris flow risk. However, it would not allow for unfettered levels of intensification. Ultimately, these limits will put a cap on further development when risk reaches the upper limit of tolerability.
- 43 The manage approach is one part of the original manage option. This original manage approach enabled the occupation of sites within the highest risk areas but use planning rules to prohibit any further development, and limit further development elsewhere to prevent increases in risk (as recommended in the preferred response package).
- 44 Having considered the original manage approach, those who took part in the community consultation sessions expressed a number of concerns with its outcome and effects. A diversity of views were provided, however consultation participants expressed an overall negative view of how the original manage option would address risk to those who already own property, live and work in the area as they felt it didn't actively or physically mitigate

the existing risk they faced. Further, participants expressed concerns with the potential financial impacts of the option, its restrictions on future development, and its overall level of uncertainty. In response to this feedback, and in recognition of the policy direction to reduce significant risk, the preferred response package does not include the most restrictive parts of the original manage approach that also left people living and working in areas subject to significant debris flow risk.

- 45 Overall, however, based on the information produced to date, it is considered that the benefits of the more targeted manage approach outweigh its associated costs. It effectively addresses risk to people and property by preventing debris flow risk exceeding tolerable levels and provides for existing households and businesses in this area to remain in place. The approach would also be straightforward to implement through the established RMA plan change process. While people would be able to continue developing their properties ongoing limits would be placed on the nature and scale of development. This restricted development potential may impact the future social and economic benefit associated with these properties and it is assumed that no other compensation is likely to accompany this part of the preferred response package.

### ***Reduce***

- 46 The 'reduce' approach is recommended across those areas that have significant debris flow risk. These areas are subject to some of the highest levels of risk that have been identified.
- 47 This approach reduces existing levels of risk by moving people and property away from harm's way. There are many different ways that a reduce approach could be applied, however, the end result of any reduce approach will be substantial changes to the way the land is used.
- 48 The reduce aspect of the preferred package comes with a significant financial burden to Council, and a significant financial and social burden to affected landowners and occupiers. These impacts of the reduce approach suggest that further work is required on funding options, including who bears the cost, as well as the need for compensation for affected landowners and occupiers. To-date, officers have assumed that compensation will be part of the reduce aspect of the preferred package, but this assumption will be tested in the further work stream on compensation.
- 49 While the policy direction sets out that significant risk should be reduced, there are no national or legislated standards which define significant risk. As such, Council has options about where to apply a reduce approach (i.e. at what level of life risk). A significant risk threshold could be applied at any of the elevated life risk levels identified by Beca (i.e. at  $1 \times 10^{-3}$ ,  $1 \times 10^{-4}$ , or  $1 \times 10^{-5}$  AIFR levels). Alternatively, Council may decide that significant risk is not present (although this is not recommended). The lower the selected level of significant risk, the greater the number of people and property that would be included within a reduce approach.
- 50 Any choice about where to apply significant risk has important implications about the location and extent of a manage approach. This is because it would also set the upper limit of tolerable risk, further, the manage approach would enable people to continue

living and working within areas that are subject to elevated levels of debris flow risk. Therefore, in choosing a threshold for significant risk, the Council would also ask people to continue to live with a specific level of risk and the restrictions associated with the manage approach.

- 51 Although there is no definition of significant risk, the Proposed RPS is recommending specific thresholds for different levels of risk. In the case of areas with existing development, the proposed RPS states that risk levels greater than  $1 \times 10^{-4}$  be categorised as significant and that risk levels between  $1 \times 10^{-5}$  and  $1 \times 10^{-4}$  be categorised as tolerable. Although Council has flexibility to choose the line of significant risk, two of the key guidance documents use the same level of risk for defining significant risk, being the proposed RPS and the AGS guidelines. Although not determinative, these documents provide a material guidance for selecting risk thresholds.
- 52 Conceptual assessments of the potential capital value that may need to be captured by a property purchase package range between \$20.5 million and \$91.5 million (based on QLDCs 2017 rating data). The funding required to acquire land to implement a reduce approach depends entirely on the risk level selected to mark the boundary between significant and tolerable risk. Further work on the identification of this significant risk threshold must be undertaken to accurately determine the capital value of properties that may need to be compensated.
- 53 Those who attended the community consultation sessions were asked to provide their views on the original reduce approach. A range of views were expressed, ranging from very opposed to pragmatic interest about how it could work. Participants expressed a reluctant acceptance that a reduce approach would have benefits for those areas subject to the highest levels of risk taking into account the limitations of an engineering and manage approach. However, concerns were expressed in regard to the financial burden that could be associated with the application of reduce. The potential relief of a compensation package was noted but the lack of similar priced alternative places to live and operate businesses in Queenstown presented uncertainties for participants.
- 54 As noted above, Council has choices about which risk level should apply to significant risk. Each choice has its own set of costs and benefits. Importantly however, any choice will result in risk reduction. This is the primary benefit associated with a reduce approach. It is the only approach capable of reducing risk to life and property across some parts of Brewery Creek and Reavers Lane, and is the only option that is able to address the community consultation findings that something is done about this risk in the areas of significant debris flow risk. However, it is acknowledged that any reduce approach has a range of social and economic costs. Further assessments will need to be undertaken to understand the full range of costs associated with a reduce approach, on who they will fall and how they will be distributed. Officers assume that the preferred package would mitigate these potential costs through the application of a compensation scheme and associated social support infrastructure. Other costs associated with a reduce approach are more difficult to mitigate, including the length of time that will be needed to implement the approach, and level of complication likely to be associated with asking people to leave their homes and businesses.

## Further work programme

55 There are a number of work packages that will need to be progressed before costs and benefits of the preferred package are fully understood, and before the preferred package could be ready for implementation. This further work is outlined below, to give an indication of the work that will be set in train should Council endorse the preferred package.

### *Work to understand costs and benefits*

56 The technical assessments completed to-date include loss modelling, economic assessment, and social assessment, in relation to the four original risk management options considered to-date (status quo, engineering, manage, and reduce). These assessments consider the social and economic costs of the four original options, should they be implemented as individual options. The preferred package combines parts of the original options to create a new, preferred package. This means the original costs and benefits assessments do not apply directly to the preferred package. Updated loss modelling, economic and social assessments will be required to understand the costs and benefits associated with this specific preferred package.

57 As discussed earlier in this report, Council has a choice about the level of risk that is removed by the reduce approach and its spatial extent. In order to give Council a good evidence base for making a decision on the extent of reduce, it is intended that the costs and benefits of each of the options are investigated as part of the further work.

58 Understanding the costs and benefits of the preferred package requires further work on some of the design aspects of the preferred package, such as:

- Engineering design of rockfall fences and mesh, so their location can be confirmed (i.e. public or private land), construction costs can be estimated, as well as costs associated with access and ongoing maintenance.
- What gets compensated for the reduce part of the package, so the cost of possible compensation can be estimated. This will require consideration of residential and commercial situations and possible relocation support.
- Funding options for rockfall fences and the reduce part of the package, so an understanding of who will bear the costs can be gained. For example, targeted rates, general rates, or other sources.
- Future use of land that might be vacated under the reduce part of the package, and what benefits that use might bring to the community.
- The role that management of the two catchments above the alluvial fans can have in managing risk levels, such as the type of vegetation cover, management of the existing forest, management of channels and debris dams, etc.

***Work to understand implementation***

59 There are number of implementation matters that need to be understood further, including:

- The various options for implementing the reduce part of the package, including ways to implement it over time, to spread out the financial cost and lessen the social impact.
- Legal mechanisms for land acquisition for reduce.
- Legal arrangements and liabilities for rockfall fences and mesh that may need to be located on private land.
- How recently consented commercial developments in the high risk areas, which have been able to demonstrate a lowered level of risk, get addressed in determining the spatial extent of reduce.
- Refining the limits on site coverage, height, setbacks, subdivision, density and activity types that would be required to ensure development did not exceed tolerable levels for the manage part of the package.
- Responsibilities for implementation and cost sharing, between QLDC, Otago Regional Council, and/or central government for rockfall fences and mesh, as well as the reduce aspect of the package.
- The coordinated timing of implementing the package as a whole, including staging implications.

***Timing of further work***

60 If the preferred response package is endorsed, detailed planning and scheduling of the further work programme will need to take place following the 30 June Full Council meeting. Scheduling will be dependent on Council capability and capacity. At this stage it is estimated that it may take 18 – 24 months to complete these further investigations.

***Community engagement***

61 Consideration will be given to undertaking further engagement with the affected community, to seek feedback on the preferred package. Consultation to-date has sought feedback on the levels of risk and the four separate original options. The next step would be to seek feedback on the preferred package as a whole, including implementation issues. Officers are conscious of 'consultation fatigue', and would only recommend further engagement when there is a specific purpose and benefit to that engagement. Officers also acknowledge the significance of the preferred package for those living and working in the area, which justifies engaging with the community.

**Further work on possible intensification**

- 62 Work is already underway on how Council might respond to the requirements of the NPS-UD on intensification of urban areas. This work may consider those areas identified outside of the elevated levels of risk from debris flow and rockfall hazard. A report of this work is due to Council in September 2022.
- 63 If these areas do not meet the criteria for intensification under the NPS-UD work, a separate plan change process to bring the areas into the PDP will be undertaken.

**Further subsurface investigations**

- 64 In December 2021, Council received a request from landowners that it undertake further subsurface investigations on Reavers Fan, estimated to cost approximately \$90,000. A proposal for this work was prepared by Bell Geoconsulting Limited (BGL) and was provided to Council by Mr Greig, a landowner and business operator from the area. The further work was requested as a way to fix a perceived gap in the information that has informed the risk assessment prepared by Council's geotechnical risk experts at Beca. The proposal followed two earlier letters from BGL, criticising the Beca risk assessment for Reavers Fan.
- 65 Officers sought advice from Beca on the BGL challenge and request for further subsurface investigations. Beca's advice to Council is that its risk assessment is sound and an appropriate basis for moving forward with the project. Beca disagrees with the interpretation put forward by BGL that there is no debris flow risk on Reavers Fan. Officers note that the Beca risk assessment was peer reviewed by GNS Science and did include subsurface investigations. Ultimately, Beca advises that, even if material was found through further sub surface investigations, this is unlikely to result in a fundamental change to the risk assessment, to the point where risk no longer warrants intervention (as suggested by BGL)
- 66 On this basis, officers do not consider undertaking further sub-surface investigations is necessary to progress the project as Beca's original work is sound, and they would represent a cost to Council that may not result in any demonstrable benefit in terms of advancing the risk assessment.

**CONSULTATION PROCESS | HĀTEPE MATAPAKI:****> SIGNIFICANCE AND ENGAGEMENT | TE WHAKAMAHI I KĀ WHAKAARO HIRAKA**

- 67 This matter is of medium significance, as determined by reference to the Council's Significance and Engagement Policy. The preceding points consider the matters required to be considered under the Part A of the Significance and Engagement Policy:
- *Importance to the Queenstown Lakes District* – The Gorge Road natural hazards review process relates to two discrete areas located off Gorge Road, near to the Queenstown CBD. The preferred response package recommended in this report does not impact any land located outside of the Brewery Creek and Reavers Lane areas, noting however that the alluvial fan catchments may also be subject to specific management if considered necessary following further assessments. There



are approximately 75 properties located within the areas identified as having a risk level of  $1 \times 10^{-5}$  or above. Given this, while the preferred response package has the potential to impact those who own property, live or work on these properties, it does not directly impact other people or property in the wider Queenstown Lakes District. Decisions concerning funding and financing (i.e., who might pay for the responses and how the costs might be distributed) of the preferred package are not subject to this report and will be informed by further assessments.

- *Community interest* – It has been noted in this report that parts of the preferred package have the potential to result in adverse social and economic impacts to some in the Brewery Creek and Reavers Lane communities. Further work on the preferred response package will provide further information on the nature and scale of these costs. The preferred package seeks to take proactive measures to prevent possible loss of life and property from rockfall and debris flow hazard. It is considered that these various costs and benefits of the preferred package will be of considerable community interest to those specific people who may be impacted by the different elements of the response package.
- *Consistency with existing policy and strategy* – This report has considered the relevant statutory policy direction that must be given effect to by the preferred package. Officers consider that the preferred package would be consistent with relevant policy and strategy documents.
- *The impact on the Council's capability and capacity* – This consideration relates to potential impacts on the objectives set out in the Financial Strategy, Infrastructure Strategy, Ten Year Plan and Annual Plan. As noted elsewhere in this report, some aspects of the preferred package may have considerable costs associated with them (i.e., the reduce and engineering responses). As discussed above, detailed planning and scheduling of the further work programme will be undertaken following the 30 June Full Council meeting and this scheduling will be dependent on Council's capability and capacity.
- *Climate change* – Council's Climate Action Plan recognises that QLDC has a role to play in managing risks and hazards effectively in response to the effects of climate change, and to improve our understanding of hazards and vulnerabilities. The Gorge Road natural hazards plan review project has sought to improve the understanding of the nature and scale of natural hazard risk across the Brewery Creek and Reavers Lane areas, and the technical risk assessment undertaken by Beca has considered the effect that climate change may have on these hazards. Given this, it is considered that the project goals and the intent of the preferred package is not inconsistent with Council's Climate Action Plan.
- *Mana whenua* – Council has engaged with Aukaha and Te Ao Marama Incorporated to share the information that has been prepared to date, describe the preferred response package, and provide opportunities for representatives to share their views and preferences. These views and preferences have been taken into account and officers will continue to engage with Aukaha and Te Ao Marama Incorporated following the 30 June Full Council meeting. It is acknowledged that Maori have a

special connection to the area, in particular, it is noted that part of the alluvial fan catchments are located within wāhi tūpuna area 'Te Taumata o Hakitekura (Ben Lomond)'. The areas directly affected by the preferred response package are not known to contain any wāhi tapu or other sites of significance to Māori.

- 68 Part B of the Significance and Engagement Policy relates to strategic assets and the extent to which a decision may involve the sale or transfer or sale of shareholding of any strategic asset. Adoption of the preferred response package in and of itself will not directly impact any of the significant strategic assets listed in the Significance and Engagement Policy, nor does it specifically request any decisions that would result in the sale or transfer of Council assets
- 69 As noted elsewhere in this report, Council has already undertaken a period of intensive consultation with property owners, residents and workers with an interest in the Brewery Creek and Reavers Lane areas on the identified natural hazard risk, the options available for managing this risk, and the various costs and benefits associated with these different options. The outcomes of this consultation are recorded in the consultation report attached to this agenda item (Attachment C). This consultation was commensurate to the level of impact associated with the implications of the natural hazard risk and the options available to manage this risk. Further community engagement will be considered following any endorsement of the preferred response package.

#### > MĀORI CONSULTATION | IWI RŪNANGA

- 70 Council officers have undertaken a number of specific discussions on the Gorge Road hazards topic with representatives from Aukaha and Te Ao Mārama Incorporated. These discussions sought to:
- describe the natural hazard resource management issue that is present across the Brewery Creek and Reavers Lane areas;
  - share the findings of the technical assessments that have been undertaken to date;
  - share the original options available for managing the identified risk from rockfall and debris flow;
  - describe the outcomes of the community consultation process;
  - describe the preferred response package and its rationale;
  - detail the steps and processes likely to be required to implement any option for managing natural hazard risk from rockfall and debris flow, including further engagement with Aukaha and Te Ao Mārama Incorporated; and
  - provide opportunities for representatives to share their views and preferences on the above matters.
- 71 Representatives consider that the preferred response package sets out an appropriate response to address natural hazard risk based on all of the information Council has collected to date.

- 72 In addition, representatives expressed a strong interest in any approach that may be applied to manage the catchments of each alluvial fan. In particular, representatives emphasised that the catchments are currently covered by expansive areas of wilding conifers and expressed a strong preference that these plant pests be removed to restore the biodiversity of the area and its special connection to Māori. Officers acknowledge this view and intend to liaise with other parts of Council to undertake further work to understand how the Brewery Creek and Reavers Lane alluvial fan catchments may need to be managed over time to compliment the intentions of the preferred response package.
- 73 Similar sentiments were received during the community consultation in regard to the role played by the catchments in managing natural hazard risk. The Ben Lomond Reserve Management Plan is due to be reviewed. Officers have begun discussions with Council's Parks and Reserves team who are reviewing the management plan.
- 74 It is intended that further specific discussions will be undertaken with Iwi representatives on any responses package that is endorsed by Council.

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**RISK AND MITIGATIONS | NGĀ RARU TŪPONO ME NGĀ WHAKAMAURUTANGA**


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- 75 This matter relates to the Community & Wellbeing risk category. It is associated with RISK00056 Ineffective Provision for the Future Planning and Development Needs of the District within the QLDC Risk Register. This risk has been assessed as having a moderate inherent risk rating.
- 76 The endorsement of the preferred response package will support the Council by allowing it to implement additional controls for this risk. The further work programme provides an opportunity to clarify the interaction of the preferred response package with this risk category including by undertaking a detailed design of those approaches included in the package, further assessing the range of costs and benefits associated with the package, and consider how these will be distributed amongst the community.

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**FINANCIAL IMPLICATIONS | NGĀ RITENGA Ā-PŪTEA**


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- 77 Endorsement of the preferred response package in and of itself will not result in any operational or capital expenditure requirements additional to existing approved budgets, the Annual Plan or the Ten Year Plan.
- 78 As noted elsewhere in this report, a range of further assessments will be necessary to finalise the detailed costs and benefits associated with various aspects of the preferred response package if it is endorsed. These additional assessments will assist in determining potential financial implications.

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**COUNCIL EFFECTS AND VIEWS | NGĀ WHAKAAWEAWE ME NGĀ TIROHANGA A TE KAUNIHERA**


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- 79 The following Council policies, strategies and bylaws were considered:

- Vision Beyond 2050. The preferred response package is part of a project that is directly relevant to the ‘disaster-defying resilience’ and ‘thriving people’ principles of the Vision Beyond 2050 strategy.
- The notified and partially operative Otago Regional Policy Statement
- The QLDC Proposed District Plan
- The Queenstown Lakes Spatial Plan

80 The preferred response package is not inconsistent with the principles set out in the named policy/policies.

81 This matter is not separately identified in the Ten Year Plan or Annual Plan, but it is part of the district plan review process, which is covered in these plans.

### **LEGAL CONSIDERATIONS AND STATUTORY RESPONSIBILITIES | KA TURE WHAIWHAKAARO, ME KĀ TAKOHAKA WAETURE**

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82 Section 6 of the RMA sets out matters of national importance that Council must recognise and provide for. Section 6(h) states that the management of significant risks from natural hazards is a matter of national importance. The preferred response package and above-mentioned further work programme will work towards recognising and providing for significant risks from rockfall and debris flow in the Brewery Creek and Reavers Lane areas.

83 Section 31 of the RMA sets out the functions of territorial authorities. These functions include controlling any actual or potential effects of the use, development, or protection of land for the purpose of the avoidance or mitigation of natural hazards. The preferred response package and above-mentioned further work programme is consistent with the Council’s obligations under section 31 of the RMA as it seeks to avoid or mitigate the effects of rockfall and debris flow in the Brewery Creek and Reavers Lane areas.

84 As noted above, it is intended that further work be undertaken in regard to the legal mechanisms for land acquisition that may be required as part of the reduce approach.

### **LOCAL GOVERNMENT ACT 2002 PURPOSE PROVISIONS | TE WHAKATURETURE 2002 O TE KĀWANATAKA Ā-KĀIKA**

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85 Section 10 of the Local Government Act 2002 states the purpose of local government is:

- (a) to enable democratic local decision-making and action by, and on behalf of, communities; and
- (b) to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future.

86 The recommendation in this report is appropriate and within the ambit of Section 10 of the Act. The preferred response package is intended to promote the wellbeing of the Brewery Creek and Reavers Lane communities in the present and into the future by addressing the elevated levels of natural hazard risk to people and property from rockfall and debris flow. The abovementioned programme of further work will assist in clarifying the detailed design of those approaches included in the preferred response package,

further contextualise the range of costs and benefits associated with the package, and consider how these will be distributed amongst the community.

87 The recommendation in and of itself can be implemented through current funding under the Ten Year Plan and Annual Plan, is consistent with the Council's plans and policies, and would not alter significantly the intended level of service provision for any significant activity undertaken by or on behalf of the Council, or transfer the ownership or control of a strategic asset to or from the Council.

**ATTACHMENTS | NGĀ TĀPIRIHANGA**

A	Brewery Creek and Reavers Lane areas under review map
B	Brewery Creek and Reavers Lane Annual Individual Fatality Risk contour maps
C	QLDC: Public engagement on risk for Brewery Creek and Reavers Lane. Summary of consultation process and findings – March 2022
D	Brewery Creek and Reavers Lane Australian Geomechanics Society Guidelines tolerability maps