Before the Expert Panel appointed under the Fast-track Approvals Act 2024

Under	the Fast-track Approvals Act 2024
And	
In the Matter of	an application for approvals by NZSki Limited to upgrade existing infrastructure at the Remarkables Ski Area, including a new passenger transport lift, carparking areas, and expanding the ski field into the adjacent Doolans Basin

Statement of Evidence of **Mark Hamer** on behalf of NZSki Limited in response to Section 53 Comments

Freshwater Ecology

Dated: 3 November 2026

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INTRODUCTION

1. My name is Mark Hamer.

2. I am a freshwater ecologist with over 17 years' experience working in the freshwater ecology and monitoring industry. My freshwater biomonitoring proficiency and experience includes:

   (a) ecological, water and sediment quality assessments;

   (b) eDNA;

   (c) river periphyton, aquatic plant identification and riparian habitat assessment;

   (d) macroinvertebrate collection and analysis; and

   (e) freshwater fish monitoring using electric fishing, netting or spotlighting methods along with associated fish handling, analysis and fish passage assessments.

3. At e3scientific for the past 3 years, my focus has been on ecological value assessments and reviewing and producing ecological impact assessments in the consenting process. I have been an expert witness at consent hearings and am a current member of the New Zealand Freshwater Sciences Society.

4. I am working on the following Fast Track applications:

   (a) FTAA-2505-1059 Southern Link Inland Port Mosgiel for the applicant.

   (b) FTAA 2606-1251 Graymont Oparure Quarry South-Western Pit for Waikato Regional Council.

   (c) This FTAA 2605-1236 Remarkables Ski Field Expansion for the applicant.

5. This statement is given as part of NZSki Limited's (**NZSki**) response to comments on the Remarkables Ski Area Upgrade and Doolans Expansion (**Project**) made under Section 53 of the Fast-track Approvals Act 2024 (**FTA**). This statement responds to specific comments raised by:

   (a) Dr Michael John Crawshaw Greer's Surface Water Quality and Ecology Specialist Response, included as Appendix 2 of the Otago Regional Council s53 response;

(b) Dr Christopher Kavazos's Statement of Evidence, included as Appendix B to the Department of Conservation S51 concessions and approvals document and S53 comments;

(c) Dr Andrew Rossaak Wetland and Tarn Specialist Response, included as Appendix 1 of the Otago Regional Council s53 response;

(d) Mr Shane Raniera Ellison, traffic and infrastructure Statement of Evidence on behalf of Ka Runaka; and

(e) Dr Rowan Dixon, climate change Statement of Evidence on behalf of Ka Runaka.

6. My original findings are provided in full in the:

(a) B-09 Remarkables Ski Area Upgrade and Doolans Expansion – Freshwater Ecological Impact Assessment;

(b) B-10 Remarkables Ski Area Upgrade and Doolans Expansion – Rastus Burn Wastewater Freshwater Ecological Impact Assessment; and

(c) B-14 Remarkables Ski Area Upgrade and Doolans Expansion – Tracks, Crossings, Stormwater Freshwater Ecological and Hydrological Impact Assessment.

7. These reports should be read in conjunction with the below reports as they interrelate: B-08 relates to B-09 and the Doolans Creek Water take. B-11 relates to B-10 and the Rastus Burn Wastewater discharge. B-12 relates to B-14 and covers wetland aspects of Doolans Basin. A-10 and B-16 relates to B14 with regard to stormwater aspects.

(a) A-10 Substantive Application Report Section 3 Project Description Updated 3 September 2026.

(b) B-08 Remarkables Ski Area Upgrade and Doolans Expansion – Doolans Creek Water Take.

(c) B-11 Remarkables Ski Area Upgrade and Doolans Expansion – Wastewater Discharge Impact Assessment.

(d) B-12 Remarkables Ski Area Upgrade and Doolans Expansion – Terrestrial Ecological Impact Assessment.

(e) B-16 Remarkables Ski Area Upgrade and Doolans Expansion – Stormwater Concept Report.

(f) Response to ORC re B.14 Tracks Crossings Stormwater Freshwater Ecological and Hydrological Impact Assessment 27 Aug 26.

(g) Response to ORC and DOC re B.09 Freshwater Ecological Impact Assessment 27 Aug 26.

8. Although this is not an Environment Court proceeding, my confirmation of compliance with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023 is included in B-09 Remarkables Ski Area Upgrade and Doolans Expansion - Freshwater Ecological Impact Assessment submitted as part of the substantive application.

9. I do not respond to any tarn or wetland comments within my evidence. For responses to tarn or wetland comments, please refer to the evidence of Dr Richard Allibone for tarn and Doolans Creek water take ecological matters; Mr Liam Salemink-Waldron, and Ms Rebecca Teele for wetland ecological matters; Mr Simon Bloomberg for water quality matters; Mr Marc Jensen for wastewater design matters; and Ms Alexandra Badenhop for hydrology matters. Ecological compensation is being addressed in the evidence of Dr Gary Bramley.

Alternative Options Review

10. Otago Regional Council (ORC) and Department of Conservation (DOC) reviewers have raised concerns around the assessment of alternatives to utilising Tarn 3 as a reservoir, see comments from Dr Kavazos (paragraph 23) and Dr Rossaak (Section 3.4).

11. Further to Section 2.2.3 of the B-09 report the below information is provided to provide comment to in relation to alternative options investigated to help demonstrate the avoidance options considered prior to arriving on Tarn 3 as the option with the lowest ecological impact for the reservoir location. The two further options considered here are Option 2 a location to the north of the Tarn 3 and Option 3 utilising Lake Alta as the water source and storage facility.

12. Option 2- An alternative reservoir site: An option ~150-200 m North-east of the Tarn 3 site was observed during the freshwater ecological fieldwork on 13 April 2025. This site was located in a natural depression, although no water was observed at the time of the site visit and no watercourses or wetlands were located nearby. From a freshwater ecological perspective, this location had merit for further assessment due to the likely high effect of utilising Tarn 3 as a reservoir location. This is briefly outlined in Section 2.2.3 of B-09 freshwater ecological impact assessment (FEcIA). However, following an assessment by terrestrial ecologists the disturbance footprint associated with this option (referred to as Option 2) intersects three vegetation

communities (*Chionochloa* tussock grassland, Rockfield, and Cushionfield). *Chionochloa* tussock grassland and Cushionfield are both assessed as Very High ecological Value and Rockfield is assessed as High Value. Further to these Very High and High vegetation values, High or Very High terrestrial faunal values such as invertebrates, lizards and avifauna were likely to be affected, leading to a Very High ecological effect. Following these findings; and based on the freshwater ecological assessment results of Tarn 3 (see B-09 and Dr Allibone's evidence for further details regarding Tarn 3), Tarn 3 was considered a lesser ecological impact than the creation of a reservoir at the Option 2 site.

13. Option 3 - Lake Alta Water Take site: A brief description of Lake Alta and its ecological values is provided in Section 2.2.2 of the B-10 Rastus Burn Wastewater report. In this report, Lake Alta has been reported to have a "very poor" trophic lake index[1] (based on modelled data), fish are known to be absent from the lake, chironomid larvae dominate the littoral macroinvertebrate community present. Macrophytes are absent while the invasive algal diatom Didymo is present within Lake Alta. The ecological value of Lake Alta is assigned as High overall with associated rational for each EIANZ matter provided in Table 1 below.

Table 1: Assessment of the Lake Alta habitat using the ecological criteria in the EIANZ Guidelines.

Matter	Criteria	Score
Representative-ness	Natural alpine lake, largely unmodified, naturally fishless. Typical alpine lake with low density and diversity macroinvertebrate community. Is the second largest tarn in the Hector Mountains/Remarkables network of tarns and the largest within the project area. Clear water and boulder/cobble substrate. A slight change from historical baseline.	High
Rarity / distinctiveness	No threatened invertebrates or fish are known to be present within Lake Alta.	Moderate
Diversity and pattern	A low level of natural diversity has been found in the Lake Alta zooplankton and littoral macroinvertebrate community[2]. Low diversity is expected in diversity metrics for unmodified alpine ecosystems such as these with a subset of the alpine community present. Therefore, low diversity is typical of these environments and Moderate value is assigned. The lake outlet does dry some summers.	Moderate
Ecological context	The alpine lake is covered in ice for months each year. In summer it receives long sunshine hours. An existing water take for snow making occurs primarily in winter/spring. The Lakes 380 project	Moderate

[1] Trophic Lake Index is a measure of lake health that utilises water quality, clarity and phytoplankton to provide an index of lake health. In this case Lakes380 have modelled data to provide a likely score. Lakes 380 accessed 12/11/2026. https://lakes380.upshift.co.nz/

[2] G Ryder 2012. NZSki – Lake Alta Effects of Abstraction on Aquatic Ecology. Ryder Consulting Ltd.

	has assigned Lake Alta as "Supertrophic" or in very poor condition based on modelled data[3]. Although other tarns in the area are classed as oligotrophic which appears to be more likely. Lake Alta is the source for the Rastus Burn. The lake sits beside a ski field and has water abstracted in winter for snow making and has many summer tourists that visit and swim in the lake. Didymo has invaded the site within the last few years. Native fish do not use the Rastus Burn to access Lake Alta or spawn here. Largest of 12 tarns within the Rastus Burn, Doolans Creek Right Branch and Wye Creek catchments. Alpine lakes are uncommon ecosystem types but are not considered threatened and are not particularly uncommon locally.	

14. Combining these four matters using the method outlined in Table 6 of the EIANZ Guidelines (Roper-Lindsay, et al., 2018), being Table 1 above, the overall ecological value is considered "**High**" for Lake Alta.

15. Within the Rastus Burn Wastewater Ecological Impact Assessment, the freshwater ecological value assigned to the Rastus Burn was Moderate ecological value. This assessment value was agreed with by Dr Kavazos in his Evidence (see Paragraph 18 and 26 of Dr Kavasos's evidence) and see paragraph 36 below.

16. An increased water take from Lake Alta may extend the period of which sections of the Lake Alta outlet is dry and when the macroinvertebrate community has to move downstream or into the hyporheic zone to survive, before being recolonised during the spring snow melt when flows will return. The macroinvertebrate community present in the short reach of the Rastus Burn which undergoes natural drying events is likely to be limited already.[4] I recommend that an updated freshwater ecological impact assessment would be required if Option 3 utilising Lake Alta was to be pursued further as the effects of altered hydrology on the Rastus Burn ecology and wastewater dilution would need to be reconsidered.[5]

17. Option 4 – Culvert/ford/bridge options: ORC Summary response (Paragraph 60) and Dr Rossaak in Section 3.3 of his review has raised concerns about the track alignment and the associated crossings. Please see the evidence of Ms Badenhop (paragraphs 31-33) and Mr Salemink-Waldren (paragraph 49) that covers these aspects.

[3] Lakes 380 accessed 12/11/2026. https://lakes380.upshift.co.nz/
[4] G Ryder 2012. NZSki – Lake Alta Effects of Abstraction on Aquatic Ecology. Ryder Consulting Ltd.

SPECIFIC RESPONSE TO COMMENTS

The Specialist Response of Dr Michael Greer on behalf of the Otago Regional Council

18. Overall, Dr Greer and I are in agreement regarding the ecological values assigned to the Doolans Creek tributaries and the Rastus Burn. We also agree with regard to the likely magnitude and overall level of effect of the proposed activities on these streams and freshwater ecosystems. Further clarifications on some matters raised by Dr Greer are provided in the following paragraphs.

The Rastus Burn

19. The proposed wastewater nutrient load and water quality parameters are addressed in the evidence of Mr Bloomberg and Mr Jensen. Also discussed in the evidence of Mr Bloomberg are the proposed instream trigger concentrations for ammonia (incorporating temperature and pH attributes) based on the ANZG (2026) ammonia toxicity guidelines.

20. The ammonia triggers are based on the 99% species protection (ANZG 2026 - https://www.waterquality.gov.au/sites/default/files/documents/ammonia-fresh-dgvs-technical-brief.pdf) guidelines, which are nationally approved and relied on standards, and ensures instream concentrations below this level will not result in ammonia toxicity for 99% of freshwater taxa. These triggers are in place year round but vary with temperature and pH (see the evidence of Mr Bloomberg) and aim to protect the ecology of the Rastus Burn throughout the various periods of skifield use. Consent condition WW.8G is provided to ensure the instream ammonia levels within the Rastus Burn remain below the ANZG 99% species protection level.

21. The low instream periphyton cover and healthy macroinvertebrate community currently present is used to validate the use of the conservative clean water benthic fauna and benthic biodiversity guideline value (Biggs, 2000; B-10 Section 4.3 & 6.2.1). This guideline value of 50 mg/m^2 of Chlorophyll *a* is justified as appropriate to maintain the instream values currently present within B-10 Section 4.3 & 6.2.1.

22. The dissolved inorganic nitrogen (DIN) trigger level of 150 mg/m^3 and dissolved reactive phosphorus (DRP) trigger of 6 mg/m^3 are proposed to maintain Rastus Burn periphyton levels at the level considered to maintain benthic biodiversity (B-10 Section 4.3, 6.2.1 & 7). Nutrient levels below these levels are predicted to maintain low periphyton cover. Consent conditions provide for periphyton monitoring and the Chlorophyll *a* trigger of 50 mg/m^2. As described in paragraph 13 the proposed consent triggers are set at levels designed to maintain the existing ecological values (i.e. low periphyton cover). These triggers are included within proposed conditions WW.8B, WW.8C and WW.8D. Monitoring requirements are addressed by conditions WW.18A and WW.18B. Further information regarding the maintenance of nutrient loads is provided within evidence of Mr Bloomberg and Mr Jensen. The macroinvertebrate community has been assessed and described as indicative of good to excellent conditions and indicative of a healthy alpine stream (B-10 Section 4.4). This assessment uses the nationally used Macroinvertebrate Community Index (MCI), Quantitative Macroinvertebrate Community Index (QMCI) and percent Ephemeroptera, Plecoptera, Trichoptera (%EPT) macroinvertebrate metrics[6]. It is proposed to maintain the ecological health of the Rastus Burn at this good to excellent level with the use of long-term monitoring and sampling in response to trigger breaches. These requirements are outlined in consent conditions WW.18 and WW.8

23. In Section 3.4.2, Dr Greer states "*I do consider that e3S 2026c (B-10) provides a sufficiently strong evidence base to support the conclusion that the current wastewater discharge is not resulting in significant adverse effects*". Therefore, I consider it more likely than not that the above measures (DIN, DRP, Chl *a* triggers and ammonia limits) and associated consent conditions will enable the maintenance of a macroinvertebrate community in good to excellent ecological health into the future.

Doolans Creek Tributaries

24. Based on Dr Greer's response there appears to be no outstanding areas of disagreement regarding the freshwater ecological aspects of the tracks, stream crossings and stormwater activities within the Doolans Creek tributaries.

25. In Section 3.6.2.2, Dr Greer states "I do not consider these activities likely to result in significant adverse effects on aquatic life". And, as such, is in agreeance with the B-14 report.

[6] Stark and Maxted (2007) and Clapcott *et al* (2017).

Proposed consent conditions

26. Section 3.7.2.2 (WAT.28) of Dr Greer's evidence suggests an ecologist should not assess the crossing implementation as proposed in condition WAT.28. I agree it is reasonable for engineer to review structural integrity and as built designs, but I consider it more appropriate that a wetland ecologist or hydrologist reviews the structure with regard to hydrological connectivity to wetlands to ensure connection is maintained. Therefore, I do not consider this condition requires alteration.

27. Section 3.7.2.3 (WAT.33) of Dr Greer's review suggests a narrative limit would be more effective than the currently proposed condition with regard to deposited fine sediment. A narrative limit is more subjective than the proposed 10% threshold which proposes to use the documented SAM-2 method (Clapcott *et al.* 2011) and may create interpretation variance. The quantitative SAM-2 method is standardised and used across the country where accurate sediment monitoring is required. Therefore, I recommend that the 10% threshold is utilised for the proposed consent condition WAT.33.

28. Section 3.7.2.4 (WAT.34) of Dr Greer's review recommends that instream sediment and rain event water quality sampling should occur 5 yearly and that macroinvertebrate sampling is not required. Dr Greer's reasoning, I assume, is linked to roofing deteriorating and leaching a greater proportion of metals (copper and zinc) over time. The proposed condition (WAT.34) is of short duration to identify the initial (first flush) levels. If elevated metal levels were preset this would identify the initial first flush levels early and enable management actions to be undertaken to further minimise the risk. However, long-term monitoring may be warranted rather than the more intensive short-term monitoring proposed in the B-14 assessment. While still low risk, I consider 5 yearly monitoring is suitable to confirm metals do not increase over time. Currently the proposed condition WAT.34 requires monitoring for the first two years in relation to the spring snowmelt and two first flushes along with an assessment of macroinvertebrates to identify if the ecology is affected if elevated levels are present. I consider it reasonable to reduce the initial sampling from two years to one year and then follow this with regular monitoring every 5 years for the life of the consent. I recommend macroinvertebrate surveys should be retained within the monitoring condition as a method to identify adverse ecological effects that a point in time water sample may not identify.

29. With regard to Section 3.7.3.3 (WW.18) of Dr Greer's review, QMCI is already included in the proposed condition WW.18. Consent conditions WW.8B, WW.8C, WW.8D, WW.8E, WW.18, WW.19, WW.38B and WW.39C already cover these requirements with a 50 mg/m^2 trigger for periphyton and 10% change for

macroinvertebrate metrics (WW.8E) proposed and does state that 3 Surber samples are to be used (WW.18).

30. Please note however that the WW.8C trigger condition has been altered to better reflect problem algae types. The wording has been changed from "10% periphyton cover" to "10% filamentous algae or matt cover". This is because thin algal films are natural in low nutrient cold water streams and are the predominant food source for grazing macroinvertebrates such as *Deleatidium*. Also, it has been demonstrated that thin algal films contribute minimal Chlorophyll *a* compared to other algae types[7].

31. Table 10 of the B-10 Rastus Burn Wastewater Ecological Impact Assessment recommends a suite of monitoring parameters, triggers and actions. These are represented in the consent conditions WW.8B, WW.8C, WW.8D, WW.8E, WW.8F, WW.18 and WW.38B. They include water quality dissolved inorganic nitrogen (DIN), dissolved reactive phosphorus (DRP), Chlorophyll *a* and macroinvertebrate metric standards, triggers and management actions.

32. Historically the Semi-Quantitative Macroinvertebrate Community Index (SQMCI) has been used for consent monitoring, which is appropriate to remain as a metric to provide consistency and comparability to the historic long-term record. Macroinvertebrate metric use, particularly the MCI and QMCI should be treated with caution within alpine environments (e.g. Section 4.2.3 B-14 report and at paragraph 35 of Dr Kavazos' evidence); however, its use downstream of a wastewater treatment plant is appropriate. I recommend, within Section 7 of the B-10 report, the use of 2 of MCI, QMCI and %EPT as indicators of an ecological change.

33. With regard to Section 3.7.1 (ESC.9 and ESC.10) of Dr Greer's review, I agree that systems should be in place to ensure that aluminium toxicity does not occur within receiving streams and this should be documented in a treatment plan. Also, that suitable TSS and turbidity discharge triggers from sediment ponds should be in place. See updated proposed condition ESC.10.

The Evidence of Dr Christopher Kavazos

34. There are many areas of agreement with Dr Kavazos, these include the ecological value assigned to Doolans Creek and the Rastus Burn. Also, the consent conditions recommended in paragraph 164 and 167 of Dr Kavazos's evidence. Freshwater biosecurity measures are recommended within the ecological impact assessment reports lodged with the substantive application and Dr Kavazos and I are in agreeance that Check, Clean, Dry protocols should be included in the Construction

[7] Kilroy et al. 2013. Estimating periphyton standing crop in streams: a comparison of chlorophyll a sampling and visual assessments. New Zealand Journal of Marine and Freshwater Research. DOI:10.1080/00288330.2013.772526.

Environmental Management Plan and followed. This has been added to the updated consent condition CON.8.

Rastus Burn

35. There is alignment with the ecological value assigned to the Rastus Burn. While the approach Dr Kavazos and I have taken differs slightly, our overall findings of the overall ecological value ultimately assigned is analogous, with "Moderate" ecological value assigned, even though I have assigned a High value regarding Representativeness matter, where Dr Kavazos has assigned Moderate.

36. Table 2: Ecological value assessment for the Rastus Burn compared to that of Dr Kavazos' (DOC) s53 expert statement.

	Rastus Burn - e3Scientific	**Rastus Burn- DOC**
Representativeness	High	Moderate
Rarity and Distinctiveness	Moderate	Moderate
Diversity and Pattern	Low	Low
Ecological context	Moderate	Moderate
Overall	**Moderate**	**Moderate**

37. The B-10 Rastus Burn Wastewater Ecological Impact Assessment assigned a low level of effect from the increased volume of wastewater. This assessment is based on the nutrient loads discharged remaining the same as current levels. As discussed in the B-10 report and paragraphs 19 to 22 above, the existing ecology of the Rastus Burn exhibits good to excellent freshwater ecological characteristics which are proposed to be maintained via enhanced wastewater treatment (see evidence of Mr Jensen) and water quality triggers that are aligned with nationally recognised protective limits for freshwater ecology (see evidence of Mr Bloomberg).

38. Rastus Burn wastewater evidence provided by Dr Kavazos (Paragraph 177) does not include the full range of data provided (Table 14, Section 4.5, B-11 and Table 5, Section 4.4, B-10) and does not consider the most recent 2024/25 data. This data shows a return to good/excellent ecological health within the Rastus Burn following a brief decline in ecological health in 2023. This ecological decline coincided with a wastewater leak at this time which, although not confirmed, may be the primary influence of the decline due to the lack of treatment, filtration, ammonia proportions and delayed timing of ecological processing until the ecological monitoring season due to cold temperatures.

39. In addition to this, and as discussed in paragraph 22 Rastus Burn instream nitrogen (DIN) and phosphorus (DRP) concentration triggers with management actions are proposed to maintain periphyton cover at low levels and are aligned with national

guidelines to minimise ecological effects (B-10 Wastewater FEcIA; e3Scientific, 2026). An instream ammonia limit is also proposed (see the evidence of Mr Bloomberg and condition WW.8G) to avoid the potential toxic effects of ammonia within the Rastus Burn. These are proposed to ensure wastewater treatment remains effective and maintains suitably low nutrient concentrations to minimise ecological effects. Review conditions WW.37A, WW.37B, WW.38A, WW.38B and WW.38C are also proposed to assist in ensuring this.

Doolans Tributary Streams – Ecological Value Assignments

40. The ecological impact assessment (**FEcIA**) reports B-9 and B-14 assigned a High Ecological Value to the Doolans tributaries while Dr Kavazos has assigned Very High Ecological Value. Very High ecological value is described as being "nationally important", whilst High ecological value is described as being "regionally important" in the Environmental Institute of Australia and New Zealand (EIANZ) guidelines (EIANZ, 2018).

41. The main reasons provided by Dr Kavazos (paragraph 18) for his Very High Ecological Value is disagreement in the weighting given to the intactness and connectivity of the Doolans Basin tributaries, and he considers higher Representativeness, Diversity and Pattern, and Ecological Context values should be attributed to the tributaries leading to an overall Very High ecological value.

42. The ecological values of Dr Kavazos evidence suggested attributing greater weight to the intactness and connectedness of the streams across the basin (paragraph 73). Intactness is an Ecological Context matter and Dr Kavazos appears to have applied this to the Diversity and Pattern matter (paragraph 73).

43. The Representativeness value was assigned as High within the ecological impact assessment, whilst Dr Kavazos considers this to be Very High (paragraph 41). His rationale for the Very High value assignment is primarily that the Doolans Basin is largely unaffected by human activity. I agree to an extent with this statement; however, I have also considered that the Doolans Basin does currently support some human activity such as winter skiing and summer/autumn hunting of introduced deer and chamois that graze the basin (B-7 Greenaway, 2026). As such, the representativeness value is reduced from 1840 levels,[8] which is the basis for the assignment of High within the ecological impact assessment rather than Very High. A Very High value would indicate an environment with no anthropogenic activities and no introduced species, which is not the case for the Doolans Basin.

[8] considered analogous to baseline conditions in the EIANZ (2018) guidelines

44. For the Diversity and Pattern matter, Moderate value is assigned within the FEcIA (Table 13, Section 4.3, B14), whilst Dr Kavazos considers this to be Very High value. The tributary streams are fishless and all had low macroinvertebrate diversity and densities. Lower diversity and reduced ecological processing in alpine streams are well known attributes of this type of environment and is therefore factored in to assigning Moderate to the Diversity and Pattern matter, as opposed to Low which would be typical for lowland streams with no fish and low diversity macroinvertebrate communities.

45. Dr Kavazos appears to have assigned greater weight to other aspects such as connectivity and intactness. Table 7 of the EIANZ Guidelines (2018) recommends the attributes to be considered when assigning ecological value to the Diversity and Pattern matter to be; level of natural diversity, diversity metrics, complexity of community and biogeographical considerations – pattern, complexity, size and shape. In my assignment of Moderate Diversity and Pattern, I have considered all of the above attributes in equal measure; whilst it appears that Dr Kavazos has placed greater weight on pattern. If these attributes are looked at in an equal manner, I maintain that the Moderate assignment for Diversity and Pattern is clearly rationalised and remains a robust assessment. Rationale for each attribute is provided as follows:

    (a) Level of natural diversity = low taxa richness due to a limited pool of aquatic taxa able to survive and effectively disperse to the location;

    (b) Diversity metrics = low Shannon diversity and evenness metrics due to characteristic of alpine environments (B-14 Section 4.2.3);

    (c) Complexity of community = depauperate instream community with relatively small foodweb that lacks fish; and

    (d) Biogeographical considerations (pattern, complexity, size and shape) = moderate overall, due to the distance inland, high altitude and downstream barriers that contribute to an absence of fish. Low productivity within the streams reduces macroinvertebrate densities and community complexity, although the 8.2 km stream length within the basin is extensive and provides a variety of habitat types including boulder, cobble, gravel and bedrock habitats within permanent and intermittent streams.

46. For the Ecological Context matter, Moderate value is assigned within the B-14 FEcIA. Dr Kavazos considers that this should be Very High value and his rationale for this increase relates to considering the tributary streams, wetlands and tarns of the basin as one system (paragraph 66). The wetlands have been assessed as Very High value within the terrestrial assessment (B-12) and evidence of Mr Salemink-

Waldren, and the tarns were assessed to have High to Very High Ecological value in the B-9 assessment (see the evidence of Dr Allibone). Ecological context is used to describe a site's role in ecosystem functioning through its relationship with its surroundings, buffering from anthropogenic activities and sensitivity to change, and an ecological impact assessment must assess the importance of a place in supporting a species throughout the season, year or lifetime (EIANZ, 2018). The seasonal temperature (and snow cover) extremes were primarily used to assign a Moderate value for this matter due to it limiting the range of taxa able to occupy the tributary streams. However, I partly agree with Dr Kavazos' points and consider increasing this matter from Moderate to High value for Ecological Context would be appropriate. This increase is due to a lack of development, level of intactness and resilience to change (See Table 7; EIANZ, 2018). As mentioned above, Dr Kavazos' assessment of Very High appears to have included wetland and tarn habitats, instead of stream habitats alone which is what is considered within the FEcIA. Therefore, only considering the Doolans Basin tributaries, the ecological value for Ecological Context is considered to be increased to a High value, but not represent Very High value.

47. Despite disagreements on method and scale used in the values and impact assessment, the overall ecological value assigned to the tributary streams is similar with High value applied within the B-14 ecological assessment and Very High reached by Dr Kavazos. As discussed earlier, Table 6 of the EIANZ (2018) guidelines provides a description of Very High ecological values as "likely to be nationally important and recognised as such", and High ecological values as "Likely to be regionally important and recognised as such". I consider the tributary streams within the Doolan Basin to be regionally important rather than nationally important as no taxa, or habitat with a national threat classification have been identified within the streams.

48. Table 3 (paragraph 49 below) summarises the differences in ecological value considered between myself and Dr Kavazos, with the rationale for my interpretation provided in B-14 ecological assessment and paragraphs above. These criteria are not fully prescriptive and are, to an extent, open to interpretation. However, based on my fieldwork and knowledge of the site, experience with EIANZ guidelines across a range of freshwater impact assessments and understanding of the wider environmental context of the Doolans Basin, I maintain that in my opinion, the overall Ecological Value of the Doolans Creek tributaries are High. The rationales provided by Dr Kavazos for the increase in ecological value have been thoroughly examined and interrogated, and as outlined in paragraphs 40 to 46 are not considered an accurate application of the EIANZ criteria. Further to this, the Doolans Creek tributaries are conservatively considered regionally important with High ecological

value assigned. It is unclear within Dr Kavazos' evidence the overall reasoning as to how these tributaries would be considered nationally important.

49. Table 3: Updated Ecological value assessment compared to Dr Kavazos s53 expert statement.

	Doolan Basin Tributary Streams - e3Scientific	**Doolan Basin Tributary Streams - DOC**
Representativeness	High	Very High
Rarity and Distinctiveness	Moderate	Moderate
Diversity and Pattern	Moderate	Very High
Ecological context	Moderate --> increased to High	Very High
Overall	**High**	**Very High**

Doolans Tributary Streams - Ecological Impact Assessment

50. With regard to the Doolans Basin tributary stream crossings impact assessment (B-14), I have assessed the level of effect of the crossings on the tributary streams as Low based on a High ecological value and Low magnitude of effect (Section 5; B-14). The low magnitude of effect is assigned due to the small area impacted by the activities (i.e. 3% of Doolan Basin tributary stream length), the absence of fish, low macroinvertebrate abundance and diversity and the approach taken to minimise sediment mobilisation. Dr Kavazos has assigned High level of effect based on the previously discussed Very High ecological value and Moderate magnitude of effect.

51. The zone of influence of the activity is defined in Section 4, B-14 as the Doolans Creek tributaries within Doolans Basin, in particular the permanent and intermittent streams. This equates to 8.2 km of stream network across the basin. Dr Kavazos based his assessment of effects at the scale of the affected tributary reaches rather than against the basin stream network considered the zone of influence at which the values and effects were assessed in the B-14 impact assessment report.

52. The zone of influence is defined in the EIANZ Guidelines (2018) glossary as "the areas/resources that may be affected by the biophysical changes caused by the proposed project and associated activities". As the project has activities occurring across the basin, this is the scale at which I have assessed the values and impacts.

53. I agree with Dr Kavazos' interpretation of the EIANZ Guidelines (2018) in paragraph 75 and EIANZ Explanatory Note (2026) in paragraph 76 and 77, that the impacts are recommended to be assessed at the same scale as the values assessment (See Sections 5.1.3 EIANZ 2018).

54. However, in paragraphs 78 and 79 of Dr Kavazos' evidence, he incorrectly infers that the ecological assessment of tributary streams (B-14) has been undertaken at

different scales within the values assessment and impact assessment. Contrary to paragraphs 78 and 79 of Dr Kavazos's evidence, the scale at which the ecological values and impacts were assessed was consistent. I deemed the zone of influence of the tracking activity on tributary streams to be across the basin from the headwaters to their confluences with Doolans Creek (including intermittent sections) both within the values assessment and impact assessment. Sampling 4 separate tributaries enabled an assessment of the ecological values of the tributaries as an interconnected whole across the basin to enable this to be a valid ecologically appropriate scale for both the values and impact assessment.

55. Dr Kavazos assesses the ecological value matters for the tributary streams at the same scale as the B-14 report:

    (a) Representativeness "within the Doolans Basin" (paragraph 44);

    (b) Rarity and Distinctiveness matter across the "Hector Mountains" (paragraph 55);

    (c) Diversity and Pattern of the "connected mosaic of streams" of the basin (paragraph 61); and

    (d) Ecological Context at a "whole of basin scale" (paragraph 66).

56. Dr Kavazos then states the assessment of magnitude of effect is assessed at an inappropriately large scale in paragraph 78 and 79. However, within paragraph 166 of Dr Kavazos' evidence he then appears to alter the scale at which he assesses the magnitude of effect to the reach scale - "Assessed at the scale of the affected tributary reaches rather than against 8.2 km of basin stream network" (paragraph 166). Therefore, in relation to the tributary streams, it is my opinion that Dr Kavazos has not correctly applied the EIANZ Guidelines (2018). He has altered the scale at which he has assessed the ecological values and magnitude of effect.

57. The main reason provided by Dr Kavazos for the disagreement in the level of effect assigned is a discrepancy in the scale used to assess the magnitude of effect (paragraph 19 & 74 – Evidence of Dr Kavazos). However, as outlined in paragraph 50-56 above, I consider the scale at which the tributary stream ecological values and impacts are assessed at are appropriate and meet the intent of the EIANZ guidelines (2018) and the explanatory note for the Interpretation of scale (EIANZ, 2026).

58. The removal of 55 m of current tarn inflow intermittent stream should be treated as stream loss. Previously it was considered that the proposed man-made schist-lined (armoured) swale that diverted inflow around the reservoir could be recompense for the intermittent inflow removal (B-14); however, following comments made by Dr

Kavazos regarding this, it is considered to precautionary to assess this as a loss. However, Dr Kavazos' evidence incorrectly outlines that the armoured swale will be lined with a geotextile base which creates a barrier to any remaining macroinvertebrate larvae when the armoured channel dries and therefore restricts the swale's function as an intermittent stream. Mr Chinn has confirmed that there is no need for an impervious geotextile liner and that the lining of this swale is not proposed. Therefore, the armoured swale may largely meet the ecological functioning of an intermittent stream (whereby invertebrate larvae could remain in the hyporheic zone during dry periods). I am unsure where Dr Kavazos and Dr Rossaak (see paragraph 68-74 below) have observed the geotextile use for the armoured swales. It is noted that Figure 3-21 of the Substantial Application and Figure 31 of B-16 Stormwater Concept Report Stantec 2025 shows the inlet and terminal discharge point of the armoured swales to have a permeable geotextile below the rock scour protection, therefore potentially this has been misconstrued as occurring throughout the armoured swale. To provide clarity on this aspect, I would support the addition of a consent condition to ensure the armoured swale is not lined with geotextile to allow the ecological functioning of this swale to be as similar to the pre-existing intermittent stream habitat, as possible.

59. Colonisation of the armoured swale is likely to be delayed following the works, and its ecological functioning may be reduced relative to a natural intermittent stream. Consequently, as mentioned above, conservatively the armoured swale should not be considered an increase in intermittent stream extent, and the earthworks associated with the reservoir inflow diversion should therefore be treated as a loss of 55 m of the 8.2 km of tributary stream channel within Doolans Basin, of which 1,700 m comprises intermittent stream channel. This is consistent with previous responses provided[9]. Including this intermittent stream loss therefore equates to a loss of 0.67% of total Doolans Basin Tributary Stream length and a 3% loss of intermittent stream channel within the Doolans Basin. This 0.67% of total stream length and 3% of intermittent tributary stream length loss is considered to remain consistent with a low level of effect.

60. With regard to paragraph 153 of Dr Kavazos's evidence where he recommends a bridge rather than the culvert proposed at culvert location H. I agree that in most circumstances installing a bridge over a stream will have more limited ecological effects on a waterway than installing a culvert within a stream due to avoidance of instream disturbance, fish passage disruption and sediment mobilisation. In this location there is an absence of fish and the Stormwater Concept Report (Stantec

[9] Section 2.2 d.ii..Response to ORC re B.14 Tracks Crossings Stormwater Freshwater Ecological and Hydrological Impact Assessment 27 Aug 26 (PDF, 3 MB)

2026b) determined a culvert was the most suitable option and this was used as the basis for the activity description and the effects assessment that was undertaken on the assumption that the crossing at location H would be Culvert H. The B-14 impact assessment assesses the ecological impact of the culvert H installation as a low provided the proposed management actions are followed.

61. With regard to zinc/copper thresholds included in Section 5.6 of B-14 and paragraphs 158-159 of Dr Kavazos' evidence, I disagree with Dr Kavazos that detection limit is more appropriate. I consider a protection threshold (1 µg/L copper and 2.4 µg/L Zinc) set to protect 99% of species to be sufficiently protective of the stream ecology. This is designed to protect 99% of species. Noting that the typical taxa present in the stream (i.e. *Deleatidium sp.*) have been assessed to have higher thresholds at 206 µg/L for copper and 505 µg/L for zinc (See Section 2, Q17 of Response to ORC re B.14 Tracks Crossings Stormwater Freshwater Ecological and Hydrological Impact Assessment; 27 Aug 26). However, I agree with the suggested conditions proposed in paragraph 164a to 164e (and if sediment is present) of Dr Kavazos' evidence and recommend they be included in the draft conditions of consent to be collected 5 yearly. Condition WAT.34 has been updated to include fine deposited sediment (if present) and 5 yearly for the duration of the consent)

62. With regard to freshwater biosecurity (Section 5.7 B-14), we agree that biosecurity measures should be implemented and followed to reduce the risk of didymo introduction to tributary streams.

63. The intent of water stored in the reservoir is for snow making. Therefore, water from the reservoir will be pumped to snow guns and frozen as it is being spread by snowguns across the basin. Freezing is a method demonstrated to kill didymo (Kilroy *et al*., 2006). As such, the primary vector of spreading water across the basin will destroy didymo. Dr Kavazos raises leaks, reservoir overflow and maintenance as possible vectors to spread didymo to the tributary streams. The piping to be used is socketed ductile iron and the likelihood of leakage is extremely low. While an overflow has been designed to ensure no uncontrolled overflow occurs, the likelihood of overflow from the reservoir is extremely low and not expected to occur, and maintenance related reservoir drawdown will be returned to Doolans Creek via a future pipe network (D. Chinn, Pers. Comm., 20/10/2026).

64. I agree with the intent of the proposed consent conditions outlined in paragraph 167 (Evidence of Dr Kavazos) to ensure management actions to minimise the potential effects of tributary stream crossings, stormwater and water quality are included. Noting I have assigned High ecological value rather than Very High as is stated in 167d of Dr Kavazos' Evidence. Maintaining hydrological connectivity is discussed in the evidence of Ms Badenhop (paragraphs 33-36).

65. Therefore, I agree that to ensure effects are managed properly, key culvert design criteria should be incorporated into consent conditions to ensure hydrological connectivity is maintained, metal monitoring is in place, and stormwater outlets maintain the existing instream visual clarity. As such, condition WAT.19 has been updated to require the construction plans to be submitted to ORC for certification.

66. With regard to paragraphs 143-146. I agree with Dr Kavazos's findings in paragraphs 143-144 of his evidence that a discharge from sediment control devices of up to 150 NTU would be orders of magnitude higher than is naturally present and would not be appropriate. Table 7 of the CEMP also describes "no conspicuous change in colour or visual clarity" as a discharge criteria. I consider that this is the most pertinent discharge criteria in this case. Therefore, the sediment retention features must be designed and implemented to ensure there is no conspicuous change in visual clarity when observed 10 times the stream width downstream of any input[10]. Provided the erosion and sediment control devices are implemented and maintained appropriately to ensure no conspicuous change in visual clarity (10 times the stream width downstream of any input i.e. beyond the mixing zone), I consider the freshwater ecological impacts to be low.

67. With regard to paragraphs 100 and 101 of Dr Kavazos's evidence in relation to concreting, the Response to ORC re B.14 Track Crossings Stormwater Freshwater Ecological and Hydrological Impact Assessment (27 August 2026) outlines in Section 1 (Q1) that the specifications have been updated and no wet concrete use in flowing water is required and Sections 5.1 and 5.9 within the B-14 report reflect this. This confirms that cement will not be used within Doolans Basin and that precast concrete would be used.

The specialist Wetland and Tarn response of Dr Andrew Rossaak on behalf of Otago Regional Council

68. Noting the wetland expert on behalf of Otago Regional Council (ORC), Dr Rossaak, has made some comment in relation to stream loss, I discuss these aspects here.

69. Dr Rossaak provides an unresolved matter relating to Doolans Basin Tributary streams as - "Stream reclamation. Effects management for the loss of 55m intermittent stream" and more fully described as - "Inflow diversion removes about 55 m of intermittent stream, which B.14 rates as a Low effect. B.14 states that downgradient wetlands will not be affected because the swales discharge to soakage fields. This is asserted without a water balance" (Section 3.2).

[10] Ozanne (2023). Mixing zones and Receiving Water Standards. Otago Regional Council.

70. The evidence of Ms Badenhop discusses the wetland hydrology and water balance aspects of Dr Rossaak's comment above.

71. As discussed in paragraphs 58 and 59 above, contrary to the assertion by Dr Rossaak in Section 3.1 of his review, the project does not intend to line the rock armoured swales with impervious geotextile liner. Only the inlet and terminal discharge points may require geotextile lining.

72. The B-14 tracks and crossings impact assessment assesses the loss of 55 m of intermittent stream as a low level of effect, as it relates to 3% of intermittent tributary stream length within the Doolan Basin and 0.67% of total stream length within the Doolans Basin.

73. Contrary to the statement by Dr Rossaak in Section 3.2 of his specialist comment, the ecological impact of the loss of intermittent stream has been assessed at the same scale as the ecological values for tributary streams of the Doolan Basin within the B-14 report.

74. With regard to the Doolans Basin tributary stream impact assessment (B-14), the level of effect of the loss of 55 m of intermittent tributary stream is assessed as Low based on a High ecological value and Low magnitude of effect (Section 5; B-14). The low magnitude of effect is assigned due to the small area impacted by the activities, the absence of fish, low macroinvertebrate abundance and diversity; however, Dr Rossaak suggests the level of effect assigned should be higher due to assessing the impacts at a smaller scale. This has not been suggested by the freshwater ecologist (Dr Greer) assigned to review the freshwater ecology aspects by ORC, would not be consistent with the ecological values assessment scale used and therefore would not be consistent with the EIANZ guidelines.

75. As discussed in paragraphs 51 to 56 earlier, the zone of influence of the activity is defined in Section 4, B-14 as the Doolans Creek tributaries within Doolans Basin, in particular the permanent and intermittent streams. This equates to 8.2 km of stream network across the basin of which 1.7 km is intermittent stream length.

76. Therefore, the assessment of a low level of effect on the tributary streams of Doolan Basin is correct, in my opinion.

The traffic and infrastructure Statement of evidence of Shane Raniera Ellison on behalf of Kā Rūnaka

77. I acknowledge that the assessments I have undertaken have not applied a cultural lens and that only Kā Rūnaka can do so.

The Climate Change Statement of Evidence of Dr Rowan James Dixon on behalf of Kā Rūnaka

78. In response to paragraph 39 of Dr Dixon's evidence, the proposed nutrient (DIN and DRP) instream trigger levels remain valid under low flow and warmer water conditions as the proposed trigger level for nutrients is adopted to limit periphyton growth to low levels regardless of flow or temperature conditions. The proposed trigger levels were developed at sites with water generally warmer than currently present within the Rastus Burn. Periphyton growth is promoted by nutrients, light and temperature and reduced by disturbance and macroinvertebrate grazing (See B-14; Appendix D Periphyton Risk Assessment). A Chlorophyll *a* trigger is also proposed to ensure instream periphyton levels remain low (at existing levels) to maintain the current ecological structure and function. The proposed Chlorophyll *a* trigger level will be required to be met even at warmer temperatures.

79. The proposed ammonia limit utilises the ANZG (2026) 99% species protection level which does alter with temperature and pH. Freshwater taxa become more sensitive to ammonia as temperature increases. If stream water temperatures increase due to climate change in the future the ammonia toxicity limit will also adjust based on temperature and the freshwater species will continue to be protected.

80. With the condition suite set as proposed, the onus will be on NZSki to ensure the treatment system and discharge quality continue to meet the triggers and limits proposed to protect aquatic life into the future under all potential climatic conditions.



Mark Hamer

3 November 2026

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