6. ASSESSMENT OF ENVIRONMENTAL EFFECTS

6.1 OVERVIEW

In accordance with Schedule 5 (clause 5 (4), clause 6 and clause 7), Schedule 6 (clause 2 (1)(g)) and Schedule 8(2)(1)(J) of the Act, this section provides an assessment of the actual and potential environmental effects associated with the Project.

NZSki has commissioned a number of independent experts to provide specialist reports on the actual and potential effects on the environment. Copies of those reports are included in **Part B** of these application documents, key aspects of which are summarised below.

In accordance with the findings of the specialist reports, the relevant actual and potential environmental effects, as summarised in the following sub-sections of this report, are considered to be:

- Positive effects;
- Cultural effects
- Terrestrial ecology effects;
- Hydrology effects;
- Freshwater ecology and quality effects;
- Landscape and natural character effects;
- Wastewater effects;
- Electricity, Telecommunications and Water
- Natural hazard effects;
- Transportation effects;
- Noise and vibration effects;
- Recreational effects;
- Archaeology and historic heritage effects.

Refer to the full reports for a more detailed assessment.

The Project proposes to implement the effects management and mitigation measures referenced in the sub-sections below by way of the proposed conditions provided in **Part H** of these application documents. A proposed set of conditions has been drafted for all

activities for which the Project is seeking approval under the Act within the jurisdiction of each administering agency.

6.2 POSITIVE EFFECTS

6.2.1 Economic Benefits

An Economic Assessment of the Project, prepared by Benje Patterson of People and Places, is included in **Part B** of this application. The assessment concludes that the proposed expansion, including both construction and ongoing operations, will generate substantial economic benefits at the local, regional, and national levels, particularly through increased employment opportunities and growth in tourism revenue.

6.2.1.1 Construction Economic Benefits

Expansion of the Remarkables Ski Area into the Doolans Basin is a major construction project in the context of both the Queenstown and Otago economies, with significant generated expenditure and full-time employment for Queenstown, Otago and New Zealand over a broad range of industries.

The ski field expansion is expected to support an average of 81 annualised construction jobs. However, due to alpine weather constraints limiting the construction season to November through May, employment is projected to peak at more than 150 jobs during this period.

It is anticipated that the GDP effects of the capital investment of the project would be $61.9 million, with capital investment mostly occurring by 2030, with an average GDP effect of $12.4 million over a five-year period. The overall capital investment of the project is estimated at over $193 million.

6.2.1.2 Operational Economic Benefits

For the purposes of modelling the operational benefits of the Project, high and low growth scenarios have been developed. The high growth scenario reflects a situation where skier numbers at the Remarkables Ski Area rise proportionally to the expansion in ski area capacity, while a lower scenario has also been estimated where the Remarkables Ski Area grows more conservatively because of other local ski area expansion.

Economic modelling of the high growth scenario shows that annual spending by holidaymakers who ski at the Remarkables Ski Area across the visitors' holidays could reach $363 million a year (measured in 2025 pricing) in Queenstown-Lakes and $402 million across the whole of the Otago region within 10 years. This represents a $151 million increase in annual spend within Queenstown Lakes and $167 million across the wider Otago region.

For a more conservative low growth scenario, the equivalent estimates are $101 million and $112 million across the Queenstown Lakes and Otago region, respectively.

From a GDP perspective, the economic bottom-line from this visitor spend would reach a $181 million per annum contribution to GDP in Queenstown-Lakes and $197 million across the Otago region under the high growth scenario. The potential future GDP contribution across Otago under the high growth scenario would be $82 million a year, higher than its current level. Under the low growth scenario, the equivalent future GDP contribution across Otago is estimated at $55 million per annum.

There are no measurable direct economic costs from the Project in terms of it putting off other recreational tourist spending or substituting existing economic uses of the land on which the ski area infrastructure will sit.

6.2.1.3 Long Term Employment Opportunities

The Project is anticipated to create a significant increase in employment opportunities in both the Queenstown Lakes District and the Otago region through an increase in seasonal jobs and an increase in wider employment growth through the generation of additional tourism in the district and region.

It is anticipated the Project will result in an increase from 2,592 seasonal job currently, to between 3,834 and 4,443 seasonal jobs within five years, with employment growth in the Otago region from an increase to seasonal filled jobs due to the Project being 1,232-1,851 jobs.

6.2.2 Recreational Benefits

The Project will allow for the creation of additional ski infrastructure required to create a multi-valley ski area that will attract local and international visitors and cater to both the existing and future visitors for ski tourism in the district. With the Remarkables Ski Area increasingly reaching its capacity during the winter, the Project will allow NZSki to continue to meet demands for recreational ski opportunities in the District.

Upon completion, the expanded ski field is expected to accommodate up to 6,000 skiers at one time. This level of activity is comparable to other major regional infrastructure, such as Queenstown Airport (which recorded an average of 7,100 daily passenger movements in the year ending June 2025), and exceeds that of Dunedin Airport (which averaged 2,300 passengers per day over the same period). This comparison highlights the scale and economic significance of the proposed expansion within the wider regional context.

The assessment also considers both high- and low-growth scenarios, developed through market demand analysis. The high-growth scenario assumes skier numbers increase in line with the expanded ski area capacity, while the low-growth scenario adopts a more conservative outlook, accounting for the potential expansion of other local ski areas. While both scenarios project growth in skier numbers, they differ in the rate and extent of that growth.

From a recreation perspective, the Project is expected to facilitate an increase in the total number of skier days from 294,735 skier days per year, to 505,260 per year within the next ten years (under the high growth scenario). Under a low growth scenario, the increase is still significant, with an increase to 435,969 ski days forecast.

6.2.3 Climate Change Resilience Benefits

The Project will provide additional resilience and longevity to the District's ski opportunities. The Doolans Basin is a vast, south facing basin with a reliable natural snow pack. As temperatures rise and snowfall patterns change over time, the Doolans Basin supports the resilience of the Remarkables Ski Area by establishing ski infrastructure in an area where snow falls and remains in place for longer over the autumn and early spring seasons.

6.2.4 Modal Shift and NZSki's 2030 Carbon Neutrality Goal

The Project will also support the transition of locals and visitors towards a modal shift when accessing the ski area, with less reliance on private cars. NZSki's proposed implementation of travel demand management will actively encourage skiers to utilise ski shuttles and buses to access the ski area, reducing the potential demand on the roading network and contributing towards NZSki's 2030 carbon neutrality goal.

6.3 CULTURAL EFFECTS

As set out in Section 2, the Project is located within the Kāi Tahu takiwā, with seven Papatipu Rūnaka having a shared interest in Kawaru / the Remarkables.

Over the years, NZSki has worked to establish a relationship with Papatipu Rūnaka to ensure NZSki's operations within the Rastus Burn supports Papatipu Rūnaka aspirations as kaitiaki and respects the mana of the mauka. A summary of this engagement is provided in Section 5.

While it is recognised that as mana whenua, Papatipu Rūnaka, are best placed to provide comment on the extent to which the Project may affect their values and Treaty Settlement, NZSki anticipates the effects that may be of relevance to Kāi Tahu include effects on their associations and responsibilities in relation to Kawarau / The Remarkables and the wider

Conservation Area, effects on wāhi tūpuna and the cultural landscape, effects on indigenous biodiversity, habitat and the mauri of the area, and effects on the ability of Kāi Tahu to exercise their rakatirataka and kaitiakitaka over time.

As is detailed throughout this section and in Section 7, NZSki has identified a range of management and mitigation measures which are broadly intended to avoid, remedy, or mitigate adverse effects associated with the Project in order to protect or minimise effects on the cultural, ecological, landscape, and hydrological values of the mauka and its surrounds. These measures include:

> Minimising vegetation clearance and land disturbance through co-location of activities where practicable;

> Reducing effects on landscape character and ridgelines through careful siting and design;

> Implementing comprehensive erosion and sediment controls;

> Avoiding, and where necessary carefully managing, effects on streams and wetlands to ensure that hydrological function and associated ecological values are maintained;

> Undertaking vegetation translocation and rehabilitation within disturbed areas;

> Identifying taonga species and identifying potential management responses for those (acknowledging further input is required from Kā Rūnaka to confirm if these are appropriate or alternative management responses would be more effective);

> Limiting water takes to what is necessary for snowmaking, potable supply, and firefighting purposes and retaining water within its source catchment;

> Upgrading wastewater infrastructure to maintain the existing water quality of the Rastus Burn; and

> Providing ecological compensation where effects cannot be fully avoided or mitigated, including 13.8 hectares of indigenous vegetation rehabilitation within the Kawarau / Remarkables area, pest control, lizard research, and wetland enhancement initiatives in the vicinity of Lake Alta.

It is also important to note that the Project does not seek to restrict or prevent Kā Rūnaka access to the mauka, their ability to exercise kaitiakitanga over the Kawarau / Remarkables Conservation Area, or application of the DOC Treaty Protocols.

In response to preliminary feedback from Kā Rūnaka regarding the types of matters a Treaty Impact Assessment would consider, NZSki has considered ways in which the Project could provide long-term monitoring opportunities that align with Kā Rūnaka's intergenerational

responsibilities and how potential governance and partnership mechanisms could enable Kā Rūnaka to exercise ongoing rakatirataka. To facilitate these outcomes, NZSki is proposing to establish a mana whenua advisory group for the Project. While the purpose and function of the mana whenua advisory group will need to be agreed with Kā Rūnaka in due course, NZSki anticipates the group's purpose and functions could include:

- Facilitating ongoing engagement between Papatipu Rūnaka with shared interests in the Project area and NZSki in respect of the activities authorised by the resource consent;
- Facilitating feedback to NZSki on the implementation of the management plans;
- Providing opportunities for mana whenua involvement in Project delivery, including in particular in respect of management plans;
- Enabling the mana whenua advisory group members to share information with the seven Papatipu Rūnaka regarding the Project;
- Ensuring appropriate tikaka and kawa (customary practices and protocols) are being applied throughout the development and implementation of the Project;
- Overseeing and directing the implementation of the accidental discovery protocol procedures; and,
- Identifying and directing cultural monitoring requirements and measures to be implemented during construction activities.

These matters, along with an overview of the Treaty Settlements, are further considered the ā-Rautaki (2026) report in **Part B** of the application documents.

NZSki looks forward to discussing these potential opportunities with Kāi Tahu in due course and has recently contacted Kā Rūnaka to commence the formation of the manu whenua advisory group in the context both of this project and its existing concession activities.

6.4 TERRESTRIAL ECOLOGY EFFECTS

The actual and potential effects of the Project on terrestrial ecological values within the Site have been assessed for the alpine project areas by e3s in the Terrestrial Ecology Assessment, the Lizard Management Plan (LMP) and the Ecology Memorandum. For the Carpark & Bus Hub Ecological Impact Assessment, Beale Consultants has prepared a similar assessment. A copy of these assessments is provided in **Part B** of the application documents, with the key findings summarised in the following sub-sections.

6.4.1 Rastus Burn and Doolans Basin

6.4.1.1 Vegetation Loss

The Project will result in approximately 15.94 hectares of indigenous vegetation disturbance. When considered in the context of the wider Ecological District, this is an equivalent loss of 0.04% of the indigenous vegetation located above 1,100 m.

Edge effects associated with earthworks, directly outside of the disturbance footprint, are anticipated. Construction activities such as access and trail formation, cut-and-fill platforms, and service trenching will create new habitat edges that may alter local microclimatic conditions through increased light penetration, wind exposure, temperature variability, and reduced soil moisture. These new edge areas are also more susceptible to erosion and colonisation of introduced plant species. However, e3s sets out that change is only anticipated to be observed within the first two metres of a community, impacting less than 50% of the vegetation cover within this two-metre area.

In respect to specific vegetation communities, e3s found that, for:

- Snow tussock grassland (very high ecological value) and north facing tussock grassland (high ecological value), the overall percentage of loss of the vegetation community and habitat is assessed as low for each, however, it is on a scale that will impact the population and distribution of some plant species. e3s assessed the effects of the Project on this vegetation community as being moderate.
- Dracophyllum scrub (high ecological value), the disturbance footprint is small compared to the extent of the community in the ecological district, however, there will be some loss and is assessed as being a minor shift in the baseline ecological conditions. e3s assessed the effects of the Project on these vegetation communities as being low for each.
- Cushionfield (very high ecological value), the disturbance footprint is small compared to the extent of this community within the alpine zone of the ecological district. Extensive areas of this community will be retained in close proximity to the areas of loss. However, a small area of loss will occur and is therefore assessed as a minor shift in the baseline ecological conditions. e3s assessed the effects of the Project on this vegetation community as being moderate.
- High alpine cushionfield (very high ecological value), less than two hectares of this community will be removed as part of the Project. However, this type of community is rarer in the ecological district, and therefore, the disturbance presents a higher ecological effect to the vegetation and habitat of this community, relative to the other

vegetation communities present. e3s assessed the effects of the Project on this vegetation community as being high.

> Snowbank (very high ecological value), this community makes up only a small percentage of the ecological district, and while the direct disturbance is largely avoided there may be indirect edge effects. e3s assessed the effects of the Project on this vegetation community as being moderate.

> Rockfield (very high ecological value), which is one of the most widespread communities in the ecological district. Rockfield is more impacted than other vegetation community types given it abundance. While disturbance of the vegetation community is comparatively high, it represents a small percentage of the available vegetation community/habitat within the ecological district. As such, e3s assessed the effects of the Project on this vegetation community as being moderate.

> Rocky outcrop (very high ecological value), which is present in moderate abundance in the ecological district (and has a high density of at risk and threatened plants and fauna). It is noted that the Project has been designed to avoid this community as far as practicable. Given this, e3s assessed the effects of the Project on this vegetation community as being moderate.

> Cushion bog wetland (very high ecological value), riparian wetland (high ecological value) and seepage wetland, the Project has been designed to avoid effects on wetlands as far as practicable (very little disturbance is proposed, in the order of approximately 2000m^2). Given on the limited extent of this vegetation community/habitat in the ecological district, e3s has assessed the effects of the Project cushion bog wetland as being moderate, low for riparian wetland and moderate for seepage wetland; and

> Disturbed vegetation, which as moderate ecological value, the vegetation is of a highly disturbed nature and, following the completion of the Project, will largely be indistinguishable from pre-disturbance composition. That said, there will be minor losses to some indigenous communities, resulting in a low level of ecological effect.

The Terrestrial Ecology Assessment describes that ecological effects on vegetation communities are unavoidable where disturbance/clearance of high and very high indigenous vegetation is required. However, the effects associated with vegetation loss are being addressed by the following effects management measures to minimise adverse effects as far as practicable (which are addressed in the proposed conditions contained in **Part D** of the application documents):

> All 'Threatened' and 'At Risk – Declining' plant species will be translocated outside of the disturbance footprint and relocated to comparable nearby habitats;

- All clusters of 'A Risk – Naturally Uncommon' and 'Data Deficient' plant species will be translocated outside of the disturbance footprint and relocated to comparable nearby habitats;
- The alignment of the disturbance footprint will be delineated and marked prior to works commencing, and the area being surveyed by a terrestrial ecologist. The survey will record and delineate the location of all species required to be translocated (and the area they will be translocated to);
- All invertebrate host specific plant species are to be translocated in accordance with the same methodology for At Risk – Declining and Threatened plant species;
- All batter slopes / exposed surfaces are to be revegetated using vegetation removed from the disturbance footprint;
- Ongoing monitoring of survival rates for the plant species that have been translocated, including minimum coverage requirements; and
- The preparation and adherence to a Terrestrial Ecology Management Plan which documents the actions to be implemented by NZSki to manage effects on vegetation communities and habitats, including the measures described above.

The Terrestrial Ecological Assessment concludes that, with the mitigation measures described above, the Project will result in an overall moderate level of ecological effect on indigenous vegetation communities (including up to 13.46 ha, which is considered to have a moderate level of residual effect). To address this residual effect, NZSki is proposing to prepare and implement a Biodiversity Compensation Project which has the following objectives:

- Provide, long term ecological benefits to the wider area and address the Project's residual ecological effects relating to the permanent loss of 13.8[93] hectares of indigenous vegetation; and
- If agreeable to tangata whenua, enable exercise of their kaitiakitanga.

To enable the Biodiversity Compensation Project, NZSki is proposing to fund the Project, at a rate of $75,000 per year, until such time as the 13.8 hectares has been re-vegetated. The Conditions set out in **Part H** provide details around the establishment of operation of this project, however in summary:

[93] This is the total area of permanent vegetation loss due to access trails or permanent infrastructure or buildings occupying those footprints.

- A Biodiversity Compensation Project Plan will be prepared no later than 18 months after the Doolans Base Building works commence;
- DOC and the mana whenua advisory group will be invited to participate in the promulgation of the Biodiversity Compensation Project Plan;
- The Biodiversity Compensation Project Plan will detail the delivery mechanism for the Project, the programme of activity for the first five years and how the funding will be spent over that time, land access arrangements, measurable and time-bound performance indicators and reporting and review requirements; and,
- Annual reporting requirements on the development and implementation of the Biodiversity Compensation Project, its effectiveness at achieving the objectives and any amendments that may be required to assist in meeting those objectives.

6.4.1.2 Fragmentation of Vegetation Communities

The Project will result in some fragmentation of vegetation communities and associated habitats, with the nature and extent of effects differing between the Rastus Burn and Doolans Basin due to their contrasting levels of existing modification and naturalness.

In the Rastus Burn, where vegetation and ecological processes have already been influenced by past land use and infrastructure, fragmentation effects will be limited in scale and largely confined to localised areas adjacent to works. In this catchment, the effect of fragmentation on vegetation communities and associated ground-dwelling invertebrates is assessed as low, with an overall level of effect ranging from very low to low depending on the ecological value of the affected species.

The Doolans Basin has a higher level of naturalness, and fragmentation within the environment and has the potential to result in more pronounced ecological effects. Fragmentation of isolated or scattered vegetation communities and associated ground dwelling invertebrates may lead to localised reductions in habitat extent, altered ecological function, and reduced connectivity at a site scale.

The most sensitive fragmentation effects will be across the wetland-associated communities, including cushion bog wetlands, riparian wetlands, and seepage systems, which rely on hydrological connectivity and form continuous ecological pathways. Fragmentation of these communities may alter habitat function and reduce the ability of flora and fauna to move through the landscape. The magnitude of effect on these communities is assessed as high, with an overall level of effect assessed as very high due to their very high ecological value. It should be noted that direct effects on these communities

have been avoided and minimised, where practicable, through siting and design considerations described in Sections 1 and 3 of this substantive application report.

Overall, while some ecological fragmentation effects are anticipated, these are expected to be largely localised and manageable through a combination of avoidance, minimisation, rehabilitation, and restoration measures, with residual effects varying by catchment and ecological value. The mitigation measures described in Section 6.4.1.1 are equally applicable to addressing fragmentation related effects on vegetation communities. For the wetland vegetation communities, the following mitigation measures are also proposed:

> The hydrological function and connectivity of all wetland/streams is to be maintained; and

> The designs of all wetland/stream crossings will be reviewed by a hydrologist and/or ecologist to ensure hydrological function and connectivity will be maintained. Following completion, these structures will be inspected to ensure the design has been implemented correctly.

The Terrestrial Ecological Assessment concludes that, with the mitigation measures described above, the fragmentation of vegetation communities due to Project activities:

> In the Rastus Burn is assigned a moderate level of residual effect; and

> In the Doolans Basin is assigned a high level of residual effect.

As discussed in Section 6.4.1.1, NZSki is proposing to implement a Biodiversity Compensation Project to address residual ecological effects, including on these environments.

6.4.1.3 Infrastructure Impediment

The establishment of new and expansion of existing structures and buildings within the Rastus Burn and Doolans Basin creates potential impediments to both kārearea and pipit, which are both susceptible to window strike. Left unmitigated, this may result in the loss of a small portion of the birds present within the surrounding landscape. The unmitigated magnitude of this effect on pipit and kārearea is assessed as low and moderate, respectively, with the difference reflecting the difference in ecological value between each bird species.

In respect to avifauna, NZSki will monitor for bird strike and, if it occurs, will implement measures to reduce the potential for bird strike (for example, applying high contrast markers to windows). With these measures in place, e3s concludes that the overall effect will be low on avifauna.

6.4.1.4 Weed Introduction and Mobilisation

The Project will result in an elevated risk of weeds being introduced and mobilised through the Site. This arises through a combination of increased ground disturbance, potential nutrient enrichment and the increased presence of vectors (materials/vehicles/footwear) traversing the Site.

Without mitigation, the magnitude of effect on already disturbed areas within the Rastus Burn is moderate due to such areas aiding the dispersal of exotic species into adjacent sensitive areas. Within the natural communities, such as the undisturbed areas of the Rastus Burn and the Doolan's Basin, the unmitigated level of effect ranges from high to very high, depending on the vegetation communities affected due to the risk of weeds fundamentally changing the composition of the vegetation. However, several consent conditions have been proposed to manage the potential for weed introduction and mobilisation, including:

- Weed management measures (and monitoring) are included in the Terrestrial Ecology Management Plan;
- No soil from outside of the Project Area will be brought onto the Site;
- No soil will be moved between catchments;
- Soil from the area adjacent to the Rastus Burn base building will not be moved upslope. In addition, soil will not be moved more than 100 vertical metres upslope from any other area; and
- Machinery/equipment will be cleaned and checked for soil (that could contain seeds or exotic plants) before entering the Project Area. A quarantine area will be established to enable checks and cleaning of machinery.

With these mitigation measures in place, e3s concludes that the overall level of effect associated with weed introduction and mobilisation is expected to be low.

6.4.1.5 Sedimentation

Vegetation clearance and earthworks associated with the Project have the potential to result in sediment mobilisation onto adjacent vegetation communities, wetlands, and watercourses. This effect is most likely to occur during and immediately following the earthworks phase but may persist in the medium to long term until disturbed surfaces are stabilised and revegetated. Unmitigated sediment deposition may lead to ecological change through vegetation smothering, altered floristic composition, and increased susceptibility to exotic species colonisation.

Wet and hydrologically connected communities, including cushion bog, riparian wetland, seepage, and snowbank communities, are particularly susceptible due to preferential flow paths and their role as sediment collection points. For these communities, the magnitude of effect is assessed as very high, with an overall level of effect assessed as very high due to their high and very high ecological values. Upland vegetation communities are less susceptible, with sedimentation effects expected to be more localised, however, these effects may still result in vegetation loss and exotic species establishment. The magnitude of effect on upland vegetation is assessed as moderate, with an overall level of effect assessed as moderate in disturbed areas and high in areas of high or very high ecological value.

The potential effects associated with sedimentation are being addressed by the following effects management measures (which are addressed in the proposed conditions contained in **Part H** of the application documents):

> All unvegetated trail surfaces are to be finished with large coarse rock rather than fine gravels (which are prone to mobilisation);

> An erosion and sediment control plan will be implemented, which will document the specific measures to be implemented to reduce the potential for runoff into wetlands, watercourse and into neighbouring vegetation communities; and

> All stockpiled material will be contained within the disturbance footprint and will not be deposited atop any indigenous vegetation.

With these mitigation measures in place, e3 concludes that the overall level of effect associated with sedimentation is expected to be 'low' for the majority of vegetation communities, and 'moderate' in respect to cushion bog, riparian wetland, seepage and snowbank vegetation communities.

As erosion and sediment control is a key measure used to manage sedimentation effects, both in terms of terrestrial ecology and freshwater, it is noted that all practicable measures will be applied during the construction of the Project to minimise the potential for any discharges of sediment to the environment. Measures include (but are not limited to):

> Existing access tracks will be utilised (where available) to access the proposed earthworks areas;

> Progressive stabilisation and staging of earthworks to minimise exposed areas;

> Diversion channels and bunds will be established to separate clean and dirty water;

> Level spreaders will be used to assist in dissipating flows;

- Decanting earth bunds and sediment sumps will be utilised; and
- Turkey nest, super silt and silt fences and coconut coir logs (or a similar alternative that does not act a position seed dispersal risk) will be utilised to capture and retain sediment.

The staged construction approach and reduced construction season duration further reduces potential for sedimentation effects. By limiting the spatial and temporal extent of the disturbed surfaces at any one-time, sequencing work to avoid concurrent high-risk areas, and immediately rehabilitating completed surfaces, the project materially lowers the magnitude and duration of potential sediment mobilisation.

6.4.1.6 Loss of Habitat

Avifauna

The Terrestrial Ecology Assessment sets out that the Site has one pair of kārearea present in the alpine environment of the Rastus Burn and one pair in the Upper Doolans catchment. Based on the known nest locations and observed habitat preferences, the Project disturbance areas are not within known nesting areas. Kārearea have large home ranges and are likely to forage throughout the Rastus Burn and Doolans. The pair within the Doolans catchment may lose 6.3ha of high-quality foraging habitat as a result of the Project, while the pair in the Rastus Burn may lose approximately 0.7 ha. The areas of disturbance are expected to account for less than 1% of the home ranges of the kārearea present. Therefore, given the relatively small area of disturbance compared to kārearea home ranges, the magnitude of the effect is 'low'.

Based on field surveys completed by e3s, a total of 23 pīhoihoi were counted on Site, with abundance decreasing at higher altitudes. The effects on pīhoihoi vary according to altitude and catchment. Nesting above 1,700 m is assessed as having a very low level of effect in both the Doolans and the Rastus Burn, and e3s considers that mitigation is not required at these elevations. Nesting below 1,700 m is assessed as having a high level of effect in the Doolans catchment and a very low level of effect in the Rastus Burn. The Terrestrial Ecology Assessment sets out that the earthworks /vegetation clearance proposed will be undertaken in the pīhoihoi breeding season (August – February), and therefore mitigation is required to address potential effects to nesting individuals.

Foraging activity in respect of the pihoihoi, both above and below 1700 m, is assessed as having a high level of effect in the Doolans and a low level of effect in the Rastus Burn.

In addition to the measures addressing vegetation loss (set out in Section 6.4.1.1), the potential effects associated avifauna habitat loss (particularly nesting habitat) is addressed

by the following effects management measures (which are addressed in the proposed conditions contained in **Part D** of the application documents):

- Where works take place within the breeding season for kārearea (August-May) or pīhoihoi (August-February), nesting habitat within the disturbance footprint for both species are to be surveyed ahead of time (no longer than 8-days prior to disturbance) and any nests identified;
- Where construction activities could cause direct disturbance to a nesting individual the following actions will be undertaken:
  - Where practicable, works will establish exclusion zones and avoid the area until chicks have fledged.
  - Where this is not possible, the nest is to be moved to a suitable alternative location and monitored to ensure nest is not abandoned.
  - If the nest cannot be moved and if construction activities may cause harm to the adult birds, the nest (and eggs if present) is to be destroyed, and the area disturbed as early in the season as possible to disperse the adults and allow for re-nesting elsewhere (only to be undertaken as a last resort).
  - All associated work will be undertaken and managed by a suitably qualified and experienced ecologist/ornithologist and undertaken in accordance with best practice capture.
  - Wildlife Act Authority will be obtained for any direct disturbance of avifauna or their nests.
- All staff will be trained in appropriate kārearea interaction and etiquette; and
- Documenting the above in the Terrestrial Ecology Management Plan.

The Terrestrial Ecology Assessment concludes that, with the above mitigation measures in place, the Project will result in a 'moderate' level of effect on kārearea (reflecting a slight change to habitat conditions for a bird of prey - pīhoihoi), and a 'high' level of effect on pīhoihoi below 1,700 m in the Doolans.

As discussed in Section 6.4.1.1, NZSki is proposing to implement a Biodiversity Compensation Project to address residual ecological effects.

Herpetofauna

Lizards present within or adjacent to the vegetation clearance and earthworks footprint may be subject to displacement, social disturbance, and minor or serious injury or mortality as a

result of the proposed works. The works will also result in the permanent loss or modification of habitat and may increase predation risk.

Detailed surveys have been undertaken within the Rastus Burn (above the Base Building) and the Doolans Basin. Other than McCann's skink, no other skink species were recorded within the vegetation clearance or earthworks disturbance footprint within these areas, and no other skink species are expected to be present.

McCann's skink are sparsely distributed within the north-facing tussock grassland above 1,600 m in both the Rastus Burn and Doolans areas, and are more widespread across aspects and communities below 1,600 m, with skink density in Doolans Basin increasing substantially below this elevation. It is estimated that proposed vegetation clearance and earthworks within the disturbance footprint (excluding Carpark 3) will affect approximately 300 to 600 individual McCann's skink. This species is not threatened.

McCann's skink are widely distributed throughout the Canterbury, Otago, and Southland regions. Having regard to the extent of habitat available and the relatively small proportion of lizards likely to be affected, the habitat removal associated with the Project is not expected to adversely affect the viability of the local or national population.

A has been prepared by e3s and is included in **Part F** of this substantive application. The LMP sets out the measures that will be implemented to avoid, remedy, or mitigate the potential effects of the Project on lizards, including the following:

> Undertaking pre-construction vegetation trimming in areas of known McCann's skink habitat to reduce habitat attractiveness prior to the commencement of works;

> Restricting the commencement of vegetation clearance and earthworks within McCann's skink habitat until temperatures have reached a minimum of 12 to 14[94] degrees, a temperature above which the skink are known to be mobile and remove themselves from the area of disturbance; and

> Funding a research project, to the value of $80,000 (total, across all approvals sought under the FTAA) to improve understanding of the location and distribution of cryptic alpine lizard species within the Remarkables Ski Area and the wider Remarkables Ecological District, supporting their overall conservation and management into the future.

[94] The lizard management plan provides a moving scale of compensation for temperature variations between 12 and 14 degrees.

All of the above have been reflected in the proposed conditions, contained in **Part H** of the application documents. With these measures in place, e3s considers that the residual adverse effects on McCann's skinks will be appropriately managed.

While no lizard surveys have been completed within Carpark 3, based on the survey results within the wider Rastus Burn e3s anticipate lizards will be found. While this will likely include McCann's skink, other species may also be present. Prior to any works commencing within this area, a separate LMP will be prepared for works within this car park. The LMP will require certification by QLDC and DOC, and will necessitate site specific trapping and survey to inform the management measures required to appropriately manage effects. A separate wildlife permit will also be sought for works in this area.

NZSki is also proposing to undertake pest control within the Doolans Basin. As described in Section 3, the proposed pest management will seek to ensure that the direct contribution or exacerbation of pest presence in the Doolans Basin as a result of NZSki's operations is appropriately managed through implementation of a Pest Management Plan. While not necessary in the context of the wider lizard compensation package nor recommended by the Terrestrial Ecology Assessment, it is anticipated these measures will also contribute towards the ongoing conservation of lizard species within the Doolans Basin (noting that NZSki already undertakes similar pest control within the Rastus Burn).

Invertebrates

As previously described in Section 2 of the application documents, a diverse invertebrate assemblage of ground dwelling and flying invertebrates were recorded in the Project Area – 24 of these invertebrate species were either classified or classified as Data Deficient, At Risk or Threatened.

The overall effects on invertebrates from habitat loss range from low to high, with the effect increasing for sensitive habitats and host-specific species. To address these effects, NZSki is proposing to implement the following mitigation measures:

- Implementation of the measures that address vegetation loss described in Section 6.4.1.1;
- All invertebrate host specific plant species (not otherwise specifically covered in the above mitigation measure, and where the residual effect on the invertebrate species is greater than low) are to be translocated in accordance with the same methodology for At Risk – Declining and Threatened plant species. This relates to all species within the *Cardamine* genus, *Aciphylla aurea* and *Aciphylla 'lomond'*;

- All vegetation community remediation will be undertaken in close proximity to the donor site as possible to retain invertebrate biodiversity in remediated and adjacent habitat and species genetic diversity; and
- All plants will be translocated in tracts of vegetation material as large as possible to ensure as much of the habitat and ground dwelling terrestrial invertebrates are persevered and are able to recolonise or disperse into comparable habitat post-movement.

With the above measures in place, e3s considers that the residual effects on invertebrates from habitat loss range from high for *Plutell*a sp.1 (CO) and *Sigaus campestris,* moderate on several species (listed in the Terrestrial Ecology Assessment) and low on *Inophloeus inuus*. As discussed in Section 6.4.1.1, NZSki is proposing to implement a Biodiversity Compensation Project to address residual ecological effects, which primarily arise as a result of habitat loss for invertebrates.

6.4.1.7 Loss of Taonga Species

Eight taonga plant species were identified within the Project Area, namely:

- Taramea / *Aciphylla aurea;*
- Taramea/ Taramea / *Aciphylla kirkii;*
- Taramea / *Aciphylla lecomtei*;
- Taramea / *Aciphylla "Lomond";*
- Taramea / *Aciphylla simplex;*
- Wīwī / *Juncus pusillus;*
- Wīwī / *Juncus novae-zelandiae;* and
- Koromiko / kōkōmuka / *Veronica salicifolia*.

In respect to fauna, pīhoihoi, kārearea, and kāhu are listed as taonga faunal species under Schedule 97 of the Ngāi Tahu Claims Settlement Act 1998. The effects of the Project on both pīhoihoi and kārearea are addressed throughout this section of the substantive application. In respect to kāhu, e3s considers that the Project will result in no discernible ecological effects on this species, however, this assessment does not reflect cultural values (NZSki acknowledges that this can only be undertaken by mana whenua).

Ecological mitigation measures proposed include the translocation of identified taonga plant species into nearby, ecologically comparable habitats. However, recognising the taonga status of affected species and the absence of a formal cultural assessment, further

engagement with Papatipu Rūnaka will be required to determine appropriate mitigation measures and management approaches that align with tikanga Māori and Kāi Tahu values. This engagement will inform whether the proposed mitigation is culturally appropriate and whether additional or alternative measures are required to address potential effects on taonga species.

6.4.1.8 Indirect Disturbance Effects

Noise

The Project will generate elevated noise levels during both the construction and operational phases in a predominantly quiet rural environment characterised by low existing ambient noise levels. Construction activities will result in short-term, high-intensity noise likely to extend beyond the site boundary, with potential adverse effects on indigenous fauna, including temporary habitat avoidance, disturbance to breeding, foraging, and nesting behaviour, and acoustic masking of communication and predator-prey cues.

Operational activities will introduce longer-term, intermittent to chronic noise sources associated with ski field infrastructure, vehicles, grooming equipment and avalanche control. These noise sources may result in ongoing degradation of adjacent habitat suitability for noise-sensitive species. The Terrestrial Ecology Assessment characterises the level of effect in respect to construction noise on species, noting that construction noise will be temporary, as follows:

- A 'moderate' level of effect on kārearea, pihoihoi and kea;
- A 'high' level of effect on *Dasyuris partheniata, Plutella sp.1 (CO), Xanthohoe frigida, Pyrausta comastis, Dasyuris micropolis, Nivetica nervosa and Sigaus campestris*; and
- A 'moderate' level of effect on *Scoparia panopla, Scoparia niphospora, Pasiphila erotica, Pasiphila sp., Hypsithocus hudsonae, Neoramia alta, Mamoea montana, Rorea otagoensis and Anagotus latirostris, Inophloeus inuus, Taenarthrus capito, Duvaliomimus walkeri, Peripatus sp. Remarkables, Subantarctia centralis, and Huttonia sp.*

Specific measures are proposed to address noise and lighting effects on kea. Where kea are observed within or nearby either catchment during construction seasons, the following measures will be undertaken under the supervision of a suitably qualified and experienced ecologist/ornithologist:

- All tools, consumable items, and loose or soft construction materials will be secured in a way that is inaccessible to kea;

- Interactions will be minimised where possible to reduce potential habituation;
- If kea become a nuisance kea safe 'playgrounds can be installed to distract kea during work hours; and
- All measures will remain in place until risks are removed from kea interactions.

The Terrestrial Ecology Assessment characterises the overall level of effect of operational noise on kea as 'low'.

In respect to lizards, construction noise may result in temporary hearing loss causing lizards to move away (be displaced) from preferred retreat, foraging and basking sites. While construction noise related effects will be temporary, it will impact a small number of individuals. Effects on lizards are proposed to be addressed through the measures identified in Section 6.4.1.6.

Light Disturbance

The Project will introduce some artificial light at night into a largely unlit rural environment, resulting in a high contrast with surrounding conditions. Elevated light levels may adversely affect indigenous fauna, particularly nocturnal and crepuscular species. Potential effects include behavioural disruption in birds through interference with navigation, altered foraging and hunting behaviour, increased collision risk with illuminated structures, and increased energy expenditure that may affect survival and reproduction. Artificial lighting may also disrupt avian movement across the valley, altering flight paths and predator prey interactions.

However, e3s considers that, in respect to kārearea and pīhoihoi, lighting is expected to have little to no effects on breeding or foraging as the only operational light proposed during night hours will be associated with snow groom and snow gun operations, both of which are restricted to winter ski season operations. No external construction or operational lighting is proposed during the summer months (the proposed conditions reflect this), and construction related lighting is only proposed in the autumn months where only absolutely required for construction purposes.

Kea may be drawn to artificial lighting as kea are highly intelligent and inquisitive. The measures identified in Section 6.4.1.8 above relating to kea are equally applicable to mitigating the effects on kea from lighting.

Nocturnal invertebrates are likely to be attracted to light sources, resulting in displacement away from suitable habitat and host plants, reduced feeding activity, and increased mortality, which may have secondary effects on species that rely on insects for food or pollination. Light-averse species, including some terrestrial invertebrates, may experience

habitat avoidance, further reducing habitat suitability within and adjacent to the site. These effects are generally expected to be localised to the illuminated areas and their immediate surrounds. The effects of lighting on invertebrate species range from very low to very high, depending on species sensitivity and season (with effects being lower in winter and higher in summer, noting again that no artificial lighting is proposed to occur in summer).

Construction Material and Design

Fauna species are not expected to be adversely affected by construction materials, with the exception of Kea. Kea are known to actively ingest lead, which can cause severe and potentially fatal impacts.

To manage these risks, no lead-based materials or finishes will be used in the construction or maintenance of any infrastructure required for the Project (which is reflected in the proposed conditions). While e3s details that with this mitigation measure in place, the effects on kea relating to the potential for lead ingestion will be 'low', the effect will be avoided if no lead-based materials or finishes are used during construction.

6.4.1.9 Basin Cumulative Effects

Existing vegetation loss associated with the Remarkables Ski Area totals approximately 60.6 hectares, representing less than 0.16% of comparable vegetation above 1100 m within the Ecological District. The proposed Doolans expansion would result in an additional disturbance of approximately 15.94 ha (around 0.04%). When considered cumulatively, vegetation loss would remain below 0.2% of the relevant ecological extent, and the Project is therefore assessed as having a 'low' cumulative effect on the ecological values of the Ecological District. However, of this 15.94 ha, only 13.8 ha will not be re-vegetated, reflecting the Project's permanent vegetation loss associated with ski trails, roading, buildings and structures associated with infrastructure.

Again, it is noted that the implementation of the Biodiversity Compensation Project will further assist in addressing the residual effects relating to vegetation loss, fragmentation of vegetation communities and habitat loss.

6.4.2 Lower Remarkables Transit Hub

6.4.2.1 Vegetation Loss

Carpark B is largely modified and dominated by exotic woody weeds and grassland, with indigenous vegetation forming a small and fragmented component of the overall site.

The clearance of the site will result in approximately 5000m^2 of grey shrubland being removed. Despite the low ecological value of the vegetation, its complete removal from the

site is assessed as a high magnitude of effect. To mitigate this effect, NZSki is proposing to rehabilitate the approximately 6000m^2 area of land immediately west of the carpark with high diversity grey shrubland planting. A detailed rehabilitation plan will be prepared before works commence in Carpark B, which will detail information such as the spacings, grades, densities and species composition. The rehabilitation plan will also set out monitoring and reporting requirements, with a minimum of annual planting, for a period of three years required to ensure an 80% survival rate.

6.4.2.2 Loss of Habitat

Avifauna

The Lower Remarkables Transit Hub provides habitat primarily for common introduced bird species, with indigenous birds likely to use the site intermittently for foraging. Vegetation clearance will result in a minor reduction in available habitat and temporary displacement of birds. The overall level of effect is assessed by Beale Consultants as low provided the following mitigations are put in place during construction:

- Prior to works commencing, a suitably qualified ornithologist surveys the site for grey warbler, fantail or silvereye nests; and,
- If nests are located, vegetation clearance must not occur between 1 August and 30 January to avoid peak breeding season.

Herpetofauna

Two indigenous lizard species are present within the broader area: McCann's skink and mountain beech gecko.

Mountain beech gecko is known to be sparse and strongly associated with rocky habitats. The site lacks extensive rocky substrates and is extensively vegetated with dense scrub and grassland. Carpark B is therefore considered unsuitable habitat for mountain beech gecko, and adverse effects on this species are unlikely.

McCann's skinks are widespread in the region and is likely to be present within the site at low densities. Potential habitat for this species includes grassland margins, scrub edges, leaf litter, and accumulations of woody debris, all of which occur in small areas across the site. Vegetation clearance and ground disturbance have the potential to result in habitat loss and, if unmanaged, could lead to injury or mortality of individual skinks.

To address this risk, an LMP will be prepared and certified prior to works commencing. The lizard management will ensure that active searching, capture, and relocation of skinks (to suitable nearby habitat) occur prior to works commencing within Carpark B.

Given the low expected population density, the localised extent of habitat loss, and the implementation of avoidance and relocation measures, the magnitude of effect on lizards is assessed as negligible.

Invertebrates

Vegetation clearance will result in a localised reduction in habitat for terrestrial invertebrates, particularly within indigenous shrub patches. These effects are assessed as moderate in magnitude at a local scale. Proposed enhancement planting will provide medium-term ecological gains for invertebrate communities.

6.5 HYDROLOGY EFFECT

Hydrological effects on waterbodies and wetlands have been assessed by e3s in the Water Take Assessment and the Roads and Crossings Assessment. The actual and potential hydrological effects are summarised in the sections below, with the supporting technical reports provided in **Part B** of this application.

6.5.1 Effects of the Water Take

In respect to water allocation, the 30 l/s water take is approximately 1% of the available allocation in the Nevis River catchment. Further, the taking of water for snowmaking will occur during the winter months, when irrigation related water takes are abstracting water from the catchment.

6.5.1.1 Effect on Flows in Doolans Creek Right Branch

The proposed water taken is around 46 % of the modelled mean annual low flow at the Doolans Creek Right Branch intake location, and it is noted that a condition has been proposed (in **Part H** of these application documents) requiring a residual flow of 20 l/s to be maintained in the creek downstream of the point of abstraction at all times. e3s considers that the effect of the taking of water as proposed on the flows of the Doolan's Creek Right Branch is 'low', for the following reasons:

- The overall volume of the take is low, being equivalent to 16 days of take at the maximum rate. The taking of water will not occur continuously – for example, snowmaking will only occur when required and when conditions are suitable;
- The take is situated high within the catchment, and additional tributaries join the creek within 500 m of the intake location. The take associated with the Project is therefore equivalent to 30 % of the mean annual low flow 600 m downstream of the take, and 18% of the mean annual low flow within 2.5 km of the take location; and

- The take is representative of approximately 0.5% of the Nevis River mean annual low flow and is, therefore, not significant, particularly as the take will be during the winter months when downstream irrigation takes are dormant.

It is noted that the water taken by NZSki to enable the Project will largely remain in the catchment and return to the stream during spring snow melt.

6.5.1.2 Effects on Downstream Water Users

In respect to potential effects on downstream water uses, there is only one water take consent downstream of the Site. This water take consent authorises the taking and use of water from Doolans Creek to irrigate 80 hectares of land. As this is an irrigation consent, the take will not be exercised in winter when the NZSki water take is occurring. Therefore, the water take associated with the Project will not impact downstream water users.

6.5.1.3 Climate Change

The Site may be impacted by future climate changes. Regardless of any changes in flows in the Doolans Creek Right Branch resulting from climate change, e3s considers that the requirement to maintain a residual flow within the creek downstream of the water take location will mitigate any climate change induced flow changes.

6.5.1.4 Effects on Hydrology of Wetlands

e3s notes that wetlands may affected by changing water levels, such as those that result from the lowering of stream flows where there is a hydrological connection between the waterbody and wetland. However, the water level in Doolans Creek Right Branch at the intake point is around 0.207 m when the flows are 65 l/s, and therefore, the reduction in water level in the creek due to the proposed take of 30 L/s would be no more than 0.1 m at the full rate of take.

In respect to seepage wetlands, they provide baseflow to Doolans Creek Right Branch and are located on the steep sides of the valley. Therefore, lowering water levels within the creek will not impact the groundwater gradient to the creek and will not impact upon the hydrological functioning of any of these seepage wetlands.

Riparian wetlands may be present downgradient to the location of the water take that could, potentially, be impacted by the lowering of water levels by 0.1m. However, e3 notes that the water take will only be occurring at the maximum rate of take for the equivalent of 16 days, and therefore the lower water levels would not be sustained over a long enough period to have effects on riparian wetlands.

6.5.2 Effects on Hydrology of Tarn

As has previously been described, the reservoir is proposed to be constructed in the location of an existing tarn. There are no downgradient wetlands that will be affected by the loss of seepage due to the construction of a lined reservoir.

While Armoured Swales A and B will divert stormwater and snowmelt that would otherwise enter the reservoir, the discharge points are specifically located along natural overtopping pathways from the tarn. This means that downstream groundwater recharge processes associated with the tarn are expected to be maintained in a manner similar to existing conditions.

Accordingly, although local stream flow pathways are modified, the overall hydrological functioning of the tarn (particularly its contribution to shallow groundwater) is not expected to be adversely affected.

6.5.3 Effects on Wetland and Stream Hydrology

The e3s Roads and Crossings Assessment considers any actual or potential effects of earthworks, access tracks and crossings on the hydrology of wetlands and streams. The effects have been considered in sub-headings below.

6.5.3.1 General Access Works – Rastus Burn

The proposed access road works are located within 100 m of a natural inland wetland (but not within 10 m), creating potential risks to wetland hydrology and sedimentation. Earthworks on steep slopes, including cut and fill activities, have the potential to alter natural drainage patterns, concentrate flows, and mobilise sediment that could be transported to downgradient wetlands.

The design approach developed for the site maintains existing sheet flow pathways across the landscape, avoiding flow concentration and diversion of water away from wetlands. The use of permeable materials (e.g. gabion baskets) and the presence of highly permeable bouldery substrates further reduce the likelihood of runoff reaching wetlands, as water is expected to infiltrate before entering sensitive areas. If not appropriately managed, concentrated discharge could increase erosion and sediment transport, but has been addressed through the proposed design approach.

To address the potential effects of general access track works within the Rastus Burn, e3s recommends the following mitigation measures:

> Maintain natural sheet flow across the road wherever practicable, including through ephemeral flow paths;

- Use side water channels to distribute flows as small, dispersed discharges rather than concentrated outlets.;
- Construct the road in short sections to reduce erosion risk;
- Install sediment control measures on the downslope side of the road;
- Use gabion baskets in steep areas to provide permeable fill and assist with sediment capture; and
- Avoid reliance on culverts that may concentrate flows and increase erosion risk.

These mitigation measures have been included in the proposed conditions contained in **Part H** of the application documents and detailed in the CEMP.

Overall, provided the proposed design and controls are implemented, effects on wetland hydrology and sedimentation are expected to be minimised and will not have an effect on the water level range or hydrological functioning (and thus will not result in the partial or complete drainage) of any natural inland wetlands.

6.5.3.2 General Access Works – Doolans Basin

The proposed access road works are located within 10 m and 100 m buffers of wetlands, requiring consideration of potential effects on wetland hydrology and sedimentation.

There is some potential risk where road cuts occur close to wetland boundaries, particularly adjacent to seepage and cushion bog wetlands near the Gondola base building. However, the road alignment and contours are generally such that wetland seepage patterns will be maintained. Similarly, along the access road to the Doolans Creek water intake, some downgradient wetlands may rely on flows intercepted by the road, but with appropriate design and management, no loss of hydrological function is expected.

During construction, there is a risk of sediment-laden discharge, however, with appropriate controls, as detailed below, long-term sediment inputs are expected to be very low.

e3s recommends the following mitigation measures to reduce any effects on wetlands:

- Minimise earthworks for temporary access tracks and use rubber matting in critical source areas.
- Clearly demarcate wetlands within 10 m prior to construction.
- Maintain natural sheet flow across roads to avoid altering wetland hydrology;

- Pause earthworks and undertake further assessment if significant groundwater is encountered in cuts and install permeable road sections if required to maintain connectivity;
- Implement dirty water diversion controls during construction, directing sediment-laden runoff to treatment areas (e.g. coconut coir logs) outside wetlands; and
- Contour roads to promote rapid discharge of stormwater and avoid concentration of flows.

These mitigation measures have been included in the proposed conditions contained in **Part H** of the application documents and will be detailed in the CEMP.

6.5.3.3 Permanent Crossings

The proposed stream and wetland crossings include splash crossings, culverts, permeable access roads, and a temporary crossing. Each structure has the potential to affect stream and wetland hydrology, primarily through modification of flow paths, disturbance during construction, and localised changes to channel form.

Splash crossings are designed to maintain natural stream flow and do not occur within wetlands; however, they will be located within 10 m and 100 m of a wetland. Splash crossings are generally located downgradient or cross-gradient to nearby wetlands, and they are not expected to affect wetland hydrology. No loss of stream or wetland extent is anticipated (i.e. through Splash Crossings A to F, as identified in the Roads and Crossing Assessment in **Part B**), although localised disturbance to streambeds will occur and will be managed through the use of rip rap.

Culvert crossings will cause localised changes to stream hydrology by altering channel profiles and flow dynamics. They will also result in a loss of stream extent within the culvert footprint and inlet and outlet protection areas (i.e. through Culvert Crossings A to I, as identified in the Roads and Crossings Assessment in **Part B**). There is potential for temporary disruption to wetland hydrology during construction, particularly where access routes pass through wetlands, and if flows are diverted for more than a short duration.

Further, there will be a loss of stream extent around culverts (equating to approximately 40m^2 or 0.5% of the tributary network):

- Upgradient of the culvert, due to local changes to flow as water enters the culvert;
- For the length of the culvert; and
- Downgradient where scour protection has been installed at the pipe outlet until it returns to natural stream bed.

Permeable access roads are proposed where access tracks cross wetlands to maintain hydrological connectivity. These are intended to avoid significant disruption to wetland flow paths, although some limited wetland vegetation loss will occur within the road footprint. The effects on wetland extent and value are considered by e3s in the Terrestrial Ecology Assessment; however, in summary, the total area of direct wetland loss through the use of permeable access tracks is approximately 2000m^2.

e3s proposes the following mitigation measures for the proposed crossings:

- Design splash crossings to maintain natural stream flow and use clean riprap to minimise sediment mobilisation;
- Limits construction within wetlands to short durations (within a day) to maintain hydrological connectivity;
- Ensure any temporary diversion of flows do not interrupt wetland water supply for more than short periods;
- Assess wetland flow paths during detailed design to determine where permeable access roads are required;
- Install permeable access roads to maintain wetland hydrology where crossings occur;
- Implement erosion and sediment controls on downgradient edges of access tracks to limit sediment discharge to wetlands;
- Undertake construction during periods of low water levels to reduce sediment mobilisation; and,
- Monitor wetland hydrology following construction of permeable access tracks and address any issues if they arise.

6.5.3.4 Temporary Access Tracks and Crossings

The proposal includes temporary access tracks, including one that crosses over a waterway, which includes the installation of a temporary culvert. The use of a temporary culvert is expected to have a lower impact on stream hydrology than other methods (e.g. a splash crossing). The culvert will be removed at the end of each construction season, and the crossing will not restrict flows or cause scour during high flow events. The culvert installation itself is not expected to result in discharges to down gradient wetlands.

None of the temporary access tracks directly intersect wetlands, however four tracks do come within 10 m of a natural inland wetland. Minimal earthworks (i.e. site scraping) and rubber matting are proposed to be used near critical source areas such as wetlands to

minimise potential effects associated with the establishment and use of temporary access tracks.

On the above basis, no adverse effects on stream or wetland hydrology, and no loss of stream or wetland extent, are anticipated by e3s.

6.5.3.5 Armoured Swales

Armoured Swales A and B

Armoured Swales A and B are proposed to divert stormwater and snowmelt away from the Water Storage Reservoir to reduce sedimentation. This will modify a section of intermittent stream hydrology, as flows will be redirected into the swales rather than entering the reservoir. However, discharge points are located along natural overtopping pathways, maintaining contributions to shallow groundwater consistent with existing conditions.

A riparian wetland upstream feeds the intermittent stream. To avoid adverse effects, Armoured Swale A should intersect the channel downstream of the wetland–stream transition. With this design, no impacts on the hydrology of upgradient or downgradient wetlands are anticipated. Wetlands within 10 m and 100 m of the works are positioned upgradient and are not expected to receive discharges or experience hydrological effects.

There will be a loss of stream extent between the interception point of Armoured Swale A and the reservoir, however, no loss of wetland extent is anticipated when the diversion is located downgradient of the wetland (as proposed).

Armoured Swale C

Armoured Swale C is proposed to convey stormwater along the outer edge of an existing moraine where access road discharge is not feasible, modifying local flow pathways by collecting and redirecting runoff to a downstream discharge point. While overall drainage function is maintained, there is potential for localised erosion or channelisation at the discharge location if flows are not appropriately managed.

Splash Crossing F is located within the same area as Armoured Swale C, and the interaction between these elements requires refinement during detailed design to ensure appropriate hydrological performance and avoid adverse effects.

Armoured Swale C is situated within 100 m of two wetlands. The upgradient wetland, fed by seepage from an intermittent stream upstream of the swale, is not expected to be affected as the swale is located downgradient. However, there is potential for effects on a downgradient wetland associated with Culvert C, where increased discharge flows may create a risk of localised scouring.

No loss of stream or wetland extent is anticipated, when the discharged flows are appropriately dispersed.

Armoured Swale D

Armoured Swale D is proposed to convey concentrated stormwater flows past nearby wetlands, thereby avoiding direct discharge into these sensitive areas. With the incorporation of the proposed permeable access road (Access Road H), wetland hydrology is expected to be maintained. No adverse hydrological effects on streams are anticipated as a result of this swale.

Earthworks and discharges associated with Armoured Swale D occur within 10 m and 100 m of wetlands and have the potential to create concentrated flows, which could lead to localised scour and sediment mobilisation. There is also a risk that poorly directed discharge could re-enter wetland areas and alter their hydrology.

e3 considers that with the recommended mitigation measures, there will be no loss of stream or wetland extent from the Armoured Swale D.

Summary

Armoured Swales A - D will modify local hydrology by diverting stormwater and intermittent stream flows, including a loss of stream extent where flows are intercepted upstream of the reservoir. However, flows are generally discharged in a manner consistent with natural pathways, maintaining groundwater contributions and avoiding effects on upgradient wetlands. Potential effects are limited to localised erosion or scour at discharge points, particularly for Swale C and Swale D, where flows may be concentrated near wetlands. With appropriate design, including downstream placement, flow dispersion, and integration with other controls, no loss of wetland extent or adverse effects on wetland hydrology are anticipated.

6.5.3.6 Gondola Towers

All gondola towers are located outside of wetlands and waterways, however two are located within 10 m of a natural inland wetland. As noted above, these will be accessed via existing or temporary access tracks. The wetlands will be delineated to avoid tower construction directly encroaching into the wetlands, and dewatering procedures (if required) will be undertaken in accordance with the draft CEMP to ensure the hydrological connectivity of the surrounding wetlands is maintained. These measures are considered to prevent complete or partial drainage of the two wetlands affected by tower construction.

6.5.3.7 Curvey Basin Utilities Trench

The Curvey Basin Utilities Trench will be located within the existing Curvey Basin access track. This track is already located, in places, within 10m of a natural inland wetland.

Trenching has the potential to act as a conduit of water away from wetlands or waterbodies. For the (existing) crossing of the Rastus Burn (which will be temporarily diverted to allow trenching to be placed, before replacing the culvert), the crossing gradient must maintain flow rates to avoid changing the water level in the upgradient wetlands.

If wetland hydrology is intersected, flow must be enabled to pass through the downgradient wetland.

Management measures proposed by e3s to manage these effects include:

> Using concrete collars up and downgradient in the trench is water is found, and the trench is acting as a conduit from it original drainage path;

> Divert clean water around the trench during construction to mitigate sediment mobilisation.

> Diversions of water are only to be used for a length of trenching that can be completed in one day, to ensure water flow to the downgradient wetland is maintained.

With the above measures in place, e3 concludes there will be no complete or partial drainage of wetlands and no change in the water level of wetlands as a result of the Curvey Basin trenching.

6.5.3.8 Remarkables Base Building

The Rastus Burn Building expansion and associated Remarkables Gondola Station and arrivals-related earthworks will not be located within 10m of a wetland. Earthworks associated with the expansion works and stormwater discharges from the building expansion will be undertaken within 100m of a wetland.

The earthworks are proposed within what is currently a large carpark where sediment and erosion control measures can be setup to mitigate discharges to wetlands. Stormwater discharges will be to the ground and then diverted to an existing piped system to the Rastus Burn, similar to the existing scenario.

Given the similarity in the existing and proposed stormwater discharges, e3s consider there will be no complete or partial drainage of wetlands between 10m and 100m of the wetland nor any change in the associated water levels.

6.5.3.9 Doolans Base Building and Learners Slope

Earthworks associated with the Doolans Base Building and Learners Slope are located within 10 m of a natural inland wetland, which drains towards a tributary where a culvert will be installed (Culvert A). The building and slope appear to be located outside of the wetland catchment; therefore, e3s does not expect the earthworks associated with these features to create any partial or complete drainage of the wetland.

6.6 FRESHWATER ECOLOGY AND QUALITY EFFECTS

e3s has prepared three technical reports relevant to the assessment of freshwater ecological and water quality effects associated with the Project. These comprise of:

- Terrestrial Ecology Assessment (relating to wetlands);
- Doolans Freshwater Ecology Assessment (relating to the tarns, weir, water take and reservoir); and
- Roads and Crossings Assessment.

The following sections provide a summary of the actual and potential freshwater ecological effects arising from the Project. Note that the effects arising from a hydrology perspective (including in terms of hydrological functioning of wetlands) are considered in Section 6.5.

6.6.1 In-water bed disturbance effects

The instream works will result in direct physical disturbance of approximately 136 m^2 of stream habitat, primarily affecting macroinvertebrates, algae and moss communities. The tributary streams are naturally fishless, with fish only recorded in the Rastus Burn 6 km downstream and in Doolans Creek more than 7.5 km downstream. Adverse effects on fish are therefore not anticipated. Sediment mobilisation is expected to be limited due to the low presence of deposited fine sediment within the channels. However, trenching activities, particularly where excavation is up to 2 m deep and 1 m wide through dewatered channels, have the potential to generate relatively higher localised sediment inputs.

In the context of the wider Doolans Basin stream network (approximately 8.2 km total length), the scale of instream disturbance is small, equating to around 1% of the total streambed. However, despite the relatively limited spatial extent and short duration of works, the tributary streams are identified as having high ecological value. There is also a specific risk associated with the use of concrete for bulkheads, where exposure of fresh or uncured concrete, slurry or washdown water to flowing water could result in alkaline leachate that is toxic to aquatic life, potentially causing localised macroinvertebrate mortality.

Overall, within the Doolans Basin Stream network, the magnitude of effect from in-water bed disturbance is assessed as moderate, reflecting the short-term nature of disturbance, limited spatial extent, and generally low sediment availability, but acknowledging the potential for sediment generation and concrete-related effects. When combined with the high ecological value of the receiving environment, the overall ecological effect is assessed as high.

In the context of the Rastus Burn, instream works will affect approximately 40m^2 or 0.26% of the streambed. These works are associated within re-establishment of splash crossings and culverts that already exist within the catchment but need to be removed to allow for trenching. The Rastus Burn has a moderate level of ecological value, with the relatively limited spatial extent and short duration of works result in the in-water bed disturbance is assessed as low. The overall level of ecological effect is assessed as low.

To effectively manage and reduce the potential level of effects arising from in-water bed disturbance, e3s recommends the following management measures are put in place:

> Earthworks will be undertaken, where practicable, during dry periods when stream flows are low and stable, and when intermittent channels are dry;

> All works will be undertaken in accordance with the CEMP and associated erosion and sediment control measures outlined in Enviroscope (2026);

> The CEMP will incorporate relevant in-stream works best practice guidelines, including working from the banks where practicable and minimising the disturbance footprint;

> The works area will be dewatered with a short diversion in place to ensure that the works area is isolated, and sediment laden water is pumped or drained to nearby sediment control devices;

> Disturbed streambanks will be stabilised using geotextile matting and replanted with dense, eco-sourced native tussock grasses to support rehabilitation and minimise erosion risk;

> Soil binding polymers will not be used;

> Work areas will be dewatered to isolate any concrete use, with any high-alkalinity water captured, pumped to a tanker, and removed offsite for disposal via a trade waste system. This approach will be documented in the CEMP; and

> The use of cement for bulkheads and how to minimise effects from its use is to be included in the CEMP.

With the above mitigation measures implemented effectively the residual ecological effect of in-water bed disturbance is assessed as low.

6.6.2 Stream Habitat Loss

The proposed works include the installation of five permanent culverts and one temporary culvert, resulting in a permanent habitat loss footprint of approximately 40 m^2, with an additional temporary loss of 8 m^2 associated with the culvert at Tower 14. Across the wider Doolans Basin tributary network (approximately 8.2 km in total length), the permanent culvert footprint represents around 0.5% of the overall stream habitat.

The placement of culverts will result in a permanent loss of streambed habitat within their footprint. However, culverts are designed to maintain flow and hydrological connectivity with downstream reaches. Given that the tributary streams are naturally fishless, the design does not need to accommodate fish passage, and no adverse effects on fish migration are anticipated.

The affected aquatic communities are characterised by low taxonomic richness and are dominated by pollution-sensitive mayflies. The presence of the data deficient stonefly[95] in Tributary C indicates some ecological value within the system, although the overall diversity remains limited.

Given the small spatial extent of permanent habitat loss, the low diversity of alpine-adapted aquatic communities affected, and the design approach, which retains stream function and habitat at splash crossings, the magnitude of effect is assessed as low. Considering the high ecological value of the receiving environment, but the limited scale of permanent disturbance, the overall ecological effect is assessed as low, and no further management actions were recommended.

6.6.3 Temporary waterway diversion and dewatering

The construction of access crossings will require temporary diversion of stream flow using coffer dams, such as sandbags or hydro barriers, with water conveyed downstream via pumping or pipe-drop structures. This approach will temporarily reduce flow within the immediate works area while maintaining downstream supply. The duration of these diversions is short, with each crossing expected to be completed within approximately two days.

[95] Stonefly *Zelandobius macburneyi*.

The temporary removal and redirection of flow has the potential to affect the hydrological regime locally. However, these effects are limited in scale and duration, as water is quickly bypassed around the works area and returned to the downstream channel. As a result, overall catchment flow is not expected to be materially altered. The diversion is also intended to reduce sediment generation within the active works area, with any sediment-laden water directed to treatment devices such as sediment sumps, turkey nests, or coir logs.

The macroinvertebrate community is unlikely to be significantly impacted downstream of the works, as individuals can temporarily utilise the hyporheic zone beneath the streambed during disturbance. Key habitat conditions, including low water temperatures and high dissolved oxygen levels that support alpine macroinvertebrate communities, will be maintained through the diversion process. As the tributary streams are naturally fishless, there are no effects on fish migration, spawning, or survival, and no fish salvage is required.

Given the short duration of works, the localised nature of flow diversion, and the limited ecological sensitivity in terms of species presence, the magnitude of effect associated with temporary damming and diversion is assessed as low. This results in an overall level of effect of low, and no further management actions are recommended.

6.6.4 Reservoir Inflow Diversion

The Project involves diverting an approximately 210 m long intermittent inflow channel around the reservoir via two armoured swales located upstream. This will alter the natural flow pathway, redirecting snowmelt and rainfall away from the reservoir and discharging it to terminal soakage fields. As a result, there will be a potential effect on the natural hydrological regime through the loss of direct inflow to the reservoir area and modification of the intermittent stream channel over the length affected by the diversion works.

E3s recommends that the diversion is designed to promote infiltration, with the armoured swales and terminal soakage fields facilitating rapid soakage to groundwater due to the loose, bouldery landform. This mitigation approach will reduce the likelihood of concentrated surface flows and associated erosion or sediment transport.

6.6.5 Removal of Tarn Habitat

The reservoir creation will lead to the permanent loss of 4,450 m^2 of tarn habitat within Tarn 3.

Based on sampling, e3s concluded that Tarn 3 had the lowest ecological values of the three assessed tarns and was largely functioning as an isolated pool rather than an ecologically significant wetland.

Although Tarn 3 assessed as having the lowest ecological value all the tarns assessed, it is still considered to have 'high' ecological value as they are classified as an uncommon wetland type. As there are no "like for like" tarn habitats available, any management actions to address this loss would need to be addressed through the development of a compensation package.

To address the loss of Tarn 3, NZSki is proposing to provide DOC with a one off payment of $20,000 towards the construction of a new boardwalk over the wetlands located on route to Lake Alta. Due to the popularity of the Lake Alta walking track, the boardwalk will support the ongoing rehabilitation and restoration of the wetland features and tributaries on route to the lake. This one-off payment is in addition to the Biodiversity Compensation Package, which is more focused towards the loss of terrestrial ecology (flora) and their supporting habitats.

6.6.6 Stormwater Run-off and Stream Sedimentation

During the construction phase, earthworks associated with road formation and trenching have the potential to generate sediment through the disturbance of exposed soils, gravel road surfaces, and cut slopes. Rainfall events could mobilise fine materials from these disturbed areas, increasing the risk of sediment runoff entering adjacent waterways and wetlands. Although works will be staged, progressive and kept as small as possible, with trench lengths limited to approximately 150 m per day, there remains a risk of sediment mobilisation, particularly during rainfall events when freshly exposed surfaces are most vulnerable.

The design approach, detailed in the Stormwater Assessment Report, minimises the extent of earthworks by limiting culvert installation and favouring splash crossings, with culverts only used in higher flow and more incised catchments. Across the wider site, stormwater will remain as sheet flow and follow existing drainage paths. It is proposed that roadside channels or swales will only be introduced where flow must be redirected to prevent scouring, overtopping, or sediment deposition. Further, all sediment control devices should be checked weekly during construction to ensure they are in working condition.

During the operational (post-construction) phase, there is potential for sheet flow runoff from the road corridor to transport fine sediment into adjacent waterways and wetlands. In most cases, runoff will disperse as sheet flow to the downslope side of the roading corridor, where sediment is expected to be filtered and retained within adjacent tussock vegetation. This natural filtering process will reduce the likelihood of sediment reaching sensitive receiving environments.

However, in locations where access swales are required to convey or redirect flows, there is potential for sediment to become concentrated and transported more efficiently toward downstream watercourses. Without appropriate controls, this could increase the risk of sediment inputs to sensitive aquatic habitats. In addition, some areas have been identified as being susceptible to scour, which could further contribute to sediment mobilisation if not appropriately managed.

Although the tributary streams support high ecological values, the macroinvertebrate community is of low density and diversity, and fish are absent. With erosion minimisation measures, stormwater separation, and effective sediment control, treatment, and maintenance in place, stormwater inputs are expected to result in only minor changes to baseline conditions. Accordingly, the magnitude of effect is assessed as low, resulting in an overall Low level of effect, with no further management actions required.

In reaching this conclusion, e3s has identified specific elements of the CEMP and ESCP that have informed their assessment. This includes a range of erosion and sediment control measures that are proposed to manage sedimentation related effects. Set out below, these measures have been reflected in the conditions of the consent, as set out in **Part H** of the application documents:

Construction phase measures proposed by e3s include:

- Earthworks areas will be kept as small as practicable and developed progressively to limit the extent of exposed soils;
- Trenching will be restricted to lengths that can be excavated and backfilled within a single day (approximately 150 m), reducing exposure to rainfall events;
- Topsoil will be stripped and retained for use in site reinstatement;
- Erosion and sediment control devices will be installed and maintained, with inspections undertaken on at least a weekly basis to ensure ongoing effectiveness;
- Non-structural controls will include staging and appropriate timing of works to reduce exposure during adverse weather;
- Structural controls will include, as relevant: clean and dirty water diversions, contour drains or swales, check dams, drop-out pits, drop-pipe structures, level spreaders, sediment sumps, silt fences, turkey nests, coconut coir logs, decanting earth bunds, and careful management of material stockpiles; and
- Progressive stabilisation and rehabilitation will be undertaken as works are completed.

Operational phase measures:

- Stormwater will generally be managed as sheet flow, allowing dispersion across vegetated areas to promote filtering and sediment retention;
- Where swales or channels are required, measures such as check dams and other sediment retention devices will be used to reduce flow velocity and limit sediment transport;
- Areas identified as susceptible to scour will receive additional protection; and
- Permanent erosion and sediment control devices (e.g. sediment sumps) will be regularly inspected (monthly when accessible, typically November to May) and maintained, with sediment removal triggered when capacity reaches 20%.

Given the high ecological value of the streams, verification monitoring is proposed to confirm the effectiveness of erosion and sediment control measures. This will involve annual summer monitoring of deposited fine sediment using the SAM 2 method at two representative downstream locations. The results will be compared to pre-works conditions, with deposited sediment levels to remain within 10%, to ensure no adverse ecological effects occur.

6.6.7 Stormwater discharge

Stormwater from buildings, particularly the proposed Gondola Base building complex, will be discharged to Tributary A, introducing potential contaminants associated with roofing materials, including zinc and copper. These metals can be toxic to aquatic life at elevated concentrations. Modelling based on conservative assumptions indicates that copper concentrations are expected to remain below guideline values, while zinc may slightly exceed guideline thresholds under a worst-case scenario using unpainted, untreated roofing. However, as the proposed roofing materials will be painted and treated, contaminant concentrations are expected to be lower, resulting in compliance with guideline values.

Given the low density and diversity of sensitive macroinvertebrate communities and the absence of fish, the introduction of roof-derived stormwater contaminants is anticipated to result in only a minor change from existing conditions. While the receiving environment is of high ecological value, the overall magnitude of effect is assessed as low, resulting in an overall low level of effect.

Although effects are anticipated to have a low level of effect, a precautionary approach is proposed by e3s, and the following mitigation measures have been proposed:

- Undertake monitoring of copper and zinc concentrations during spring snowmelt and two first-flush rainfall events across summer and autumn for the first two years following construction;
- Use painted and treated galvanised steel roofing to reduce zinc and copper leaching;
- Sample Tributary A upstream and downstream of stormwater discharge points at the Gondola Base building;
- Collect and analyse deposited fine sediment annually for copper and zinc concentrations (if present);
- Undertake annual summer macroinvertebrate surveys upstream and downstream of discharge locations to identify any ecological changes; and
- If monitoring identifies elevated copper or zinc concentrations above guideline levels, implement additional management measures such as:
  - Diverting first-flush stormwater to ground soakage; or
  - Installing universal pollutant treatment (UPT) devices to reduce contaminant concentrations.

6.6.8 Biosecurity

Didymo is present within the wider catchment (Rastus Burn and Doolans Creek at the basin floor) but has not been recorded in the tributary streams within the Doolans Basin. Construction activities, particularly the movement of vehicles and equipment through splash crossings, create a pathway for the transfer of didymo into these currently unaffected tributaries. If introduced, didymo has the potential to alter periphyton and macroinvertebrate communities, particularly in low phosphorus, stable stream environment, resulting in ecological shifts.

Given this risk, the introduction of didymo to the tributary streams is assessed as having a moderate magnitude of effect. When considered in the context of the high ecological value of the tributary streams, the overall ecological effect is assessed as high.

The proposed mitigation measures have been proposed by e3s for biosecurity matters, these include:

- Implement strict biosecurity protocols for all vehicles and equipment moving between catchments;
- Ensure vehicle wheels are washed after the final Rastus Burn splash crossing;

- Require all equipment used in Doolans Creek to be decontaminated before re-entering tributary streams; and
- Include detailed biosecurity procedures within the CEMP to prevent the transfer of didymo.

With effective implementation of these biosecurity measures, the risk of didymo spread can be substantially reduced, resulting in a residual ecological effect of low.

6.6.9 Weir Construction

Construction of the weir has the potential effects on freshwater ecology, including:

- Permanent loss of 20 m^2 of streambed habitat;
- Potential discharge of sediment to watercourses downstream associated with earthworks; and
- Potential to raise the alkalinity of the water associated with the use of cement.

e3s has recommended the following mitigation measures be implemented during weir construction to manage actual and potential effects:

- Any disturbed streambanks are to be replanted with at dense plantings of suitable native tussock grasses;
- Earthworks are to be undertaken during a dry period and associated low flow;
- Erosion and sediment control best practice approaches to be followed;
- In-water works guidelines (MfE, 2021) will be followed, such as working from the banks where possible, limiting the works area to the extent practical and preventing cement from entering flowing water; and
- The works area will be dewatered, cement use is isolated and any high alkalinity water pumped to a tanker and trucked offsite for disposal into a trade waste system.

All of these mitigation measures have been included in the proposed conditions contained in **Part H** of the application documents.

With the implementation of these measures, e3s considers a 'low' level of residual effects associated with weir construction.

6.6.10 Water Abstraction

Doolans Creek Right Branch is in the Nevis River catchment, which ORC identifies as having 21,89 l/s of available water allocation. The Project is proposing to take water from the

Doolans Creek Right Branch at a rate not exceeding 30 l/s from June to September, where the winter base flow is predicted to be approximately 67 l/s. A residual flow of at least 20 l/s will be maintained at all times immediately downstream of the point of abstraction.

The proposed water take will reduce flows for a total of 16 days within the upper reach of the Doolans Creek Right Branch, noting that this reach of the waterbody is fishless – fish are identified as being present in the stream around 7.4 km downstream of the abstraction point. The water take will only occur during the winter and spring months, where flows will be reduced for approximately 600 m before the next inflows increase the flow in the Doolans Creek Right Branch by 20%. At the downstream point where fish have been recorded, the proposed water take represents 20% of the mean annual low flow, for the 16 days that the take would be occurring. Based on this, e3s assessed the water take as having a low level of effect on freshwater ecology.

In addition, sediment is naturally transported downstream periodically in Doolans Creek Right Branch. Water abstraction may remove sediments through the water intake to the pumping chamber. The proposed design has a return pipe to aid with flushing sediment accumulated within the pumping chamber and pipes back to the Doolans Creek Right Branch downstream of the water take.

With the application of these extraction rates, water abstraction between June and September and intake design to return of stream sediments, e3s considers the level of effect associated with water abstraction on freshwater ecology is low.

6.6.11 Cumulative Effects

The proposal will result in a combination of freshwater habitat losses and modifications within the Doolans Basin. These include the total loss of approximately 60 m^2 of permanent stream habitat, reduction of 55 m of intermittent stream length, in-stream bed disturbance of approximately 136 m^2, and the loss of a small alpine tarn (4,450 m^2), as well as minor stream modification associated with the installation of a weir.

Collectively, these changes will contribute to an alteration of the existing freshwater environment, including a reduction in habitat extent and modification of natural features. The works will also affect the character of the basin, which is currently described as pristine, isolated, and largely undisturbed.

However, when the total extent of habitat loss and modification is considered relative to the wider freshwater environment and considering the temporal and spatial scales of the impacts and their interactions, the cumulative ecological effects are limited in scale. Consistent with the findings of the terrestrial and freshwater ecological assessments, the

overall cumulative effect on freshwater streams and tarns is therefore assessed as Low at a district and regional scale.

6.6.12 Summary

The proposed works, including roading, stream crossings, reservoir inflow diversion, trenching, and associated stormwater discharge, will result in limited disturbance to streambed and wetland habitats. Approximately 136 m^2 of instream habitat will be disturbed, with around 60 m^2 of stream extent and 2000m^2 of wetland extent permanently lost. These effects are small in scale, affecting tributary streams that support low diversity, fishless alpine communities.

Design approaches such as splash crossings, engineered permeable crossings, and minimised culvert use will maintain hydrological connectivity. While temporary diversions, dewatering, and trenching may generate sediment and involve the use of cement, these effects will be managed through adherence to the CEMP, erosion and sediment control best practice, and relevant in-stream works guidelines. Stormwater will predominantly be managed as sheet flow, with swales only used where necessary to control erosion.

Overall, with mitigation measures implemented, residual effects on stream habitat and sedimentation are expected to be Low, and cumulative freshwater ecological effects across the Doolans Basin are also assessed as Low. The exception being the loss of Tarn 3, for which the overall level of effect is considered very high due to the direct loss of a high-value waterbody. Compensation for this loss is provided through NZSki's proposed funding of a boardwalk over the wetlands near Lake Alta. Compensation for the loss of wetland is addressed in Section 6.4, through the Biodiversity Compensation Package.

All mitigation, management and compensation matters are detailed further in Section 7 of this application and conditions proposed by NZSki are provided in **Part H**.

6.7 LANDSCAPE, NATURAL CHARACTER AND VISUAL EFFECTS

The potential effects of the Project on the natural character, landscape, and visual values of the Site and the surrounding environment have been assessed in the Landscape Assessment and the Carpark and Bus Hub Landscape Assessment. A copy of these assessments is provided in **Part B** of the application document, with the key findings summarised below.

6.7.1 Visual Effects

Visual amenity effects are influenced by a number of factors, including the nature of the proposal, the landscape absorption capability and the character of the site and the

surrounding area. Visual amenity effects are also dependent on the distance between the viewer and the proposal, the complexity of the intervening landscape and the nature of the view.

6.7.1.1 Effects on Views of the Rastus Burn

As the Rastus Burn valley is physically and visually confined, views of the Rastus Burn are limited to short-distance viewpoints within the valley, viewpoints from the Ski Field Access Road and long-distance viewpoints from the Whakatipu Basin/Coronet Peak.

All viewpoints within the Rastus Burn are 'recreational' in that there are no permanent occupiers of the area. While the ski field expansion works will be readily visible alongside the existing ski field infrastructure, Boffa Miskell considers the presence of ski field infrastructure in the location of an existing ski field is an expected element of views in the area for recreational viewers and would be in character with the existing ski field environment. Any views of the Midstation on the skyline would be perceived within the context of the surrounding ski field and would blend into this expected experience. There would be no views from the main non-skiing recreational draw in the area, being Lake Alta, and limited visibility from Lake Alta Track. As such, Boffa Miskell considers there would be low adverse visual effects on views from within the Rastus Burn.

The proposed ski field expansion, including the gondola and Midstation on Helicopter Ridge, would only be visible intermittently from the Remarkables Ski Field Access Road, limited to short stretches of road approximately 1 – 2.5 km from the Rastus Burn Base Building and on the final approach to the top car parks/ base building. As travellers on the road would be aware that it is a ski field access road, any views of the ski field expansion would not be unexpected and would be perceived as in character with the existing ski field environment. The Midstation would appear on the skyline of the visual catchment; however, will be cut into the landscape to reduce its visual prominence. Retaining walls and earthworks below the Midstation will be visual, however. 'Unnatural' earthworks would be visible from the intermittent viewpoints however would only be apparent outside of snow seasons and the visual prominence would reduce over time as recolonisation with vegetation occurs. As such, Boffa Miskell considers there would be low adverse visual effects on views of the Rastus Burn from the ski field access road.

Longer distance views from Whakatipu Basin of the Rastus Burn are available via a narrow viewshaft to west of Lower Shotover Road to Domain Road, a short section of western Malaghans Road and the slopes below and around Coronet Peak. The viewing distance of approximately 10-15 km from these viewpoints means that the ski field expansion in the Rastus Burn would not be readily perceived or impactful on these viewpoints. As such, Boffa

Miskell considers there would be very low adverse visual effects on longer distance views of the Rastus Burn.

6.7.1.2 Effects on Views of Doolans Basin

Views of the Doolans Basin are limited to viewpoints from within the valley and from the surrounding ridgelines. All viewpoints within the Doolans Basin are 'recreational' in that there are no permanent occupiers of the area.

Within the Doolans Basin, the ski field expansion will be visible from a variety of viewpoints. Elevated viewpoints within the Basin will allow viewers to view the proposal in its entirety while lower viewpoints will experience intermittent views due to intervening ridgelines. The ski field expansion will introduce an entirely new component into the visual catchment that would not be in character with the existing largely natural surroundings views. Boffa Miskell considers these effects will be mitigated in part by the proposed recessive colours of the Midstation and Doolans cabin building, and that the ski field expansion has been designed to be relatively confined, avoiding sprawl across the entire Doolans Basin. As such, Boffa Miskell considers the overall adverse visual effects would range from moderate for distant viewpoints and high to close viewpoints within the Doolans Basin.

Due to intervening landforms, the ski field expansion would not be visible from the nearby recreational features including the DOC Glen Roy Raceman's back country hut, the 4WD access road from Coal Pit Saddle to Ben Cruachan or the Wye Creek Route hiking track.

The ski field expansion will be visible from the ridgeline immediately above the Doolans Basin as well as more distant viewpoints from Single Cone however the number of viewpoints and visibility of the ski field expansion will both be limited due to intervening landforms, and partially viewed in the context of the existing ski field, which will be visible on the other side of the ridgeline. As such, Boffa Miskell considers the overall adverse visual effects from the wider ridgeline would be low to moderate.

Longer distance views from the head of the Doolans Right Branch catchment will be limited, with oblique views available intermittently. At a viewing distance of approximately 2km, Boffa Miskell considers visibility would be low from this area, resulting in very low adverse visual effects.

6.7.1.3 Effects on Views of the Lower Remarkables Transit Hub

Views from SH6 may show earthworks and vegetation clearance for Carpark B. The low-lying carpark on mountain slopes is mostly hidden by foreground vegetation, with earthworks in the Coneburn Industrial area visible in the background. If glimpses of Carpark B appear, they would be consistent with other modifications, causing low visual effects.

Close-up views are blocked by mature deciduous trees between the road and the parking area, obscuring Carpark A and B. While partial glimpses of Carpark A are possible through the canopy, views of Carpark B and the Boneyard are partially blocked by landform. The Boneyard Carpark location is not visible from SH6. Nearby trees also block views from the road approaching from north and south, limiting short-range glimpses to about 350m of road, resulting in very low visual effects.

The Rastus Burn Recreation Area is accessed via the Remarkables Ski Field Access Road. Users will traverse through Carpark A and the proposed transit hub, which will be laid out differently; no adverse visual effects are expected from this proposed change. Views into the area will vary depending on the road's elevation relative to Carpark B. The creation of Carpark B large-scale earthworks will require vegetation removal and cut/ fill to create flat areas. To soften and break up views into the area, it is recommended to selectively plant native vegetation along parts of the northern edge (where existing vegetation or landform does not provide screening from the ski field road) and on the central escarpment between the split levels. This would reduce the moderate adverse visual effect of Carpark B that would otherwise be experienced along some sections of the access road to low.

The Boneyard Carpark is located in a visually confined area, surrounded by scrubby vegetation and landform, obscuring it from view along the access road. Only brief glimpses can be gained at the entrance to the area, resulting in very low visual effects, given that the area is an existing storage yard.

The southern part of Frankton faces the Kawarau River with the Remarkables West Face in the background. No views are possible towards Carparks A and Boneyard due to landforms. Carpark B is partially visible from some residences along Frankton's southern edge; however, views are indirect and obscured by vegetation. If glimpses are possible, Carpark B would look similar to earthworks in Coneburn Industrial Area to the south, with very low visual effects due to the low-lying location.

The Coneburn Industrial area extends along the lower slopes of the Remarkables Range, south of the Remarkables Ski Field Road. It is set back from SH6, behind bunds on the upper terraces, with existing development well screened by landform and vegetation, thereby blocking views of the proposed carparks. There will be no views from the Parkridge development, due to intervening vegetation and landform.

A few residential buildings exist along Stoney Creek Lane south of the site, where landform separates it from Carparks A and B. No adverse visual effects are expected on residences south of Stoney Creek Lane (4, 7, and 68).

Two residences north of Stoney Creek Lane, 83 and 86, look northwest and could gain views of Carpark B. Stoney Creek Lane 86, elevated and setback, is less likely to be affected, but Stoney Creek Lane 83, near the carpark, may see parts of it in its lower view. However, views towards Peninsula Hill and Queenstown Hill remain above the carpark. If the carpark is visible, adverse effects would be low due to the distance (>350m) and elevation difference.

No adverse visual effects are expected on the three residences to the north of the site (247, 247A, and 249 Kingston Road), as they are oriented north and separated from the application site by landform and vegetation.

6.7.2 Landscape Effects

Landscape character is derived from the distinct and recognisable pattern of elements that occur consistently in a particular landscape. It reflects particular combinations of geology, landform, soils, vegetation, land use and features of human settlement. It creates a unique sense of place, defining different areas of the landscape. The assessment of potential effects on the landscape considers effects on landscape character and values.

6.7.2.1 Landscape Effects in the Rastus Burn

Within the Rastus Burn catchment, effects on the landscape values of the area result from earthworks and the construction of the base station extension, gondola towers and stations and the access roads/return ski trails. These effects will be reduced, however, given that the Rastus Burn catchment already contains a substantial level of modification in the form of the existing ski field with its associated infrastructure and earthworks.

While the base station extension, gondola drive station and gondola towers 1-6 will be large structures with clearly visible built form, Boffa Miskell assesses the effects on the wider landscape values will be very low as these structures will be established wholly within the existing extent of the ski field and would be perceived as entirely in character with the existing ski field landscape.

By comparison, the construction of the Midstation, gondola towers 7-9 and extensions to the Curvey Basin and Sugar Bowl access roads will occur above the existing ski field and therefore within currently unmodified areas of the Rastus Burn. These physical modifications will impact the integrity, visual cohesiveness, naturalness, legibility and intactness of the unmodified areas including the Sugar Bowl tarn.

However, the proposed changes would be perceived cumulatively with and closely associated with the existing ski field development in the Rastus Burn, mitigating the effects on landscape values. Boffa Miskell assesses the adverse landscape effects of these

changes as low-moderate given the context of the existing perceived and associated landscape modifications in the Rastus Burn.

6.7.2.2 Landscape Effects in the Doolans Basin

In the short term, construction activities including high noise generating equipment, machinery, earthworks and increased human presence will impact the naturalness of the area and reduce the sense of remoteness.

As noted in Section 6.4 above, all new buildings, structures and infrastructure within the Doolans Basin have been informed by extensive ecological surveying of the catchment by e3 and site selection processes to avoid (to the extent practicable) disturbance of the highest ecological habitats. However, the presence of earthworks and modified built form will be apparent within the landscape, affecting the physical and perceptual values of the area. The establishment of the Midstation on the ridgeline will be widely visible within the Doolans Basin catchment, which will impact the naturalness, legibility, aesthetics, and intactness of the prominent ridge and natural skyline.

The proposed water take access road will extend the footprint of physical works within the Doolans Basin beyond the main ski area. While the water take structures will be relatively unobtrusive, the reservoir proposed to store the water will result in an alpine tarn being repurposed and lined to for water storage.

The proposal will also significantly increase the presence of human activity (skiers, visitors and staff) and machinery in the Doolans Basin on an ongoing basis along with increased noise which, while having effects within themselves, will also reduce the sense of isolation and remoteness in the Basin.

The proposal will also introduce artificial lighting into an area where none is currently present. While there may be some temporary construction lighting, permanent lighting will be limited to vehicle headlights, snow groomers and snow making equipment, with some external lighting mounted on the Midstation and cabin building. This lighting will be low lux and downlighting, however, and will be subject to restricted operational hours. There will be no overnight lighting within the Doolans Basin.

Overall, Boffa Miskell assesses the adverse effects on landscape values within the Doolans Basin as high during construction and high in the long term given the proposed modifications in a previously almost entirely unmodified environment will result in a high level of change reducing the natural values that contribute to the Outstanding Natural Landscape. Boffa Miskell has informed the site selection process with respect to the location (and co-location) of buildings and structures and the selection of building colour palettes. For this

reason, the mitigation that would ordinarily be recommended to mitigate landscape effects has already been integrated into the project design.

6.7.2.3 Landscape Effects Lower Remarkables Transit Hub

The Boneyard carpark, located on the edge of an ONL, lies along the base of the Remarkables Range. Its boundary excludes existing residential and industrial areas south of the ski field access road and the existing carparks, while residences north of the road and the existing storage area within the proposed Boneyard Carpark, which extends about 150m into the ONL. The Boneyard Carpark area is adjacent to the boundary and largely concealed by landform and vegetation, making the landscape change from minimal and unlikely to significantly affect the ONL.

Carpark A is outside the ONL, with only minor layout adjustments proposed to the existing access arrangements. These changes are localised and pose no adverse landscape or visual effects beyond the site.

Carpark B involves vegetation removal to create two-levelled parking areas over approximately 2.5 hectares, affecting native species like matagouri and coprosma. Earthworks will require substantial cut and fill, but much of the vegetation comprises invasive weeds. The existing escarpment will remain unchanged. These modifications will produce low to moderate landscape effects, consistent with previous land uses in the area.

Overall, landscape effects are very low for proposed Carpark A and the Boneyard, as the existing character is maintained without perceptible adverse impacts beyond the site.

The modification in the form of the proposed Carpark B will lead to low to moderate landscape effects due to the size of the proposed vegetation clearance. While the proposed mitigation planting will assist with the reduction of the effects on perceptual aspects of the landscape to a low level, the physical effects associated with the vegetation clearance will remain low-moderate, as planting will only occur along the perimeter/escarpment. This modification will occur adjacent to a part of the lower Remarkables slopes that currently exhibits a relatively high level of similar human modification.

6.7.3 Natural Character Effects

Effects on natural character consider changes in existing condition, across relevant attributes, such as those derived from changes in physical condition and characteristics of waterbodies encompassing their elements, patterns and processes, and how these are experienced.

6.7.3.1 Natural Character Effects in the Rastus Burn

Within the Rastus Burn catchment, effects on the natural character of the area arise as a result of the earthworks associated with the establishment of the base building extension, gondola towers and access roads.

The proposed gondola base station, towers and temporary access roads are located within an existing heavily modified area of the Rastus Burn. All earthworks will be undertaken in accordance with erosion and sediment controls, and any temporary access tracks will be remediated and revegetated once construction is complete. The long-term outcomes associated with establishing the proposed new ski infrastructure is therefore comparable to the existing environment, with low natural character effects in the short term, leading to a very low natural character effect once the access roads to the towers have been rehabilitated.

The extension to the Sugar Bowl access road and return trail will involve earthworks within proximity to an unmodified tarn and wetland within the Sugar Bowl Basin. Given the distance between these waterbodies and the access road and ski trail, the natural character effects are perceptual, rather than direct in nature. The construction and long-term effects on natural character are considered to be low.

Overall, Boffa Miskell assesses the natural character effects on freshwater vegetation communities within the Rastus Burn as low, given the existing level of landscape alteration. The perceptual aspects of natural character will also not be substantially impacted in areas where ski infrastructure already forms part of the existing environment.

6.7.3.2 Natural Character Effects in the Doolans Basin

Within the Doolans Basin catchment, it is anticipated there will be effects on the natural character of the area as a result of the earthworks associated with establishment of the cabin building, gondola towers, access roads, new water reservoir and new water take.

The location of all new buildings, structures and infrastructure within the Doolans Basin has been informed by extensive ecological surveying of the catchment by e3s, and site selection processes to avoid (to the extent practicable) disturbance of the highest ecological value wetlands, waterways and tarns within the catchment. This has assisted to minimise potential adverse natural character effects on these waterbodies.

Where proposed disturbance will occur within more common lower value freshwater ‘adjacent’ vegetation communities, such as snow tussock grassland, the abundance of these communities within the Basin means that minimal fragmentation is expected to

occur. Boffa Miskell assesses the natural character effects on these vegetation communities outside the wetlands, waterways and tarn areas to be moderate-to-high.

Fragmentation of, and changes to the functioning of, vegetation communities within the wetlands and waterways in the Doolans Basin has the potential to result in high natural character effects given the susceptibility of these communities to fragmentation and their very high ecological values. Several access roads (including the water take access road) will be required to cross the freshwater bodies. As a result, it is proposed to utilise culverts and low flow stream crossings to maintain the hydrological connection of these areas and maintain the hydrological and ecological functions of the freshwater bodies. Boffa Miskell assesses the natural character effects on these vegetation communities within the wetlands and waterways to be moderate-to-high.

The proposed conversion of the alpine tarn to water storage for snow-making purposes would essentially remove all natural elements, patterns and processes of the tarn given the need for modifications, changes to hydrological flows and lining and fencing of the tarn. Boffa Miskell therefore assesses the natural character effects on the tarn as very high.

The proposed installation of a weir intake structure and the associated taking of water from the Doolans Creek Right Branch is considered to have a low and localised long term natural character effect, provided the works occurs during low flows and erosion and sediment controls are in place. Conditions are proposed to secure these measures, therefore ensuring the natural character effects associated within the water take are low.

Construction works have the potential to introduce exotic vegetation/pest species into the catchment and create sedimentation effects on freshwater bodies. To manage these effects:

> Specific weed management measures are proposed to ensure no new exotic species are introduced into the wider landscape during construction and operation of the ski area; and,

> Erosion and sediment controls are proposed to minimise sedimentation effects.

In addition, NZSki is proposing to implement a pest management plan to address its contribution toward pest presence within the Doolans Basin.

The above measures are proposed to be secured through conditions imposed on both the resource consent and concessions sought. With the above controls in place, Boffa Miskell assesses the natural character effects from the potential for construction activities to introduce exotic species and cause sedimentation or erosion as moderate.

Due to the existing level of naturalness within the Doolans Basin and the perceptible changes to natural waterbodies, Boffa Miskell considers the overall effects on the natural character of freshwater within the Doolans Basin to be moderate to high, and very high in relation to the conversion of the tarn to a water reservoir, even with mitigation measures in place.

6.7.4 Cumulative Effects

The extent of ski field development proposed could give rise to adverse cumulative visual and landscape effects.

Boffa Miskell considers that cumulative visual effects within the Rastus Burn will be low due to the capacity of this area to absorb the change into the existing ski field area.

Within the Doolans Basin, the ski field expansion has been designed to consolidate and align the development as much as possible, creating a higher intensity of development within the expansion area, but avoiding wider sprawl across the Doolans Basin. Due to the number of components proposed, Boffa Miskell assesses the cumulative visual effects within the Doolans Basin as moderate.

In terms of vegetation loss and impacts on landscape values, the existing extent of the modified Remarkables Ski Area is approximately 60.6 hectares. The proposed ski field expansion will result in an additional disturbance of approximately 15.9 hectares; however, this only equates to approximately 0.2% of the subalpine and alpine environments in the Ecological District 1500 m ASL. As such, Boffa Miskell assesses the cumulative effects of the vegetation loss as low to moderate.

The main cumulative effects arising from the Lower Remarkables Transit Hub relate to Carpark B, since Carparks A and the Boneyard are amendments to existing modified areas without substantial increases in landscape and visual effects. Within the confined area of the north-eastern part of the Southern Corridor, the cumulative landscape effects are considered to be low to moderate, but not out of character with existing modifications.

6.7.5 Landscape, Natural Character and Visual Effects Summary

The Landscape Effects Assessment undertaken by Boffa Miskell concludes that the Project will result in a range of landscape, natural character and visual effects, the scale and significance of which vary across the Rastus Burn and Doolans Basin catchments and reflect the differing levels of existing modification and naturalness.

Within the Rastus Burn catchment, the majority of works are located within an already modified ski field environment. As a result, natural character, landscape and visual effects

are generally assessed as low to very low in the long term, following construction and rehabilitation of temporary works. Where new development extends into currently unmodified areas above the existing ski field, effects are assessed as low to moderate but are mitigated by their close association with and perception as an extension of the existing ski area. Overall, the Rastus Burn catchment is considered to have a high capacity to absorb change associated with the Project.

In contrast, the Doolans Basin comprises a highly unmodified environment with very high natural character and landscape values. The assessment concludes that the Project will result in moderate to high natural character effects on freshwater vegetation communities, with very high natural character effects on the currently unmodified tarn, and high landscape effects overall, due to the introduction of built form, earthworks, increased human activity, and modifications to natural landforms and hydro-ecological systems, including the conversion of an alpine tarn for water storage. However, the Project design has been informed by extensive ecological surveying and site selection processes to avoid higher value freshwater habitats to the extent practicable, consolidate development, and integrate mitigation measures into the layout, form and materials of the proposed infrastructure.

Visual effects within the Rastus Burn are assessed as low across short-, medium- and long-distance viewpoints, reflecting the recreational viewing context and the expectation of ski infrastructure within the existing ski field landscape. In the Doolans Basin, visual effects range from moderate to high for viewers within the Basin, with lower effects experienced from more distant and elevated viewpoints due to intervening landforms and the confined extent of development.

Overall, while the Project will result in notable landscape and natural character change within the Doolans Basin, these effects are considered in the context of a deliberately constrained and consolidated expansion footprint, integrated mitigation measures, and the limited extent of cumulative vegetation loss at the ecological district scale. The assessment concludes that, subject to the implementation of the proposed conditions and management measures, the identified landscape, natural character and visual effects are understood, appropriately managed, and capable of being accommodated within the receiving environments.

6.8 ELECTRICITY, TELECOMMUNICATIONS AND WATER SERVICING AND INFRASTRUCTURE EFFECTS

Stantec (2026b, 2026e, 2026f, 2026h, 2026j) have prepared servicing and infrastructure design reports for electricity, water supply, and telecommunications. A copy of these reports is included in **Part B** of the application documents.

The Project's electricity and telecommunication demands can be readily met by site specific electricity and telecommunication upgrades. Demand for potable water supply, firefighting and snow making is all available via new or existing water takes. While the siting and conceptual design for these is shown in **Part C** and detailed in the relevant Stantec reports contained in **Part B**, all electricity, telecommunications and water services can be provided on site without giving rise to adverse effects on the wider networks.

All electricity, telecommunications and water servicing will be subject to detailed design and certification requirements prior to servicing works commencing.

Effects relating to the management of stormwater are addresses throughout Section 6.4 and 6.5 and are not repeated here. Overall stormwater management on site has sought to adopt natural based management solutions to mimic natural hydrology and protect sensitive alpine ecosystems.

6.9 WASTEWATER EFFECTS

The effects of the wastewater discharge on freshwater ecology and water quality have been considered by e3s in the Rastus Burn Wastewater Assessment and the Wastewater Discharge Impact Assessment. These reports have been informed by the Stantec, Rastus Burn Wastewater Report. An overview of the effects set out in those reports is provided in the following sections.

6.9.1 Wastewater Management with the Doolans Basin

To avoid potential adverse effects associated within onsite treatment and disposal within the Doolans Basin, and to minimise further disturbance of land, wastewater will be piped via rising and falling mains from the Doolans Basin to the existing wastewater treatment system in the Rastus Burn. The detailed design of this system will be subject to detailed design and certification requirements prior to works commencing.

The following sections address the potential effects of the additional pressure on the existing Rastus Burn wastewater treatment plant as a result of wastewater from the Doolans Basin being treated by that system.

6.9.2 Existing Wastewater Management within the Rastus Burn

6.9.2.1 Existing Discharge Quality and Effects

e3s (2026d) have undertaken a review of existing monitoring information collected as a requirement of NZSki's existing discharge permit, as NZSki will continue to operate under this system until 2029. In addition, this review has formed the basis for determining the performance standards for the upgraded wastewater treatment system.

Existing Compliance Monitoring

The existing consent requires a monthly monitoring regime of treated effluent (discharge pipe), groundwater and surface water quality across four representative locations. The relevant monitoring parameters are set out in **Table 6-1**.

Table 6-1: Compliance Monitoring Laboratory Analysis Suites.

Effluent	Water
i. BODs	i. Dissolved Reactive Phosphorus
ii. Faecal Coliforms	ii. Escherichia coli/faecal coliforms
iii. Total Phosphorus	iii. Nitrate-nitrite
iv. Ammoniacal nitrogen	iv. Ammoniacal Nitrogen
v. pH	v. Conductivity
vi. Total Suspended Solids	vi. pH
vii. *Escherichia coli*	vii. Total Nitrogen
	viii. Turbidity

Wastewater Flows

The measured monthly wastewater flows between 2016-2025 indicate that average flows peak in August during the ski season, with the lowest average flows recorded during January. Throughout the monitoring period of 2016-2025, the annual discharge volume has ranged from a minimum of 15,227 m^3 (2016) to a maximum of 17,724 m^3 (2022). The monitored discharge records show clear winter peaks during the ski season while remaining below the consented maximum daily discharge rate of 127.44 m^3/day throughout all months of the year.

Discharges from the wastewater system occur outside the ski season as a result of the by-wash system and biannual tank maintenance. These discharges can result in wastewater flows above the per person design flows of 35L/day, however maintenance events are relatively irregular, and by-wash is clean water meaning the potential effects from discharges outside the ski season are relatively small by comparison to those that potentially occur during the ski season.

6.9.2.2 Rastus Burn (Receiving Environment) Water Quality

The compliance monitoring results have shown that there are measurable but slight effects on the quality of water in the Rastus Burn from the existing discharge of wastewater to land. The dominant effects are noted as elevated nutrients and pathogens (faecal indicators) during the months of the ski season. Concentrations are, however, orders of magnitude lower than the concentrations in the effluent discharged to land indicating that high

amounts of attenuation, via treatment, or dilution are occurring. Instream ecological data was extracted from the NZSki bi-annual biological compliance monitoring reports (Ryder Consulting 2014, 2017; SLR 2023, 2025). In general, NZSki appears to be managing the overall nutrient load so that the instream values remain in 'good to excellent' condition.

Despite the above, it should be noted that a leak reported in July 2023 resulted in elevated concentrations of wastewater contaminants in the Rastus Burn (including the upstream sample) measured on 12 July 2023. The leak was noted on 14 of July due to no or low recorded flows passing through the flow meter from 5 July 2023. An inspection of the wastewater management system identified a blockage in one of the rodding eyes with effluent being expelled from it and flowing over land into the Rastus Burn just upstream of the upstream sample location. The leak was fixed, and processes updated to check flows daily for any indication of loss of flow. As noted in the annual report for that year, the concentration of contaminants in the Rastus Burn reduced back to typical concentrations in the August sample.

Further details about the results of the ongoing monitoring of water quality in the Rastus Burn are set out below.

Nitrogen

During the ski season, negligible organic nitrogen is discharged to land, with ammoniacal nitrogen 100% of the nitrogen discharge due to low temperatures limiting nitrification. During the summer months, when temperatures are warmer, microbial communities are able to nitrify and thus nitrate concentrations increase. The levels of ammoniacal nitrogen are occurring at an acceptable level less than the 99% Default guideline value ("**DGV**") for a pH of 7.2, a water temperature less than 10 and at a level that can be processed by instream aquatic fauna.

The concentrations of ammoniacal nitrogen in the Rastus Burn do not exceed the ANZG (2018) DGV for nitrate toxicity and are an order of magnitude below the guideline value and good water quality Schedule 15 limits of the Water Plan (as demonstrated in **Figure 6-1**). On one occasion, concentrations did exceed the ANZG DGV, which was the result of a documented leak in 2023, which is excluded as an anomaly as a short-term duration event (<1 week).

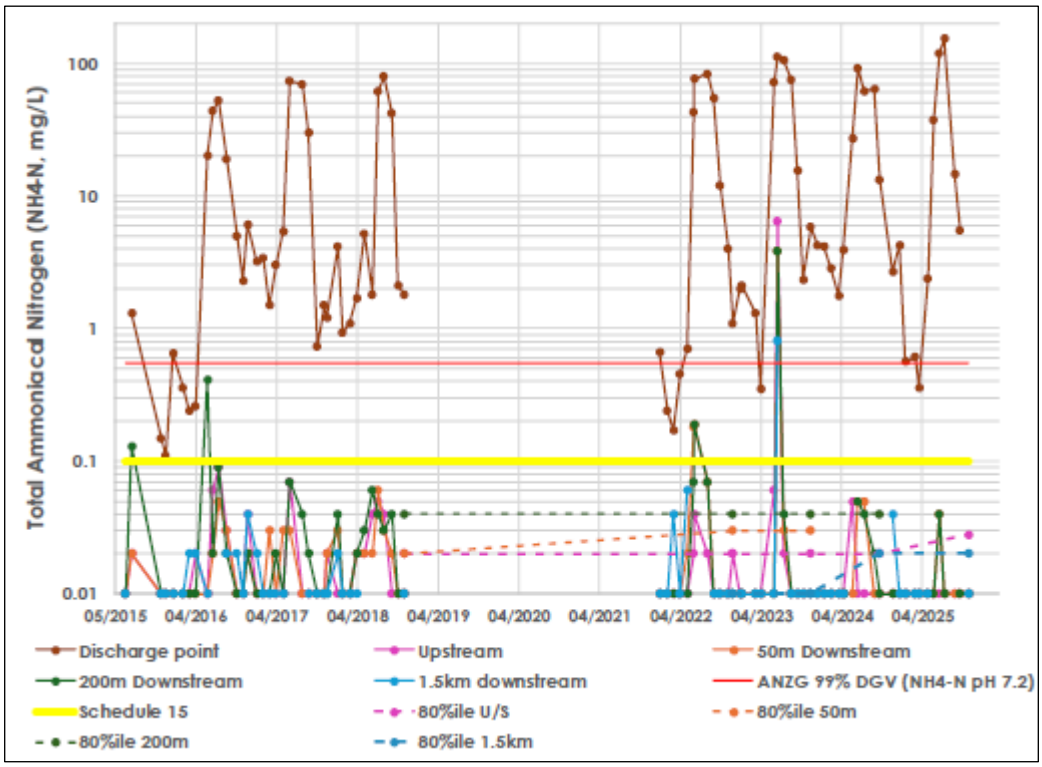

Figure 6-1: Total Ammoniacal Nitrogen Compliance Monitoring Results.

The nitrate concentration is inverse to the treated discharge in that the highest concentrations are observed in winter and lower concentrations in summer. The nitrate concentrations in the Rastus Burn do not exceed the ANZG (2018) DGV for nitrate toxicity effects and are at an order of magnitude below the guideline value (refer to **Figure 6-2)**.

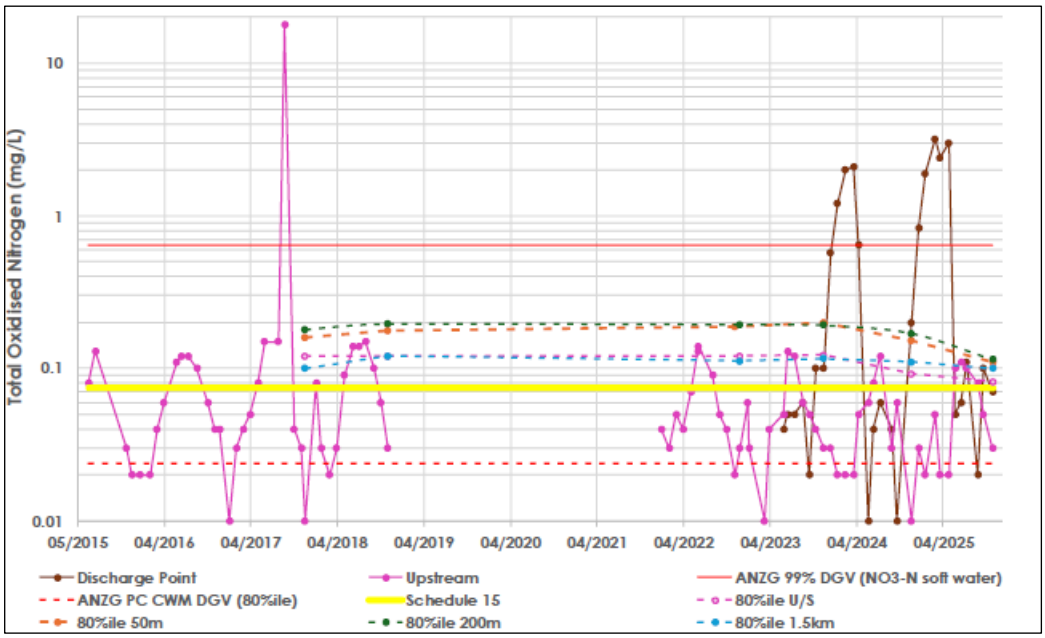

Figure 6-2: Total Oxidised Nitrogen (Nitrate) Compliance Monitoring Results.

Critically, the monthly upstream concentrations frequently exceed the Schedule 15 limit and 80% of upstream samples over a five-year period also exceed these limits. In the off-season, nitrate concentrations measured at the infiltration basin discharge point are less than upstream samples therefore the source of nitrate in the Rastus Burn is likely related to diffuse biogeochemical processes occurring in the wider ski area and not related to the point source nutrient load which is largely discharged during winter.

Total Oxidised Nitrogen at 1.5 km downstream appear to be similar to upstream samples indicating that by distance waters have diluted or processed all discharge effects. The nitrate toxicity DGV has never been exceeded.

Phosphorous

Prior to 2023, only total phosphorous was tested at the discharge point, while Dissolved Reactive Phosphorous ("**DRP**") was tested at other monitoring locations. DRP represents an average 70% of total phosphorous in the off-season while in the ski season it makes up 50% of total phosphorous. During the ski season, influent increases in strength significantly with more solid material entering the on-site wastewater management system increasing the proportion of phosphorous and total phosphorous. Currently, DRP is meeting the Water Plan Schedule 15 limits of 0.01 mg/L but occasionally exceeds the didymo growth limit of 0.002 mg/L, below which, didymo blooms are more likely. There is a clear trend in the water quality of Rastus Burn that demonstrates that there is a source of DRP upgradient of the

dispersal field which may be from weathering/erosion of schist bedrock and subsequent nutrient cycling in the lakes and wetland areas in the upper catchment.

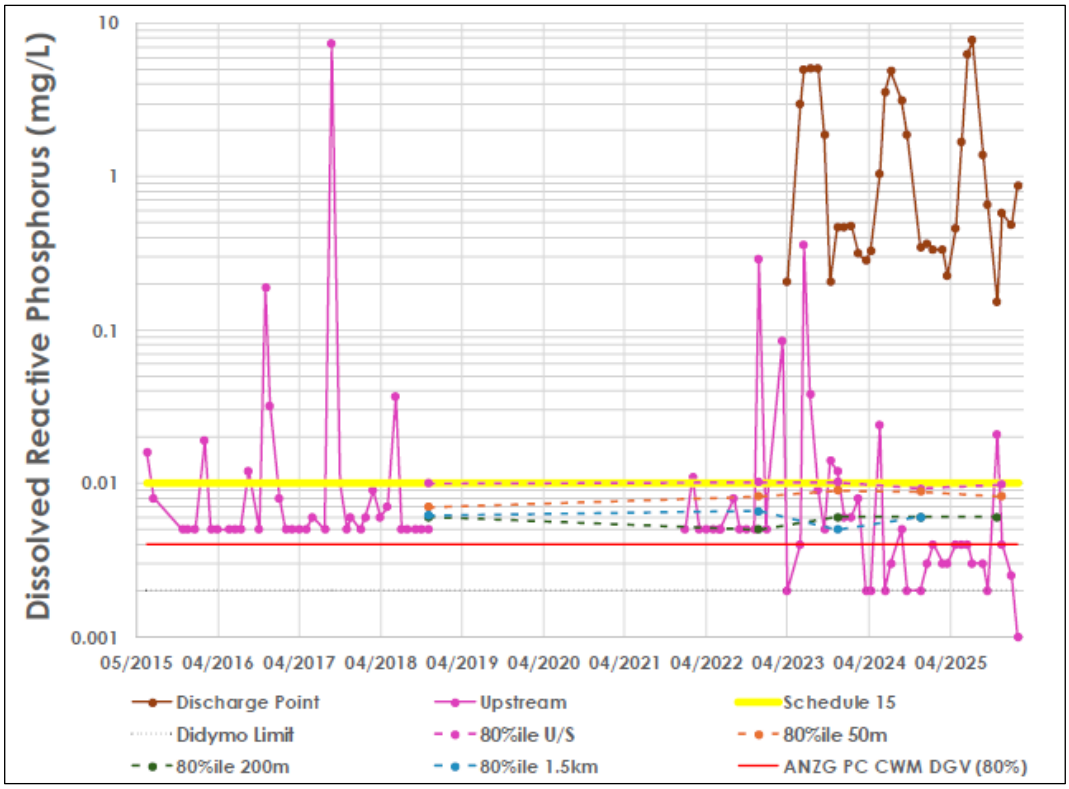

Figure 6-3: Dissolved Reactive Phosphorous Compliance Monitoring Results.

6.9.2.3 Other Monitored Parameters

Other 'less critical' parameters are also monitored in the Rastus person. These include e.coli, conductivity, suspended solids and pH. A discussion on each of these is provided below.

E.coli

The same trends for nitrogen are present for *E. coli* which show occasional measurable impacts to the Rastus Burn during the ski-season when higher flows are discharged to the dispersal field. All Rastus Burn concentrations meet the schedule 15 limit of 260 cfu/100ml which understood to be a limit that is protective of recreational contact. It should be noted there are not expected to be any recreational users of the Rastus Burn.

Total Suspended Solids/Turbidity

Total suspended solids ("**TSS**") and turbidity are tested at the discharge point, and turbidity is tested at the compliance monitoring locations in the Rastus Burn identified in Section

3.8.1. The results indicate higher turbidity at the upstream site, which is not impacted by the wastewater discharge, such that the Schedule 15 limits in the ORC Regional Water Plan have been exceeded. While concentrations at the 50 m and 200 m downstream monitoring sites have also recently exceeded the limit, this is by a lesser amount than the upstream value indicating dilution with distance from the source of sediment/turbidity. For completeness, it should be noted that the 1,500 m downstream monitoring site complies with the Schedule 15 limit. Overall, there appears to be no correlation between the wastewater discharge and concentration of sediment in the Rastus Burn and the infiltration basins and receiving substrate are providing significant filtering of suspended particles.

Conductivity

The conductivity in the Rastus Burn is low to moderate, which is expected for waters in the alpine headwaters, and strongly influenced by seasonal flow patterns. Given the wastewater discharge exhibits higher conductivity of up to 1,000 µS/cm in winter, the low conductivity in the Rastus Burn during winter provides evidence of dilution.

The largest dilution and decrease in concentration occurs in spring during higher flows after snowmelt. Conductivity concentrations increase in winter as precipitation is stored as snow and July is the month of lowest flows.

pH

Monthly monitoring of discharge pH ranges from over 8 in winter to less than 7 during summer. The Rastus Burn is effectively neutral (upstream has an average of pH 7.2), while there is significant variability along the monitored reach. On one occasion in 2024 the downstream 200 m pH was elevated above pH 8 but the next month's sample had returned to typical values.

Compliance monitoring results show that water quality in the Rastus Burn does not meet the ANZG (2018) guideline values, however this is not considered to be an issue because downstream and upstream monitoring results are within 10% of each other and are not indicative of any adverse effects from the existing wastewater discharge.

6.9.2.4 Dilution and Attenuation

The concentrations of contaminants in the Rastus Burn from the effluent discharge to land are slight but measurable (refer to **Figure 6-4** below). As the dispersal field does not offer any land treatment, dilution and attenuation are the dominant process which mitigates the effects of the discharge on the Rastus Burn. As the discharge infiltrates through the vadose zone, the discharge will be attenuated. Dilution occurs as the infiltrating plume of

wastewater mixes with the excellent quality groundwater beneath the dispersal field. Further dilution occurs as groundwater discharge to the excellent quality Rastus Burn water.

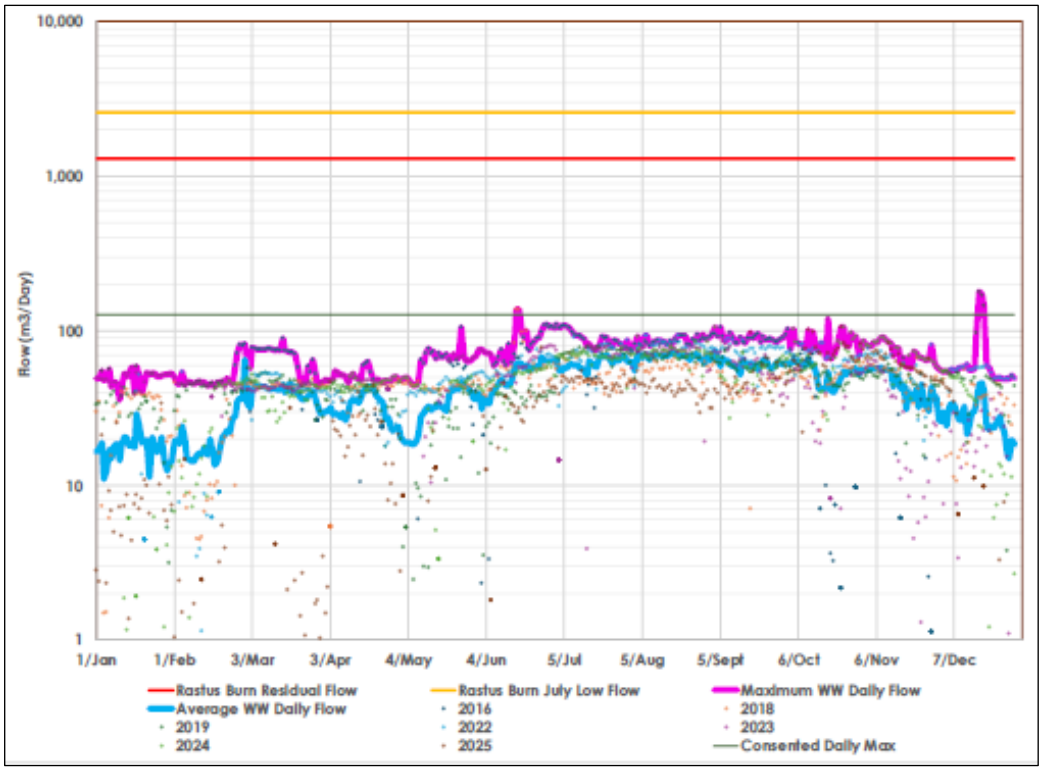

Figure 6-4: Comparison of Modelled Rastus Burn Flows to Remarkables Wastewater Discharge.

Noting the residual flow of 15L/s is required to be maintained in the Rastus Burn below the water take, this residual flow likely represents <1% of all flows and is a useful worst-case scenario, noting that there are additional flows into the Rastus Burn below the water take. The consented maximum discharge into a residual flow of 15 L/s would be diluted 10:1, and the average effluent peak flow of 66 m^3/day would be diluted to 19:1. With an average flow of 25 L/s the surface water dilution of the wastewater flows would increase to 17:1 for the consented maximum discharge and 32:1 for the average effluent peak flow.

Figure 6-5 presents the total nitrogen concentration in the discharge (brown line) during the off season (black arrows) and ski season (blue arrows) compared to the Rastus Burn and includes a useful metric (red arrow) during a reported leak accident demonstrating the dilution that would occur should the discharge be direct to water at a dilution of 18:1. The average ski-season ratio, as measured at the downstream 50 m/200 m is around 170:1.

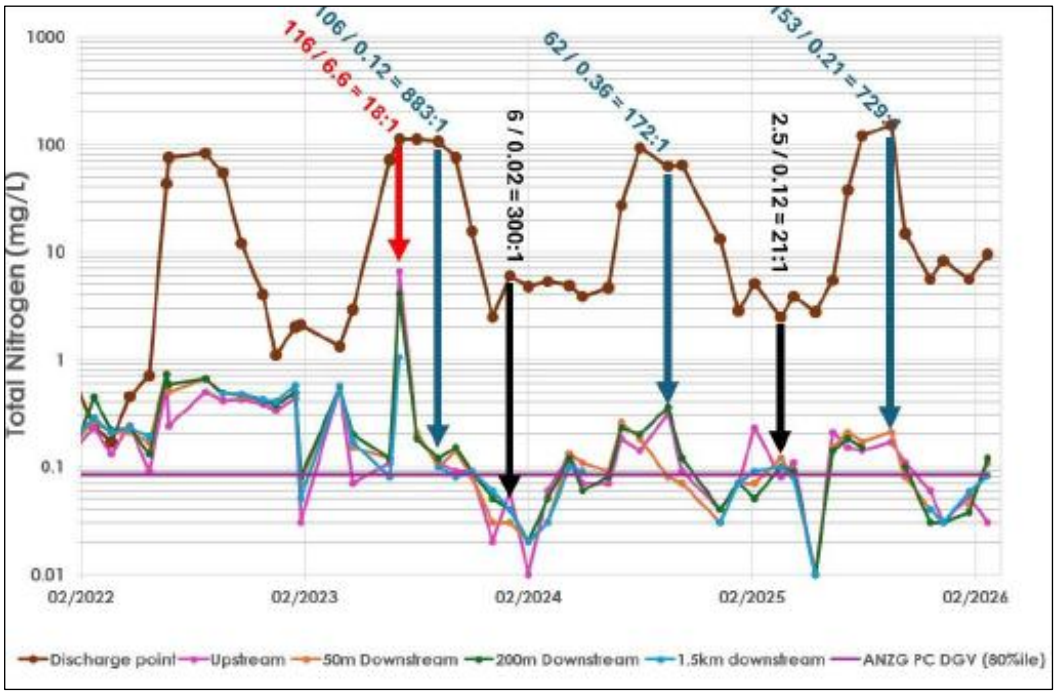

Figure 6-5: Range of dilutions of Total Nitrogen (mg/L) from discharge to Rastus Burn.

The blue arrows reflect a compliant ski season discharge where all wastewater is discharged to the infiltration basins and whereby dilution is orders of magnitude higher. This reflects that the attenuation and dilution is occurring in the dispersal field and groundwater prior to diffuse and discharge along the adjacent reach in the Rastus Burn. In the off season, dilution rates range from 300:1 to 21:1; with variation due to Rastus Burn flows increasing with spring snow melt and a slow taper off towards autumn and lower rates of wastewater generation with fewer people using the public toilet facilities.

6.9.2.5 Existing Contaminant Load to Receiving Environment (Rastus Burn Catchment)

Monthly and annual total nutrient loads were estimated because they have the greatest potential to result in adverse effects to the receiving aquatic ecosystem. It was observed that a threshold nutrient load was crossed in 2023 resulting in good-excellent instream values being degraded to 'Fair to Good'. In 2025, the nutrient loading decreased again, and monitoring of instream quality indicators reported a return to good-excellent condition at all sites. Accordingly, a nutrient load threshold has been determined in the form of performance criteria based on the loads from these years, which is expected to maintain good to excellent instream values.

Nitrogen Load

The estimated nutrient loads from 2016-2018 appear to have doubled by 2022-2023 and then reduced to lower values in 2025 (refer to **Figure 6-6**). The increase in load in 2022/2023 appears to be related to increases in wastewater flows and slight increase in nitrogen concentrations. Although there is an increasing trend in total nitrogen concentration over time (refer to **Figure 6-5**), lower flows in 2025 resulted in lower loads.

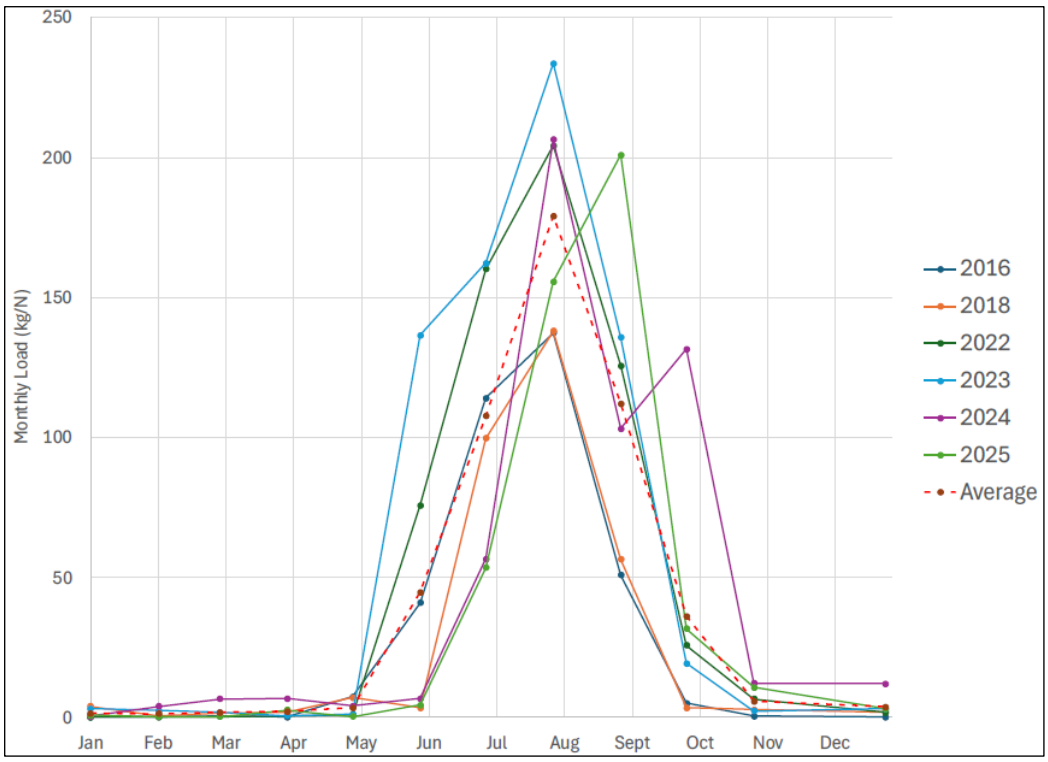

Figure 6-6: Estimated Monthly Total Nitrogen Load.

The seasonal nature of the discharge containing the highest loads during winter-spring ski season means that this coincides with the lowest flows of the Rastus Burn resulting in a slight but measurable nutrient load but not to the extent likely to result in periphyton productivity increases or chronic adverse effects on grazing invertebrates. The biological components in the treatment system are active from October to May, converting ammonia to nitrite/nitrate. At this time of year, the increases in Rastus Burn flow, water temperature and daylight length allows instream flora and fauna to process accumulated nutrients.

Phosphorus Load

Phosphorous inputs to the Rastus Burn catchment are modest (as represented within **Figure 6-7**) with concentrations in the Rastus Burn from 2024 and 2025 below the Schedule 15 ORC limit.

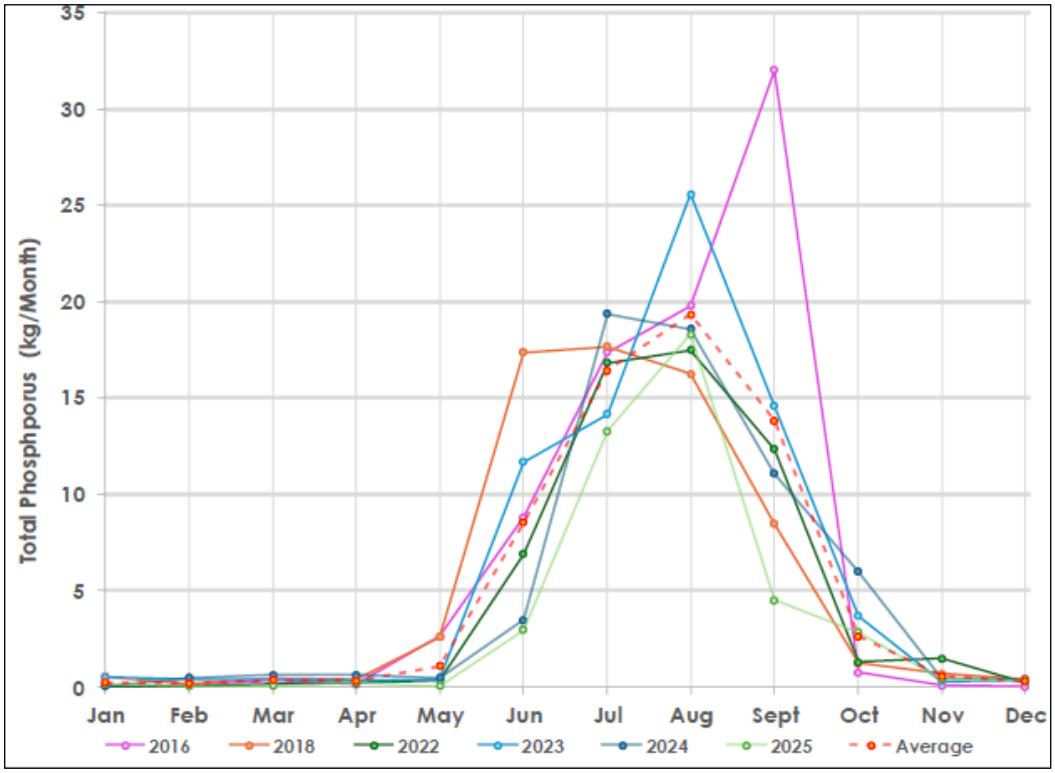

Figure 6-7: Estimated Monthly Total Phosphorus Load.

Other Contaminants

Total suspended solids are not a concern for the Rastus Burn as the highly permeable gravel bedded basins filter the discharge. It is proposed that the good performance of the infiltration basins be maintained via a combination of total suspended solids discharge limits, infiltration basin infiltration monitoring and, if needed, basin maintenance to maintain the required infiltration capacity.

The organic loading rate is not critical at the site as the dispersal field is not designed for land treatment. Further, algal mats are unlikely to grow in pores as the temperatures are too cold.

Discharging the wastewater via the dispersal field presently provides excellent pathogen removal in the Rastus Burn catchment (as indicated by E.coli) due to the thickness of sandy gravel above the groundwater table and the distance that pathogens must travel before entering a surface water body.

6.9.3 Proposed Wastewater Management and Discharges within the Rastus Burn

The current wastewater system on Site provides primary treatment to the wastewater discharge, whereby only solids are removed. An upgraded wastewater treatment plant is proposed, which will treat both the existing wastewater and additional wastewater generated in the Doolans catchment, as described in Section 3.4.4.3.

The following assessment of effects is based on the upgraded wastewater system operating to the proposed performance criteria to ensure that the existing water quality and ecosystem health conditions are maintained under future development scenarios. That is, that the measurable water quality effects remain at an acceptable level, and the reported good to excellent ecosystem health is maintained.

As previously described, the existing wastewater treatment system and associated compliance monitoring, has formed the basis for developing the performance criteria that any upgraded wastewater treatment system must meet. The performance criteria are described in Section 3.8.1 of this substantive application.

6.9.3.1 Effects on Soils and Plants

The wastewater discharge primarily occurs over winter when biological activity is likely to be low, as snow covers soil and plants. The soil and plants most likely to interact with the impacted groundwaters are in the riparian margin of the Rastus Burn for the reach adjacent to the dispersal field. This is primarily where seeps occur as groundwater is forced to the surface by bedrock or hydraulic head.

The groundwater discharge to the Rastus Burn is understood to occur as diffuse recharge across the whole adjacent reach. These seeps have yet to be sampled but may discharge diluted impacted groundwaters with short distances into the Rastus Burn. Soils and the flora and fauna that cohabitate in the riparian margin may have a slight benefit from the increase in nutrients. Clogging of pore spaces will not occur as the riparian margin is in places up to 100 m from the discharge, and therefore all organic matter is expected to have been assimilated prior to any discharge to seeps.

Overall, e3s concludes there likely to be negligible effects on soil and flora/fauna.

6.9.3.2 Effects on Natural Inland Wetlands

As discussed in Section 3.8.1, based on aerial photography analysis there are two seepage wetlands in close proximity to the infiltration basins. The hydraulic connection of the wetlands to groundwater is uncertain, however if connected, it is possible that they will experience a slight increase in flow as a result of the proposed increase in wastewater volume.

Given the proposed nutrient loadings will be maintained, and the increase in wastewater flow is slight, there is not expected to be a measurable effect on these wetlands.

6.9.3.3 Groundwater Quality

Groundwater quality is affected in the immediate vicinity of the dispersal field. The groundwater migrates to the north and west and most likely recharges to the Rastus Burn due to hydraulic head and/or shallow bedrock forcing groundwater to the surface at nick points (waterfalls). The dominant permeability in the dispersal field is most likely in the horizontal plane. Secondary permeability in the vertical direction (i.e. downwards) allows for infiltration to continue until it is eventually stopped by the presence of a low permeability layer, i.e. the shallow schist bedrock identified during the recent drilling.

Due to the slope of the land, the hydraulic gradient is steep which results in groundwater flowing downgradient along permeable horizons in the unconsolidated materials, and further horizontal flow along the upper surface of the bedrock. It is possible some flow partitioning occurs with groundwater entering fracture networks in the schist bedrock but it is unlikely that this is a significant proportion of the impacted groundwater, due to the relative contrast in permeability between the bedrock and overlying alluvial/colluvial materials.

For fracture networks to be an issue for this site they would need to be connected over vast distances and as there are no human groundwater users in the vicinity of the discharge in which impacted groundwater is likely to be present (a nominal 1 km radius), effects on human groundwater users are unlikely.

6.9.3.4 Surface Water Quality

In the steep Rastus Burn catchment, the impacted groundwater is forced to the surface by the concave morphology of the shallow bedrock which concentrates flow downslope. Groundwater may gain or lose flow from surface water and therefore the potential for adverse effects from the degraded groundwater quality are considered for surface water quality, the receptors living in the surface water, and other users of surface water.

During the ski season there are slight but measurable impacts in the Rastus Burn reach adjacent to the infiltration basins. To date, compliance monitoring results indicate that most adopted guideline values are being met for the contaminants of concern. Further, biennial biological monitoring indicates that the Rastus Burn has good to excellent ecosystem health when considering the instream values (periphyton, invertebrates).

The downstream 1,500 m monitoring site in the Rastus Burn generally shows no effects or very minor effects, indicating that water quality returns to its upstream values over this

distance. Surface water is likely to be used by grazing pests (deer, chamois) but the key risk to these species is from pathogen or ingestion of toxic algae, and neither of these risk factors are consistently present in the Rastus Burn at concentrations that would be cause for concern.

Overall, there is a slight but measurable effect on surface water quality under the existing discharge conditions, however, to date the effects are considered acceptable. As long as the proposed increase in wastewater volumes is managed to maintain the current standard of water quality in the catchment as proposed, there will be no increase in the scale or intensity of adverse effects on water quality compared to those which are currently occurring within the Rastus Burn.

6.9.3.5 Freshwater Ecology

As discussed in Section 3.8.1 the Rastus Burn has been assessed as having moderate ecological value based on an assessment against the EIANZ Guidelines.

Effects on freshwater ecology primarily relate to nutrient enrichment but can be compounded by associated effects from elevated water temperatures and reduced dissolved oxygen. Each of these is summarised below.

Nutrient Enrichment

Increased nutrient loads have been shown to generally influence algal community growth rates and composition. The Rastus Burn has a low diversity macroinvertebrate community dominated by pollution sensitive mayflies and is naturally fishless at this location. Small nutrient increases may increase algal growth rates and associated macroinvertebrate grazer densities as the system becomes more productive. A minor shift in in macroinvertebrate densities would suggest the ecosystem is absorbing the increased productivity. A shift in the spring or autumn algal composition and biomass and an associated shift in the macroinvertebrate composition would be indicative of a more degraded ecosystem.

The upgraded wastewater system will enable the greater volume of wastewater to be treated and disposed to land without increasing the annual nutrient load above the performance criteria (which are, as previously described, based on a review of the effects of historical discharges). The current nutrient loads have been assessed not to be adversely affecting the freshwater ecology of the Rastus Burn, provided there are no direct discharges of untreated wastewater to the stream. Therefore, the increased wastewater volume to a maximum of 204 m^3/day combined with the implementation of performance criteria, will equate to a low magnitude and a low level of effect.

Reduced Dissolved Oxygen

The Rastus Burn is well oxygenated (near 100%) and a reduction to even 90% may be ecologically meaningful at this location. However, because the wastewater discharge is to land via the infiltration basins, organic material in the wastewater is 'filtered', which strips out the organic matter that could otherwise drive a reduction in dissolved oxygen in the Rastus Burn.

It has been assessed by e3s that there will be a very low level of effect in respect of reduced dissolved oxygen

Thermal Change

Wastewater infrastructure will be thermally protected to prevent freezing. The treated wastewater will be discharged to the infiltration basins where the temperature will reduce to air temperature before soaking through the infiltration's basins and soils. The wastewater will mix with cool groundwater before entering the Rastus Burn. Therefore, the likelihood of thermal effects on the Rastus Burn is considered extremely low.

The predicted temperature change equates to a very low level of effect.

Summary

Overall, the proposed increased wastewater discharge is considered to have a low level of effect on the aquatic ecology values (e.g. instream algae, alpine invertebrate community and ecological processes) present. However, monitoring is proposed to help ensure potential effects on the ecological values present are low for the increased wastewater volume.

6.9.3.6 Climate Change

Climate change has the potential to influence the treated wastewater discharge over the next 15- 30 years however the scale and intensity of this effect is predicted to be modest.

Overall, it is expected that the current dynamic equilibrium that the system is designed for may slowly change over the next two decades as the effects of climate change set in. This may mean that the design and operation of any upgraded treatment system needs to consider any impacts to the operation from a changing climate.

6.9.3.7 Cumulative Effects

Water quality in the Rastus Burn is impacted by the existing ski field operations by modification of the natural topography (such as roading), which has increased human access, led to the displacement of wetlands, the concentration of stormwater flows, the

destabilisation of slopes, and the discharge of wastewater to land. The net effect of the ski field operation appears to be overall acceptable as the adopted environmental guidelines are generally met and recent reporting indicates good-excellent ecosystem health indicators prevail. It should be noted that the presence of didymo in Lake Alta could change the diversity and abundance of freshwater species in the Rastus Burn overtime, which is unrelated to the wastewater discharge.

The Rastus Burn will experience an increase in discharged wastewater volumes, but any potential increase in nutrient load is to be mitigated by upgrading the wastewater system such that the water quality is maintained to the current standard. Overall, the cumulative effects are acceptable in terms of water quality.

6.10 NATURAL HAZARD EFFECTS

The Stantec Natural Hazards Assessment includes a risk assessment of the overall natural hazard risk of the Project. The identified natural hazard risks include flood, solifluction, debris flow, seismic, wind, global instability, rockfall, snow avalanche and localised land instability risks. A copy of this assessment is provided in **Part B** of the application document, with the key findings described in the following sub-sections.

For the purposes of the assessment below, the risk matrix classifications, as set out in the National Policy Statement for Natural Hazards, have been applied.

6.10.1 Flood Risk

Flooding has primarily been identified as a potential risk in the vicinity of the Rastus Burn Base Building and Gondola Terminal, the Doolans Base Building and the Doolans Creek Right Branch Intake structure.

6.10.1.1 Rastus Burn Base Building and the Gondola Terminal and Bottom Terminal

The proposed Rastus Burn Base Building and the Doolans Gondola Terminal are located immediately westward and adjacent to Rastus Burn Creek. Rastus Burn Creek has been relocated from its original channel alignment, with the realigned channel designed to accommodate flows from a 100-year ARI with 600 mm freeboard. The channel is lined with armouring to protect against erosion.

During a super design event (exceeding a 100-year ARI), the creek will overtop its banks and spill onto the level platform associated with the expanded Rastus Burn Base Building and the Doolans Gondola Terminal. Such an event would result in erosion of the platform shoulder but no significant damage to either the base building or gondola terminal. While such effects are manageable, a moderate consequence level is assigned due to the

potential damage to buildings. The likelihood of such an event is considered “unlikely” (between a 1% and 0.2% AEP). Overall, the flood hazard risk to the Rastus Burn Base Building and Gondola Terminal is considered medium.

The existing realignment of Rastus Burn Creek provides some mitigation of the potential flood risk on site, as does the existing redirection of sheet flow from the learners slope into the Rastus Burn. Stantec (2026a) has also identified that during a super-design event, water will likely spread out onto the vehicle arrival and drop zone area, which will further attenuate flows (and potential damage) during a flood event.

6.10.1.2 Doolans Base Building

The Doolans Base Building is located on a rock knoll, adjacent to an unnamed creek. A 5m height differential exists between the top station and the adjacent creek bed. The risk of flooding is therefore rare (between 1 in 100-year ARI and 1 in 5000-year ARI) due to the freeboard between the building platform and the creek.

The overall flood risk to Doolans Base Building is assessed as low.

6.10.1.3 Doolans Creek Right Branch Intake

The water intake structure has an operational and functional need to be submerged and located within the creek. Other than temporary sedimentation of the intake structure due to the flooding, no other adverse flooding effects have been identified for this structure.

The pump building associated with the water intake has been intentionally positioned on a terrace 10 m above the creek bed to avoid potential flood hazard risk.

Overall, the flood risks for both the water intake structure and the pump building are considered to be low. Notwithstanding, the intake structure will be provided with some scour protection to reduce potential erosion risk. Any aggradation risk can be managed through routine clearance and maintenance of the intake structure.

6.10.2 Solifluction Risk

Solifluction is the process of slow, downslope creeping of water saturated soil and rock debris associated with cyclic freeze thaw conditions in cold alpine areas. As solifluction movement is seasonal and slow, is not considered to be a risk to human safety but can cause damage to permanent structures.

Solifluction[96] risk is considered by Stantec (2026a) to be unlikely and has been largely mitigated through site selection processes avoiding assets being located in areas of solifluction risk (or where the risk is minimal - movement of 200mm or less). Where avoidance has not possible, it is considered that the solifluction risk can be appropriately managed through site-specific detailed geotechnical (foundation) design.

The consequence of solifluction is considered negligible to humans and minor for assets and infrastructure. Overall, the residual risk is considered to be low.

6.10.3 Debris Flow Risk

The deeply incised character of the Doolan Creek Right Branch and the availability of loose material in the catchment means a debris flow resulting in a landslide dam is possible, albeit rare (i.e. a 0.2 to 0.02% AEP). The consequences of a failure are considered to be minor, as neither staff nor skiers will be within the creek bed. The risk of debris flow is therefore assessed by Stantec (2026a) as being low.

No areas of potential debris flow have been identified within the highly modified Remarkables Ski Area. Despite intermittent avulsion occurring within scree debris and evidence of slope riling erosion, there is insufficient opportunity for significant quantities of material available to develop that would lead to a larger debris flow. The residual risk of effects relating to debris flow within the Remarkables Ski Area is therefore low.

6.10.4 Seismic Risk

The seismic risk associated with propagation of avalanches, rockfall or slips is covered in each relevant section. This section focuses on the seismic risk to artificial structures associated with the Project. It should be noted that there are no known major faultlines within 20km of the site.

The design of the water storage reservoir is covered by New Zealand Society on Large Dams (despite not being a large dam), the New Zealand Building Code and the 'Dam Safety Guidelines'. While these design requirements sit outside of the statutory framework of the FTAA, it is proposed that the detailed design of the reservoir will be provided to the ORC and CODC for certification prior to tarn being repurposed as a water storage reservoir.

From a seismic design perspective, the structures associated with the Project are generally considered to be of "importance level 2". The Doolans Base Building is the exception to this, due to the number of people it is designed to accommodate (300) elevating the building into

[96] gradual processes in which a mass moves down a slope

the “importance level 3” category. For design purposes, the annual probability of seismic exceedance for the level 2 structures is 1 in 500 years and 1 in 1000 years for level 3 structures.

Strict adherence to the relevant New Zealand standards would suggest the likelihood of a design level earthquake occurring is rare. However, applying the published likelihood of a design level earthquake in the next 50 years (due to the Alpine Fault), the likelihood of a significant earthquake occurring is “likely” or “possible”. This changes the overall seismic risk to buildings and structures from seismic risk from medium to high. Note this categorisation is not unique to the Project and is synonymous with areas located within seismically active areas of New Zealand (particularly in the vicinity of the Alpine Fault).

Notwithstanding the above, all structures will be required to be designed and constructed in accordance with the relevant New Zealand Standards. This serves to mitigate the seismic risks of these buildings and structures.

6.10.5 Global Land Stability

6.10.5.1 Doolans Basin

No significant landslide areas were identified along the gondola and chair lift alignments within the Doolans Basin.

The Doolans Base Building and Return Terminal are located above and near an existing bluff containing horizontal foliation (layering) of the schist. This presents a low risk of sliding along schist planes.

While no signs of settlement or land movement have been detected within the area, localised block toppling failure or failure along joints at the upper part of the bluff feature may compromise the gondola station foundations. Offsetting the Doolans Base Building approximately 15m from the bluff, as is currently proposed, will mitigate this effect as the foundations will be located beyond the area of unstable joint sets.

The likelihood of a global slope instability occurring within the Doolans Basin is very rare (greater than 1 in 5000-year ARI), however the potential consequences should such event occur would be major due to the potential damage to buildings and structures. The overall risk of global land instability is therefore assessed as medium. In reaching this classification, Stantec (2026a) notes that the propagation of a large landslide would be associated with initial land displacement. The initial movement of land would be likely to be immediately apparent and thus appropriate inspection and subsequent action would be taken to mitigate those risks.

6.10.5.2 Upper Rastus Burn Basin

Extensive development has been undertaken in the Upper Rastus Burn Basin where the existing Remarkables Ski Area facilities are located. Previous site investigations through this area have not identified any areas of significant global instability that would adversely affect the infrastructure proposed as part of the Project.

The likelihood of a global land stability issue occurring in the Upper Rastus Burn is considered to be very rare (greater than a 1 in 5000-year ARI). However, due to the potentially major consequences for structures located within the Rastus Burn should such an event occur, the overall global land stability risk has been assessed as medium.

Similar to the Doolans Basin assessment above, any initial deformation would have an immediate effect on existing structures, such that appropriate inspection and action would be taken to mitigate those effects.

6.10.6 Rockfall Risk

6.10.6.1 Doolans Gondola

Some areas of minor rockfall exist along the Doolans Gondola alignment within the Rastus Burn. Through site selection processes, the location of towers within these areas have been avoided such that the rockfall risk is assessed as “very rare”.

Within Helicopter Ridge, there is a rocky spine containing a number of perched rocks and historic evidence of rockfall. Some of the rocks remaining higher on the ridge may be mobilised by a sufficiently large earthquake and pose a potential risk to the gondola towers. The potential risk to the gondola towers within the Doolans Basin can be mitigated through site selection or alternatively, through the removal of potentially unstable rock during construction. With these measures in place the risk of rockfall affecting the Doolans Gondola (within the Doolans Basin) is unlikely.

In both instances, should a rockfall occur, the potential consequences are assessed as major because of the risk of structural damage and the potential risk to human life. This results in an overall medium level rockfall risk for the Doolans Gondola.

During the winter, when the gondola will be operating, rockfall risk is considered to be less common and is attenuated by the presence of snow. The risk to the towers has been reduced through site selection processes, and the gondola stations are sited outside of areas of rockfall risk. Furthermore, towers are designed to be robust and would bend and deflect rocks during a rockfall event. Complete collapse of a tower, and thus risk to human life is very unlikely.

6.10.6.2 Swan Lake

The proposed access route between the top of Sugar Bowl lift and Helicopter Ridge traverses below a steep rocky ridgeline containing numerous potentially unstable rocks. Immediately above Swan Lake is a very large rockfall where a significant part of the ridgeline has collapsed and fallen into the lake creating a debris field.

The potential for rockfall through this area, and onto the access road, is exacerbated by rainfall, freeze thaw conditions or earthquakes. This includes the potential for large rocks, ranging from one to 20 tonnes being released.

Stantec have assessed the likelihood of rockfall along the access route to be possible due to the relatively low construction traffic volumes. The risks to human life during such an event is assessed as major. During the operations, the risk is mitigated due to rockfall being less common in winter and attenuated by snow.

While the overall risk is assessed as high in this location, mitigating circumstances include the expected short term use of the road during the summer by construction vehicles.

6.10.6.3 Snow Making Reservoir

A rocky ridge containing rocky tors exists above the snow making reservoir. Most of the unstable blocks along this ridge have detached, with few significant blocks remaining.

The risk of rockfall beneath the ridgeline, above the reservoir, is assessed as unlikely. In the rare event that a person is present in this location during a rockfall, the consequence to life is assessed as being moderate. The overall rockfall risk in this area is therefore assessed as medium.

The low occupancy of skiers or staff being present within this area and below this feature serve as a mitigating factor towards this overall risk classification. Importantly, the risk of rockfall is a common feature across alpine regions where recreation activities occur.

6.10.6.4 Snow Avalanche Risk

Avalanche risk within the Remarkables Ski Area is managed through NZSki's existing avalanche control programme. This includes maintaining an avalanche atlas for the ski area which identifies avalanche path run out zones and conditions that may develop avalanches. This programme will continue to be applied across the wider Remarkables Ski Area footprint and will be extended into the Doolans Basin.

The western side of the Doolans Basin is a known snow avalanche risk area as it sits lee to the westerly winds and develops lee slope slab risk. Avalanches from this slope will not

threaten any gondola infrastructure but will affect the skiable terrain, which will be managed as part of the extension to the existing avalanche control programme.

The occurrence of natural or human triggered avalanches in the Doolans Basin below the headwall to Helicopter Ridge is considered rare due to the slope being outside of what is commonly considered a prime avalanche gradient (30-45 degrees). The slope to the immediate south-east of Helicopter Ridge is sufficiently steep that localised or human triggered avalanches could occur.

Extending NZSki's existing avalanche programme into the Doolans Basin will assist with mitigating potential avalanche risks. Preparation and implementation of the avalanche atlas forms a requirement of the resource consent conditions for this application.

The consequence of a potential avalanche has been assessed by Stantec as being moderate due to the potential risk to human life if located within an avalanche path. As a result, the overall avalanche risk is for the Doolans Basin has been assessed as medium. Contextually it is important to note that there have been no recorded avalanche related fatalities on controlled ski area terrain in New Zealand. The risk of a person being caught in an avalanche in such a controlled environment is therefore unlikely.

6.10.7 Localised Land Instability

Within the Doolans Basin, the area of development is in relatively benign terrain with 'Rock Glacier' features which are no longer active.

The proposed access route between the top of Sugar Bowl and Helicopter Ridge traverses steep scree terrain identified as the area of greatest potential for localised slope instability. Any cutting of the access formation is likely to cause areas of upslope instability and downslope is sufficiently steep where retaining of the formation is difficult to achieve with a practical or economically viable solution.

The proposed service corridor and trail route between Helicopter Ridge and Curvey Basin, traversing a scree slope, has been designed at a gradient consistent with other accesses in the Remarkables Ski Area which have remained stable over time.

Given the proposed mitigation measures, including the proposed geotechnical design of road and access excavations, the use of retaining structures and the site selection process avoiding infrastructure being established within areas susceptible to instability, the residual geotechnical risk is assessed as medium.

6.10.8 Summary of natural hazard risks

The risk assessment undertaken for the Project has focused on key structural elements and their exposure to a range of natural hazard risks. For the most part, these risks range from low to medium, with one high risk identified.

The natural hazard risks presented by Stantec (2026a) should be considered in the context of the alpine setting which the ski field is located. Ski fields have both an operational and functional requirement to be located in environments where snow accumulates, which means alpine locations which are inherently exposed to a range of natural hazards.

In addition to the above, further geotechnical assessment will be undertaken as part of the detailed design for the project to ensure that the key aspects of the project, such as the buildings, towers and the reservoir are all appropriately engineered to mitigate the potential natural hazard risks identified in this assessment and respond to the geological conditions of the site.

6.11 TRANSPORTATION EFFECTS

Stantec (2026j) has prepared a Transportation Assessment for the Project. There are several transportation matters that need to be considered as part of the Project, which have been described in sub-headings below.

6.11.1 Construction Traffic Management

During construction, the Project would involve between 80 and 150 workers and up to 20 material deliveries per day. Construction workers are expected to arrive at the ski field access road before 8:00 AM and will be departing after 4:00 PM, and material deliveries by heavy vehicles are likely to be distributed across the day.

Construction traffic will access the site via the existing intersection of SH6/ Remarkables Ski Field Access Road. While it is considered that construction traffic movements can be accommodated at the existing intersection, the CEMP will detail any specific arrival or departure requirements for construction vehicles using the Remarkables Ski Field Access Road and State Highway 6 intersection, including Stantec's recommendation that construction traffic be required to exit the site through a left turn only. This recommendation is reflected in the conditions attached in **Part H**.

A separate Construction Traffic Management Plan is not required for the works due to the low construction traffic volumes anticipated during the construction period.

6.11.2 Operational Traffic Management

6.11.2.1 Site Access and Intersection Performance

The Project is accessed via is an existing give-way controlled intersection at the Remarkables Ski Field Access Road and SH6. During the ski season, NZSki operates a temporary traffic management plan (**"TMP"**) that directs all departing drivers to turn left during the afternoon peak. For those seeking to make a right turn departure, vehicles are required to turn left and then U-turn at the Coneburn roundabout to travel north.

In 2025, the SH6 intersection was operating at close to its theoretical capacity on high demand days. By 2028, it is anticipated that the intersection will exceed its capacity due to forecasted higher SH6 volumes. As such, a revised approach to managing departures during the afternoon peak departure period is required under the existing baseline operations (i.e. without an increase in skier numbers).

Intersection modelling has identified that operating the intersection with temporary signals during the afternoon peak will increase its capacity compared with the current TMP arrangements. Options such as stop/go controls or temporary signals present practical measures to allow ski field traffic to depart on to the highway. Although this would introduce some delays for through traffic, it would improve safety and reduce turning demands at the Coneburn roundabout. Signalling is not recommended during the morning peak due to low exit demands and the potential to create long queues for northbound traffic.

In the medium to long term, it is anticipated that NZTA will be required to consider corridor and intersection improvements through this section of state highway (referred to as the "Southern Corridor") to address overall growth in traffic volumes south of the Kawarau Bridge due to changing land and development patterns. NZSki understands that NZTA is in the process of developing a strategic network plan for Queenstown which will consider the short, medium and long term network improvements for this stretch of state highway. This strategic plan is not due for release until June / July 2026; however, it is understood that it will cover a range of matters such as network upgrades (including road widening, roundabouts and four lanes), multi-modal transportation options (including bus lanes and mass transport) and potential funding mechanisms. It is also understood that the state highway forecasting model is being updated this year.

In September 2025, QLDC adopted the Te Tapuae Southern Corridor Structure Plan (**"the Structure Plan"**). Intended to guide how the Southern Corridor grows and develops over the next 30 years, the Structure Plan identifies the construction of a new roundabout at the SH6 / Remarkables Ski Field Road as a short term action (within 0-3 years) to be led by QLDC, ORC and NZTA.

The rapid growth through the Southern Corridor, combined with the evolving short to long term network planning makes identification of an appropriate intersection solution challenging. In the short term, NZSki will experience a reduction in the intersection capacity, despite a lowering of vehicle movements through the modal shift measures implemented over the next three to four winter seasons. In the longer term, while further intersection works may be required, it is difficult for an appropriate solution to be identified at this time without the long term network outcomes known. To address this, a two stage approach is proposed to manage the site access and intersection performance over the short and longer term:

- Short term: implement permanent left turn measures out of the SH6 / Remarkables Ski Field Access Road intersection and consider the use of variable speed limit signs on SH6.;
- Long term: in collaboration with NZTA, undertake an investigation of the network growth projections and the long term network upgrades and identify options and funding mechanisms for upgrading the SH6 / Remarkables Ski Field Road intersection.

This will ensure the Project aligns with the long term Southern Corridor objectives, is commensurate with NZSki's contribution to forecast passenger growth and will avoid implementing a solution with limited longevity.

6.11.2.2 Road Safety

Traffic volumes are anticipated to increase for vehicles travelling north on SH6 and turning right to access the Remarkable Ski Field Access Road, associated with future developments to the south. This growth in northbound traffic turning right at the SH6/ Remarkable Ski Field Access Road intersection will increase the risk of rear end type collisions and loss of control type crashes where vehicles may seek to overtake via the unsealed shoulder.

Future safety improvements at the intersection will be largely informed by the aforementioned investigation of the intersection upgrades.

6.11.2.3 Private Buses and Shuttles

Based on predicted demand, 14 additional bus services from Queenstown and 3 additional bus services from Frankton to the ski field will be required during the peak morning period. Additional services from the south may also be required, from the Homestead Bay, Jack's Point and Hanley Farm.

NZSki is proposing to implement a travel demand management plan that will actively encourage a modal shift away from single occupancy vehicle access to the ski area. As part

of this plan, NZSki will monitor its uptake and demand for private bus and shuttles and will adjust those services based on where the greatest demand originates.

6.11.2.4 Parking

Future parking demands are likely to exceed the available parking capacity on site. In the short term, the following operational procedures are proposed by NZSki to address these increases in parking demand:

- Impose restrictions on the minimum occupancy of people per vehicle for carparks 1, 2 and 4 throughout the ski season
- Utilise Carpark A as a park-and-ride facility by operating shuttle services to the ski field at 5 minute intervals to accommodate peak bus arrival and departures
- Establishing three bus bays within SH6 carpark to allow for loading of at least two buses in parallel
- Promoting car pooling within a dedicated area in the SH6 carpark to support higher vehicle occupancy levels in the upper car parks.
- Potential implementation of a booking system to influence parking demands on busier days.

In the medium to long term, provision for additional car parking will be required. Carpark B and the Boneyard Carpark will meet this demand over time. The Travel Demand Management and Car Parking Plan, through its monitoring requirements, will ensure this car parking is provided immediately before the increase in demand for such services. In the intervening periods, Carpark B and the Boneyard will potentially be used for construction staging purposes.

6.11.2.5 Public transportation

The Project does not rely on the use of public transport to access the Site. Notwithstanding, NZSki will co-ordinate with the Otago Regional Council to ensure that its shuttle and bus services from town do not cause any conflict with public transport services trying to utilise the same bus stop locations.

In accordance with the Structure Plan, a mass transport hub may be developed to the south of the site in the medium to long term. NZSki would be willing to work with QLDC, ORC and NZTA to ensure it operates complement and co-ordinate with those services.

6.11.2.6 Pedestrians

Pedestrian movement is not permitted on the Remarkables Ski Field Access Road below carpark 3. Visitors are required to use the buses and shuttles.

In parking areas, pedestrians and drivers are expected to pay due care and attention to each other when they are manoeuvring. This involves travelling at low speed and not unduly obstructing access routes.

6.12 NOISE AND VIBRATION EFFECTS

6.12.1 Construction Noise

6.12.1.1 Rastus Burn and Doolans Basin

The Noise Assessment prepared by EMM (2026) has modelled worst-case construction scenarios for the Project over a four-year period. This includes construction associated with:

- The Rastus Burn Base Building expansion and Doolans Gondola Terminal and bottom terminal – works include site establishment works, concrete pours, footing and foundations works and structural erection;
- The Doolans Gondola Midstation – works include site establishment works, concrete pours, footing and foundations works and structural erection;
- Doolans Base Building – works include site establishment works, concrete pours, footing and foundations works and structural erection;
- Doolans Gondola (towers) – works include site establishment works, concrete pours, footing and foundations works and installation of towers (crane or helicopters); and;
- Access and ski trails formation – includes bulk earthworks (excavation and material haulage).

Based on modelling, EMM (2026) conclude that noise from general construction activities being undertaken at the above locations will have a negligible effect (less than 20 dB $_{LAeq,15min}$) at the nearest noise sensitive residential receivers and will comply with the relevant noise limits set out in NZS6803.

Noise effects on fauna during construction is considered in Section 6.4.18.

Due to the alpine environment and the prevalence of schist on site, rock blasting may be required on site. These works will be in isolated locations, intermittent and temporary in nature. While rock blasting will result in elevated levels of noise, the small scale nature of

the blasting activities and the significant separation between the closest noise sensitive receivers mean the effects will be minimal and well within best practice blasting limits.

6.12.1.2 Lower Remarkables Transit Hub

The upgrades of existing lower Remarkables Carpark (Carpark A) and the establishment of new Carpark B have been modelled by EMM (2026). The establishment of the proposed new "Boneyard" Carpark has not been modelled, as this will be established within the existing yard with minimal works required.

Predicted exceedances of the construction noise limits are limited to seven residential assessment locations for the upgrades to Carpark A and eight for the establishment of Carpark B. These exceedances are predicted to occur only for works undertaken outside of normal construction hours.

In order to manage these potential exceedances, construction works associated with the Lower Carpark Upgrades will be undertaken between 7:30am and 6:00pm, Monday to Saturday. Any effects arising as a result of construction noise associated with the lower Remarkables carpark upgrades would be negligible and within appropriate limits.

6.12.1.3 Heavy Vehicle Noise Effects

Heavy vehicles will be required to transport, deliver and support construction activities. With one primary access road, noise predictions of heavy vehicle movements were considered from all assessment locations. The results of this assessment found the predicted noise levels will remain within the recommended noise limits, even during the evenings which is a more sensitive noise environment. Furthermore, the construction period is only limited to the summer months, and any noise effects would be temporary in nature. For these reasons, any noise effects arising from an increase in heavy vehicle movements will be negligible.

6.12.1.4 Helicopter Noise Effects

Worst-case construction activities modelled as part of the effects assessment include:

- The use of large helicopters (Black Hawk) for lifts and placements of gondola towers at the Rastus Burn, Midstation, and Doolans Base locations.
- The use of smaller helicopter (Squirrel) for lifts and placements of concrete and other lighter loads at gondola tower locations and water infrastructure locations within the Rastus Burn, Midstation, and Doolans areas.

Helicopter noise during construction was predicted at all assessment locations. Predicted noise levels at residential assessment locations are less than 40 dB L_{Aeq}, which is below the applicable L_{dn} noise limit for helicopters of 40 dB adopted from the Proposed Plan. As a result, no residential receivers are expected to experience adverse noise effects from helicopter use during construction works. While helicopter operations will be perceptible, the predicted noise levels comply with the relevant standards and are considered acceptable in the context of temporary construction activities.

6.12.2 Operational Noise and Vibration

Operational noise associated with the Project has the potential to arise from two primary sources:

- Ongoing ski area operations; and
- Vehicle movements associated with the Project carpark and access road during visitor arrivals and departures.

Operational noise effects from the ski area itself are anticipated to be negligible at all residential receivers due to the large separation distances between the operational noise sources and surrounding residential receivers.

Operational noise from vehicle movements associated with the Lower Remarkables Transit Facility and the access road represents a short-term and intermittent noise effect related to visitor arrivals and departures.

Predicted noise levels from the transit facility and access road were assessed during peak visitor arrival and departure periods, including morning arrivals before 8:00 am and afternoon departures after 3:30 pm. Maximum noise levels were also assessed for vehicle movements during the morning peak period (arrivals before 8:00 am). Predicted noise levels at all residential assessment locations were within the relevant noise limits of the Proposed Plan.

Given these results, the extent of operational noise effects is limited, with predicted noise levels remaining within applicable standards at all times and therefore having negligible effects on all receivers.

6.13 RECREATIONAL VALUES EFFECTS

Greenaway (2026) has prepared a Recreation Assessment for the Project that includes an assessment on recreation effects. As detailed in Section 2 of this substantive application, there are numerous recreational uses that occur in Doolans Basin and different access alternatives. Any actual or potential effects have been detailed in subheadings below.

6.13.1 Construction Phase Effects on Recreation

The recreation assessment identifies the construction phase of the Doolans Basin Expansion as having very high but temporary adverse effects on the recreational environment.

Construction activities will occur predominantly over three summer seasons, with some minor tidy-up works possible in a fourth summer. Effects arise from the extensive scale of works required to establish gondola infrastructure, buildings, ski trails, access roads, snowmaking facilities, and associated services. These activities will introduce noise, vehicle movements, helicopter activity, lighting, and visible construction activity within an otherwise undeveloped backcountry environment.

All summer recreation activities within the Doolans Basin are expected to experience a very high level of temporary effect during the construction period. In addition, the temporary loss of public use of upper ski area carparks for construction laydown purposes over two summer seasons will reduce ease of access and displace users to lower parking areas, increasing travel time and effort for recreational users accessing the Basin and adjacent areas.

Although construction effects are confined to a defined timeframe and largely localised to the Doolans Basin, the assessment concludes that their magnitude is high, due to the sensitivity and very high existing recreation value of the environment. With appropriate construction management and communication with recreational users, these effects remain temporary and reversible, and no residual long-term construction effects are anticipated. The transient nature of this effect is also reflected in the assessment of noise effects on recreational users, as detailed in the noise assessment.

The proposed management and mitigation measures proposed during the construction phase to mitigate effects on summary recreational users (when construction occurs) include:

> Establishment of recreational users group, to share information about the construction of the project (initially) and recreational opportunities within the Remarkables and the Hectors Mountains;

> Implementation of a CEMP to manage effects on recreational users (noise, dust, safety and security);

> Sharing of important construction related matters online for the benefit of wider recreational users during construction; and

> Limited use of visitor exclusion areas during construction.

6.13.2 Operational Phase Effects on Recreation

The operation of the expanded ski area will result in enduring changes to the recreational environment of the Doolans Basin, with effects differing between recreation opportunities and recreation values.

Recreation opportunities (the physical ability to undertake activities) will generally be retained.

Operational effects on all winter activities are assessed as moderate, reflecting the modification of the physical setting through grooming, avalanche control, ski trails, access roads, buildings, and lift infrastructure, alongside the creation of new lift-assisted skiing opportunities. While the form and scale of winter use will change, users will continue to be physically able to undertake snow-based activities.

Operational effects on hunting and all summer activities are assessed as minor, due to the relatively low levels of summer use in the Basin and the availability of alternative locations regionally. Access to the Basin for these activities is expected to remain available.

In contrast, recreation values (the quality and character of the experience) will be more substantially affected.

Operational effects on backcountry winter ski sports are assessed as very high or high, reflecting the fundamental and permanent shift of the Doolans Basin from a predominantly backcountry setting to a front-country, managed ski area. This change will be characterised by permanent infrastructure, grooming, operational controls, and significantly higher visitor encounter rates, resulting in a loss of solitude, remoteness, and unmodified natural character that currently underpin the Basin's very high recreation value.

Operational effects on mountaineering, ice climbing and outdoor education activities are assessed as moderate, as these activities rely on similar environmental qualities but have a greater number of alternative locations regionally.

Operational effects on all summer activities are assessed as minor, reflecting both the low intensity of current use and the availability of suitable alternative environments.

Overall, the assessment concludes that while the proposal will significantly enhance recreation opportunities and accessibility for a larger number of people, it will also result in an unavoidable and permanent loss of backcountry recreation values for existing users of the Doolans Basin.

The proposed management and mitigation measures proposed during the operational phase to mitigate effects on summary recreational users (when construction occurs) include:

- Establishment of recreational users group, to share information about the construction of the project (initially) and recreational opportunities within the Remarkables and the Hectors Mountains;
- Only impose physical access restrictions where necessary for safety reasons (for example, avalanche control);
- Site rehabilitation on closure – as per the concession requirements; and
- Continuation of one up, one back life passes for those accessing the backcountry.

6.14 ARCHAEOLOGY AND HISTORIC HERITAGE EFFECTS

NZHP (2026) have prepared a Heritage Assessment for the Project that includes an assessment of impacts on heritage values. As detailed in Section 2 of this substantive application, historic values specific to the Doolans expansion area were assessed as low.

NZHP (2026) note that the proposed works will alter the landscape within the expansion area, with earthworks and the addition of modern buildings and structures and the integrity of the landscape is a key component of the Kawarau / Remarkables Conservation Area's heritage value. Any changes to this landscape could diminish the legibility of historical features, however, NZHP (2026) concludes that the proposed structures in the Doolan's will not be visible from key heritage features in the surrounding landscape. For this reason, it is considered that because of the lack of visual connectivity, any actual or potential adverse effects are significantly reduced.

In terms of positive effects, NZHP (2026) detail that there is an opportunity for the Project to improve public understanding of the historic landscape by providing information about nearby heritage features. If managed appropriately, increased access to the area could enhance public appreciation of its historical context and contribute positively to the wider heritage values of the Doolans and surrounding environment.

Overall, NZHP (2026) concludes that there will be negligible adverse impact on heritage values of the wider Kawarau / Remarkables Conservation Area. Further, due to there being no heritage values identified for the Remarkable Ski / Rastus Burn area the proposed expansion will have no impact on heritage values. Notwithstanding this, accidental discovery protocols will be put in place to ensure any unforeseen discoveries are appropriately managed during construction. These protocols will also appropriately manage areas, such as the water take access road, which were not originally part of the detail site walk over undertaken by NZHP.