

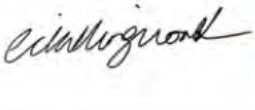
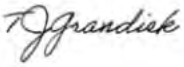
Construction Environmental Management Plan

Remarkables Ski Area Upgrades and Doolans Expansion Project

November 2026

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Version 2:	**Name**	**Position**	**Signature**
Prepared by	Tom Grandiek & Katy Bonacci	Principal Environmental Consultant & Environmental Consultant	
Reviewed by	Elisa Chillingworth	Senior Consultant	
Approved by	Tom Grandiek	Principal Environmental Consultant	

Suitably Qualified and Experienced Professional

This Construction Environmental Management Plan (CEMP) has been prepared by Tom Grandiek and Katy Bonacci and reviewed by Elisa Chillingworth, all of Enviroscope.

Katy holds two Bachelor of Science degrees, majoring in Environmental Science and Geography. Katy has experience preparing Environmental Management Plans and Erosion and Sediment Control Plans within the Queenstown Lakes District and wider Otago Region.

Tom is a Certified Environmental Practitioner (CEnvP) and recognised Suitably Qualified and Experienced Professional (SQEP), Tom brings senior-level experience in both public and private sectors. Tom has over nine years' experience in environmental management, regulatory compliance, training, project leadership, and technical delivery across infrastructure, land development, and resource management sectors.

Elisa is a certified Environmental Professional (CEnvP) and holds a Bachelor of Science with Honours (BSc). Elisa has spent eight years working in Environmental Management and the Construction Industry and has extensive experience in the preparation, implementation and monitoring of EMPs and ESCPs.

Tom and Elisa meet the criteria of a Suitably Qualified and Experienced Professional (SQEP) for the purposes of preparing and reviewing this EMP and overseeing the environmental aspects of this project.

We confirm that we have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. This report has been prepared in compliance with that Code, as if it was expert evidence presented in proceedings before the Environment Court. Unless we state otherwise, this report is within my area of expertise, and we have not omitted to consider material facts known to us that might alter or detract from the opinions expressed in this report.

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Appendix 10	Archaeological Discovery Protocol
Appendix 11	Alpine Works and Rehabilitation Protocol

EMERGENCY CONTACTS

Contact made with any of the following shall be undertaken with due consultation of the Environmental Representative or Project Manager. These are outlined in Table 2 below.

Table 2: Emergency Contacts

Element	Emergency Contact	Details
Pollution incident	Otago Regional Council (ORC)	0800 800 033 pollution@orc.govt.nz compliance@orc.govt.nz
Environmental complaint	Environmental Representative	TBC upon appointment of contractor
Discovery of contaminated land	Environmental Representative	
Unexpected heritage finds	Environmental Representative	
Human remains	New Zealand Police	111
Fire including bushfire	Fire and Emergency New Zealand (FENZ)	111
Public utilities	Queenstown Lakes District Council (QLDC) Central Otago District Council (CODC)	(03) 441 0499 rcmonitoring@qldc.govt.nz (03) 440 0056 info@codc.govt.nz
Internal contacts	Project Manager	Erik Barnes Auxillium [redacted]
Internal contacts	Environmental Consultant	Tom Grandiek Enviroscope [redacted] Elisa Chillingworth Enviroscope [redacted]
Internal contacts	Ecology and Herpetology	Glen Davis e3scientific [redacted] Trudy Anderson e3scientific [redacted]

1.0 INTRODUCTION

1.1 Purpose

On behalf of NZSki Limited, Enviroscope has prepared this Construction Environmental Management Plan (CEMP) for the works associated with the Remarkables Ski Area Upgrades and Doolans Expansion Project (the Project), under the Fast-track Approvals Act 2024 (FTAA). This CEMP has been prepared to manage the potential adverse effects arising from the earthworks and general construction activities associated with the Project and aims to reduce the effects of the project's construction activities on the receiving environment. Specific details in relation to the expansion activities are provided in **Section 2.0**.

This document should be read in conjunction with the Erosion and Sediment Control Assessment Report (ESCAR), prepared by Enviroscope, which provides the:

- Overarching erosion and sediment control principles and procedures relevant to the Project.
- Suitable erosion and sediment control measures to minimise erosion and manage sediment-laden runoff.
- An assessment of the effectiveness of those erosion and sediment control (ESC) principles and procedures in minimising potential sediment discharges to an acceptable level.
- Assessment of the receiving environment.

This document aligns with the objectives and policies of the Otago Regional Council (ORC) Land and Water Regional Plan, and with the objectives and policies of Chapter 25 – *Earthworks* of the Queenstown Lakes District Council (QLDC) Proposed District Plan and associated Central Otago District Council (CODC) District Plan. This CEMP has been prepared in accordance with the QLDC Guidelines for Environmental Management Plans (June 2019). This document has been prepared in accordance with the Ministry for the Environment (MfE), *National works in waterways guideline - best practice guide for civil infrastructure works and maintenance*.

This CEMP is prepared with reference to the *Protocol for the Rehabilitation of Natural Alpine Environments Following Ski Area Development between Department of Conservation and NZ Ski Ltd* (DOC Protocol). This document has been specifically designed for the mountainous alpine environment and has informed environmental management for earthworks at the RSA since 2015.

This CEMP serves as the overarching environmental management framework for the expansion, supported by several sub-documents that address specific work areas. The purpose of this CEMP is to be an effective and practical reference manual for construction personnel that applies to all project activities during the construction phase and includes the following:

- Strategies to manage environmental aspects and risks, based on associated best practice.
- Provides for contingency planning.
- Provides a framework for monitoring, reporting, review and continual improvement.
- Defines roles and responsibilities.
- Procedures to investigate and resolve environmental non-conformances and initiate corrective and preventative actions.

1.2 Scope

Given the temporal and spatial scale of the Project, it is acknowledged that the technical design will evolve both prior to and during construction. The dynamic nature of the subject site presents inherent limitations in pre-determining the precise locations and configurations of erosion and sediment controls and some environmental management measures, prior to detailed design.

An adaptive management approach is therefore considered fundamental to achieving the project's environmental performance objectives. This approach involves undertaking earthworks in a staged and progressive manner. This enables continuous improvement through on-site observations, monitoring outcomes, and feedback loops, ensuring ongoing environmental improvement and optimising subsequent implementation. Accordingly, this CEMP is intended to operate as a 'living document', updated and refined throughout the duration of the works.

The CEMP has been developed in accordance with recognised best-practice guidelines, based on the preliminary design information available at the time of the consent application. An updated CEMP and associated Erosion and Sediment Control Plans (ESCPs) will be submitted to the respective regulatory authorities prior to construction commencement, via the resource consent conditions.

1.3 Associated Resource Consents and Permits

This CEMP has been prepared in accordance with industry best practice to accompany the Fast Track application. Provided the activity is undertaken in accordance with this CEMP, it will comply with the relevant conditions set within the associated resource consents. The resource consents associated with this project will be provided in **Table 3:** Associated Resource Consents & Applicable Documents

Table 3: Associated Resource Consents & Applicable Documents

Consent Number	Authority	Activity Description	Date of Decision Issue	Date of Decision Expiry	Consent Status
-	DOC	A Protocol for the Rehabilitation of Natural Alpine Environments Following Ski Area Development Between Department of Conservation and NZSki LTD.	-	-	-
TBC	FTAA	-	TBC	TBC	TBC

2.0 CONSTRUCTION SEQUENCING

2.1 Overview

This is a preliminary staging methodology and may be subject to change based on site conditions encountered during construction and finalising of detailed design. The extent of earthworks and staging is depicted on the Erosion and Sediment Control (ESCP) drawing in **Appendix 1**. Once appointed, the Contractor's representative, detailed design plans and the Contractor's programme of works will be updated into CEMP, alongside the erosion and sediment control plans (ESCP).

2.2 Alpine Environment and Seasonal Construction Windows

The Project is located within an alpine environment that has inherent constraints on construction timing, access, and methodology. Construction activities will be influenced by:

- Seasonal snow cover.
- Low temperatures and freeze–thaw conditions.
- High wind events.
- Rapidly changing weather conditions.
- Limited daylight hours during shoulder seasons.

As a result, construction will generally be undertaken within defined seasonal windows that reflect:

- Safe working conditions.
- Ground accessibility.
- Environmental protection requirements.
- Operational ski field constraints.

Construction programming has been developed on a conservative and realistic basis, recognising that weather-related delays are an inherent feature of alpine construction. Allowance will be made for temporary suspension of works during adverse conditions, with construction activities resuming when conditions permit.

Construction activities are typically concentrated within the summer construction period. Where works are not completed within a single construction season, work areas will be stabilised and left in a safe condition, including, where necessary, temporary reinstatement or protection measures, to enable safe transition into winter ski field operations and Doolan's Basin winter recreational access. Earthworks generally follow a balanced cut-and-fill approach to minimise the import and export of material and reduce disturbance beyond approved works areas.

Key aspects of the cut-and-fill methodology include:

- Optimisation of cut volumes to reduce surplus material generation.
- Reuse of suitable excavated material on site.
- Staged placement and compaction of fill to achieve long-term stability.
- Progressive shaping of cut and fill interfaces to suit local terrain and ground conditions.
- The use of helicopters to transport plant and materials.

2.3 Construction Programme

The following programme outlines the anticipated scope and sequence of works for the Project. It is recognised that the Project programme may be subject to change upon detailed design. The programme is outlined below:

Construction Season 2026 - 2027

- Base Area Excavations and Services Diversions
- Base Building and Gondola Foundations (1-7)
- Midstation / Rastus Burn Access Roads and Services
- Ratus Burn Temporary Access Roads, Laydown Areas and Construction Platforms
- Ratus Burn Gondola Towers
- Doolans Access and Services
- Rastus Burn Wastewater Investigations

Construction Season 2027 - 2028

- 33KV Power Upgrade
- Superstructure Base Building and Gondola
- Midstation Earthworks and Foundations
- Doolans Gondola Towers
- Doolans Access and Services (Continued)
- Reservoir and Pump Shed
- Doolans Ski Trails and Snowmaking Infrastructure
- Doolans Base Area Earthworks and Water Storage Tanks

Construction Season 2028 - 2029

- Lower Carpark Expansions
- Superstructure Base Building and Gondola (Continued)
- Midstation Gondola and Patrol Hut
- Doolans Gondola and Cabin Building
- Water Storage Tanks
- Water Intake Access Road and Infrastructure
- Reservoir, Water Intake and Snowmaking Commissioning
- Ratus Burn Wastewater Onsite Disposal

Construction Season 2029 - 2030

- State Highway 6 Intersection
- Doolans Cabin Food and Beverage
- Snow Play Zone, Conveyor and Snowmaking Infrastructure
- Trail Development and Operational Improvements
- Rastus Burn Wastewater Onsite Disposal

2.4 Construction Best Practice

Below are considered 'best practice' construction methodologies for a broad range of scenarios that will occur across the entirety of the Project.

2.4.1 Earthworks

Earthworks will generally utilise an excavator with a wide, flat bucket to uplift the vegetation, rock and topsoil. The uplifted topsoil and vegetation will be temporarily placed, or immediately reused on a recently formed section, immediately behind the excavator and then placed across the batters as they reach design levels. The process of uplifting and placement of uplifted vegetation will occur over a short period of time. Plant survival will depend on careful operation of the digger operator to ensure that much of the root structure of the affected plants and attached soil remains intact when being uplifted. Individual plants are not to be stacked on top of each other.

- Ensure the current ESCP, CEMP and associated resource consents are available onsite and/or available electronically.
- Complete site induction with Environmental Consultant and Ecologist.
- Establish site laydown and hardstand. Ensure spill kits are onsite, stocked, and ready for deployment in case of a spill.
- All plant and machinery must be cleaned and inspected prior to arriving onsite to ensure it is free of soil or organic matter that could contain seeds or exotic plant species that may contaminate the site.
- The surveyor is to mark out the earthwork's extents for the applicable stage of works.
- The site area is to be surveyed by a suitably qualified ecologist or ornithologist for nesting avifauna.
- Avoid tracking plant and machinery and stockpiling material within proximity of waterbodies and critical source areas.
- When tracking plant, do so carefully within the works zone extents.
- Established tracks must be used wherever they are available.
- Within temporary access areas, all machinery is to utilise a single defined track, with minimal back-and-forth movement, to reduce ground disturbance.

2.4.2 Works Within or Crossing Waterbodies

Some earthworks associated with the Remarkables Ski Area Expansion occurs within waterbodies such as wetlands, cushion bogs, ephemeral overland flow paths and alpine streams and tarns.

Temporary waterway diversions enable works to be undertaken without working in wet conditions and without displacing excessive loads of sediment into the waterbodies. These measures seek to divert all flow via a stabilised system around the area of works and discharge it back into the waterbody, below the works to avoid scour of the channel bed, whilst maintaining the hydrological neutrality and integrity.

This is to be completed using the methodology outlined below, which has been prepared in accordance with The Remarkables Ski Area Upgrade & Doolans Expansion Roading, Stream Crossings and Stormwater Freshwater Ecological and Hydrological Impact Assessment, prepared by e3Scientific Limited for NZSki Limited (e3 scientific 2026b); GD05 Diversion Works Best Practice Methodology (Section G4.2.3) and the National Works in Waterways Guideline (MFE, 2021).

The pipe-drop methodology has been provided as an alternative to channel diversion. This control measure ensures that water is safely isolated and can be diverted through exposed areas, and reduces further disturbance required when constructing formalised diversion channels.

Principles

- Avoid, as far as practicable, permanent habitat loss.
- Avoid, as far as practicable, loss of rare ecosystem types and habitats for threatened taonga and mahinga kai species.
- Avoid, as far as practicable, impacts on habitat connectivity, including barriers to fish passage.
- Avoid, as far as practicable, impacts on threatened, at-risk, taonga and mahinga kai species.
- Create safe habitats, especially for threatened, at-risk, taonga and mahinga kai species.
- Avoid, as far as practicable, effects on water quality and sediment, including for mahinga kai and mauri.
- Avoid, as far as practicable, altering natural hydrology patterns.
- Avoid, as far as practicable, the potential for spread and/or establishing pest plants or animals in freshwater habitats (including riparian margins).
- Avoid, as far as practicable, impacts on important habitats for the life cycle and ecology of freshwater fauna.
- Avoid, as far as practicable, disturbing archaeological or wāhi tapu (sacred) sites.

Management Measures

When undertaking works within a waterbody or wetland, the works shall be undertaken as follows,

- Apply MfE (2021) in-water works guidance, minimising the active works footprint.
- Prior to construction, the boundaries of wetlands within 10 m of the planned road should be marked out to ensure that all contractors are aware of the location of wetlands and to ensure they are not damaged.
- Soil binding polymers are not to be used, in direct proximity to water bodies.
- Dewater works areas using short diversions and pump sediment laden water to appropriate control devices.
- Stabilise disturbed streambanks with geotextile matting and eco sourced native tussock plantings.
- Include cement use management procedures in the CEMP.
- Biosecurity measures are in place after the last Rastus Burn stream Crossing to ensure didymo is not transferred to Doolans Basin tributary streams.
- Undertake works, as far as practicable, when flows in the waterbody or wetland are low.
- Where possible, undertake works in the dry bed.
- Ensure plant used within the wetland or waterbody boundaries is cleaned prior to entering the area.
- Ensure the sediment losses to water are avoided where practicable and that erosion and sediment silt are installed in accordance with the corresponding (ESCP).
- Ensure that all disturbed vegetation and soil or other materials are deposited, stockpiled or sustained to prevent the movement of the material.
- Ensure the consented structures in the bed are stabilised and/or armoured to prevent scouring and erosion.
- Ensure that fuel storage tanks and machinery stored in the construction area are always maintained to prevent leakage of oil and other contaminants into the waterbody.

Waterbody Diversion - Maintenance Measures

Any works within a waterbody require ongoing and vigilant maintenance to minimise sediment generation. To achieve this, identify and correct any signs that may indicate a potential problem. Take notice of the following signs and make

repairs immediately:

- Pipe remains correctly aligned, stable, and seated within the channel or wetted bed.
- No visible displacement, flotation, or rotation of the pipe.
- Pipe joints, connections, and seals remain watertight with no leakage.
- Pipe diameter remains unobstructed and free-flowing.
- Pipe inlet and outlet are free of debris, vegetation, or sediment build-up.
- Pipe material remains structurally sound (no cracking, crushing, or deformation).
- Temporary pipe slopes remain consistent with design gradients, avoiding ponding or backwatering.
- No visible sediment plumes downstream of the works.
- Accumulated sediment around the pipe inlet or outlet is removed promptly and disposed of appropriately.
- Stockpiled material remains stabilised and isolated from flowing water.
- No loose material present that could mobilise during rainfall.
- Document inspections and maintenance in accordance with the inspection requirements outlined in **Section 3.0** of the CEMP.

Waterbody Diversion - Contingency Measures

In the event of high rainfall or snow melt during construction, or prior to leaving the site for more than a 24-hour period, the contractor will ensure the following:

- Weather forecasts reviewed daily.
- Additional geotextile, erosion matting, and rock available on site.
- Pipe-drop system remains capable of safely conveying anticipated peak flows.
- Temporary works remain secured prior to rainfall or site shutdown.
- Any required stabilisation completed before leaving the site unattended.
- Additional geotextile/erosion matting will be kept on site at all times.
- Extended working hours (12 – 14-hour days) will be considered where it is demonstrated that a significant programme or environmental benefit can be achieved.
- All existing and additional erosion and sediment control measures will be inspected, secured and maintained where required, should a significant rainfall event be imminent.
- The wetted bed will be fully stabilised to ensure no flows create scour issues. It is expected that this will be achieved through geotextile, intact vegetation and the placement of rock as necessary.
- Non-conformances documented with immediate corrective actions implemented.
- Maintenance actions logged, including sediment removal, repairs, or realignments.

2.4.3 Tower Footing Construction

Tower footing construction will enable the vertical assembly and installation of the gondola towers.

- The environmental SQEP and ecologist are to mark out the work zone extent and access points.
- Carefully track plant onto the works zone extents. In areas with established tracks, those shall be utilised. In areas that require temporary access, a one-track-in and one-track-out methodology should be utilised.
- Install a clean water diversion bund (CWDB) using site won vegetation and rocks upslope of the proposed tower footing excavation. Place coconut coir logs downslope of the footing excavation prior to any forecast rainfall as part of the rapid rain response.
- Establish a temporary building platform to enable the works associated with the tower footing construction.

- Excavate the tower foundation pit, stockpiling any excess material adjacent to the area, within the erosion and sediment control envelope, until it can be transported to a stockpile area.
- When pouring the concrete tower footing, concrete boxing should be formed around the tower footing to isolate and contain any concrete flows.
- Assemble the tower in accordance with the approved design.
- Reinstate vegetation and rock evenly around the tower footing to stabilise any disturbed area around the footings.
- Track out via the same access point.

2.4.4 Service Trench Excavations

Trenching will be required for the installation of civil services, gondola cables and snowmaking infrastructure.

- Trench alignment should only be extended as far as it can be backfilled and restabilised within 24-hours of a forecast significant rainfall event.
- Carefully strip topsoil and vegetation, maintain the plant root structure and place it upslope of the trenching alignment.
- Dig the trench alignment and place the subsoil away from the vegetation and topsoil.
- Undertake the required trenching within the earthworks sub catchments and backfill as per the methodology above.
- Place snow machines and connect to services.
- All existing and stockpiled vegetation, topsoil, and rocks are to be immediately placed over the disturbed trench alignment to stabilise.

Service Trench Excavations – Contingency Measures

Trench alignment should only extend as far as it can be backfilled and restabilised within 24 hours of a forecast significant rainfall event. However, if a trench remains open, the following methodology should be followed.

- Place coconut coir matting over the open trench. Ensure it is pinned/staked securely into the ground.
- Place coconut coir logs within the trenching alignment to reduce the velocity of flows within and entrap any mobilised sediment.
- Install coconut coir logs downslope of the trenching alignment to capture any potential sediment laden flows from the trenching alignment.
- After the storm event, when the site is deemed safe, ensure any remedial measures necessary are undertaken. Clear sediment, backfill the trenching and place vegetation over the backfilled trench.

2.4.5 Gabion Retaining Wall Installation

Gabion retaining walls will be installed in selected areas to provide effective ground reinforcement and improve slope stability, predominantly around access tracks.

- Position empty baskets by hand or with light machinery, ensuring correct alignment and secured together horizontally to form a continuous, stable structure.
- Fill baskets progressively with selected rock layers, with lacing and alignment checks carried out at one-third and two-thirds capacity to maintain structural integrity and minimise voids.

- Complete filling to the top, ensuring an even surface before folding and lacing the lid securely. Repeat the process for each row to achieve a uniform and stable retaining structure.

2.4.6 Access Track Construction

Access track construction involves developing all permanent four-wheel-drive (4WD) tracks required to provide access to the Doolans Basin Ski Area.

- For access track works within a waterbody, wetland, or within a 10 m buffer of these features, refer to the methodology outlined above in **Section 2.4.2**.
- Carefully uplift any topsoil and vegetation encountered, ensuring root and rootlets remain intact. Vegetation is to be stored upright until reinstatement is possible. Carefully uplift rocks, ensuring they are not crushed or fragmented. Any relocated rocks must mimic their original placement and blend with the surrounding natural terrain.
- In workable sections, undertake cut-and-fill earthworks of the material to shape the trail to the required alignment and gradient. Sub-stages have been outlined on the corresponding ESCP sheets to encourage the progressive installation of access routes and the installation of erosion and sediment controls.
- Progressively install erosion and sediment controls in accordance with the corresponding ESCP drawings. These controls generally comprise of temporary measures during construction, with some transitioning to permanent installations. Measures include the following:
    - **Temporary measures:** the installation of sediment sumps at the outlet of the armoured swale alignments, drop-out pits, pipe-drop structures, level spreaders, temporary culverts and coconut coir logs.
    - **Temporary into permanent measures:** Rock armouring of culvert inlets and outlets, splash crossings and trafficable swales.
- Reinstatement is to occur on shaped batters (upslope and downslope of the road cut) and in any areas requiring rehabilitation along the access route.

2.4.7 Ski Trail Construction

- For ski trails works within a waterbody, wetland, or within a 10 m buffer of these features, refer to the methodology outlined above in **Section 2.4.2**.
- Install pipe-drop structures in any areas conveying clean water. Ensure the pipe-drop structure directs clean water away from exposed earthworks and discharges it to an area with adequate erosion protection.
- Existing ground cover (both rocks and vegetation) is to be carefully stripped and relocated above the cut batters to form clean water diversion bunds (CWDBs) around the works area.
- Vegetation should not be placed within flow paths, stacked on top of one another, or located within designated ‘no go zones’.
- Complete cut-and-fill earthworks in a staged approach to establish new levels. Earthworks areas are to be minimised and completed in manageable units. Sub-stage boundaries have been provided on the ESCP sheets for guidance.
- Undertake the required service trenching within the ski trail alignment and backfill in accordance with design requirements.
- Immediately place existing topsoil, vegetation and or rocks over the shaped levels to progressively stabilise exposed areas and reduce erosion risk.
- Maintain all erosion and sediment controls until the SQEP Environmental Consultant confirms they may be removed.

2.4.8 Groundwater/Dewatering

In the event of encountering localised groundwater during earthworks, the contractor will ensure the following:

- Groundwater must remain within the same catchment from which it is intercepted. Transfer to adjacent catchments is not permitted due to risks of hydrological alteration.
- Separate clean groundwater from exposed earthworks.
- Pipe drops shall be installed on a case-by-case basis to convey these flows beyond the extent of the works as required. A 110 mm unpunched novo coil pipe has been selected as a conservative approach.
- Discharge onto stable ground or into pre-established clean water diversion systems.
- Groundwater should be appropriately treated and attenuated to ensure that it is not adversely affected by contaminants.
- Remain in the same catchment it is taken from, only be a non-consumptive take; and only occur for the time required to carry out the trenching works for the project.
- Establish an isolated work cell using bunding, impermeable liners, or sandbags to prevent interaction with the surrounding environment.
- Any water that does not meet the discharge criteria in **Table 7** is to be pumped to a portable treatment pod or tank and trucked off-site for disposal into a trade waste system.
- Divert via turkey next, discharging onto stable, vegetated ground or a temporary lined sump with sufficient residence time.
- Pumps must be sized to match inflow rates, preventing overtopping or scour.
- The discharge point must be visually monitored for clarity and flow stability.

2.5 Construction Season 2026 - 2027

The 2026-2027 Construction Season will involve the majority of the earthworks required to enable the infrastructure expansion within the Remarkables Rastus Burn area. The Doolans Basin Access and Services works are proposed to occur concurrently, providing access into the upper portion of the proposed Doolans Basin expansion area.

Sub-stage boundaries have been provided within the respective ESCP sheets, to clearly define the earthworks extents. It is recommended that works are undertaken in small, manageable sections to minimise the area of exposed earth and the volume of stockpiled material at any one time. By completing sub-stages, cut-to-fill operations can be completed efficiently, and the exposed areas can be stabilised immediately thereafter.

2.5.1 Rastus Burn Gondola Terminal and Base Building Extension – ESCP-002, Appendix 1

The Rastus Burn Gondola Terminal and Base Building Extension comprises bulk earthworks, retaining walls, underground services, gondola terminal and tower foundations (T1 and T2), and foundations for the extension of the existing base building.

- Track plant onto the works site utilising the established Remarkables Ski Area Access Road. Utilise the existing carpark as the laydown area.
- Install the dirty water diversion bund (DWDB), trafficable swale and sediment sump around the perimeter of the Remarkables Maintenance Shed, as shown on ESCP-002, **Appendix 1**.
- Install the decanting earth bund (DEB) and associated dirty water diversion channels (DWDCs) as shown on ESCP-002, **Appendix 1**.
- Place coconut coir logs below the proposed fill batter (catchment 3), as depicted on ESCP-002, **Appendix 1**.

- Undertake cut-to-fill earthworks in a progressive and controlled manner. Ensure fill grades slope back towards the exposed works area, so that any potential 'dirty' water is directed to the designated sediment controls.
- Progressively revegetate the fill batter, reinstating any preserved vegetation as soon as practicable.
- When design levels are reached, construct the required retaining walls (refer to **Section 2.4.5**) and install underground services. Form the building, gondola terminal and tower foundations, enabling the commencement of vertical construction.

2.5.2 Rastus Burn to Midstation Access Road and Halfpipe Fill – ESCP-003, Appendix 1

Rastus Burn to Midstation access and half-pipe fill works involve cut-and-fill earthworks, retaining wall construction, and stockpiling material.

- Carefully track plant along the existing tracks within the Remarkables Ratus Burn area to access the designated works area.
- Construct a DWDB at the downslope end of the existing half-pipe. This bund is to be constructed using site won rock and vegetation and shall be maintained for the duration of the Project. The half-pipe fill area will function as a stockpile area throughout the Project. Any material remaining at the end of each construction season it is to be compacted and stabilised using site won rock or vegetation.
- Install pipe drops across excavations that intersect and water bodies.
- Undertake cut-and-fill earthworks in sections to form the Rastus Burn to Midstation access track.
- Progressively install trafficable swales within the low points of the access track. Install drop-out pits and coconut coir logs at the outlet to the trafficable swales to reduce water flow velocities and capture sediment. Refer to Section **2.4.5** and **Section 2.4.6** for detailed requirements.

2.5.3 Curvey Return Trail and Doolans 4WD Track – ESCP-004 & 005, Appendix 1

Doolans Access and Services involves cut-and-fill earthworks, retaining wall construction, access road formation, service installation, and snowmaking infrastructure.

- Refer to **Section 2.4.4**, **Section 2.4.5**, and **Section 2.4.6**.
- Carefully track plant along the existing tracks within the Remarkables Ratus Burn area to access the designated works area.
- Install pipe drops across excavations that intersect and water bodies.
- Undertake cut-and-fill earthworks in sections to form the access track.
- Progressively install trafficable swales within the low points of the access tracks. Install drop-out pits and coconut coir logs at the outlet to the trafficable swales to reduce water flow velocities and capture sediment. Refer to Section **2.4.5** and **Section 2.4.6** for detailed requirements.
- In areas where a splash crossing is to be established refer to **Section 2.4.2**.

2.5.4 Gondola Tower Alignment – ESCP-011, Appendix 1

Rastus Burn gondola tower construction involves temporary access track formation, establishment of temporary 8 m × 8 m tower construction platforms, construction of tower foundations, tower erection, and subsequent vegetation reinstatement.

- Refer to **Section 2.4.3** and **Section 2.4.4**.

2.6 Construction Season 2027 - 2028

Construction Season 2027-2028 will involve further expansion into the Doolans. This involves Midstation works, installation of the Doolans gondola towers, construction of the blue ski trail, and completion of the remaining section of the 4WD access track to the proposed base terminal and building location.

2.6.5 Gondola Midstation – ESCP-006, Appendix 1

- Carefully track plant onto the worksite using the established 4WD tracks, taking care to avoid damaging existing rock and vegetation as much as practicable.
- Construct the DWDB (topsoil bund) along the northernmost point of the proposed fill batter. Topsoil removed from the earthwork's footprint may be repurposed to construct the required bunding as shown on ESCP-006, **Appendix 1.**
- Install the DWDCs and corresponding sediment sumps along the south-east earthworks footprint as shown on ESCP-006, **Appendix 1.**
- Progressively undertake cut-and-fill earthworks, completing works in subsections to minimise the extent of exposed ground and stockpiled material at any one time. Given the characteristically high winds on the ridge line, priority, must be given to the rapid and progressive stabilisation of exposed areas, using site won rock.

2.6.6 Doolans Blue Trail and 4WD Track – ESCP-007, Appendix 1

- Carefully track plant along the existing tracks to access the designated works area.
- Progressively install the trafficable swales, culverts, sediment sumps, level spreaders, pipe-drops, permeable road and coconut coir logs as shown on ESCP-007, **Appendix 1.**
- Progressively undertake cut-and-fill earthworks, completing works in subsections to minimise the extent of exposed ground and stockpiled material at any one time.
- Refer to **Section 2.4.6** and **Section 2.4.7** for detailed requirements.

2.6.7 Doolans Water Reservoir – ESCP-008, Appendix 1

- Undertake the cut-and-fill earthworks associated with the swale/cut-off drain alignment, surrounding the north, east and west aspects of the proposed water reservoir footprint, depicted on ESCP-008, **Appendix 1**. Ensure the cut is stabilised as soon as practicable, as it will function as the clean water diversion channel (CWDC) throughout the duration of bulk earthworks. Where possible, topsoil should be lifted carefully and 'folded over' to retain the vegetative root network, allowing it to be folded back into place with intact plants, for rapid stabilisation. Treat rocks as stabilising materials and retain them for reinstatement.
- Install coconut coir logs at the southern most points of the CWDCs, as shown on ESCP-008, **Appendix 1**.
- In areas where a splash crossing is proposed to be installed, refer to **Section 2.4.2**.
- Construct the DWDB (topsoil bund) at the base of the reservoir fill footprint. Topsoil stripped from the earthwork's footprint may be reused to form the bunding as depicted on ESCP-008, **Appendix 1**.
- Undertake bulk cut-and-fill earthworks required to form the water reservoir. Ensure all vegetation and rock cleared is progressively reinstated or stockpiled for later use.
- If attenuated flows are retained within the reservoir cut area during earthworks, they may be pumped to a sandbag turkey nest structure prior to discharge.
- Progressively place existing vegetation and rock over the cut and fill batters to stabilise exposed areas and reduce erosion risk.

2.6.8 Doolans Base Station and Beginner Ski Slope – ESCP-009, Appendix 1

- Carefully track plant onto the worksite using the established 4WD track, taking care to avoid damaging existing rock and vegetation as much as practicable.
- Install the temporary pipe-drop structure and then the engineer designed culvert. Refer to **Section 2.4.2** for detailed methodology.
- Install the CWDB followed by the DWDCs, sediment sumps, coconut coir logs, DWDBs and DEB as shown on ESCP-009, **Appendix 1.**
- Ensure spill kits and concrete washout are established in the laydown.
- Commence cut-to-fill earthworks in a progressive manner, allowing vegetation to be reinstated as works advance and enabling the earthworks area to be stabilised progressively.
- Once design levels are reached for the gondola base station and the base building area, undertake the necessary infrastructure trenching in accordance with **Section 2.4.4**.
- Pour base slabs and undertake vertical construction in accordance with the design plans.

Doolans Base Station and Beginner Ski Slope – Contingency Measures

In instances where there is a forecast rain event or the site is to be left unoccupied for 48-hours or more, the following methodology should be followed:

- Install the contour drains, directing 'dirty' water flows to the corresponding DWDCs and sediment sumps as shown on ESCP-009, **Appendix 1**.

2.7 Construction Season 2028 - 2029

Construction Season 2028-2029 will consist of the earthworks associated with the Doolans Water intake access, commissioning of the water intake and snowmaking infrastructure, and vertical construction associated with the previous construction season's earthworks.

2.7.1 Doolans Water Intake Access – ESCP-010, Appendix 1

- Carefully track plant along the existing tracks to access the designated works area.
- Install the DWDCs, culverts, sediment sumps, level spreaders and coconut coir logs as shown on ESCP-010, **Appendix 1.**
- Progressively undertake cut-and-fill earthworks, completing works in subsections to minimise the extent of exposed ground and stockpiled material at any one time.
- Refer to **Section 2.4.4** and **Section 2.4.6** and **Section 2.4.2** and **Section 2.4.8** when undertaking these works.

2.7.2 Lower Mountain Transit Hub – Car Park B

A detailed construction methodology will be provided in due course, specific to these works.

2.8 Construction Season 2029 - 2030

Bulk earthworks are proposed to be undertaken in stages. Construction Season 2029 – 2030 will consist of the remaining trail development, operational improvements and any remaining snow-making infrastructure installations.

2.8.3 Doolans Blue Trail – ESCP-007, Appendix 1

Any remaining earthworks required for the formation of the Doolans Blue Trail will be undertaken.

- Carefully track plant along the existing tracks to access the designated works area.
- Progressively install the trafficable swales, culverts, sediment sumps, level spreaders, pipe-drops, permeable road and coconut coir logs as shown on ESCP-007, **Appendix 1.**
- Progressively undertake cut-and-fill earthworks, completing works in subsections to minimise the extent of exposed ground and stockpiled material at any one time.
- Refer to **Section 2.4.6** and **Section 2.4.7** for detailed requirements.

2.8.4 Trail Development and/or Operational Improvement

Any additional earthworks required for the formation of the ski trails associated with the Project, and necessary operational improvements, will be undertaken.

- Trail development should be undertaken in accordance with **Section 2.4.7** and the corresponding ESCP sheet.
- Operational improvements should be undertaken in accordance with their corresponding **Section 2.4** best practice methodology.

2.8.5 Vertical Construction

- Undertake remaining vertical construction and infrastructure development. Ensure the appropriate best practice methodologies are utilised.

Decommissioning

- Any surplus vegetation and/or topsoil shall be reinstated or redistributed across areas deemed appropriate for rehabilitation to ensure no indigenous material remains unused.
- Remove erosion and sediment control devices once stabilisation has occurred across the entire site. This is generally defined as 80% vegetative or rock cover.

2.9 Hours of Operation

Construction activities and the associated hours of operation shall generally comply with *NZS 6803:1999 Acoustics - Construction Noise Guidelines*, however, due to the shortened construction season and isolated nature of the site, construction is proposed between the following times:

- 0700 and 1830 between 1 November and the 30 April
- 0700 and 2100 up to three days a week

The proposed timeframes are consistent with the approved (DOC) Rastus Burn Concession timeframes. However, this does not preclude any emergency works or works required for incident investigation or response. Additional details relating to noise-producing activities are to be undertaken in accordance with **Section 7.0** of this CEMP.

3.0 CEMP IMPLEMENTATION

3.1 Environmental Roles and Responsibilities

3.1.1 Project Manager

The Project Manager is responsible for the effective implementation of the CEMP and has overall responsibility for the environmental performance of the project. Duties include:

- Ensuring adequate resources are in place to implement the CEMP.
- Ensuring all staff and sub-contractors operate within the guidelines of the CEMP.
- Ensuring that CEMP is prepared and that environmental standards, processes and procedures meet relevant resource consent conditions.
- Overseeing the successful implementation, monitoring and review of the CEMP.
- Ensuring that inspections are carried out in accordance with the relevant CEMP.
- Restricting or stopping any activity that has the potential to or has caused adverse environmental effects.
- Providing notification and reporting of Environmental Incidents to Council and other environmental reports as required by The Guidelines and/or conditions of resource consent.
- Delegating authority of the above responsibilities.

3.1.2 Environmental Representative

The Environmental Representative supports the Project Manager in the day-to-day implementation of the CEMP. Duties include:

- Ensuring the installation of environmental controls as per the CEMP.
- Undertaking environmental site inspections.
- Undertake water quality sampling during rainfall events.
- Overseeing the maintenance and improvement of defective environmental controls.
- Providing environmental inductions to all staff and sub-contractors.
- Assisting the project leadership in attending to Environmental Incidents and Complaints.

The Environmental Representative shall be familiar with environmental risks associated with the project, the CEMP and best practice erosion and sediment control principles and practices.

3.1.3 Environmental Consultant

The Environmental Consultant (SQEP) will provide technical environmental management advice as required. Key tasks include delivering the Site Environmental Induction to core staff and providing as-built confirmation of erosion and sediment controls to Council. The Environmental Consultant shall undertake monthly monitoring of the site and submit Monthly Environmental Reports to **QLDC, CODC, and ORC**.

3.1.4 All Staff and Sub-Contractors

All staff and sub-contractors have a responsibility to undertake all activities in accordance with the requirements of this CEMP. This includes reporting any activity that has the potential to or has resulted in an Environmental Incident to the Project Manager or Environmental Representative.

3.2 Site Environmental Induction

All staff and subcontractors shall attend an Environmental Induction to ensure they are aware of the project's environmental risks as well as their responsibilities to help manage these risks. Prior to ground-disturbing activities, the Environmental Consultant will deliver the induction to core staff. During the project, the Environmental Representative will induct subcontractors and new staff. The site induction handout is attached as **Appendix 3** and all persons inducted will be recorded on the Induction Register attached as **Appendix 4**.

3.3 Environmental Inspections

Table 4 outlines the regular environmental inspections to be undertaken.

Table 4: Environmental Inspections

Environmental Inspection	Timing	Purpose
Weekly Inspection	Every seven days	• Confirm that all environmental controls are present, functional, and adequate. • Identify any activities that may cause an environmental incident or actual or potential environmental effects. • Identify maintenance requirements for implemented management measures. • Review and record the site weather station rainfall and wind data. All weekly inspections shall be recorded on the Weekly Site Inspection form attached as **Appendix 5**.
Pre-Event Inspection	Prior to a significant rainfall and or/adverse weather event[1]	• To ensure that erosion and sediment controls are present, functional, and adequate for forecast rain event. • This inspection will inform any preventative work required and may result in the Rapid Response Procedure being implemented (see **Section 4.6**).
Adverse Weather Event Monitoring	During a significant weather event (if safe to do so)	• Erosion and sediment control devices continue to function correctly and inform any necessary emergency responses. • Complete water quality monitoring and sampling. • Record any non-conformances and identify any areas of improvement.
Post-Event Inspection	Post a significant rainfall and/or adverse weather event	• Erosion and sediment control devices are repaired and/or maintained. • Any observations and corrective actions should be recorded in **Appendix 8**.

[1] A significant rain event is defined as any forecast/actual rain event of 20 mm within a 12-hour period (as per QLDC CEMP Guidelines) or a rain event that can generate overland flow, noting that this varies seasonally. A significant or adverse weather events (damaging wind, snow, freezing conditions and/or rain) as referred to in the QLDC and ORC Earthworks Guidelines.

3.4 Monthly Environmental Inspection and Reporting by SQEP

The Environmental Consultant (SQEP) will monitor the site monthly to ensure that the CEMP is correctly implemented, identify any unforeseen issues arising and advise on alternative environmental solutions. The Environmental Consultant (SQEP) will also submit a Monthly Environmental Report to **QLDC, CODC, and ORC** at the end of each month. The report will include the following information:

- Updates to the CEMP and the Erosion and Sediment Control Plan (ESCP) during the month (if required).
- Number of weekly inspections completed.
- Summary of any water quality monitoring and/or sampling undertaken.
- Positive environmental outcomes achieved and opportunities.

3.5 Environmental Incident Management

Environmental incidents shall be responded to as soon as the project team becomes aware of their occurrence. The response will generally involve oversight by the Environmental Consultant and will involve:

- Immediate cessation of the activity that caused the incident.
- Investigation into the cause of the incident.
- Initial response to bring the incident under control.
- Implement any remediation works.

The Project Manager must notify **QLDC, CODC, and ORC** of the details of any Environmental Incident within 12 hours of becoming aware of the incident. Notification will be through a phone call to Council monitoring staff (see Emergency Contacts in **Table 2**). The Project Team shall provide an Environmental Incident Report within ten working days of the incident occurring. The Incident Report form is attached as **Appendix 6**.

3.6 Complaints Procedure

Any complaint received will be recorded and an investigation will be carried out. The complainant will be provided with a response acknowledging receipt of the complaint and outlining corrective actions to be implemented. After the investigation, any necessary corrective actions will be carried out, and a follow-up of the original complaint is to be conducted to ensure the actions implemented have been effective. All complaints will be recorded on the Complaints Register attached as **Appendix 7**.

3.7 CEMP Non-Conformance and Corrective Actions

CEMP non-conformances found during site inspections, monitoring or as a result of environmental incidents or complaints shall be recorded in the CEMP Non-Conformance Register. The non-conformance register attached as **Appendix 8** will detail when corrective actions are due, how they are to be carried out and the close out date. The non-conformance register ensures that issues do not escalate or are missed, as well as, providing a clear record of evidence that can be used to defend any potential complaint or formal enforcement action.

3.8 Records and Registers

The records listed below will be collated onsite. If a request is made by a **QLDC, CODC, and ORC** official, the records shall be made available to the official within 24 hours of the request being made.

- Environmental Induction Register - **Appendix 4**.
- Weekly Environmental Inspection Form - **Appendix 5**.
- Environmental Incident Reports - **Appendix 6**.
- Complaints Register - **Appendix 7**.
- CEMP Non-Conformance Register - **Appendix 8**.
- Water Quality Monitoring Results - **Appendix 9**.

3.9 CEMP Updates

The CEMP will be regularly reviewed throughout the project to ensure the document remains fit for purpose and to drive continual improvement. This may be initiated by:

- Significant changes to the construction methodology.
- Improvements identified as a result of an Environmental Incident or Corrective Action.
- Where directed **QLDC, CODC, and ORC** by Monitoring and Enforcement or Compliance teams.

All CEMP updates will be managed through the document control table on page one and shall be submitted to **QLDC, CODC, and ORC** for acceptance.

4.0 EROSION AND SEDIMENT CONTROL

4.1 Guidelines and Standards

Erosion and sediment controls shall be designed and installed in accordance with current best practice guidelines, **to the extent practicable**, recognising the site's unique characteristics. The choice of which erosion and sediment control measures are used will depend on site-specific constraints and the project construction staging.

Generally, this is:

- Department of Conservation and NZSKI Ltd. Protocol for the Rehabilitation of Natural Alpine Environments Following Ski Area Development.
- Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016 (Auckland Council Guideline Document GD2016/005).
- QLDC Guidelines for Environmental Management Plans, June 2019 (The Guidelines).
- Ministry for the Environment (MfE), National works in waterways guideline-best practice guide for civil infrastructure works and maintenance.

Due to the Alpine environment, the practical installation of GD05 design sediment controls for this project won't always be feasible and would ultimately incur greater disturbance of the local flora and fauna. Therefore, a focus on proactive erosion control is adopted to minimise erosion occurring in this first instance and reduce displaced sediments. Sediment control provided for in this plan are adopted to provide low impact design, whilst minimising potential adverse effects on surrounding receptors.

In line with Stantec's Stormwater Concept Report (Stantec 2026a), existing sheet flow and natural surface water pathways have been retained wherever practicable across trails and roads within the Rastus Burn Basin and the proposed access and ski trail in the Doolans basin. This has been achieved by avoiding the construction of swales and channels that would otherwise intercept, divert, and concentrate flow.

Instead, existing sheet flow patterns and ephemeral watercourse pathways have been preserved to maintain their natural function. Surface water is encouraged to disperse and pass across roads and trails, rather than being collected in swales and channels. This approach maintains, as closely as practicable, the original natural surface sheet flow regime and reduces alteration to the existing hydrological processes.

GD05 ARC Guidelines

QLDC Environmental Guidelines

4.2 Erosion and Sediment Control Principles

ESC devices shall be installed, maintained and decommissioned in accordance with the following principles:

- To ensure that there is a minimum of interference with the natural environment, and avoidance of disturbance to areas outside approved work areas.
- Culverts will only be installed where splash crossings or sheet flow are impracticable due to topography, safety, or environmental constraints.
- Where culverts are required, inlet and outlet scour protection.
- To ensure that any indigenous vegetation disturbed by development is restored as near as possible to its original density and diversity, within the shortest practical timeframe.
- To minimise the erosion and sedimentation of exposed soils (and soil among transplanted vegetation), optimising the long-term regeneration of indigenous vegetation through natural dispersal.
- Erosion and sediment controls are integrated with construction planning.
- Construction is staged to minimise the duration and area of exposed soil open at any one time.
- A 'treatment train' approach so that the sediment retention devices operate as efficiently and effectively as possible.
- Separation of 'clean' and 'dirty' water, with clean water to be diverted around the site to minimise the volume of dirty water needing management onsite.
- The extent and duration of soil exposure is minimised.
- Controls are always maintained in proper working order.
- Progressively stabilise and revegetate disturbed or completed areas.
- The site is monitored, and erosion and sediment control practices are adjusted to maintain the required performance standard.
- Soil erosion is minimised as far as reasonable and practical.
- Avoidance of sediment discharge off-site and protection of receiving environments.

4.3 Erosion Control Practices

4.3.1 Non-Structural Controls

Non-structural approaches to erosion control are closely linked to the fundamental principles of ESC detailed in **Section 4.2**. The key erosion control practices are outlined below. These principles and concepts provide guidance for ESC throughout the planning, construction and maintenance phases of a project. Construction activities are typically concentrated within the spring/summer and autumn construction period, reflecting alpine access constraints and the operational requirements of the ski season. Where works are not completed within a single construction season, work areas will be stabilised and left in a safe condition, including, where necessary, temporary reinstatement or protection measures, to enable safe transition into winter ski area operations.

Staging

Only by exposing those areas that are required for active earthworks, the duration of exposure and risk of erosion and sedimentation can be minimised. 'Earthworks staging', where the site has earthworks undertaken in smaller units over time, limits erosion. Staging is demonstrated in the Erosion and Sediment Control plan attached as **Appendix 1**and has been outlined in **Section 1.3.**

Timing

It is recommended that works are undertaken within the construction seasons and outside of significant or adverse weather events (e.g. during sustained periods of rainfall, or snow and ice, or dry and windy periods that are conducive to exacerbated rates of erosion and sedimentation).

Progressive Rehabilitation

A focus on progressive rehabilitation is necessary to reduce the exposed catchments and avoid the possibility of erosion and sedimentation occurring. Rehabilitation measures are outlined below:

- Existing vegetation is initially stripped and located above the cut batters to form clean water diversion bunds and dirty water diversion bunds downslope of excavations.
- Existing vegetation and topsoil are immediately placed over cut and fill batters to stabilise the works area, once design levels have been reached.
- In areas where vegetation is sparse, reinstating with rocks and boulders provides rapid rehabilitation.

4.3.2 Stabilisation Measures

Revegetation

- Vegetation along with the topsoil and roots will be carefully excavated to keep the roots intact so it can be reinstated back with the plants (e.g. tussock) intact to enable quick re-establishment.
- In some areas at lower elevations, an alpine mix of seed, is recommended to be hand-sown where vegetation re-establishment is struggling.

Access Tracks and Ski Trails

- Road and trail surfaces will be armoured using well-graded granular material to resist erosion under sheet flow conditions.
- Localised rock armouring will be provided at flow transition points, splash crossings, culvert outlets, and roof runoff discharge areas as required.

Erosion Matting

- There are many different types of erosion matting, and the product selected should be done so under the direction of an appropriately qualified person.
- Biodegradable erosion matting like coconut fibre or wool matting material can be utilised on lower-grade slopes and actively promote revegetation, subject to DOC approval.
- A more robust geotextile erosion matting may be required on high-grade batters with higher susceptibility to further mobilisation of material, or areas subject to fluvial undermining. Geofabric lining is to be installed as per Geotechnical recommendations. Efforts should be made to source erosion matting with neutral colour tones that will blend with the existing catchment tones to reduce visual effects.
- Where and when erosion matting is utilised needs to be undertaken per the direction of the Geotechnical Engineer and Environmental Consultant.

Soil Stabilising Polymers

- Erosion control, soil binders or polymers may be utilised as a short-term ground protection agent (generally less than 6 months) on exposed surfaces prior to final shaping and treatment. Polymers help bind soil particles

and produce a 'laminated' surface area, reducing susceptibility to erosion. A proven, environmentally safe product should be utilised under the direction of the project SQEP and terrestrial ecologist, subject to DOC approval.

- Use of soil binders is not considered appropriate where the established soil crust is likely to be damaged, or within areas of concentrated flow or periodic inundation is likely to occur. It is also emphasised that use of soil binders does not constitute stabilisation of the site, but rather as a temporary mitigation measure against the potential effects of raindrop and/or windborne erosion.

4.3.3 Site Access

The Remarkables Ski Area has multiple existing stabilised access points, and machinery and plant will be confined to the consented earthworks footprints. Existing access tracks will be utilised to access the proposed earthworks areas to reduce impacts on the existing flora and fauna.

Any tracking over the site shall follow the path of least disturbance and/or the nominated access tracks as shown in the ESCP's. Protective matting, or site won rock can be utilised in areas within direct proximity of critical source areas, as directed by the project ecologist and where they can safely be deployed without causing a slipping hazard.

4.3.4 "Clean Water" Diversion Channels and Bunds

Clean water diversion channels and bunds (CWDC/CWDB) will be used to capture and divert clean water from the undisturbed surfaces above the exposed works site. The purpose of these devices is to separate clean and dirty water and minimise the size of the contributing catchment.

Due to the steep slopes, as well as a requirement to avoid damaging indigenous vegetation as far as reasonably possible, the vegetative layer of topsoil and root zone should be pushed upwards above the intended cut area to form a vegetated earth bund. Where possible, the topsoil will be carefully lifted and folded over to keep roots intact so it can be folded back with plants (e.g. tussock) intact to enable quick re-establishment. The clean water diversion bunds shall be installed on contour and direct upslope sheet flows to the adjoining flow paths.

4.3.5 "Dirty Water" Diversion Channels and Bunds

Dirty water diversion channels and bunds (DWDC/DWDB) will be installed to capture and carry sediment-laden stormwater to the respective sediment control device.

Concentrated flows in the steep alpine environment are generally not advantageous, and with limited areas for sediment attenuation devices, implementing DWDCs is not always feasible. Due to the nature of the proposed earthworks to form ski trails that largely match the existing terrain and trenching, which is excavated and backfilled in a staged manner, there are limited opportunities to effectively install DWDCs.

The use of heavily vegetated dirty water diversion bunds at the base of excavations has been successfully implemented during earlier phases of development across other projects within the Remarkables Ski Area, as well as other ski areas in the district, overseen by Enviroscope.

4.3.6 Contour Drain

Contour drains will be installed to reduce the slope length and thereby reduce the velocity and erosive power of dirty water runoff. Flows caught by the contour drains will be directed into the nearest sediment control measure, before outletting towards an appropriate flow path of waterbody.

4.3.7 Check Dams

Rock check dams will be deployed primarily to reduce the velocity of concentrated flows in the DWDCs and DWDBs. They will also act to capture some coarse sediment. Surrounding rock won during excavations can be utilised to form the check dams, reducing the necessity to transport rock to the site.

4.3.8 Drop-Out Pits

Drop-out pits can be used within the DWDCs and DWDBs to good effect as they:

- Allow the heavier coarse sediments to drop out, preventing them from entering the sediment retention devices, and reducing loads on these devices.
- To act as a sump joining two intersection channels or bunds.

4.3.9 Pipe-Drop Structures and Flumes

Pipe drop structures shall be used to transport clean water that may terminate from waterbodies or ephemeral flow paths without causing erosion through works areas. Due to the alpine environment, it is common to encounter clean water seepages or flows generated from flow paths during rainfall events and/or snow and ice melt. While care has been taken to avoid all prominent waterbodies and flow paths, the proposed earthworks will encounter some areas of clean water that will need to be conveyed around or over the works area safely.

4.3.10 Culverts

Culverts shall be used onsite to transport ‘clean’ or ‘dirty’ water under ski trails and access tracks. Culverts shall consist of a PVC culvert, and follow the detailed design provided in Stantec’s Stormwater Concept Report (Stantec 2026a). Geofabric and rock shall be placed at the inlet and outlet to prevent scour from the higher velocity water exiting the culvert.

4.3.11 Splash Crossings

Splash crossings will be used preferentially over culverts for water body crossings where traffic volumes and gradients allow. Splash crossings maintain hydrological continuity, reduce blockage risk, and minimise long-term maintenance requirements in alpine conditions. Splash crossings will be rock lined using site won rock and mimic the existing bed of water bodies they intersect.

4.3.12 Trafficable Swales

Trafficable swales will be installed at low points in the access tracks and ski trails, to provide sheet flow to flow across the trail surfaces, mimicking sheet flows, as designed in (Stantec 2026a). Trafficable swales shall have a drop out pit and coconut coir log installed at the outlet during construction, to reduce water velocities and capture sediments.

4.3.13 Level Spreader

Level spreaders are commonly utilised in alpine environments to convert concentrated flows into sheet flows. The use of a level spreader assists in dissipating flows before conveying them through a suitable sediment control measure before being routed into adjoining waterbodies or overland flow paths.

4.3.14 Stockpiles

Stockpiling of materials will be required throughout construction for the temporary storage of stripped topsoil, vegetation, rock, cut material, imported fill (if required), and subgrade materials. These materials will be retained on site, where practicable, for reuse in earthworks, rehabilitation and site reinstatement activities.

Two primary stockpile types are anticipated during the works:

- **Vegetation and topsoil stockpiles**, comprising stripped vegetation, topsoil and organic material, and rock to be used in rehabilitation and site reinstatement activated.
- **Subsoil and subgrade stockpiles**, comprising suitable cut material, weathered rock, and imported fill/subgrade for reuse in earthworks and filling operations.

Stockpile locations will be selected to ensure they are situated on stable ground and located away from concentrated flow paths, critical source areas, waterbodies, wetlands and other sensitive receiving environments. Indicative stockpile locations are identified within the ESCP and may be refined throughout the construction programme to suit programme requirements and actual on-site conditions.

Prior to stockpile establishment, erosion and sediment controls will be installed, as specified in the ESCP. Stockpiles will generally be managed through the installation of a CWDB upslope of the stockpile area, with silt fences and / or coconut coir logs installed downslope to intercept sediment-laden runoff.

Vegetation and topsoil stockpiles will be managed to maintain the viability of retained material for rehabilitation, including limiting stockpile heights. Vegetation layering should be avoided, and stockpiles should be watered during extended dry periods as required to maintain vegetation survivability.

Where stockpiles are to remain in place for an extended duration, stabilisation measures such as shaping, surface compaction, erosion control matting, vegetation cover, or rock cover will be implemented as appropriate to maintain stockpile stability and minimise erosion and sedimentation.

4.4 Sediment Control Practices

4.4.1 Decanting Earth Bund

Decanting earth bunds (DEBs) are to be used to capture flows from larger earthworks extents and allow sediment to settle out of the water column. These are initially earmarked to be utilised at the base of larger earthworks extents, where gradient permits their installation, like the base building, lower gondola terminal in the Doolans Basin, and any other viable locations along the ski trails or access tracks.

Due to the steep and sensitive alpine environment, the ability to excavate areas to form GD05 design DEB's may not be feasible, but every effort should be made to construct them to their maximum allowable size. If, through bench testing, it is determined that chemical treatment of the soils can provide tangible environmental benefit, then the DEBs will be chemically treated in accordance with an approved Chemical Treatment Management Plan (CTMP). Final sizing and dimensions will be provided with the CEMP and ESCP prior to construction.

4.4.2 Sediment Sumps

Sediment sumps or small sediment basins will be excavated at the termination of the 'dirty' water diversion channels or bunds and manage smaller catchments ≤2000m^2, where fall cannot reach more formalised retention devices or the

topography does not support the construction of more formalised retention devices. Sediment sumps function as an important element of the 'treatment train' approach, whereby flow velocity is reduced, and sediment can settle out of suspension before overflowing into adjoining overland flow paths or waterbodies.

Sediment sumps shall typically be formed to dimensions of 2.0 m W x 2.0 m L x 1.0 m D, though depth should vary depending on the subsoil media. It is important that sediment deposits are regularly cleared from the sump to maintain exposure of these free-draining soils. A spillway should be constructed and lined on the downslope wall of the sediment sump, ensuring the lining is secured in place to avoid erosion and undercutting.

4.4.3 Chemical Treatment

Chemical treatment is not initially proposed for this project due to the difficulties of implementing it in the alpine environment and due to the inability to practically install sediment retention ponds (SRPs) and DEBs. Snow and ice encountered throughout the year traditionally inhibit effective dosing of coagulants and flocculants.

If chemical treatment is deemed necessary based on daily, weekly and monthly environmental inspections as defined in the CEMP, a CTMP shall be prepared by Enviroscope. Bench testing will be undertaken to confirm chemical treatment requirements. This will ensure that the selected flocculant or coagulant is dosed at appropriate rates to cause efficient coagulation whilst avoiding potential contamination in receiving waterways.

4.4.4 Standard Silt Fence

A silt fence (SF) is a temporary barrier of woven geotextile fabric that is used to capture mainly coarse sediments carried in sheet flow. Its purpose is to detain runoff flows so that deposition of transported sediment can occur through settlement. They are not used to filter sediment out of runoff.

SFs are appropriate where there is a need to control sediment by intercepting sheet flow, where a site is low gradient, or is confined with a small contributing catchment, such as short batter fills and around watercourses, to delineate the limit of disturbance on an earthworks site, such as riparian areas or bush reserves, or where installation of an earth or topsoil bund would impact sensitive areas, such as indigenous flora, fauna or waterbodies.

A standard SF can be used to capture potential sheet flows from smaller catchment areas, and in sheltered areas, unlikely to be exposed to severe winds and snow**.** Exact SF locations to be confirmed by the environmental consultant and ecologist, subject to ground conditions during initial excavations. This is to ensure best practice control with the least ecological impact is selected.

4.4.5 Super Silt Fence

Super silt fences (SSFs) temporarily impound sediment-laden runoff, reduce velocities and allow sediment to settle out of the water. The use of SSFs is like that of SFs. However, SSFs are more robust devices that are appropriate to control runoff from steeper or larger catchments than SFs. SSFs can be utilised to greater effect in the alpine environment as they provide a greater level of tensile strength. SSFs are to be utilised below any fill areas within direct proximity of waterbodies.

The anchoring of the SSF will ensure stability, and the double-layered geotextile will ensure that finer grades of sediments will be captured prior to any water filtering through the fabric. This solution will be adopted in a restricted manner, as the nature of the alpine environment makes erecting and maintaining SFs in wind zones very difficult. As a staged approach is being undertaken along with progressive rehabilitation, contributing exposed works areas are limited as far as reasonably practicable. Exact SSF locations are to be confirmed by the environmental consultant and

ecologist, subject to ground conditions during initial excavations. This is to ensure best practice control with the least ecological impact is selected.

4.4.6 Turkey Nest

A turkey nest is typically constructed using a physical structure wrapped in a layer of permeable geotextile matting to act as a means of filtration via dewatering. The turkey nest should be constructed utilising hessian sack sandbags wrapped in geotextile material with the dimensions of 2000 x 1500 x 500 mm (L x W x H). The geotextile should consist of non-woven needle-punched geotextiles and manufactured from the extrusion of polymer fibres, which are then laid down on a manufacturing 'bed'. They are then needle punched to entangle the threads, resulting in a permeable, yet dimensionally stable product which provides filtration. Spare geotextile matting should be readily available on-site to replace the used matting, which will lose its filtration capabilities after use.

4.4.7 Coconut Coir Log

Coconut coir logs can be considered both an erosion and sediment control. Coconut coir logs will act to reduce the slope length and thereby reduce the velocity and erosive power of dirty water sheet flows, whilst capturing entrained sediment. During excavations, if exposed areas cannot be quickly stabilised prior to forecast rainfall events, coconut coir logs shall be installed below excavated areas, and on contour across excavated slopes to reduce slope length and capture entrained sediments, subject to DOC approval.

The use of coconut coir logs is technically outside of the GD05 specifications due to the slope and extent of some of the contributing catchments; however, there are mitigating factors that justify their use, as explained below.

- They can be utilised in exposed, high wind and snow zones without becoming severely damaged, unlike silt fences.
- Coconut coir logs have a reduced effect on local biota as they do not require machinery to disturb the ground by digging/trenching them into place. They can be robustly secured utilising pegs and rope.
- They are constructed with a biodegradable product that does not bioaccumulate or produce waste in the sensitive alpine environment. They provide short and long-term erosion and sediment mitigation, as well as a suitable medium for vegetation to bind to and reestablish.
- They can be deployed and decommissioned rapidly to allow for works to be staged and rehabilitated as required by this plan. They are also reusable and can be utilised on a continuous basis across independent stages.
- They do not pose a health and safety risk for recreational users of the ski trails if they become enveloped by snow.

4.5 As-Built Verification

The Environmental Consultant will provide the Council with as-built confirmation to verify that the erosion and sediment controls have been installed in accordance with the approved ESCP.

4.6 Maintenance of Erosion and Sediment Control Devices

Ongoing maintenance of the site shall be undertaken as follows, and as summarised in **Table 5**:

Regular and Weather-Responsive Inspections

- Daily visual checks during active earthworks.
- Prior to and Post-Rainfall Inspections: Mandatory within 24 hours before or after rainfall events.
- Weekly formal inspections by the Environmental Representative.

Prompt Corrective Action

- Address any identified damage, blockage, or failure immediately and always before the next forecasted rainfall.
- Sediment removal and maintenance must prevent any reduction in treatment capacity.

Structural Integrity

- Check for scouring, undercutting, collapsed batters, or overtopping.
- Ensure all outlet structures, spillways, and decant systems remain stable and functioning as per design specifications.

Access and Health & Safety

- Maintain safe access routes for inspection and maintenance crews.
- Ensure no instability or unsafe conditions develop around ESC devices.

Table 5: Typical Maintenance Requirements

ESC Device	Maintenance Requirements
Sediment Sumps	Remove sediment at 20% capacity and inspect spillways and emergency overflow pathways.
Silt Fences / Super Silt Fences	Clear trapped sediment before it reaches 1/3 height, repair rips or leaning posts, ensure toe-in is maintained.
Diversion Channels and Bunds	Remove sediment buildup, repair erosion or bank failures, keep linings (if any) secure.
Decanting Earth Bunds	Maintain decant system, clear sediment as per thresholds, repair structural damage. Ensure the DEB decant arm is backflushed to ensure no residual sedimentation effects.
Check Dams / Level Spreaders	Remove sediment buildup, repair armouring (rock or geotextile) to avoid scour.

4.7 Rapid Response Procedure for Significant or Adverse Weather Events

The Environmental Representative (ER) will maintain active and ongoing monitoring of weather forecasts from reliable sources (e.g., MetService, NIWA) throughout the duration of earthworks. The ER will ensure that sufficient preparation time is allowed for site crews to inspect, maintain, and reinforce erosion and sediment control (ESC) measures prior to any significant or adverse weather event.

Weather Forecast Monitoring

- The ER will check and document daily weather forecasts, including short-term severe weather warnings.

Pre-Rainfall ESC Inspections

- Conduct thorough inspections of all ESC devices (e.g., DEBs, silt fences, diversion channels/bunds, sediment sumps, drop-out pits, and check dams) at least 24 hours prior to the forecast event to confirm functionality and available capacity.

Stabilisation of Exposed Areas

- Apply temporary stabilisation measures (e.g., vegetation, site won rock, polymers/soil binders, erosion/geotextile matting) to exposed, inactive, or at-risk areas.

Suspension of Earthworks

- Temporarily cease earthworks activities on vulnerable areas prior to and during the forecast event to minimise active soil exposure.

ESC Maintenance

- Undertake any necessary sediment removal (e.g., from DEBs, sediment sumps, drop-out pits, or silt fences) and repair any structural damage or undercutting identified. Spare erosion and sediment control products should be stored onsite at all times, including, but not limited to:
- Silt fencing (x 5).
- Waratahs (x 50).
- Spare high tensile wire.
- Novacoil pipe (at least 50 m).
- Silt fence clips (x 50).
- Pump and generator.
- Rock rip rap for check dams, culvert inlets, and outlets.
- Geofabric x 4 rolls.
- Coconut coir logs (x 20).
- Sandbags (x 10).

Active Monitoring During Rainfall (Where Safe)

- During prolonged rainfall events, and where safe to do so, the ER or delegated site personnel will monitor key ESC measures for overtopping, bypassing, or failure.

Emergency Repairs

- Be prepared to undertake immediate reactive maintenance if any ESC device shows signs of failure during the event.

Snow and Ice

- Remain vigilant of the forecast and inspect ESC devices prior to forecast snow events, during thaws.
- Where possible, avoid starting new earthworks just before snow or icy conditions.
- Direct meltwater away from exposed soil and toward the DEB or sediment sump.
- Ensure ongoing maintenance of the drop-out pits, sediment sumps, and check dams to slow down meltwater flow to reduce erosion and promote sediment settlement.

- As soon as conditions allow, repair any damaged ESC devices and reapply mulch or geotextile fabric where needed.

Record Keeping and Reporting

All pre- and post-weather event inspections, maintenance actions, and site observations shall be recorded in the site's ESC inspection and maintenance logs provided in the CEMP. Where required by consent conditions, notifications and significant event reporting (e.g., turbidity exceedances or ESC failures) will be provided to the relevant District and Regional Council Compliance Monitoring staff (e.g., ORC, CODC, QLDC) in accordance with consent condition timeframes.

4.8 Decommissioning and Removal

Erosion and sediment control devices will remain in place until 'stabilisation' of the site has been achieved. Within the alpine environment, site 'stabilisation' will focus on reinstatement of vegetation initially stripped from the works area, with cut-and-cover techniques employed to retain topsoil, organic matter, and the indigenous vegetation present, thereby supporting natural regeneration and long-term surface stability. Due to the presence of extensive rock at higher elevations, replacing rock over disturbed surfaces also provides a suitable level of stabilisation and will be adopted extensively. Examples of these are depicted in **Figure 1.**



0%



100%



0%



100%

Figure 1: Visual Cover

4.9 Contingency Measures

The following contingency measures in Table 6 shall be deployed as required.

Table 6: Erosion and Sediment Control Contingency Measures

Issue	Contingency Measure
Sediment-laden stormwater flowing across the site boundary	• Cease all earthworks immediately in the contributing catchment. • Deploy sandbags, silt socks, or bunding to redirect and contain overland flow. • Install emergency silt fence or geofabric barriers where practical. • Divert clean water away from disturbed areas to reduce further mobilisation. • Notify the Environmental Consultant (SQEP) and initiate a site-specific incident response plan. • Conduct incident documentation (location, cause, volume, response time). Submit to the regulatory authority.
Controls do not appear to be working as intended	• Undertake immediate inspection of failed controls (e.g., collapsed silt fence, overtopped basin). • Reinstate or upgrade the control using materials on-site (e.g., double silt fence, reinforce batter). • Assess whether additional or alternative measures are required (e.g., temporary stabilisation, chemical treatment). • Environmental Consultant (SQEP) to update the ESCP and record actions taken. • Notify QLDC, CODC and ORC.
The site is inappropriately exposed prior to imminent rain event	• Suspend further soil disturbance activities immediately. • Prioritise stabilisation of exposed areas using: • Vegetative or rock cover. • Polymer if < 48 hours (subject to ground conditions). • Geofabric or jute matting for slopes and channels. • Inspect and reinforce existing ESC devices before rainfall. • Activate **Section 4.7** Rapid Response Procedure.

Issue	Contingency Measure
Sediment retention devices are near capacity and more rain is forecast	• Check decant heights, primary spillway and emergency spillway functionality. • Temporarily reduce contributing catchment using diversion bunds if feasible. • Begin chemical treatment (e.g., PAC, flocculant, or coagulant dosing) to accelerate sediment settlement and increase capacity as outlined in the CTMP. • Document actions and notify the Environmental Consultant (SQEP) and Council.

5.0 WATER QUALITY

5.1 Waterbodies

Surface water bodies (rivers, streams, lakes and wetlands) provide important habitats for many species of plants, fish, birds and animals, some of which are endemic and/or threatened. To protect these values, water quality must be safeguarded, and the natural flow of the watercourse maintained to the greatest possible extent. An increase in suspended sediment within the water column can degrade water quality, and sediment deposition can adversely affect benthic habitat for macroinvertebrate communities. Where flow must be reduced or diverted, mitigation is required to ensure the values of the waterbodies are not degraded.

5.2 Identified Waterbodies

The freshwater ecological characteristics of the receiving environments are described in detail within the Ecological Assessment prepared by e3 Scientific and should be read in conjunction with this report. To support wetland mapping across the study area, e3 Scientific have undertaken hydrological analysis to model likely flow paths and water accumulation. Surface waterbodies, flow paths and wetlands identified within and in proximity to the site are provided in **Figure 2** and **Figure 3** below.

The headwaters and upper tributaries of the Rastus Burn and Doolans Creek Right Branch are located throughout the respective upper basins and faces where the ski area expansion works are proposed to occur. There are also Natural Inland Wetlands and Alpine Tarns present within both upper basins.

Rastus Burn

The greater Rastus Burn watershed covers an area of 1,460 hectares and is fed by Lake Alta and two prominent tributaries. Lake Alta is located at the head of a cirque basin, and its overflow feeds the Rastus Burn. The Rastus Burn and its tributaries are shaped by glacial, periglacial, channel erosion and mass-movement processes, typical of the steep alpine environment. The Rastus Burn flows into the Kawarau River, opposite Hayes Creek, which in turn feeds into the wider Clutha River Matau Branch.

The Rastus Burn catchment is influenced by rapid runoff due to its steep slopes and shallow soils. Seasonal snowfall and subsequent melt contribute significantly to baseflow patterns. NIWA's NZ River Maps indicate that the upper portion of the Rastus Burn generates up to 382.6 tonnes/year of suspended sediment.

The Rastus Burn has been modified in areas within the Remarkables ski area via re-diversion and culverting in areas of ski trails and associated infrastructure. Downslope of the Rastus Burn Recreation Reserve; agricultural activities have also modified the Rastus Burn tributaries to some degree. Water is taken from the Rastus Burn for the purposes of snow making in the Remarkables Ski Area.

Schedule 1A of the Regional Plan: Water for Otago (2020) identifies the natural and human use values of Otago's surface water bodies. The Rastus Burn is listed in Schedule 1A. The listed ecosystem values of the Rastus Burn include:

- Free from aquatic pest plants.
- Presence of riparian vegetation of significance to aquatic habitats.
- Presence of a boulder bed composition of importance for resident biota.
- Presence of indigenous invertebrates threatened with extinction upstream of NZMS 260 F41:806641.

Doolans Creek Right Branch

The Doolans Creek Right Branch drains a large watershed, including the upper Doolans Basin, an extensive alpine catchment located on the south-east side of The Remarkables within the Hector Mountains. The Doolans Creek Right Branch flows into the Kawarau River below Victoria Flats and Victoria Bridge, ultimately contributing to the wider Clutha River Matau Branch. The Doolans upper faces and basin associated with the Remarkables ski area expansion project is a glacially and fluvially derived Alpine environment, containing numerous cirques, tarns, boulder fields, and alpine snow tussock and herbfield environments.

The Doolans Creek Right Branch can be characterised as a high-energy fluvial erosion catchment, with boulder and rock-dominated channels typical of steep alpine waterbodies. These characteristics indicate a naturally high erosion environment, with coarse sediment supply from scree and over steepened hillslopes delivering material directly to the Creek network. NIWA's NZ River Maps indicates that the upper portion of the Doolans Creek Right Branch generates up to 586.5 tonnes/year of suspended sediment.

Groundwater

Significant groundwater and aquifers are largely absent across the Rastus Basin and Doolans Basin, due to the elevated nature of the subject site and relative depth of mapped aquifers in the area[2]. Typically, groundwater occurs only as shallow, discontinuous, low-volume storage in fractured rock, colluvium, talus, and local moraine pockets. Perched groundwater and seepages are expected to be encountered during earthworks, and the management of these localised flows are provided for in the CEMP and ESCP.

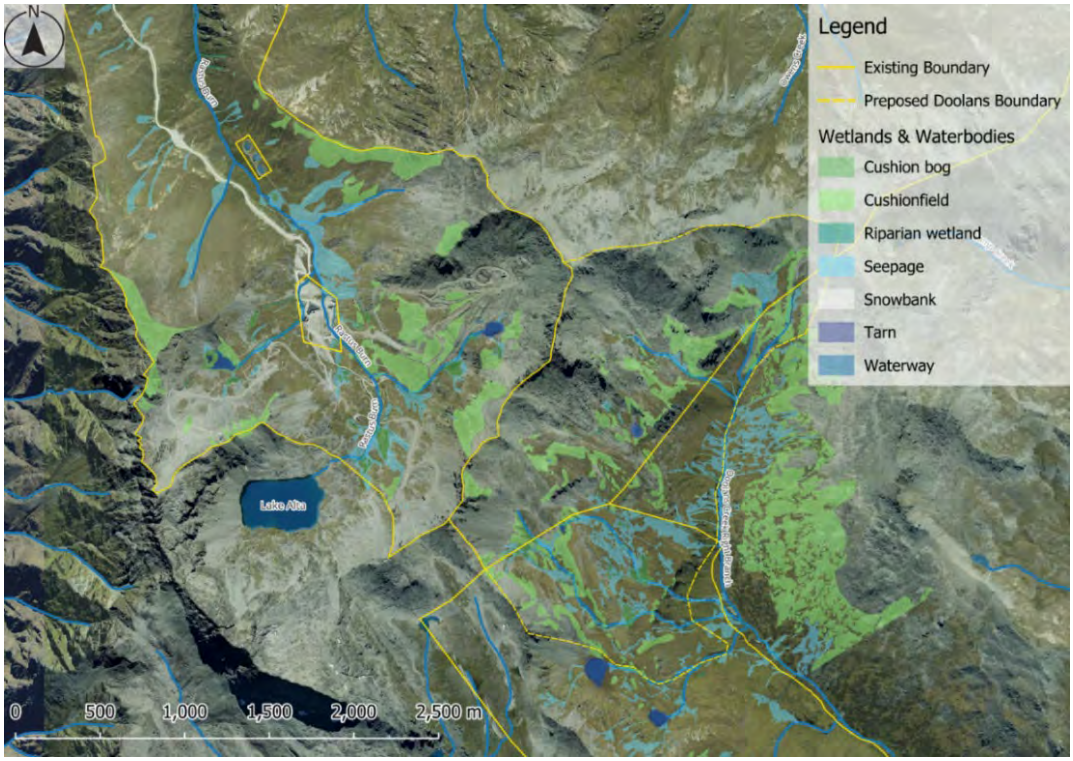


Figure 2: Waterbodies within and in proximity to the Site (Source: e3 Scientific)

[2] https://www.orc.govt.nz/environment/water-care/groundwater/#aquifers

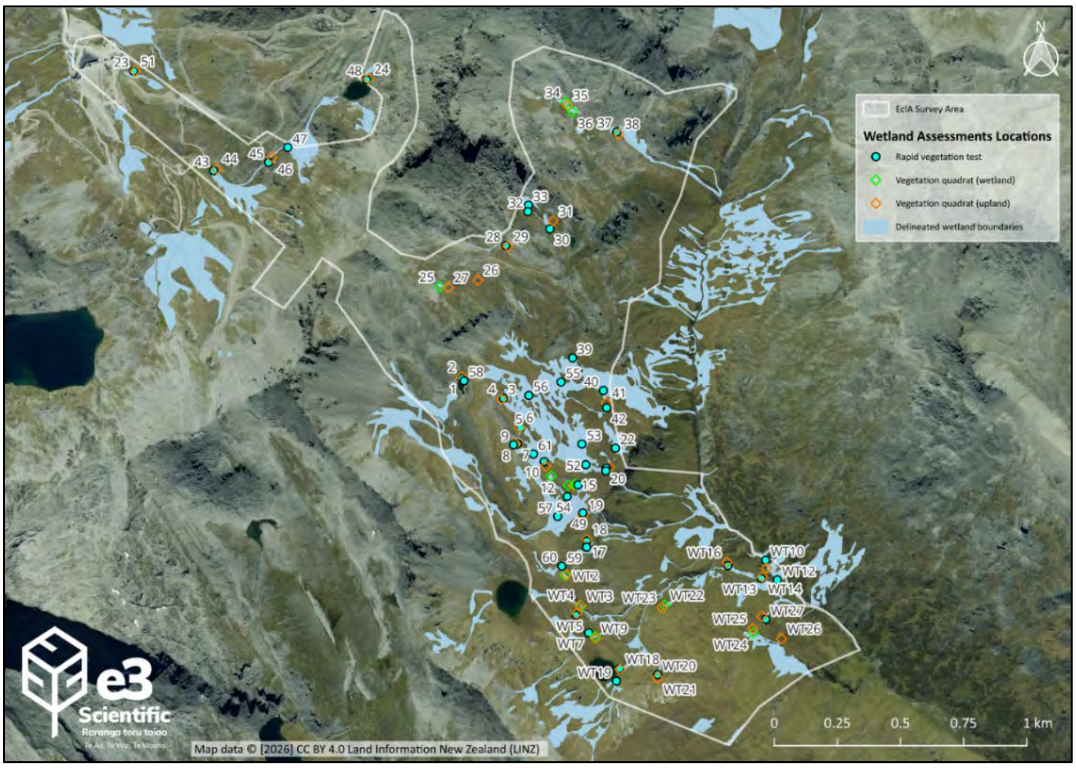


Figure 3: Wetland assessment results and delineated wetland boundaries (Source: e3 Scientific)

5.3 Performance Criteria

The recommended water quality performance criteria have been proposed following current accepted industry best practice, assessment of the proposed works and the characteristics of the receiving environment.

Key considerations include:

- The existing environment/watershed and related water quality of adjoining waterbodies.
- Staged earthworks sequencing over a four-year construction window.
- Progressive rehabilitation of disturbed surfaces.
- Variations in the sediment retention efficiency of commonly used erosion and sediment control practices, including differing ground covers, silt fences, and DEBs[3].

The assumed efficiencies of sediment control devices represent average performance across a range of rainfall/snow and ice melt conditions. Unless turbidity or TSS limits are set at relatively high levels, exceedances may occur at certain points during storm events due to natural fluctuations, even when overall effects remain within acceptable limits.

[3] https://www.landcareresearch.co.nz/assets/Events/Remote-sensing/2022/RA1.2_Review_final_2020_LC3761.pdf

Turbidity and/or visual clarity have been proposed for on-site water quality monitoring, consistent with the Erosion and Sediment Control Guide for Land Disturbing Activities (GD05), Otago Regional Council, Land and Water Regional Plan (LWRP) and the QLDC EMP Guidelines.

GD05 identifies visual clarity (mm) and turbidity (NTU) as a practical and responsive indicator of suspended sediment during construction, as it provides immediate results suitable for operational monitoring. While GD05 recognises Total Suspended Solids (TSS) as the benchmark parameter for quantifying suspended sediment, it also notes the limitations of TSS for day-to-day monitoring due to sampling and laboratory processing time, which is acutely relevant due to the isolated alpine environment of the site. Accordingly, GD05 supports using visual clarity/turbidity-based trigger levels to guide site management responses during earthworks.

Given these considerations, any discharge from the sites' boundaries or sediment control devices should set out to meet the criteria in **Table 7**.

Table 7: Water Quality Discharge Criteria

Parameter	Discharge Criteria
Receiving waterbodies	No conspicuous change in colour or visual clarity
Turbidity[4] - Sediment control devices	≤ 150 NTU
Visual clarity (mm) - Sediment control devices	≥ 100 mm (As per GD05)
If Turbidity or Visual Clarity are exceeded, test TSS...	
Total Suspended Sediment (TSS)	≤ 50 mg/L
pH[7]	5.5 – 8.5
Hydrocarbons or tannins	No visible trace
Waste	No waste or litter is visible

5.4 Management Measures

The following measures will be deployed to ensure the protection of receiving waterbodies:

- Erosion and sediment controls will be implemented and maintained in accordance with the site-specific Erosion and Sediment Control Plan.
- Ministry for the Environment (MfE) 2021, National works in waterways guideline-best practice guide for civil infrastructure works and maintenance.
- Undertake earthworks during spring, summer and autumn, when fine weather is more frequent, to reduce the risk of weather-related erosion and sedimentation.
- Undertake vegetation removal and rehabilitation in accordance with the approved *Remarkables Skifield Doolans Expansion Project Terrestrial Ecological Management Plan*, prepared by EMM Consulting Pty Ltd, May 2026.

[4] Turbidity and or visual clarity can provide a practical, real-time measure on site. If the specified turbidity or visual clarity value is not met, a water sample will be collected and sent for TSS laboratory testing.

- Undertake all works in accordance with *A Protocol for the Rehabilitation of Natural Alpine Environments Following Ski Area Development (Alpine Works and Rehabilitation Protocol)*, prepared by the Department of Conservation and NZSki Ltd.
- Ensure that no vegetation is disturbed or removed beyond the defined consented works area, to prevent undue degradation of the site and instream habitats.
- All wetlands, flow paths, boulder fields, snow tussock grassland and shrublands are to be avoided, except for consented areas.
- Ensure any water take duration only occurs between May to October (inclusive).
- Refuelling, servicing and storage of hydrocarbons will be in accordance with the relevant procedures in the Chemicals and Fuels Management set out within the CEMP.
- All concrete washing is to be undertaken in the designated concrete wash-out pit.
- All plant and equipment on-site will be inspected regularly to ensure they are of an acceptable standard.
- Stockpiling of any organic, erodible or hazardous material onsite is not to be placed within close proximity of a watercourse/major drainage lines.
- All chemical treatment of sediment-laden water, if required, will be undertaken in accordance with an approved Chemical Treatment Management Plan.

5.5 Water Quality Monitoring Plan

Water quality will be monitored in accordance with **Table 8**.

Table 8: Water Quality Monitoring Measures

Sampling Scope	
Objective	To assess whether controlled and uncontrolled discharge meets the Discharge Criteria referred to in **Section 5.3.**
Responsibility	On-site water quality sampling is to be completed by the nominated Environmental Representative.
Spatial boundaries	Discharges from within the sites' boundaries, receiving waterbodies and/or sediment control devices.
Frequency	When there is a discharge of water across the site boundary or from a decanting earth bund, and where a Significant Rain Event occurs through the night, monitoring must be undertaken the following day. A significant rain event is defined as any forecast/actual rain event of 20 mm within a 12-hour period or a rain event that can generate overland flow, noting that this varies seasonally.
Sampling Design	
Water quality criteria	As outlined in the Discharge Criteria referred to in **Section 5.3.**
Sampling locations	At boundaries of the site where any water is flowing into receiving waterbodies and/or sediment control devices.

Sampling method	• TSS – Registered laboratory. • Turbidity (NTU) – Nephelometer. • Visual clarity – Clarity tube/Secchi disk. • pH – pH meter, only if utilising chemical treatment. • Gross pollutants – visual observations. • Tannins – visual observations (any unusual darkening of waters). • Hydrocarbons – visual observations (is there any oily film[5] on the surface or smell).
Quality control	Any water quality meters will be calibrated according to the manufacturer's instructions.
Recording	
Recording results	All results will be entered into a spreadsheet and kept onsite provided in the site Construction Environmental Management Plan.
Actions	
Non-conformances	Any exceedances observed will be reported to the Project Manager/ Environmental Consultant who will investigate and ensure appropriate corrective actions are implemented immediately.

5.6 Contingency Measures

The following contingency measures in **Table 9** shall be adopted if required.

Table 9: Water Quality Contingency Measures

Issue	Contingency Measure
Exceedance of water quality criteria	• Contact the Project Manager and Environmental Consultant (SQEP) immediately. • Works will cease or be modified to remove further risk of contamination. • **QLDC, CODC and ORC** will be verbally notified. • The Environmental Incident procedure provided in the site Construction Environmental Management Plan will commence. • Remedial measures will be implemented, and the Environmental Incident will be closed out by the Environmental Representative with a copy of an Environmental Incident report to the Project Manager and **QLDC, CODC and ORC**.

[5] Some bacteria produce a naturally occurring film on the water surface. Bacteria films breaks apart in angular shapes when disturbed whereas hydrocarbon film separates as globules.

5.7 Assessment of Effects

5.7.1 Actual or Potential Effects on Receiving Environment

To avoid duplication, this section should be read in conjunction with the Erosion and Sediment Control Assessment Report (ESCAR), which provides the detailed assessment of effects with respect to receiving waterbodies.

5.7.2 Cumulative Effects on Waterbodies

To avoid duplication, this section should be read in conjunction with the ESCAR, which provides a detailed assessment of effects in respect of receiving waterbodies.

5.7.3 Kai Tahu Tikanga and Natural Values

To avoid duplication, this section should be read in conjunction with the ESCAR, which provides a detailed assessment of effects in respect of receiving waterbodies.

6.0 DUST MANAGEMENT

6.1 Dust

Dust from construction activities, vehicle movements and stockpiles can create a nuisance to the public, neighbouring properties, adjoining roads and service infrastructure. The key risks associated with dust occur during the bulk earthworks phase of the project. There are a range of activities that may produce dust onsite, including:

- General disturbance of soil (particularly during drier months).
- Inappropriate staging that does not seek to minimise the extent of exposed soil.
- Vehicle movements along haul roads.
- Sediment-tracking onto surrounding roads.
- Stockpiling of topsoil or subsoil.
- Slow or ineffective revegetation procedures.

6.2 Identified Sensitive Receptors

The prevailing winds, typically from the west during warmer months, can contribute to dust generation. Additionally, katabatic winds descending from nearby slopes may develop in the afternoon, particularly during dry conditions when exposed soil surfaces are prone to rapid drying. Given the isolated alpine location of the subject site, the number of sensitive receptors is limited. However, notable receptors include recreational users of the surrounding DOC land, site staff and contractors working in the vicinity of the earthworks area, and the surrounding alpine flora and fauna.

Rastus Burn

The Rastus Burn area of the Remarkables Ski Area consists of partially sheltered mid-mountain bowls, providing some natural protection from strong south and south-west winds. Within this environment, recreational users of the wider Remarkables recreation area, along with contractors undertaking the works are considered sensitive receptors. These receptors may be exposed to localised dust plumes during dry conditions or during periods of heightened construction activity.

Doolans

The Doolans expansion area sits at a higher elevation and is markedly more open, exposed alpine basin compared with the opposing Rastus Burn side. The combination of open terrain and the absence of natural shelter create conditions that are more conducive to dust entrainment, uplift, and wider dispersal. Strong and persistent winds characteristic of this side of the site increase the potential for dust to be mobilised from disturbed surfaces.

While recreational users traversing the Doolans ridgelines and adjacent basins remain sensitive receptors, their separation distances are generally greater than in Rastus Burn; however, the enhanced exposure to wind means that dust plumes, when generated, have a higher propensity to travel across broader spatial scales.

6.3 Performance Criteria

The project must ensure that reasonable and practical measures are taken to avoid dust moving across the boundaries of the site at all times.

6.4 Management Measures

The following measures will be deployed to ensure dust generation onsite is minimised:

- Stage works where possible to minimise soil exposure extents and timeframes.
- Revegetate disturbed areas progressively throughout construction.
- Dust suppression of exposed areas and stockpiles by sprinklers, k-lines (where possible) approved by the Environmental Representative[6].
- If dust activities cannot be controlled during high winds, work will cease until favourable conditions return.
- Only designated access points and haul routes are to be used.
- A speed limit will be posted as 20 km/hr, unless deemed otherwise by the Project Manager.
- To avoid spillage risks, trucks will not be overloaded.
- All trucks must have tail gates up and swept or cleaned prior to exiting to external roads.
- Stockpile heights are to be minimised wherever practicable (maintained at less than two metres) and shaped into rounded, low-profile forms to reduce wind exposure and mitigate the potential for wind-borne erosion and dust generation.
- Long-standing topsoil stockpiles that may be prone to erosion should be temporarily stabilised by covering with site won rock or an approved polymer/soil stabiliser.
- Within two weeks of completion, all earthworked areas should be stabilised by applying site won rock, reinstating indigenous vegetation, tracking and compacting of erodible subgrades on access tracks.

6.5 Monitoring

Site staff will maintain continual vigilance for any increases in wind to ensure measures are deployed prior to dust crossing site boundaries. Weekly Environmental Inspections and the Monthly SQEP Environmental Inspections will also ensure that the management measures described above are sufficient and performing effectively.

6.6 Contingency Measures

The contingency measures in **Table 10** shall be adopted if required.

Table 10: Dust Contingency Measures

Issue	Contingency Measure
Excessive dust creation from soil disturbance	• Increase frequency of water truck spraying or increase irrigation. • Spray down excavation areas and activities where the excavator bucket is operating. • Cease excavation during high winds, particularly if wind direction is likely to impact sensitive receivers.

[6] Ensure the water take duration only occurs between May to October (inclusive).

Issue	Contingency Measure
Excessive dust creation from hauling operations	• Reduce truck speeds. • Cover or spray loads causing dust impacts. • Cease truck movements.
Excessive dust creation from stockpiles	• Spray stockpiles with water or apply a temporary soil stabilising polymer. • Locate stockpiles further away from sensitive receptors.

6.7 Dust Incident

A dust incident is considered to have occurred where:

- Dust is observed crossing the boundary into sensitive receptors or,
- A justified complaint is received regarding dust emissions across the boundary of the site.

The incident procedures outlined in **Section 3.5** shall commence.

7.0 NOISE AND VIBRATION MANAGEMENT

7.1 Noise and Vibration

Noise and vibration generated during construction have the potential to affect sensitive receivers. NZS 6803:1999 Acoustics – Construction Noise Guidelines, is the principal New Zealand standard used to guide the management of noise from construction, demolition and maintenance works. While not a statutory instrument, it is widely adopted by councils and regulators and is generally considered the industry benchmark for good environmental practice.

Given the isolated environment and the absence of surrounding infrastructure, dwellings and people, the number of sensitive receptors in direct proximity to the work sites is limited. Existing flora and fauna may experience temporary disturbance, and the following sections outline the recommended best-practice mitigation, monitoring, and reporting measures to mitigate adverse effects.

Potential noise and/or vibration effects may be generated by the following:

- Excavation and earth moving plant.
- Light vehicles near sensitive receptors.
- Ancillary plant and equipment.
- Piling equipment.
- Compaction equipment.
- Rock breaking.
- Rock blasting.
- Reversing alarms.

7.2 Identified Sensitive Receptors

Sensitive receptors within the project area comprise recreational users, indigenous avifauna, herpetofauna, and invertebrate species present across the Rastus Burn and Doolans environments. Bird species, including pipit, kārearea and other alpine avifauna, may be disturbed by elevated construction noise and associated human activity. Local lizard populations, such as the McCann's skink and Te Wahipounamu skink, are also considered sensitive given their reliance on stable refugia that can be affected by vibration and repeated disturbance.

Collectively, these ecological receptors represent fauna for which even temporary increases in noise and vibration may result in behavioural modification or localised displacement.

7.3 Performance Criteria

- Construction activities shall generally meet the relevant noise limits specified under NZS 6803:1999 Acoustics - Construction Noise.
- Construction activities shall generally meet the relevant vibration limits specified in DIN 4150-3:1999 Effects of vibration on structures on any structures or buildings on any other site (see **Table 11** below).
- Construction activities shall be undertaken in accordance with the permitted hours of operation outlined in **Section 2.9** of this CEMP.

Table 11: Vibration Thresholds for Structural Damage (PPV mm/s)

	Short Term				Long-Term
	At Foundation			Uppermost Floor	Uppermost Floor
Types of Structures	0 to 10 HZ	10 to 50 Hz	50 to 100 HZ	All Frequencies	All Frequencies
Commercial/Industrial	20	20 to 40	40 to 50	40	10
Residential	5	5 to 15	15 to 20	15	5
Sensitive/Historic	3	3 to 8	8 to 10	8	2.5

Note: When a range of velocities is given, the limit increases linearly over the frequency range.

7.4 Management Measures

The following measures will be deployed to ensure noise and/or vibration associated with the project are appropriately mitigated:

- Advance notification: Recreation user groups, and other relevant stakeholders will be notified in advance of construction activities that are anticipated to generate elevated noise or vibration levels, where reasonably practicable.
- Regular communication: Information regarding the location, timing, duration, and nature of high-noise construction activities will be communicated through appropriate channels, such as project updates, signage, stakeholder emails, or NZSki communication platforms.
- On-site signage: Temporary signage will be installed where required to inform recreational users of active construction areas and any noise-generating activities occurring in the vicinity.
- Undertake the relocation of identified Avifauna and Herpetofauna, prior to undertaking ground disturbing activities in consented earthworks areas. This should be undertaken in accordance with the approved Ecological Management Plans and under the direction of the project ecologist.
- Where practicable, select lower noise producing equipment or use lower noise generating alternatives.
- Regularly service equipment to ensure plant is running optimally.
- Plant and equipment to be fitted with noise control/attenuation devices as appropriate and maintained and operated in accordance with the manufacturer's specifications.
- Revving of engines will be limited. All plant and vehicles will be turned off when not in use and if safe to do so.
- The use of audible alarms on mobile equipment will be limited, and two-way communication will be used.
- Undertake activities that may lead to noise or vibration effects, during reasonable and practical hours.

7.5 Monitoring

All earthworks activity will be closely monitored by the project ecologist, environmental consultant and the operator to ensure that noise and vibration remain within acceptable limits and not causing undue stress on surrounding flora and fauna. Weekly Environmental Inspections (**Appendix 5**) and Monthly SQEP Environmental Inspections shall include an assessment of the site to determine the effectiveness of noise and vibration management controls.

7.6 Contingency Measures

The following contingency measures in **Table 12** shall be adopted if required.

Table 12: Noise and Vibration Contingency Measures

Issue	Contingency Measure
Noise and/or vibration complaint received	Manage the complaint in accordance with the Environmental Complaints procedure in **Section 3.6.**
Exceedance of performance requirement criteria	The Environmental Consultant (SQEP), in consultation with the Environmental Representative, will investigate and implement actions to reduce noise and/or vibration levels to below criteria levels.
Ongoing noise and/or vibration issues	Where noise or vibration emissions consistently exceed the performance criteria despite the site staff's best efforts, an Acoustic Specialist will be engaged to assist.

7.7 Noise and Vibration Incident

A noise or vibration incident is considered to have occurred when a justified complaint is received and, on investigation, is found to exceed the performance criteria. The environmental incident procedures outlined in **Section 3.5** shall commence.

7.8 Noise and Vibration Assessment

Due to the alpine environment and the prevalence of schist rock across the site, considerable rock breaking is anticipated. However, the isolated location of the site, coupled with earthworks occurring for only five of the twelve months each year, over the four-year construction period, significantly reduces the likelihood of noise and vibration nuisance.

Construction noise and vibration best practice, focused on equipment selection, activity planning, and adaptive management, as outlined in **Section 7.3**, will be implemented to ensure any noise and vibration effects remain temporary, intermittent, and within acceptable environmental limits.

8.0 CULTURAL HERITAGE MANAGEMENT

8.1 Archaeological and Cultural Heritage

The loss or damage of cultural heritage items could be caused by construction activities. The damage or loss of artefacts can lead to the loss of culturally or historically significant items and information.

Examples of cultural heritage items include:

- Koiwi tangata (human skeletal remains).
- Waahi taoka (resources of importance).
- Waahi tapu (places or features of special significance).
- Māori artefact material.
- A feature or archaeological material predating 1900.
- Unidentified archaeological or heritage site.

8.2 Identified Sensitive Receptors

A review of CODC's district plan database does not indicate any identified heritage buildings, historic reserves, Nohoanga or known archaeological features.

DOC has documented historic heritage values across the wider Kawarau / Remarkables Conservation Area, including Māori and Pākehā use, and gold-mining heritage in various valleys. However, these DOC records describe heritage across the general Remarkables area, not the Rastus Burn or Doolans Basin specifically. The Doolans is typically characterised as a high-elevation alpine basin with little historical land use, and most known archaeological or mining features in the region occur at lower elevations (e.g., Upper Nevis, Ben Nevis slopes, or historic routes).

A search of QLDC's database indicates that part of the site is situated within the Wāhi taoka, mauka (36, Kawarau, The Remarkables), Wāhi Tūpuna area. Wāhi Tūpuna are landscapes that embody the relationship of mana whenua and their culture and traditions with their ancestral lands, water, sites, wāhi tapu (sacred places), and other taoka (treasure). The associated Wāhi Tūpuna is shown in **Figure 4** below.

A review of Chapter 39 of the QLDC Proposed District Plan outlines that there is no description of the sites included in this area. Recognised threats are listed as:

- Exotic species, including wilding pines.
- Buildings and structures.
- Energy and Utility activities.
- New roads or additions/alterations to existing roads, vehicle tracks and driveways.
- Activities affecting the ridgeline and upper slopes.
- Earthworks.
- Subdivision and development.
- Activities affecting natural character.

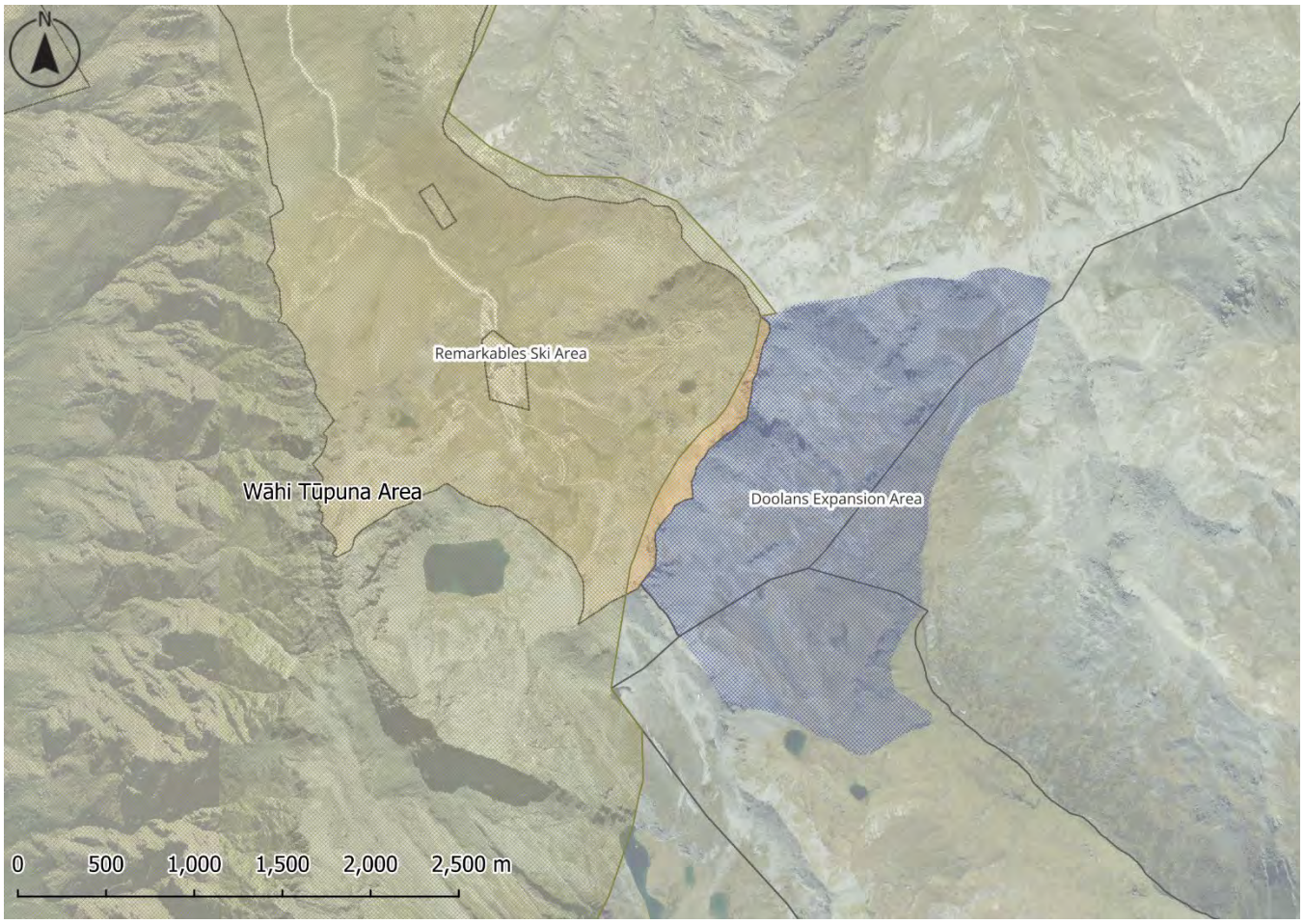


Figure 4: Location of Areas with Cultural Significance (Source: QLDC GIS)

8.3 Performance Criteria

- The protection of cultural heritage artefacts and places in accordance with the Heritage New Zealand Pouhere Taonga Act, 2014.
- Strict adherence to Heritage New Zealand's Archaeological Discovery Protocol (attached as **Appendix 10**) in the case of unexpected finds.

8.4 Management Measures

All works on this project will be undertaken in accordance with the obligations of the *Heritage New Zealand Pouhere Taonga Act*, 2014.

8.5 Monitoring

Weekly inspections shall include a visual assessment of the site to ensure that no new significant artefacts have been encountered. However, operators must remain vigilant for such encounters as they occur.

8.6 Accidental Finds

If any unknown artefacts are uncovered, the project will work to Heritage New Zealand's *Archaeological Discovery Protocol* (attached as **Appendix 10**).

8.7 Cultural Heritage Assessment

The potential effects of ground disturbance on archaeological and cultural heritage values will be appropriately managed through the implementation of the measures outlined in **Section 8.3**, including accidental discovery protocols and, where required, archaeological oversight during earthworks. These measures are expected to ensure that any adverse effects on archaeological or cultural heritage values are minimised as far as reasonably practicable.

9.0 FLORA AND FAUNA MANAGEMENT

9.1 Overview

The Ecological Impact Assessments (EcIAs) prepared for the Remarkables Ski Area Upgrade and Doolans Expansion Project collectively provide the overarching assessment of potential ecological effects and identify the mitigation and management measures required to avoid, remedy, or mitigate those effects. The detailed ecological values, species-specific sensitivities, and impact assessments relevant to both the Rastus Burn and Doolans Basin are provided within the EcIAs and should be read in conjunction with this CEMP.

The recommendations of the EcIAs are implemented through the Remarkables Ski Area Upgrade and Doolans Expansion Project *Terrestrial Ecological Management Plan* (TEMP), prepared by EMM Consulting Pty Ltd (May 2026), and the *Lizard Assessment and Management Plan* (LAMP), prepared by e3Scientific (May 2026).

The CEMP establishes the overarching environmental management framework for construction and shall be read in conjunction with the TEMP and LAMP. The TEMP sets out the requirements for vegetation clearance, ecological supervision, fauna management, ecological monitoring, rehabilitation, revegetation, and weed management. The LAMP provides species-specific management requirements for lizards, including survey methodologies, capture and relocation protocols (where required), habitat management measures, ecological supervision requirements, and monitoring associated with lizard management. Where specific ecological management measures, procedures, or induction requirements are identified within the TEMP or LAMP, these shall supplement the requirements of the CEMP and be implemented by the Contractor under the guidance of the Project Ecologist.

The Project Ecologist shall oversee the implementation of ecological management measures and provide ecological input into construction planning, vegetation clearance, rehabilitation activities, and fauna management undertaken during the works. Compliance with the TEMP and LAMP shall be integrated into construction planning, site inductions, toolbox meetings, ecological supervision, environmental inspections, and ecological monitoring undertaken throughout the construction programme.

9.2 Flora

Vegetation within the Remarkables Conservation Area is predominantly representative of intact, naturally functioning alpine ecosystems, with disturbance largely limited to areas modified by existing ski infrastructure, access tracks, and the Curvey Basin Chairlift alignment. Disturbed environments typically consist of bare ground, exotic ruderal species, and early colonising indigenous species.

The e3Scientific EcIA identifies twelve distinct vegetation communities, representing a range of ecosystem types consistent with the Remarkables Ecological District, including:

- Snow tussock grassland, the dominant vegetation community across both Rastus Burn and Doolans;
- Subalpine shrubland mosaics;
- Short tussock and cushionfield communities;
- Alpine herbfield in exposed sites;
- Wetland and damp seepage systems in localised depressions;
- Rock outcrop communities supporting specialised alpine flora.

9.3 Fauna

The alpine basins of the Remarkables and Doolans support a diverse range of indigenous fauna, including avifauna, lizards, and invertebrates.

Avifauna

Bird species recorded or expected within the Rastus Burn and Doolans environments include:

- New Zealand pipit (At Risk – Declining);
- Kārearea / New Zealand falcon (Threatened – Nationally Vulnerable);
- Harrier hawk;
- Seasonal or incidental use by kea.

Herpetofauna

The EcIA confirms the presence of:

- Oligosoma pluvialis (Te Wahipounamu skink – Threatened), found primarily above ~1600 m;
- Oligosoma maccanni (McCann's skink).

Invertebrates

A diverse assemblage of alpine invertebrates occurs across both basins, including:

- Threatened or Data Deficient Lepidoptera,
- Ground-dwelling beetles, spiders, and alpine moths.

9.4 Identified Sensitive Receptors

Based on the EcIA, sensitive ecological receptors within or near the proposed construction footprint include:

- Indigenous avifauna using alpine shrubland, tussock grassland, rock outcrops, and ridgelines;
- Skinks, particularly O. pluvialis in higher elevation zones and O. maccanni across mid-slopes;
- Invertebrates, including threatened and at-risk Lepidoptera and alpine ground-dwelling species;
- Localised wetland and seepage vegetation communities that support specialised flora and invertebrates;
- High-value tussock and alpine herbfield communities.

9.5 Performance Criteria

- Avoid the clearance of indigenous or protected vegetation wherever practicable.
- Minimise the extent and duration of vegetation disturbance within the consented earthworks envelope.
- Avoid injury, mortality, or undue distress to indigenous fauna.
- Prevent the spread of noxious weeds within the construction area and to adjoining conservation land.
- Limit disturbance to lizard habitat and prevent vibration impacts where practicable.
- Maintain separation from sensitive ecological features identified in ecological mapping.
- Implement all measures required by DOC, QLDC, CODC or as recommended in the EcIA.

9.6 Management Measures

The following measures will be deployed:

- Clearly demarcate No-Go Zones around high-value vegetation, wetlands, exposed boulder fields, and all identified sensitive receptors.
- Limit disturbance to the minimum area necessary for construction.
- Undertake vegetation clearance progressively, not in bulk, to reduce exposed surfaces.
- Immediately stabilise exposed surfaces using rock, vegetation, erosion control matting, or natural fibre coverings.
- Stockpile mulch only where necessary, keeping heights below 2.5 m to minimise fire risk and leachate generation.
- Implement machinery hygiene protocols to prevent weed transfer between Rastus Burn, and Doolans Basin.
- Monitor for post-disturbance colonisation by opportunistic exotic species and treat promptly.
- Ecologist to brief construction staff on fauna sensitivities prior to works ("toolbox ecological induction").
- Undertake pre-works checks for lizards, birds, and invertebrate habitats in all disturbance zones.
- Where lizards are encountered, works must cease pending direction from the project Ecologist/herpetologist.
- Avoid disturbance during any active nesting period if identified by the Ecologist.
- Manage noise, vibration and dust in accordance with mitigation measures in the CEMP and EcIA to reduce disturbance to avifauna and invertebrates.

9.7 Monitoring

Weekly Environmental Inspections and Monthly SQEP Environmental Inspections shall include a visual assessment of the site to determine the effectiveness of vegetation management controls.

9.8 Contingency Measures – Accidental Discovery Protocol

If a protected species (flora or fauna) are accidentally discovered on the site during construction or fauna enters the site, follow the accidental discovery protocol as outlined below:

- If indigenous species breach the site boundaries, works are to cease until they safely exit or are safely removed (to be carried out under the direction of the project Ecologist).
- Cease all works within 10m of the discovery.
- Prevent access by workers and machinery.
- Mark the location (e.g., GPS, flagging tape).
- Inform the Project Manager and the SQEP Environmental Consultant.
- Contact DOC, QLDC, CODC and ORC (If required).
- Maintain the no-go zone until further direction by the project Ecologist.

9.9 Ecological Incident

An incident is considered to have occurred where:

- Protected vegetation has been damaged or removed;

- A No-Go Zone is breached;
- Indigenous fauna is harmed, distressed, or killed;

The environmental incident procedures outlined in **Section 3.5** shall commence.

9.10 Flora and Fauna Assessment

Flora and fauna effects will be managed by limiting clearance to areas authorised under consent and maintaining strict protection of vegetation outside the consented earthwork's footprint. The EcIA prepared by e3scientific confirms that, with these measures, effects on vegetation values are expected to be appropriately managed. Progressive rehabilitation will ensure stable landforms and maintain ecological integrity following completion of construction.

10.0 CHEMICALS AND FUELS MANAGEMENT

10.1 Chemicals and Fuels

Hazardous substances can endanger both human health and the environment. Used incorrectly, they can cause catastrophic accidents, such as fires and explosions, and serious harm to people who are exposed to them.

10.2 Identified Sensitive Receptors

Key sensitive environmental receptors include staff members working on the site, overland flow paths, wetlands, surrounding flora and fauna, and recreational users of the surrounding DOC land.

10.3 Performance Criteria

- Chemicals and fuels are stored and used in a manner that avoids contamination of the site and the surrounding environment.
- All spills are cleaned up immediately, and the contaminated soils/waters are disposed of appropriately.

10.4 Management Measures

The following measures will be deployed to ensure chemicals and fuels associated with the project are appropriately managed.

- All hazardous substances to be stored, transported and used according to the safety data sheet requirements.
- Storage of chemicals and fuels shall be located as far as practicably possible from wetlands, waterways and concentrated flows.
- Refuelling of vehicles and plant onsite will occur away from critical source areas, within identified laydown areas.
- All concrete washing is to be undertaken in the designated concrete wash-out pit. Concrete wash-out water will be evaporated or disposed of via trade waste.
- 240 L Oil and Hydrocarbon spill kits will be located in close proximity to the location of liquid hazardous materials storage and refuelling areas. 50 L Oil and Hydrocarbons spill kits are to be kept in all utility vehicles and plant equipment traversing the site.
- The volumes of the hazardous substances listed in **Table 13** will not be exceeded.

Table 13: Maximum Volumes of Chemicals and Fuels

Chemicals and Fuels	Maximum Volume	Storage Location
Diesel	1,000 L	Portable fuel trailers will be located within nominated works areas.
	5,000 L	Bunded tanks will be located within nominated laydown areas.

Chemicals and Fuels	Maximum Volume	Storage Location
Unleaded Fuel	500 L	Jerry cans in lockable container at the maintenance facility.
Oil	100 L	Packaging in lockable container
Lubricant (WD40 or similar)	Six Cans	Packaging in lockable container
Grease	5 L	Packaging in lockable container
Spot marking paint	2 L	Packaging in lockable container
Cementous product	100 kg	Packaging in lockable container

10.5 Monitoring

Weekly Environmental Inspections and Monthly SQEP Environmental Inspections shall include a visual assessment of the site to determine the effectiveness of chemicals and fuels management.

10.6 Contingency Measures

The following contingency measures in **Table 14** shall be adopted if required.

Table 14: Chemicals and Fuels Contingency Measures

Issue	Contingency Measure
Spills response	• Stop works in proximity to the spill and assess the safety of all personnel. • Take immediate action to contain the spill to prevent discharge into stormwater drains or natural waterways. • Use spill kits to contain and treat the spill. • Notify Environmental Consultant to advise on next steps. • If necessary, notify the Regional Council spill response unit. • Remove contaminated material to a suitable contained location for remediation/disposal (require any necessary approvals/permits from ORC). • The spill kits shall be replaced by an approved supplier.
Inappropriate storage	• Upgrade facility. • Clean-up of storage area. • Notify and train staff.
Inappropriate handling/transport	• Notify and train staff through toolbox meetings on the appropriate handling and transport methods.

Issue	Contingency Measure
Inadequate spill kit materials	• Order more materials. • Investigate types of chemicals onsite and consult a supplier for advice on appropriate equipment. • Develop or revise spill material monitoring and ordering system.
Inappropriate disposal of chemicals or fuels	• Provide appropriate disposal facilities or service providers. • Notify and train staff.
Inaccurate or insufficient records	• Advise staff and update records. • Monitor through inspections.

10.7 Chemicals and Fuels Incident

A chemicals and fuels incident are considered to have occurred where:

- A spill of more than five litres has occurred.
- A situation is discovered where a spill of more than five litres would likely have occurred before it happens, where the management measures listed above have not been followed.

The environmental incident procedures outlined in **Section 3.5** shall commence.

10.8 Chemicals and Fuels Assessment

Potential effects associated with the storage and use of chemicals and fuels will be managed through the implementation of the construction management measures outlined in **Section 10.3**, including the appropriate storage of fuels and hazardous substances, spill response procedures, and refuelling controls. These measures are expected to ensure that any adverse effects on land, water, or cultural values arising from the use of chemicals and fuels are minimised as far as reasonably practicable.

11.0 WASTE MANAGEMENT

11.1 Waste

Waste from construction activities can create a nuisance to the public and adversely affect flora and fauna.

11.2 Identified Sensitive Receptors

Key sensitive environmental receptors include staff members working on the site, overland flow paths, wetlands, surrounding flora and fauna, and recreational users of the surrounding DOC land.

11.3 Performance Criteria

- Non-recyclable waste generation is minimised, and the site and surrounds are kept free from waste at all times.
- Wastes shall be stored safely and in an organised manner until recycling, reuse, or disposal.

11.4 Management Measures

The following measures will be deployed to ensure waste management associated with the project is appropriately mitigated:

- The Waste Management Hierarchy philosophy will be implemented, as illustrated in **Figure 5**.
- Measures will be implemented to ensure the site is maintained in a safe, clean and tidy state.
- Where possible, waste shall be segregated into labelled bins with lids: General, Hazardous and Recyclables.
- Wastes onsite shall be suitably contained and prevented from migrating offsite.
- The waste is to be contained so it doesn't contaminate soil, surface or groundwater, create unpleasant odours or attract vermin.
- Any material dropped in or adjacent to open drains shall be recovered immediately after it occurs.
- Waste storage is not permitted in or near drainage paths.
- The burning of waste is strictly prohibited.
- No wastes shall be disposed of onsite.
- Wastes shall be removed from the site regularly and at completion of works.

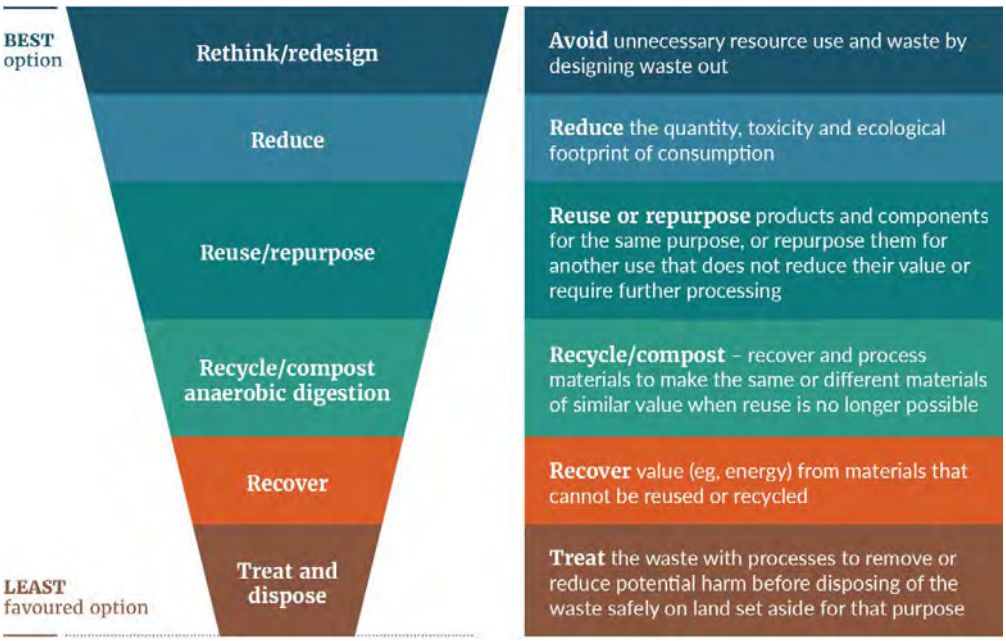


Figure 5: The Waste Hierarchy (Source: Ministry for the Environment).

11.5 Monitoring

Site staff will be briefed on waste processes prior to works commencing and shall maintain continual vigilance for excess waste around the site and following appropriate disposal procedures. Weekly Environmental Inspections and Monthly SQEP Environmental Inspections shall include a visual assessment of the site to determine the effectiveness of waste management controls.

11.6 Contingency Measures

If waste items are accumulating or are stockpiled, the following contingency measures will be adopted:

- Arrange for collection by an approved licensed contractor.
- Provide additional bins with lids if available.
- Remove waste offsite as soon as possible.

11.7 Waste Incident

A waste incident is considered to have occurred where:

- Waste from the site is found within a sensitive environment or where it may reasonably migrate to a sensitive environment.
- A complaint is received regarding inappropriate management of waste, and an investigation is warranted.

The environmental incident procedures outlined in **Section 3.5** shall commence.

11.8 Waste Assessment

Potential effects associated with the generation, and disposal of waste will be managed through the implementation of the management measures outlined in **Section 11.4**, including the segregation, storage, and appropriate off-site disposal of construction and demolition waste at authorised facilities. These measures are expected to ensure that any adverse effects associated with waste generation are minimised as far as reasonably practicable.

12.0 CONTAMINATED SITE MANAGEMENT

12.1 Contaminated Land

The identification and management of contaminated land is critical to protecting human health, the environment, and the integrity of construction activities. Sites with actual or potentially contaminated soils can present risks to workers, the wider community, groundwater, surface water, and ecological receptors. Understanding these risks early ensures that earthworks are planned responsibly and in accordance with regional plan requirements, the NES-CS, and best-practice environmental management.

A review of the ORC's Natural Hazards and HAIL (Hazardous Activities and Industries List) databases confirms that areas within the site has previously been used for a HAIL-listed activity, refer to **Figure 6**.

- The Maintenance Yard Diesel Tank is a verified HAIL site (ID: HAIL.00485.01), classified under category A17 — the storage of fuel, chemicals, or liquid waste in tanks or drums. The site's contamination status on the Otago Regional Council (ORC) HAIL Register is currently recorded as '*acceptable'*, with the summary noting: "*Single diesel tank removed in 2015. All results meet Tier 1 Criteria for commercial/industrial land use."*
- The Shadow Basin Chairlift Diesel Tank is a verified HAIL site (ID: HAIL.00771.01), classified under category A17. The site's contamination status on the Otago Regional Council (ORC) HAIL Register is currently recorded as '*acceptable'*, with the summary noting:" One *underground diesel tank and fuel lined removed in 2016. One sample near dispenser exceeded maintenance criteria, but likely due to small spill during removal."*
- A Detailed Site Investigation (DSI) was undertaken by Pattle Delamore Partners (PDP) in March 2015 in relation to the removal of an underground petroleum storage system (UPSS) located within the Remarkables Maintenance Building Area. Soil samples were collected and analysed for petroleum hydrocarbons, with results indicating concentrations below the Ministry for the Environment (MfE, 2011) Tier 1 Soil Acceptance Criteria (All Pathways) for commercial/industrial land use.
- An Accidental Discovery – Surplus Soil Re-use Memorandum was prepared by e3 Scientific for the site after Base Contracting identified visually contaminated soil during demolition works for the Remarkables Maintenance Building on the 19 November 2025. A subsequent investigation by e3 Scientific confirmed that residual contamination was present at concentrations above background at some sample locations; however, all detected concentrations remained below the adopted criteria for the protection of human health and groundwater quality.

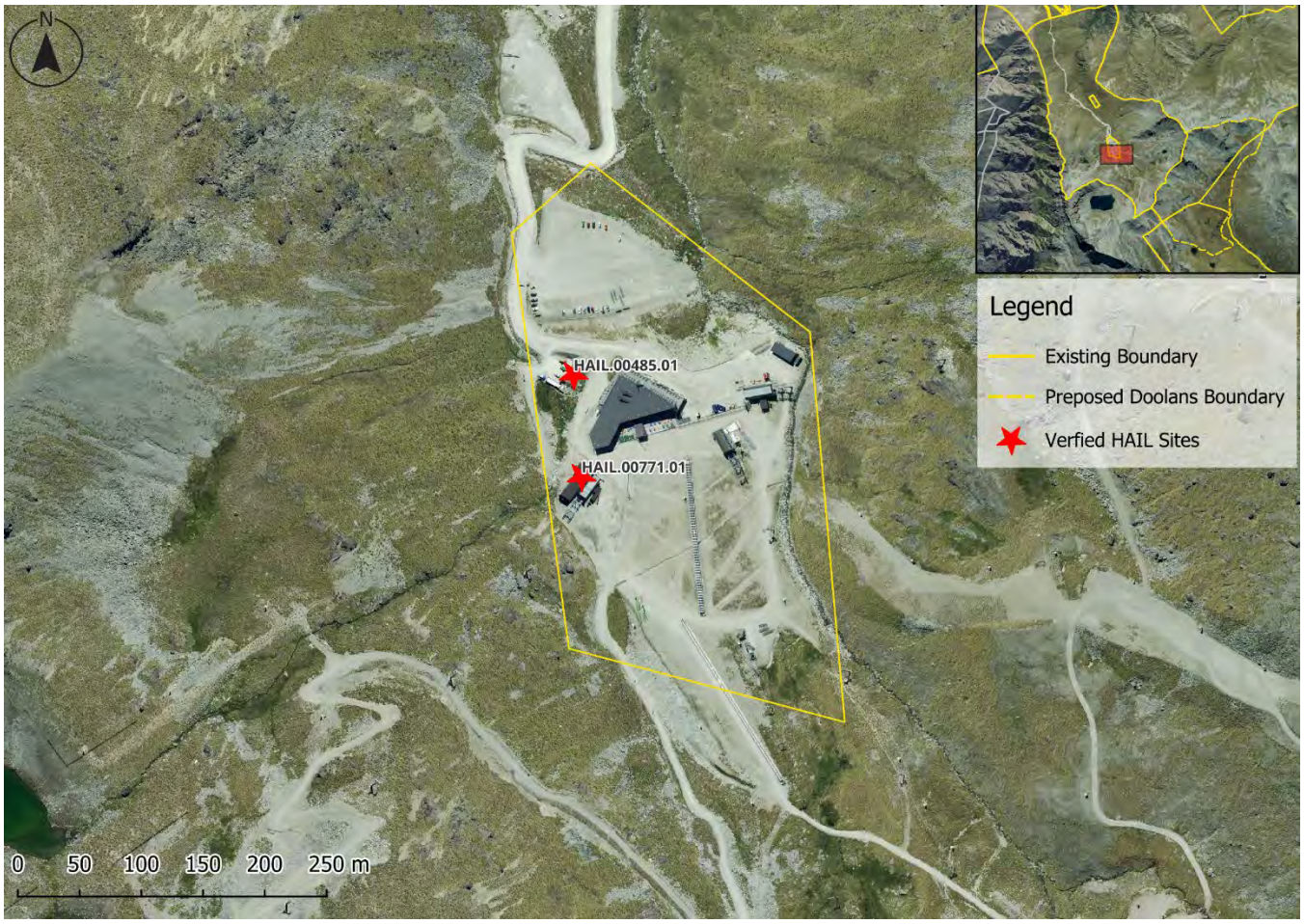


Figure 6: Verified HAIL Site (Source: ORC SLUS)

12.2 Identified Sensitive Receptors

Due to the isolated nature of the site, many of the areas proposed to be developed have had limited human interaction and exposure to HAIL activities and contaminants are not anticipated to be encountered.

If contaminants are accidentally uncovered, key sensitive receptors to protect include staff members working on the site, overland flow paths, wetlands, surrounding flora and fauna, and recreational users of the surrounding DOC land.

12.3 Performance Criteria

Effectively identify, assess, and manage any areas where contaminated or potentially contaminated soil is encountered, ensuring that contaminants are contained and do not migrate beyond their source, and that all activities are undertaken in a manner that avoids unacceptable risk to human health or the environment.

12.4 Management Measures

The following measures will be deployed to ensure contaminated soil associated with the project is appropriately mitigated:

- If any evidence of suspected contamination is identified in the field, the personnel noting the contamination shall immediately notify the Environmental Representative to determine whether it is necessary to engage a Contaminated Land Practitioner in accordance with the Unexpected Contamination Discovery protocol outlined in **Section 12.6** below.
- The consent holder should ensure only soil meeting the definition of 'Cleanfill material' as set out in the Technical Guidelines for Disposal to Land (Waste Management Institute New Zealand Incorporated, 2023), may be imported and utilised on the site as part of land disturbance activities. Unless sourced from a commercial quarry, imported soil should be analysed to verify cleanfill status at the ratio of one sample for every 500 m3 of imported soil
- Many of the controls required to manage potential effects associated with low-level contaminated soil is based on best practice erosion and sediment control and dust management techniques. These are outlined in **Section 4.0** (Erosion and Sediment Controls) and **Section 6.0** (Dust Management). Both sections cover management of stockpiles.
- All surplus fill material requiring off-site disposal as clean fill shall meet the Ministry for Environment definition of clean fill, as specified in Section 1 of the report "Technical Guidelines for Disposal to Land, Revision 3.1", prepared by Waste Management Institute of New Zealand for the Ministry for the Environment and dated September 2023.
- Any soil removed from the site shall be disposed of at a facility approved to receive the material and documentation of that disposal shall be kept on site
- Trucks removing or transporting any soil from the site will be covered or sealed to prevent dust, leakage or loss of materials during transport.

12.5 Monitoring

Unless any higher-level contamination is accidentally found during earthworks, no specific monitoring of soil, groundwater or water quality will occur (other than what is detailed in the water quality criteria outlined in **Section 5.3**. If contaminated material is identified during earthwork, it is expected that monitoring will be required at the direction of the Land Contamination Practitioner.

12.6 Contingency Measures – Unexpected Contamination Discovery

The following procedures should be followed to avoid health and safety risks to site workers or the discharge of contaminants into the surrounding environment if unexpected contamination or suspected contamination is encountered during the excavation works. Indicators of contamination or hazardous materials may include the following:

- Unusual odours
- Discoloured or stained water seeps and soils
- Petroleum hydrocarbon contaminated soil and/or free product

- Liquid waste, putrescible waste, household refuse and any material that normally would be sent to a licensed landfill.
- Suspected asbestos-containing material.
- Intact or broken drums and containers.
- Evidence of burning (charcoal fragments, nails, deformed metal fragments).

During the earthworks on site, the Environmental Representative shall actively monitor for the conditions/materials specified above. In the event one or more of these are identified, the Contractor should take the following contingency actions:

- Stop all earthworks within a 20 m radius of the area where the suspected material/emission/discharge has been recorded.
- Immediately notify the site supervisor.
- Cordon off the area as practicable with a suitable barrier.
- Work shall not resume or commence within a 20 m radius of the area unless authorised by the Contaminated Land Practitioner.

The Environmental Representative shall consult with the Contaminated Land Practitioner and advise on the appropriate course of action. The Contaminated Land Practitioner shall:

- Notify the regulatory authorities (QLDC, CODC and ORC), if required, that contamination has been discovered and contingency action is being implemented, noting that depending on the nature and scale of the contamination identified on site, additional resource consents may be required

12.7 Contamination Incident

An environmental incident is considered to have occurred where inspection finds that excavation or other work continues within contaminated soil without report or remedial action. The environmental incident procedures outlined in **Section 3.5** shall be followed.

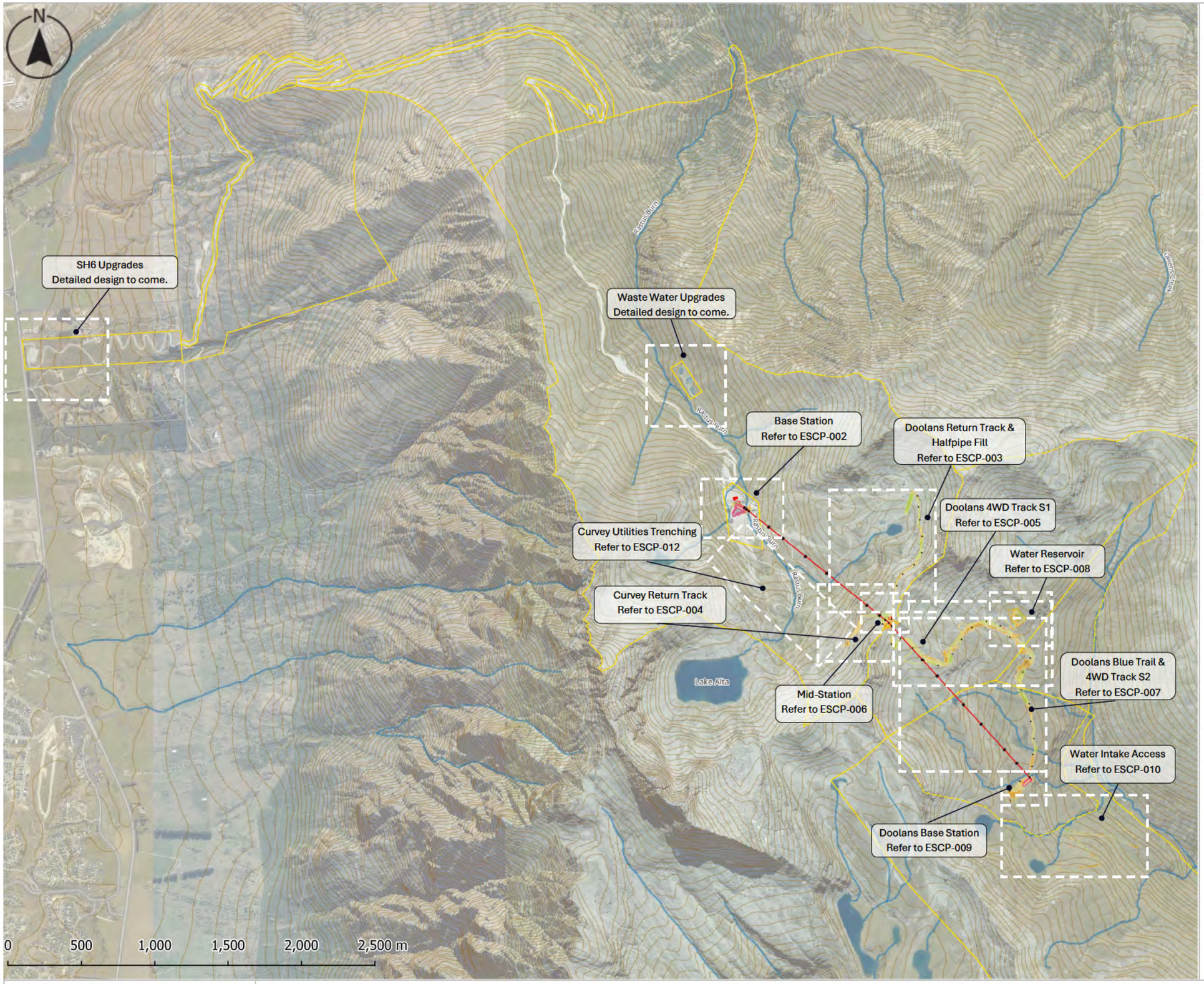
12.8 Contaminated Land Assessment

Potential effects associated with contaminated soils will be managed through the implementation of the measures outlined in **Section 12.3**, including appropriate procedures for identifying, handling, and disposing of any contaminated material encountered during earthworks. In the event that unidentified contamination is discovered, works will be undertaken in accordance with relevant guidelines and regulatory requirements. These measures are expected to ensure that any adverse effects on human health or the environment are avoided or minimised as far as reasonably practicable.

13.0 REFERENCES

- Auckland Council. (2023). *Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region* (GD05). June 2023.
- Department of Conservation and NZSki Ltd. (n.d.). *A Protocol for the Rehabilitation of Natural Alpine Environments Following Ski Area Development*.
- EMM Consulting Pty Ltd. (2026). *Remarkables Ski Area Upgrade and Doolans Expansion Project Terrestrial Ecological Management Plan. Prepared for NZSki Ltd*. May 2026.
- e3Scientific Ltd. (2026a). *Remarkables Ski Area Upgrade and Doolans Expansion - Doolans Creek Water Take Assessment of Effects*. Prepared for NZSki Ltd. May 2026.
- e3Scientific Ltd. (2026b). *Doolans Basin Access Tracking Stormwater, Earthworks and Crossing Freshwater Ecological Impact Assessment*. Prepared for NZSki Ltd. 2026.
- e3Scientific Ltd. (2026c). *Remarkables Ski Area Upgrade and Doolans Expansion Terrestrial Ecological Impact Assessment*. Prepared for NZSki Ltd. 2026.
- e3Scientific Ltd. (2026d). *Doolans Basin Tarns, Weir and Water Take Freshwater Ecological Impact Assessment*. Prepared for NZSki Ltd. 2026.
- e3Scientific Ltd. (2026e). *Lizard Assessment and Management Plan. Prepared for NZSki Ltd. May 2026.*
- *Ministry for the Environment*. (2011). *Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values*. October 2011.
- Ministry for the Environment. (n.d.). *National Works in Waterways Guideline: Best Practice Guide for Civil Infrastructure Works and Maintenance*.
- Otago Regional Council. (2023). *Residential Earthworks in Otago: A Guide for Developers, Landowners, Contractors and Service Providers*. March 2023.
- Queenstown Lakes District Council. (2019). *Guidelines for Environmental Management Plans*. June 2019.
- Stantec. (2026a). *Remarkables Ski Area Upgrade and Doolans Expansion Project Stormwater Concept Report*. Prepared for NZSki Ltd. 2026.

APPENDIX 1 EROSION AND SEDIMENT CONTROL PLAN



Legend

	Site boundaries
	Gondola alignment
	Waterbody

Notes

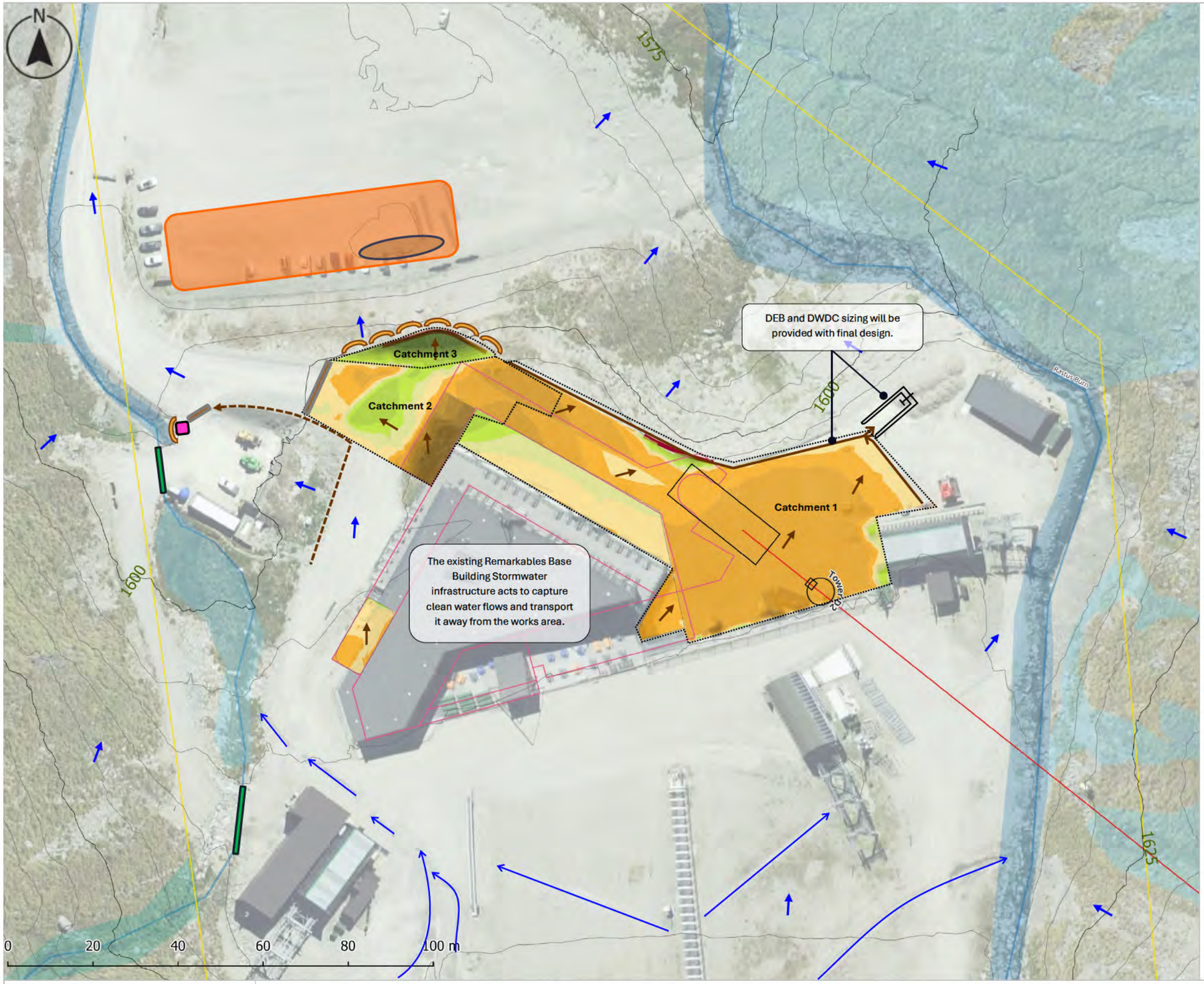
- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- Scale 1:26050 @ A3.

enviroscope

Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Site Overview

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 001	2



Legend

	Seepage wetland (no-go area)
	Waterbody (no-go area)
	Clean water overland flow
	Dirty water overland flow
	Existing clean water contour drain
	Dirty water diversion channel (DWDC)
	Dirty water diversion bund (DWDB)
	Coconut coir log
	Laydown area
	Existing engineered designed culvert
	Trafficable swale
	Sediment sump
	Stockpile location
	Decanting earth bund (DEB)
	Catchment boundaries
	Gondola alignment

Notes

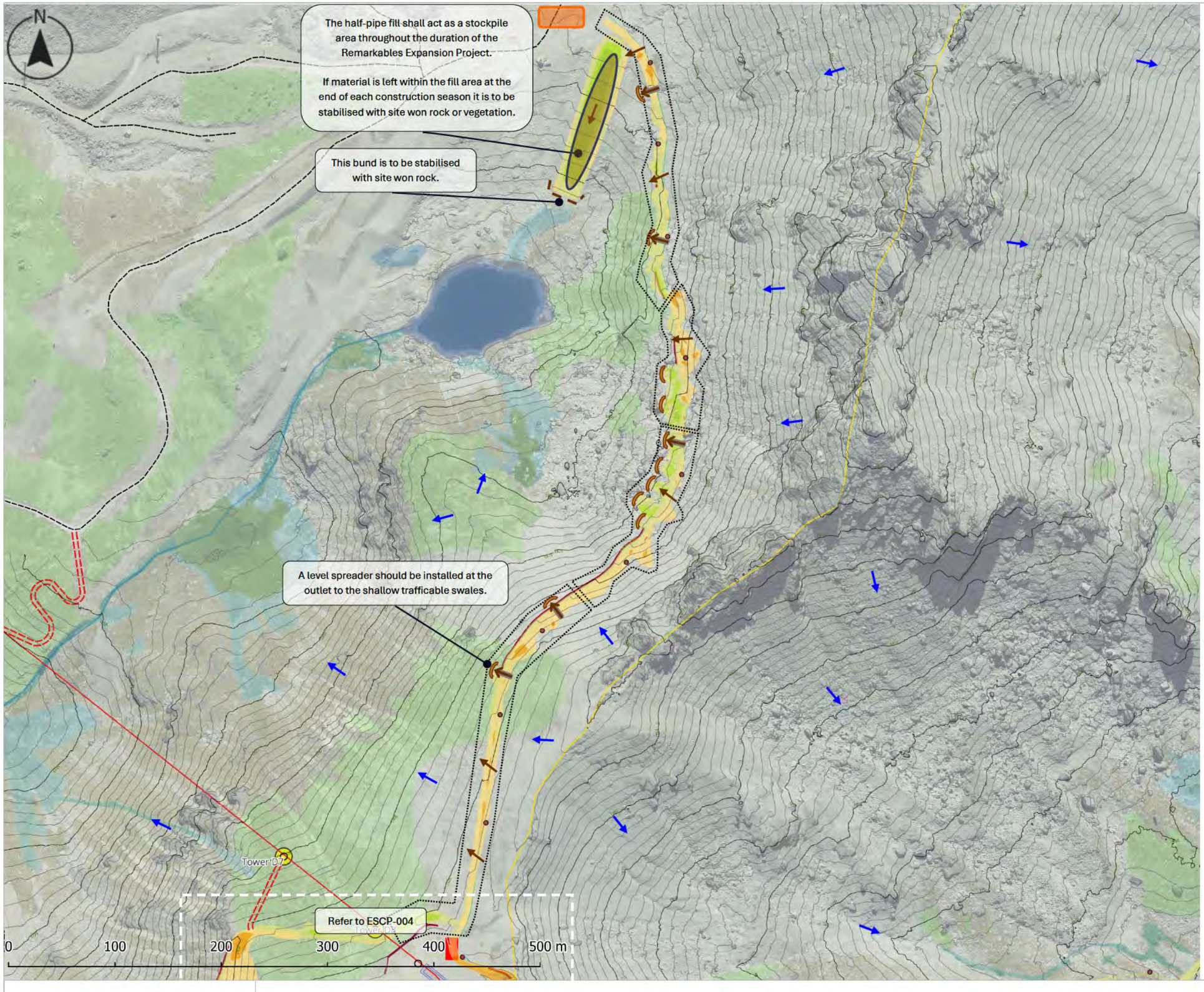
- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- All devices are to be inspected weekly and pre and post-rain event to ensure they are fully functional.
- The laydown area is a hardstand area where all plant, machinery, refuelling, chemicals and fuels, waste management measures should be located.
- Identified no-go areas shown on this plan are located outside the specified earthworks footprint.
- Scale 1:900 @ A3

enviroscope

Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Rastus Burn Gondola Terminal and Base Building Extension (Construction Season 2026-2027)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 002	2



Legend

	Seepage wetland (no-go area)
	Cushion bog (no-go area)
	Cushion field (no-go area)
	Waterbody (no-go area)
	Existing access track
	Temporary access track
	Clean water overland flow
	Dirty water overland flow
	Trafficable swale
	Dirty water diversion bund (DWDB)
	Coconut coir log
	Laydown area
	Stockpile location
	Proposed gabion basket
	Snow gun
	Wastewater main
	Sub-stage boundaries

Notes

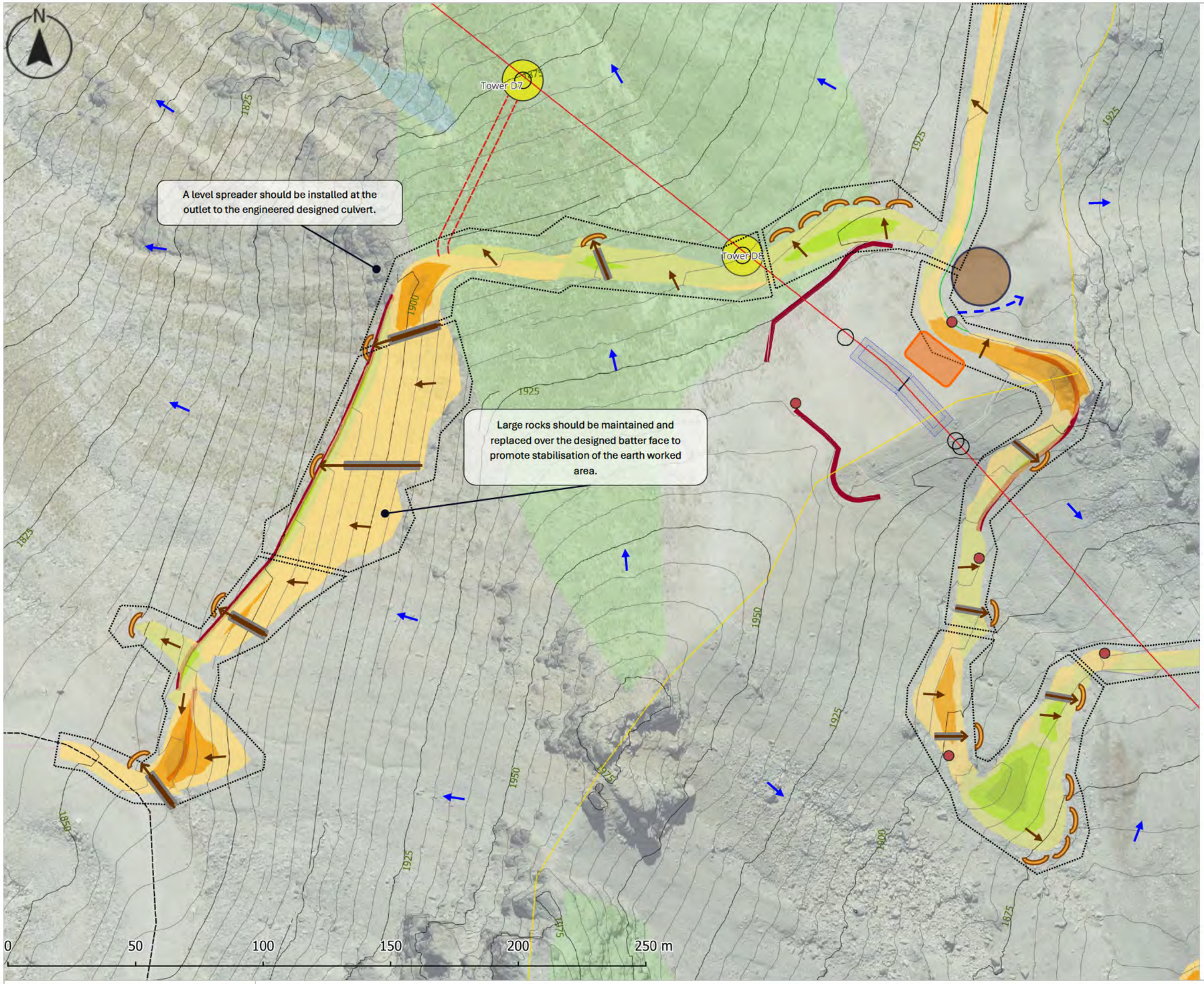
- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- All devices are to be inspected weekly and pre and post-rain event to ensure they are fully functional.
- Sub-stages have been provided to define and manage the extent of works occurring.
- Identified no-go areas shown on this plan are located outside the specified earthworks footprint.
- Scale 1:3600 @ A3

enviroscope

Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Rastus Burn to Mid-Station Access and Halfpipe Fill (Construction Season 2026-2027)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 003	2



Legend

	Seepage wetland (no-go area)
	Cushion bog (no-go area)
	Cushion field (no-go area)
	Waterbody (no-go area)
	Existing access track
	Temporary access track
	Gondola alignment
	Clean water overland flow
	Dirty water overland flow
	Clean water diversion bund (CWDB)
	Trafficable swale
	Coconut coir log
	Laydown area
	Stockpile location
	Proposed gabion basket
	Snow gun
	Sub-stage boundaries

Notes

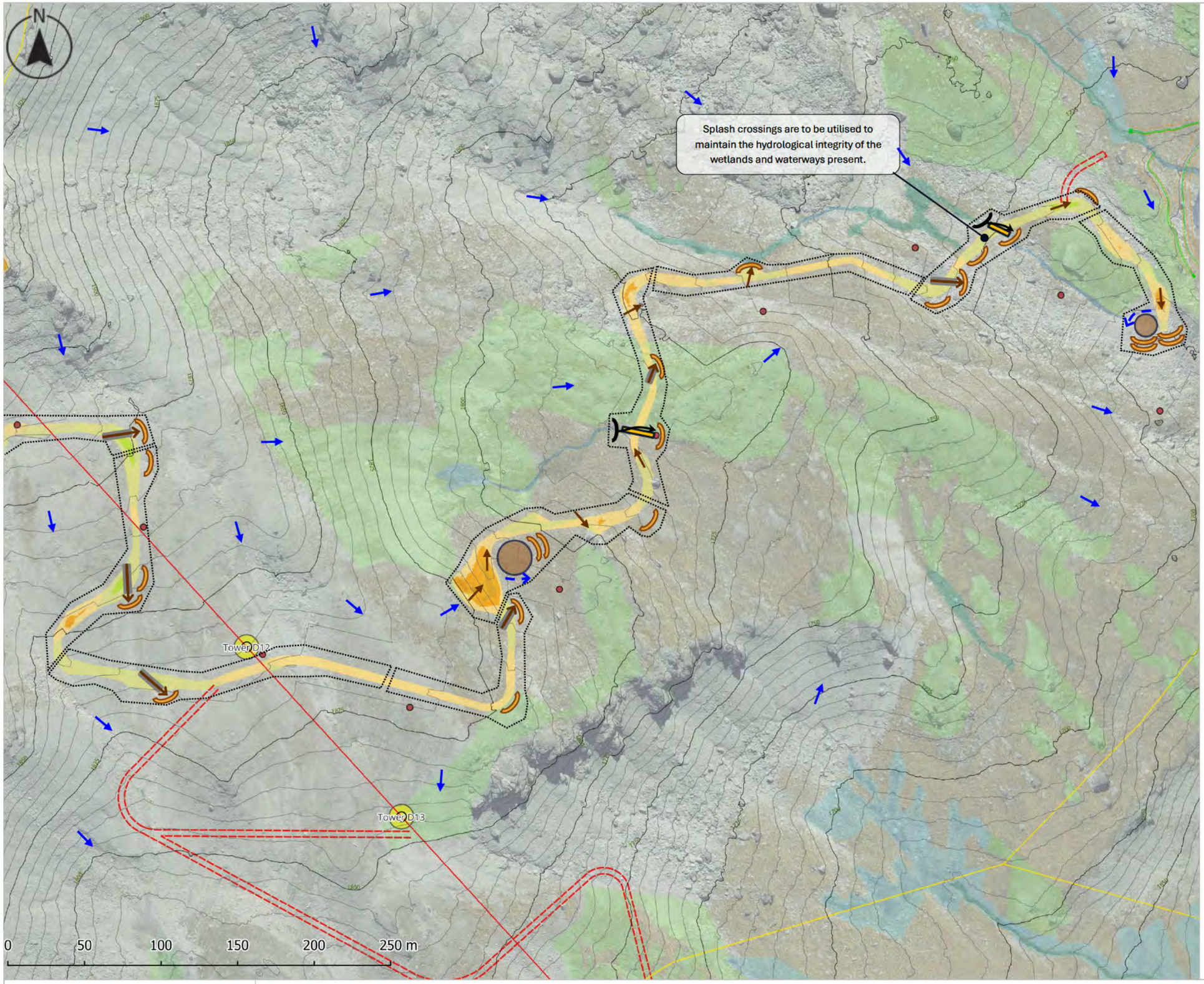
- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- All devices are to be inspected weekly and pre and post-rain event to ensure they are fully functional.
- Identified no-go areas shown on this plan are located outside the specified earthworks footprint.
- Scale 1:1500 @ A3.

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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Curvey Return Trail and Doolans 4WD Track (Construction Season 2026-2027)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 004	2



Legend

	Seepage wetland (no-go area)
	Cushion bog (no-go area)
	Cushion field (no-go area)
	Waterbody (no-go area)
	Temporary access track
	Gondola alignment
	Clean water overland flow
	Dirty water overland flow
	Clean water diversion bund (CWDB)
	Pipe drop
	Coconut coir log
	Splash crossing
	Trafficable swale
	Stockpile location
	Snow gun
	Sub-stage boundaries

Notes

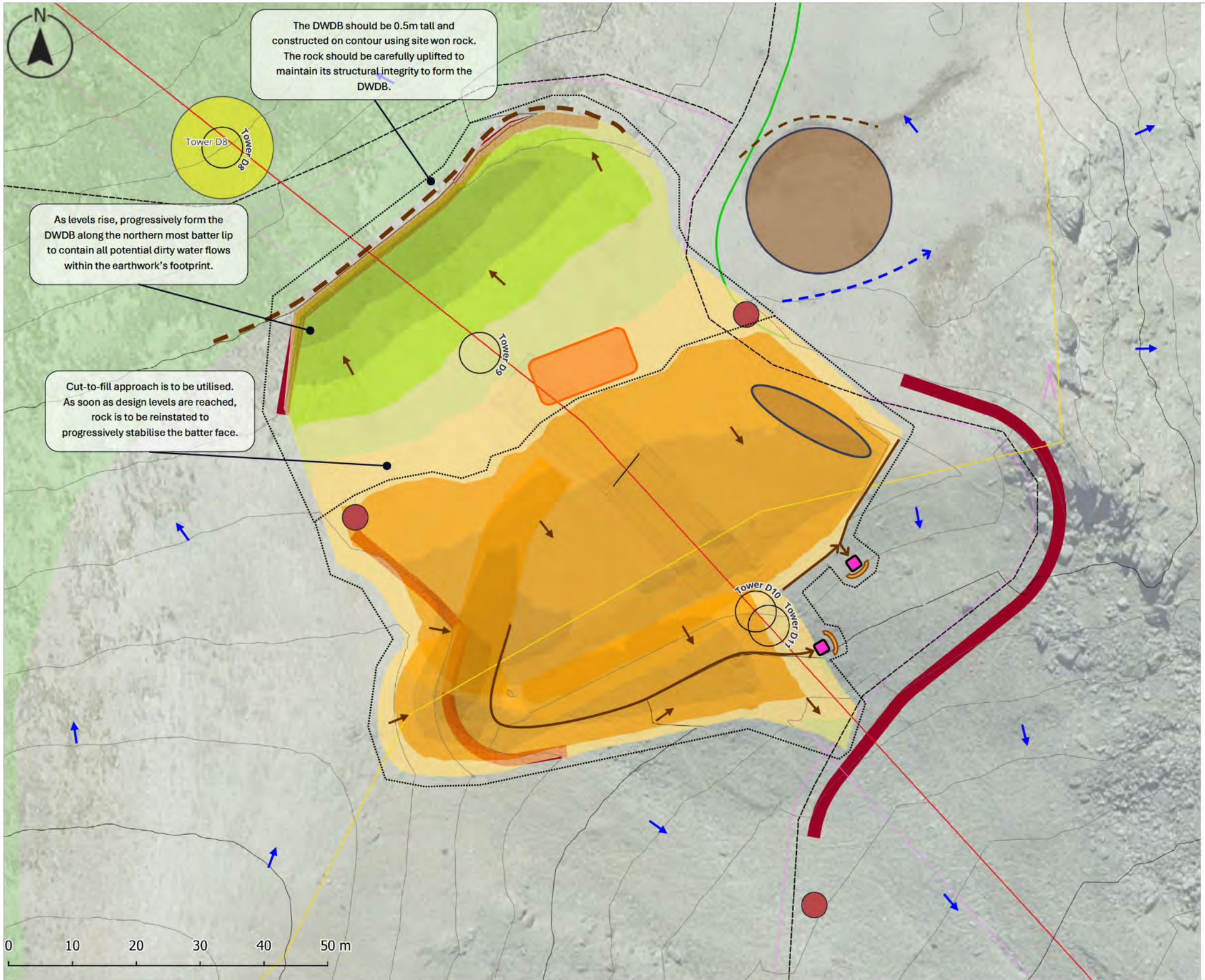
- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- Pipe drops to be installed prior to forming splash crossings and culverts.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- All devices are to be inspected weekly and pre and post-rain event to ensure they are fully functional.
- Identified no-go areas shown on this plan are located outside the specified earthworks footprint.
- Scale 1:2500 @ A3

enviroscope

Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Doolans 4WD Track (Construction Season 2026-2027)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 005	2



Legend

	Seepage wetland (no-go area)
	Cushion bog (no-go area)
	Cushion field (no-go area)
	Waterbody (no-go area)
	Existing access track
	Temporary access track
	Gondola alignment
	Clean water overland flow
	Dirty water overland flow
	Clean water diversion bund (CWDB)
	Dirty water diversion channel (DWDC)
	Dirty water diversion bund (DWDB)
	Coconut coir log
	Laydown area
	Sediment sump
	Stockpile location
	Proposed gabion basket
	Snow gun
	Sub-stage boundaries

Notes

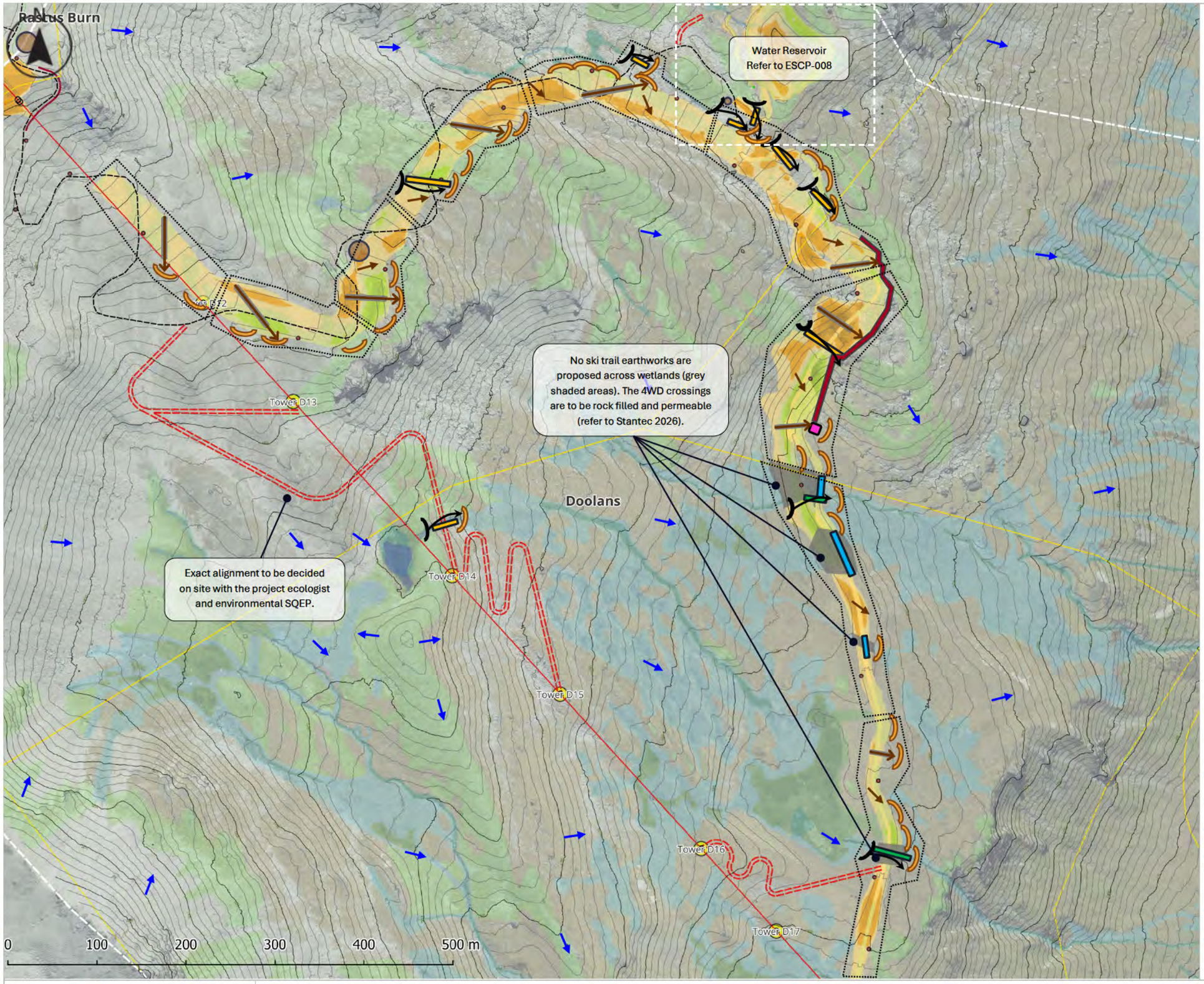
- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- All devices are to be inspected weekly and pre and post-rain event to ensure they are fully functional.
- Identified no-go areas shown on this plan are located outside the specified earthworks footprint.
- Scale 1:600 @ A3

enviroscope

Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Gondola Mid-Station (Construction Season 2027-2028

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 006	2



Legend

	Seepage wetland (no-go area)
	Cushion bog (no-go area)
	Cushion field (no-go area)
	Waterbody (no-go area)
	Existing access track
	Temporary access track
	Gondola alignment
	Clean water overland flow
	Dirty water overland flow
	Pipe drop
	Coconut coir log
	Laydown area
	Stockpile location
	Engineer-designed culvert
	Engineered permeable road
	Splash crossing
	Armoured Swale
	Trafficable swale
	Sediment sump
	Proposed gabion basket
	Snow gun
	Sub-stage boundaries

Notes

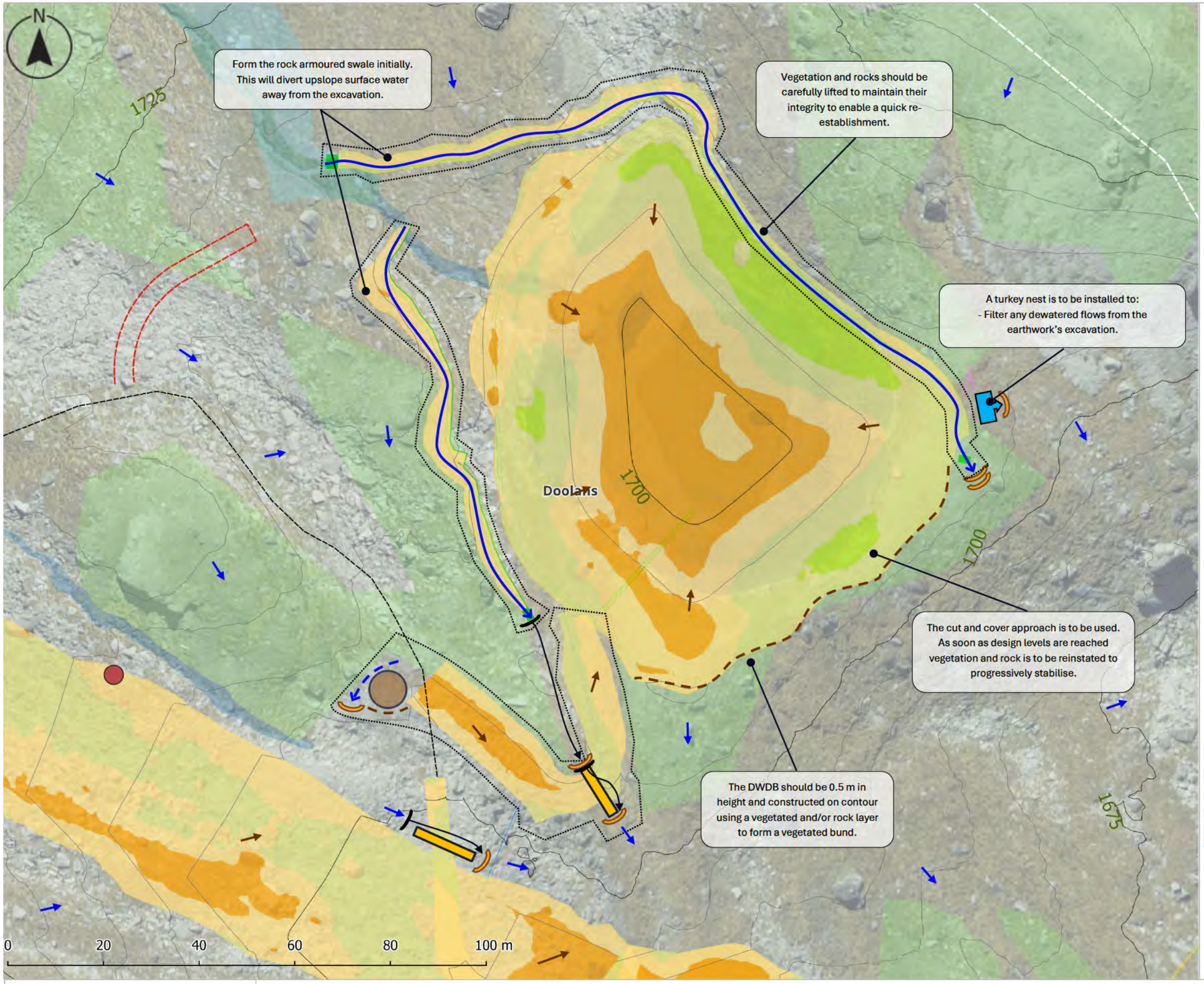
- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- All devices are to be inspected weekly and pre and post-rain event to ensure they are fully functional.
- Pipe drops to be installed prior to forming splash crossings and culverts.
- The laydown area is a hardstand area where all plant, machinery, refuelling, chemicals and fuels, waste management measures should be located.
- Identified no-go areas shown on this plan are located outside the specified earthworks footprint.
- Scale 1:4300 @ A3

enviroscope

Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Doolans Blue Trail and 4WD Track (Construction Season 2027-2028 & 2029-2030)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 007	2



Legend

	Seepage wetland (no-go area)
	Cushion bog (no-go area)
	Cushion field (no-go area)
	Waterbody (no-go area)
	Existing access track
	Temporary access track
	Clean water overland flow
	Dirty water overland flow
	Clean water diversion bund (CWDB)
	Dirty water diversion channel (DWDC)
	Rock armoured swale (CWDC)
	Dirty water diversion bund (DWDB)
	Coconut coir log
	Splash crossing
	Pipe drop
	Turkey nest
	Snow gun
	Stockpile location
	Sub-stage boundaries

Notes

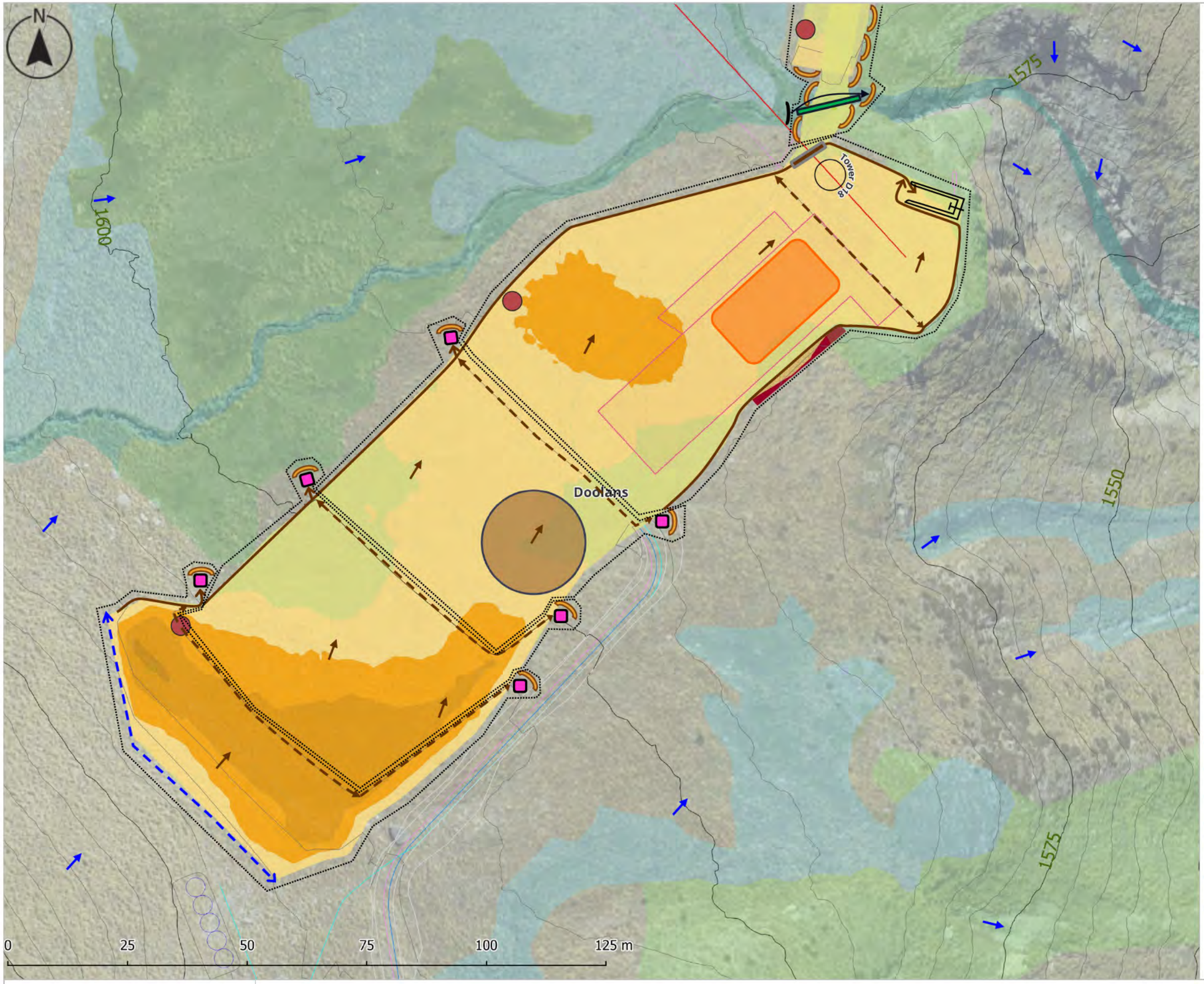
- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- Pipe drops to be installed prior to forming splash crossings and culverts.
- All devices are to be inspected weekly and pre and post-rain event to ensure they are fully functional.
- The laydown area is a hardstand area where all plant, machinery, refuelling, chemicals and fuels, waste management measures should be located.
- Identified no-go areas shown on this plan are located outside the specified earthworks footprint.
- Scale 1:1000 @ A3

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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Doolans Water Reservoir (Construction Season 2027-2028)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 008	2



Legend

	Seepage wetland (no-go area)
	Cushion bog (no-go area)
	Cushion field (no-go area)
	Waterbody (no-go area)
	Clean water overland flow
	Dirty water overland flow
	Dirty water diversion channel (DWDC)
	Dirty water contour drain (DWCD)
	Clean water diversion bund (CWDB)
	Dirty water diversion bund (DWDB)
	Coconut coir log
	Laydown area
	Engineered designed culvert
	Trafficable swale
	Sediment sump
	Decanting earth bund (DEB)
	Stockpile location
	Proposed gabion basket
	Snow gun
	Sub-stage boundaries
	Pipe drop

Notes

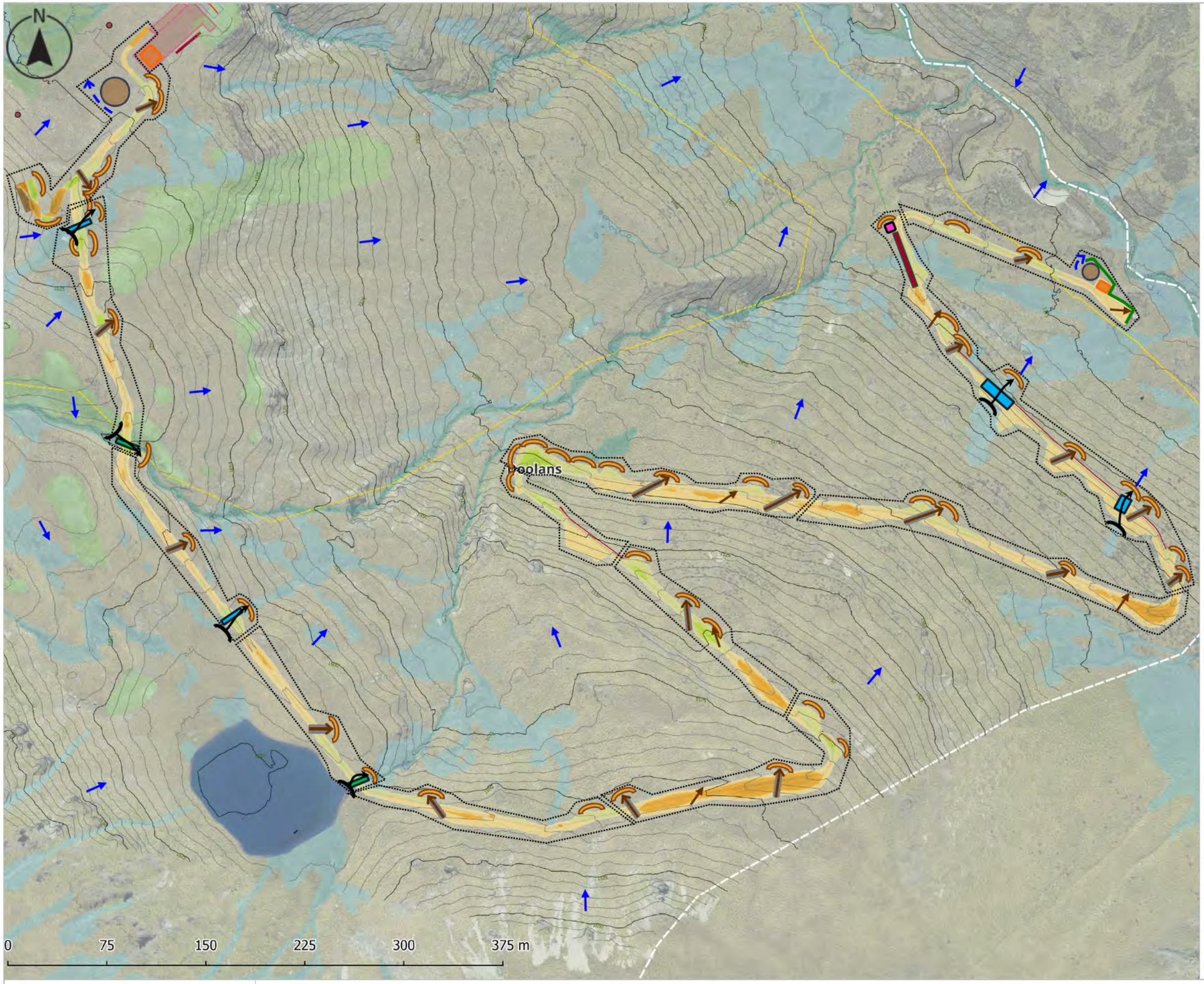
- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- All devices are to be inspected weekly and pre and post-rain event to ensure they are fully functional.
- Pipe drops to be installed prior to forming splash crossings and culverts.
- The laydown area is a hardstand area where all plant, machinery, refuelling, chemicals and fuels, waste management measures should be located.
- Identified no-go areas shown on this plan are located outside the specified earthworks footprint.
- Scale 1:800 @ A3

enviroscope

Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Doolans Base Station and Beginner Ski Slope (Construction Season 2027-2028)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 009	2



Legend

	Seepage wetland (no-go area)
	Cushion bog (no-go area)
	Cushion field (no-go area)
	Waterbody (no-go area)
	Clean water overland flow
	Dirty water overland flow
	Clean water diversion bund (CWDB)
	Dirty water diversion channel (DWDC)
	Clean water diversion channel (CWDC)
	Dirty water diversion bund (DWDB)
	Coconut coir log
	Laydown area
	Engineer-designed culvert
	Engineered permeable road
	Splash crossing
	Armoured Swale
	Trafficable swale
	Pipe drop
	Silt fence
	Stockpile location
	Proposed gabion basket alignment
	Snow gun alignment
	Sub-stage boundaries

Notes

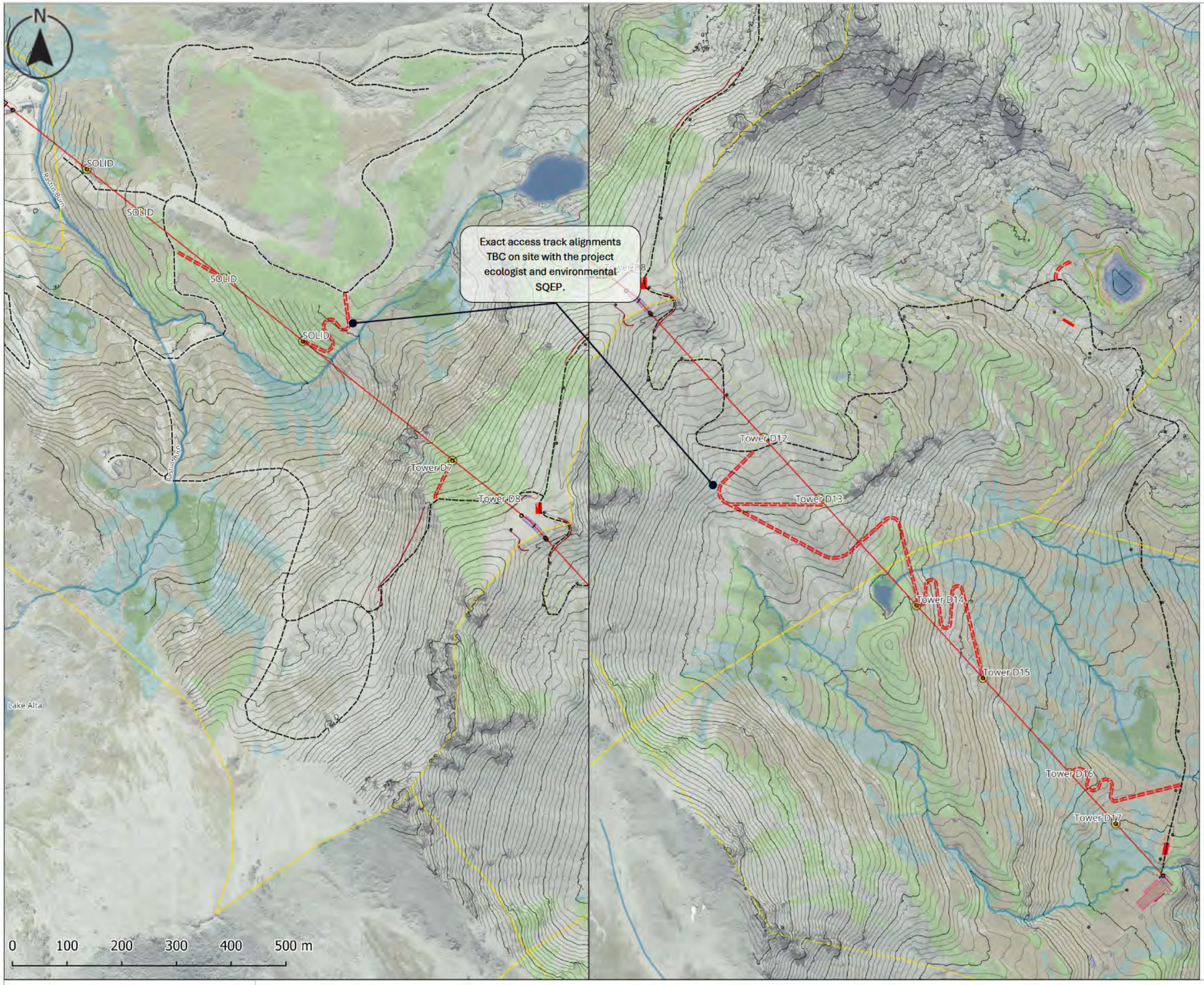
- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- All devices are to be inspected weekly and pre and post-rain event to ensure they are fully functional.
- Pipe drops to be installed prior to forming splash crossings and culverts.
- Identified no-go areas shown on this plan are located outside the specified earthworks footprint.
- Scale 1:7000 @ A3

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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Doolans Water Intake Access (Construction Season 2028-2029)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 010	2

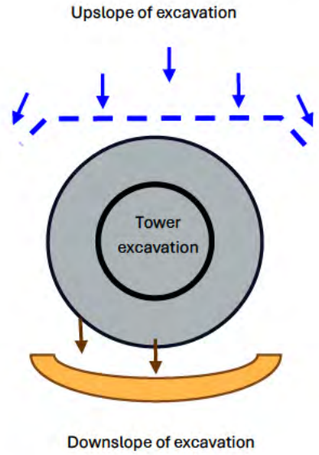


Legend

	Seepage wetland (no-go area)
	Cushion bog (no-go area)
	Cushion field (no-go area)
	Waterbody (no-go area)
	Existing access track
	Temporary access track
	Clean water overland flow
	Dirty water overland flow
	Clean water diversion bund (CWDB)
	Coconut coir log
	Wastewater main
	Gondola alignment

Notes

- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- All devices are to be inspected weekly and pre and post-rain event to ensure they are fully functional.
- Exact temporary access track alignment is to be confirmed on site by the project ecologist and environmental SQEP. This will ensure the access with the least disturbance is selected.
- Identified no-go areas shown on this plan are located outside the specified earthworks footprint.
- Scale 1:7000 @ A3

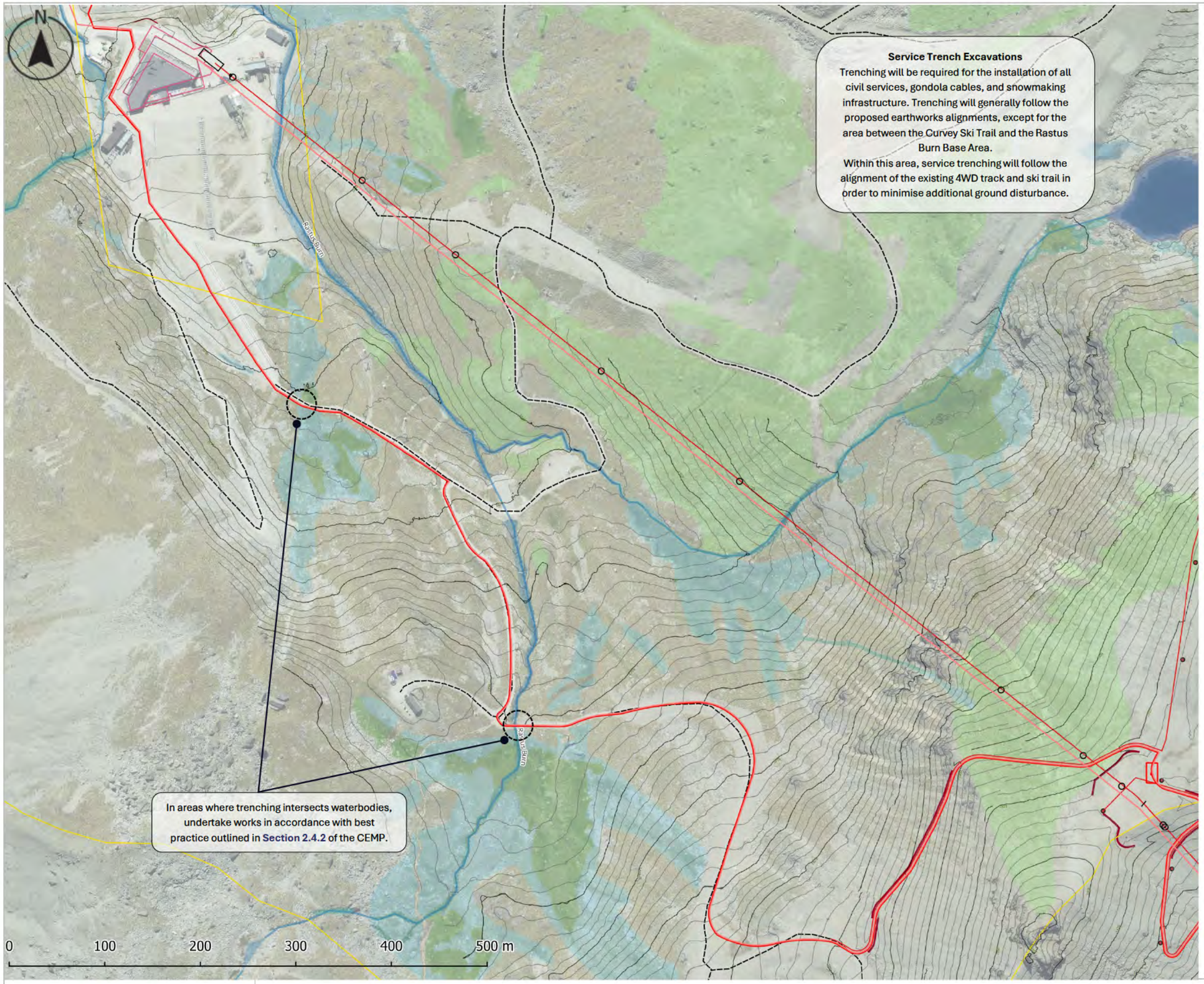


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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Gondola Tower Alignment (Construction Season 2026 – 2027 and 2027 – 2028)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 011	2



Legend

	Seepage wetland (no-go area)
	Cushion bog (no-go area)
	Cushion field (no-go area)
	Waterbody (no-go area)
	Existing access track
	Temporary access track
	Clean water overland flow
	Dirty water overland flow
	Wastewater main
	Telecommunications

Notes

- This plan is to be read in conjunction with the CEMP prepared by Enviroscope.
- All locations of erosion and sediment control (ESC) devices are indicative and exact placement to be confirmed onsite.
- All devices are to be inspected weekly and pre and post-rain event to ensure they are fully functional.
- Exact temporary access track alignment is to be decided on site by the project ecologist and environmental SQEP.
- Identified no-go areas shown on this plan are located outside the specified earthworks footprint.
- Scale 1:4000 @ A3

enviroscope

Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Curvey Utilities Trenching (Construction Season 2026 – 2027)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 012	2

APPENDIX 2 SCHEMATICS FOR EROSION AND SEDIMENT CONTROLS

EROSION MATTING

(Images - Enviroscope)

- Application of erosion matting instantly reduces the erosive potential of disturbed areas of earthworks.
- Erosion matting may be used on short steep slopes or batters during periods of inactivity on site.
- Erosion matting can come in the form of temporary biodegradable geotextiles (e.g. coconut fibre or biowool) or permanent non-biodegradable geotextiles (e.g. synthetic geofabric or plastic).
- For this project the use of biodegradable matting is recommended.









- Use of erosion matting is also applicable within temporary or permanent diversion channels, where channelised flow has the potential to erode the exposed channel bed at high flow velocities.
- The selection of lining type used within channels should be at the direction of the geotechnical engineer or SQEP to determine the appropriate material.

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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project

Description: Erosion and Sediment Control Schematics

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 013	2

STABILISATION

(Images - Enviroscope)











- All vegetation within the site boundaries is to be retained and replanted. Where possible topsoil should be lifted carefully and folded over to keep the vegetative root network intact so it can be folded back into place with intact plants, enabling quick re-establishment.
- Rocks are to be utilised as a surface stabilising ground cover. Rocks should be placed over earth worked surfaces immediately upon completion.
- Ensure when stockpiling indigenous vegetation layering is avoided. Additionally, the watering of vegetation should be carried out.

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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project

Description: Erosion and Sediment Control Schematics

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 014	2

TEMPORARY SOIL BINDERS

(Pages 166-170 of GD05)



- Soil binders or polymers can be used to form a cohesive membrane or protective crust over exposed earthworks. This reduces windblown dust generation and reduces raindrop impact to minimise erosion.
- Provides short-term protection (generally < 6 months). This does not constitute 'stabilisation'.
- The use of polymers should only be undertaken under direction of the site SQEP and approval from DOC.

DUST SUPPRESSION

(Page 169-172 of GD05)



- Dust suppression is typically achieved via use of a water cart of a sprinkler system. This should be applied incrementally so maintain a moist surface, but without saturating the surface and resulting in sediment run-off.

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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project

Description: Erosion and Sediment Control Schematics

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 015	2

TEMPORARY ACCESS

(Images - Enviroscope)

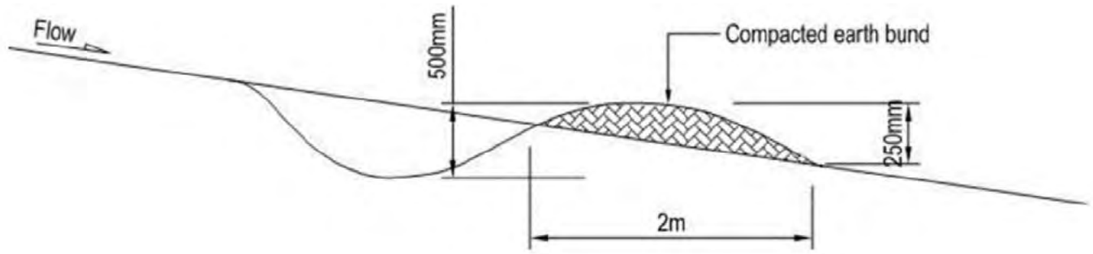




- Rubber matting to be utilised for works within proximity of critical source areas as defined by project Ecologist and Environmental SQEP.
- Temporary access is to be restricted to existing access tracks where possible. Single tracks to be utilised by all machinery, with minimal tracking back and forth to minimise ground disturbance.

CONTOUR DRAIN

(Pages 47-50 from GD05)





Slope of site (%)	Spacing (m) of contour drains
Less than 5%	50
5-10%	40
10- 15%	30
15- 30%	20

- Contour drains will be minimum dimension of 250 mm high and 500 mm deep.
- Contour drains are to be placed at as per the table above.
- The grade of the contour drain is less than 2% to minimise erosion.
- The catchment serviced by the contour drain will is no more than 0.5 ha.
- As the grade of the contour drain is greater than 2%, the contour drain will be lined.
- The contour drain should outlet into a DWDC or associated sediment sump.

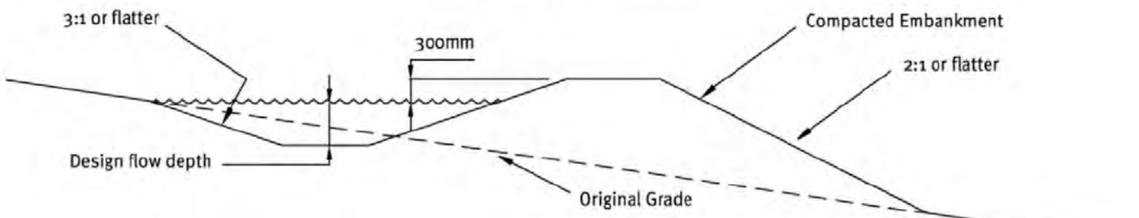
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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project
Description: Erosion and Sediment Control Schematics

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 016	2

DIRTY WATER DIVERSION CHANNEL

(Pages 43-46 from GD05)

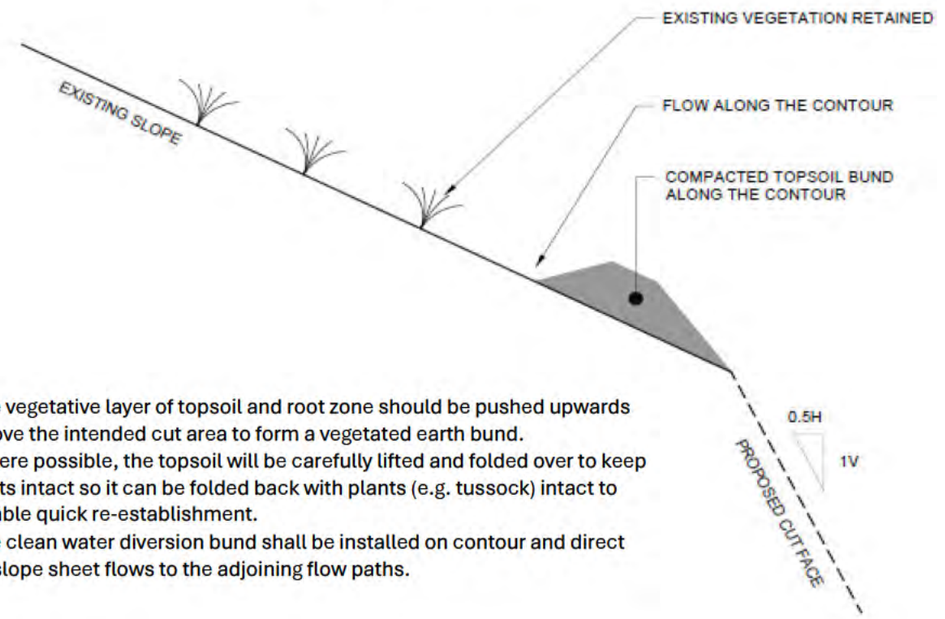


Cross Section

- This is to be implemented if required.
- Trapezoidal shape.
- Full calculations TBC.

CLEAN WATER DIVERSION BUND

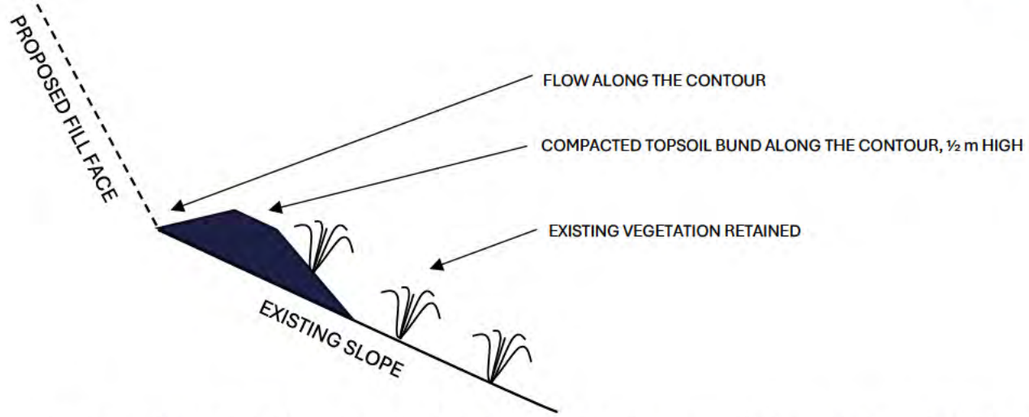
(Pages 38-43 from GD05)



- The vegetative layer of topsoil and root zone should be pushed upwards above the intended cut area to form a vegetated earth bund.
- Where possible, the topsoil will be carefully lifted and folded over to keep roots intact so it can be folded back with plants (e.g. tussock) intact to enable quick re-establishment.
- The clean water diversion bund shall be installed on contour and direct upslope sheet flows to the adjoining flow paths.

DIRTY WATER DIVERSION BUND

(Page 45 from GD05)



- The vegetative layer of topsoil and root zone should be pushed downwards below the intended fill area to form a vegetated earth bund.
- Where possible, the topsoil will be carefully lifted and folded over to keep roots intact so it can be folded back with plants (e.g. tussock) intact to enable quick re-establishment.
- The dirty water diversion bund shall be installed on contour and direct upslope sheet flows to the corresponding logs.
- The image included to the right is a dirty water diversion bund used to capture dirty water flows from the access road works area.



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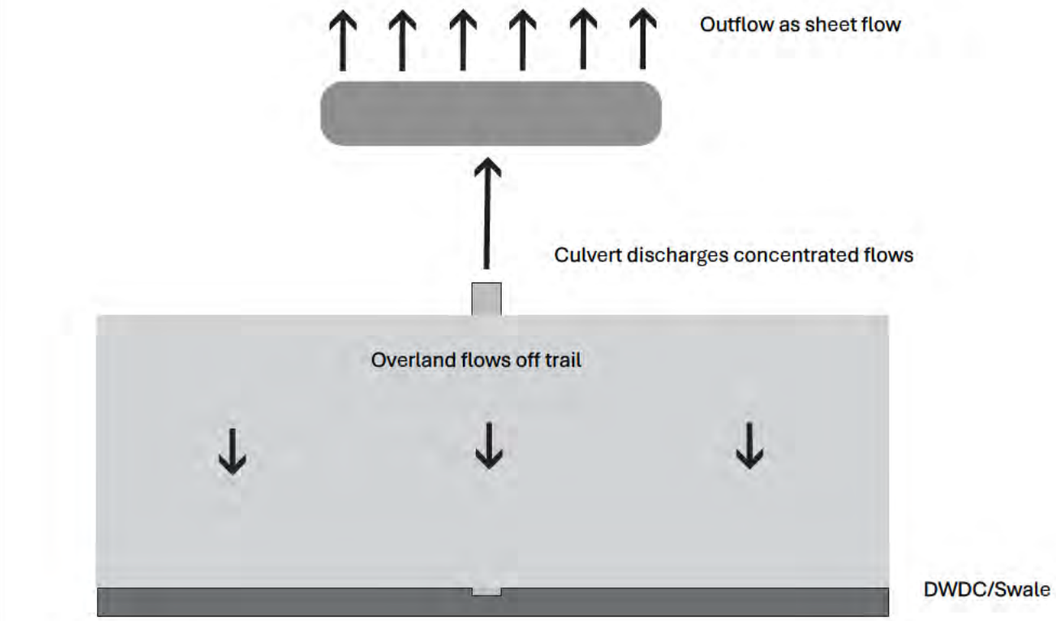
Project: Remarkables Ski Area Upgrades and Doolans Expansion Project
Description: Erosion and Sediment Control Schematics

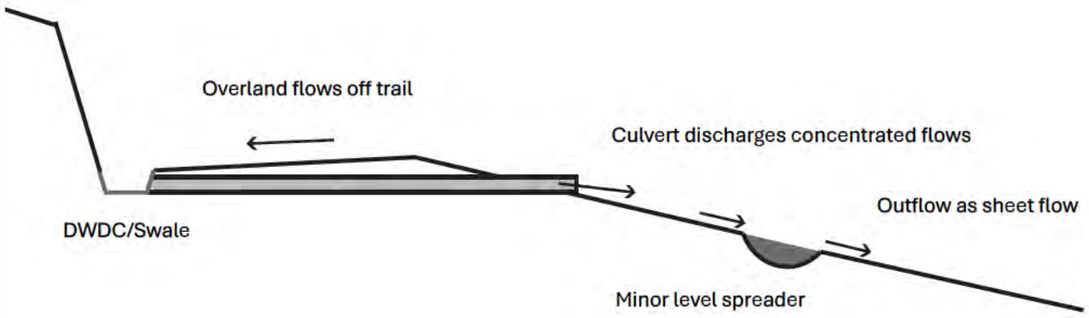
	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 017	2

LEVEL SPREADER

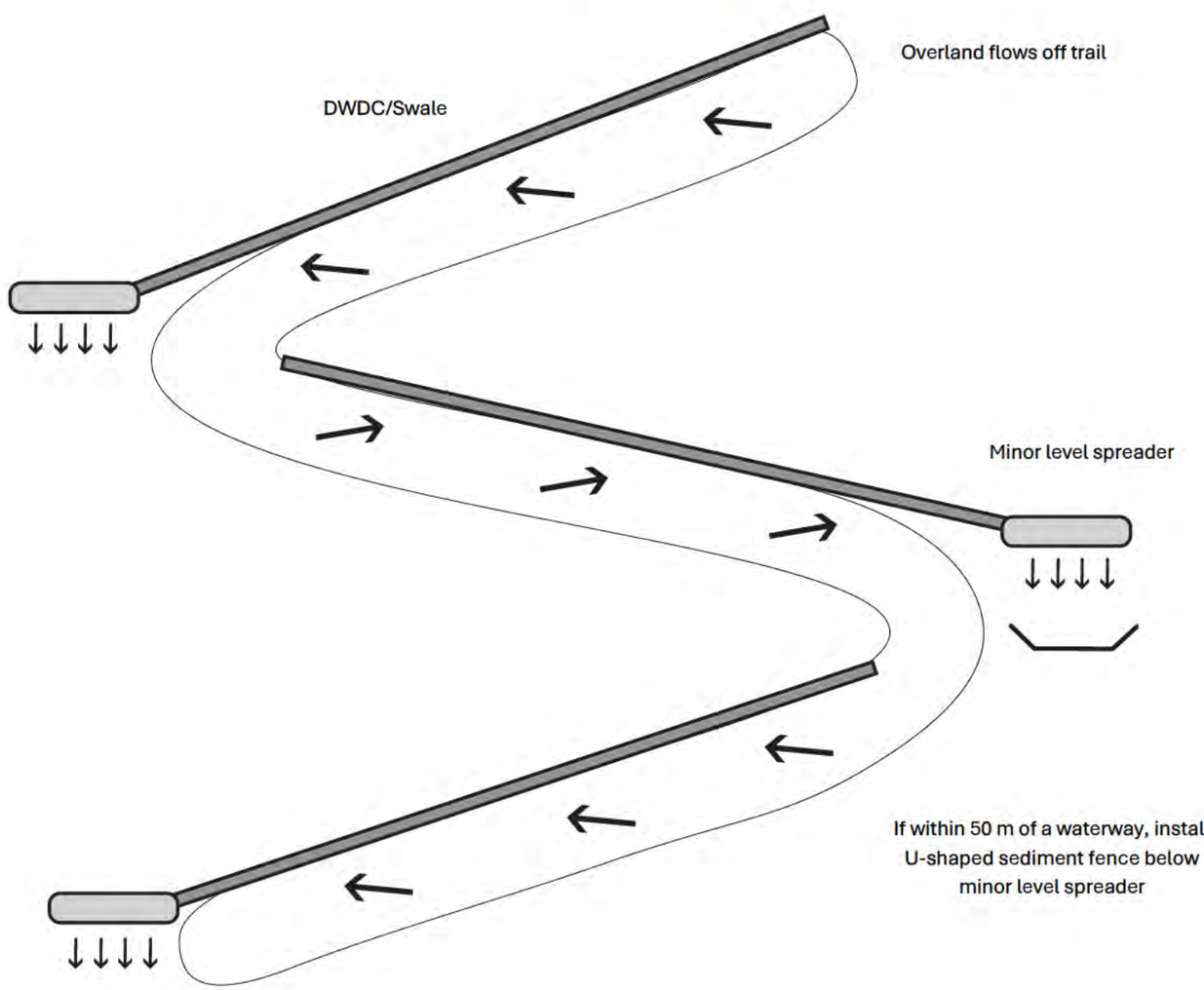
Schematics – Enviroscope

MINOR LEVEL SPREADER





SWITCHBACK



- Level spreaders are commonly utilised in alpine environments to convert concentrated flows into sheet flows.
- Level spreaders can be formed using either coconut coir logs or timber boards installed level to ensure even flow distribution.
- Ensure the level spreader remains level across its entire length to prevent flow concentration.
- Materials must be secured against high winds, snow loading, and freeze-thaw movement.

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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project

Description: Erosion and Sediment Control Schematics

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 018	2

DROP-OUT PIT

Page 45 from GD05

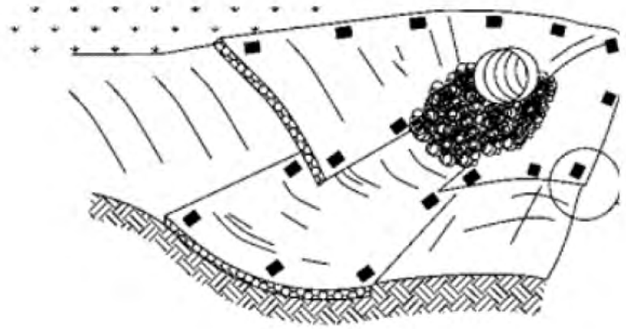




- Drop out pits should be one metre deep by one-metre-wide cube.
- As a contingency measure, drop out pits can be increased in size and lined to prevent any scour of the pit.

CULVERT

(Diagram from TP90 – now GD05)



- To be non-perforated concrete, PVC or plastic drainage coil.
- The culvert should consist of a 300 mm PVC or farm-grade culvert to allow for heavy haul vehicles to traffic over.
- Geofabric and rock should be placed at the outlet to prevent scour from the higher velocity water exiting the culvert.

TRAFFICABLE SWALE

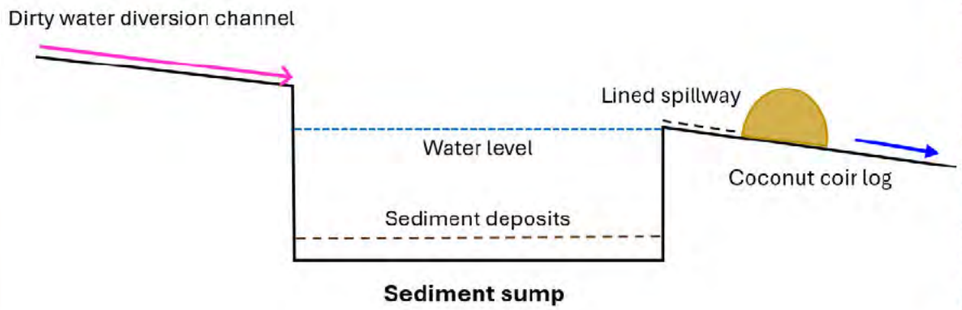
Image - Enviroscope



- Trafficable swales should be constructed by mounding and compacting soil diagonally across the road to direct sheet flows, mimicking predevelopment flow regimes.
- Trafficable swales shall have a drop out pit and coconut coir log installed at the outlet during construction, to reduce water velocities and capture sediments.
- Rock-lining may need to be added if the swale structure is continuing to degrade by trafficking.

SEDIMENT SUMP

Image - Enviroscope



Sediment sump



- Sediment sumps shall be formed to dimensions of 2.0 m W x 2.0 m L x 1.0 m D at the termination of the corresponding DWDC.
- A spillway is to be constructed to convey any overtopping water from the sediment sump to the coconut coir log. The spillway is to be lined with geofabric and secured to avoid erosion and undercutting.
- Sediment sumps are to be cleaned out once they reach 20% capacity, and free-draining soils (if any) are exposed.

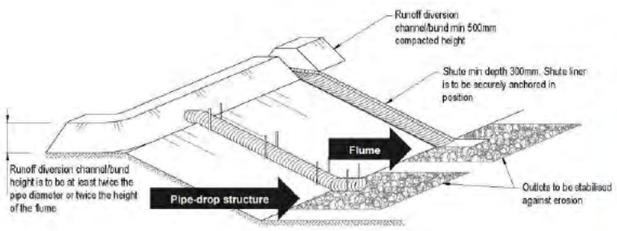
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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project
Description: Erosion and Sediment Control Schematics

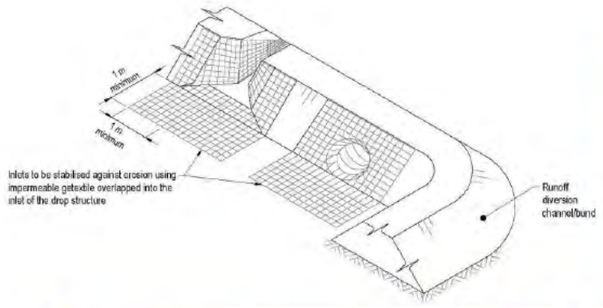
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	KB	TG	2/11/2026	ESCP – 019	2

PIPE DROP STRUCTURE

Page 55-60 from GD05







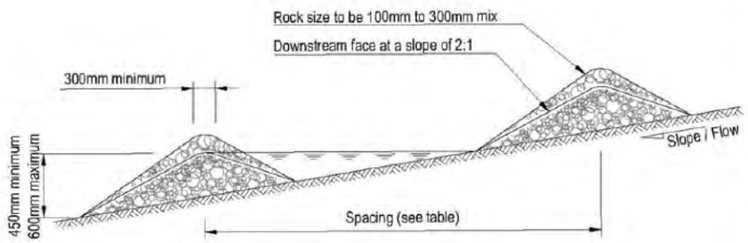


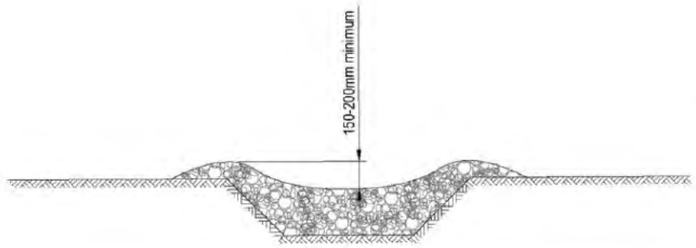


- Ensure the height of the bund is 2x the pipe of flume diameter.
- Attach a 110 mm flume or pipe into the bund.
- The drainage coil will be unpunched and ensure all connections are water tight.
- The inlet to the flume or pipe will have a one metre long stabilised apron on a 3% grade.
- The flume or pipe will be pinned every four metres to anchor it. There will be no less than two anchors equally spaced along the length of the flume or pipe.
- Ensure the slope the flume or pipe directs flows down is steeper than 3:1.
- Ensure the flume or pipe extends beyond the toe of the slope and the outlet is stabilised with geofabric or rock rip rap to avoid downslope scouring.
- The pipe drop structure or flume will be monitored and maintained regularly to ensure it operates effectively.

CHECK DAMS

(Page 50-54 from GD05, Image - Enviroscope)







- Check dams will be constructed out of 100 – 300 mm site won rock
- Check dams should be 50-100 mm lower than the outside edges of the DWDC to form a spill way.

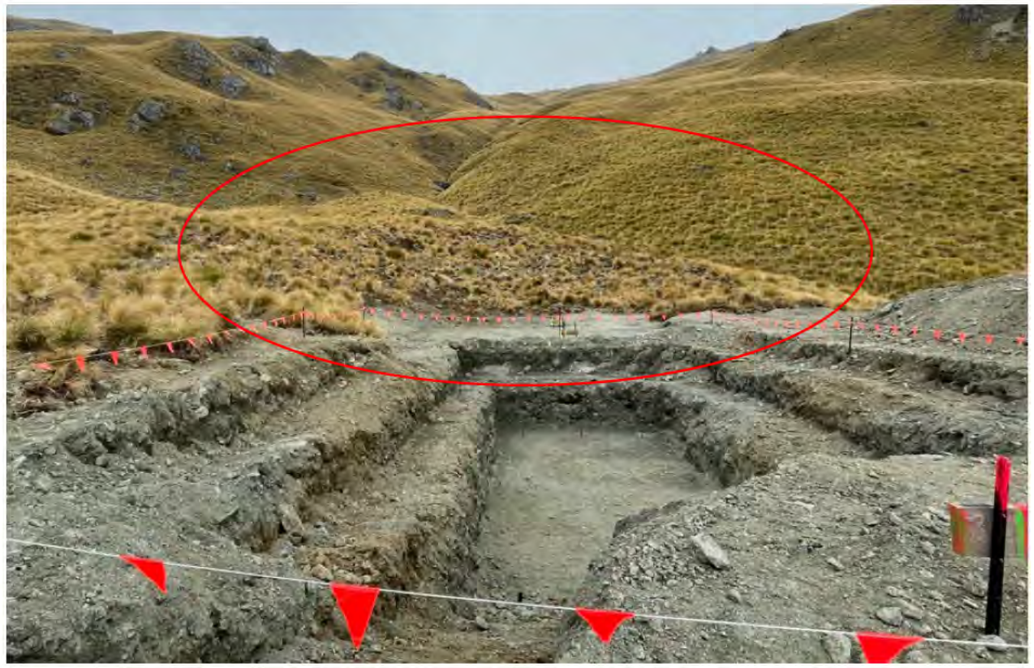
Project: Remarkables Ski Area Upgrades and Doolans Expansion Project
Description: Erosion and Sediment Control Schematics

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 020	2

CUT AND COVER

Image – Enviroscope





TRENCHING

Image – Enviroscope



- Trench alignments should only extend as far as it can be backfilled and restabilised within 24 hours of a forecast significant rainfall event.
- Carefully strip topsoil and vegetation, maintain plant root structure and place upslope of the trench alignment.
- Dig the trench alignment and place subsoil away from the vegetation and topsoil.
- Existing vegetation is to be carefully placed outside of alignment and placed back over the backfilled trench.

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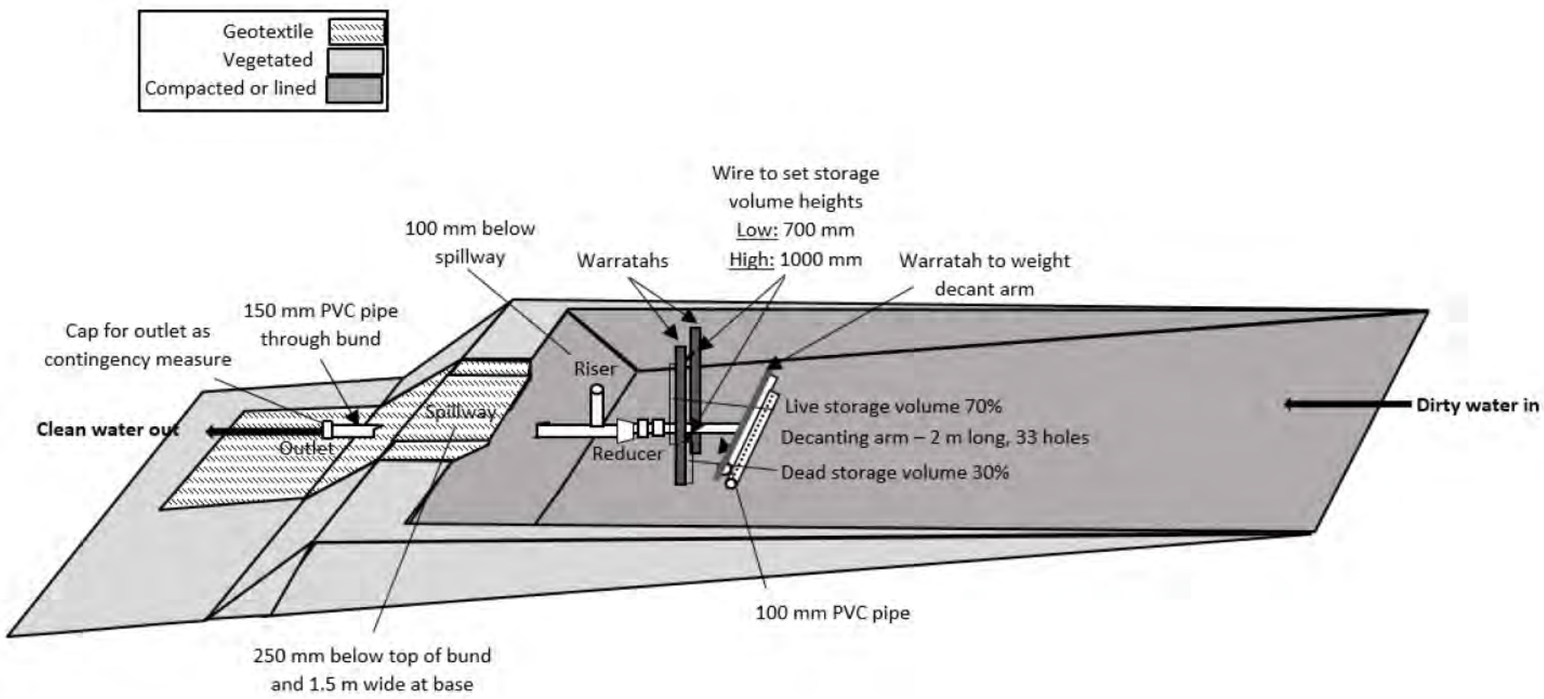
Project: Remarkables Ski Area Upgrades and Doolans Expansion Project

Description: Erosion and Sediment Control Schematics

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 021	2

DECANTING EARTH BUND

Page 106-112 from GD05



- Sizing and Calculations TBC with detailed design.

TURKEY NEST

Image - Enviroscope



- Turkey nests should be constructed utilising sandbags wrapped in geotextile material with the dimensions of 2000 x 1500 x 500 mm (L x W x H). The geotextile should consist of non-woven needle-punched geotextiles and manufactured from the extrusion of polymer fibres which are then laid down on a manufacturing 'bed'. They are then needle punched to entangle the threads, resulting in a permeable, yet dimensionally stable product which provides filtration.
- Hay and straw bales to be avoided to prevent the spread of exotic seeds to the site.
- Ensure geofabric lining is appropriately secured.
- To be cleaned out once 20% capacity reached.

SPLASH CROSSING

Image - Stantec



- Splash crossings will be rock lined using site won rock and mimic the existing bed of water bodies they intersect.
- Splash crossings maintain hydrological continuity, reduce blockage risk, and minimise long-term maintenance requirements in alpine conditions

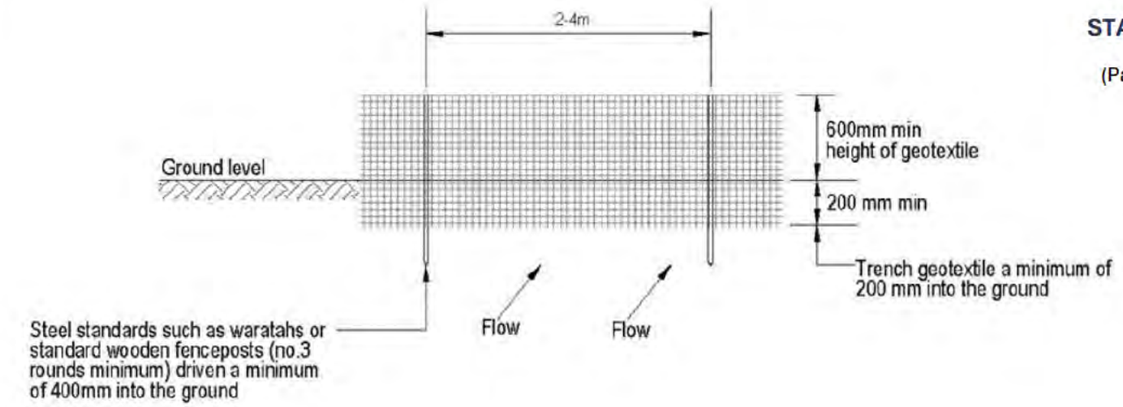
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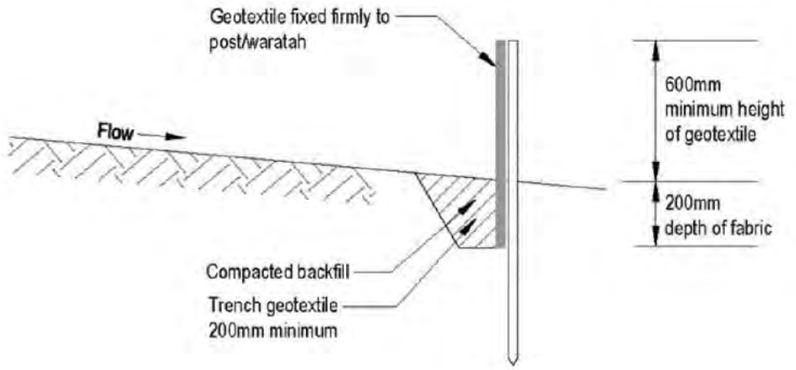
Project: Remarkables Ski Area Upgrades and Doolans Expansion Project
Description: Erosion and Sediment Control Schematics

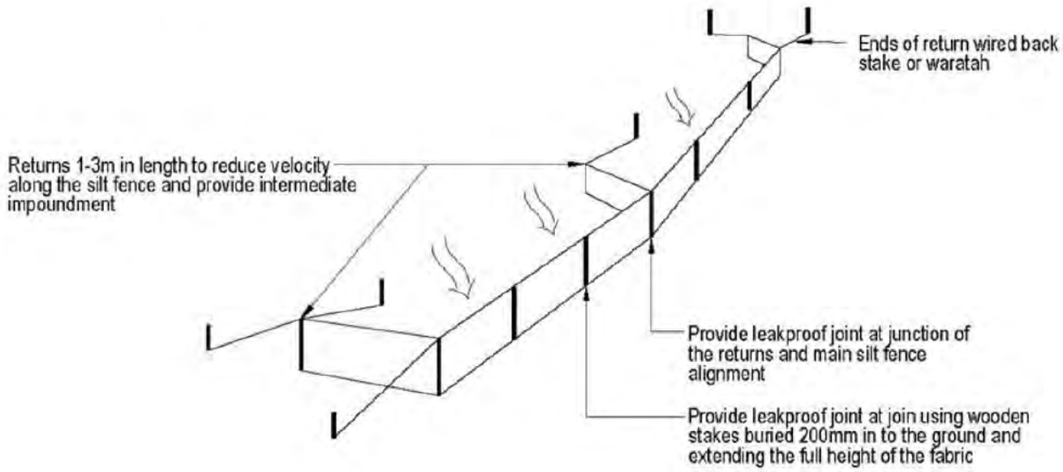
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	KB	TG	2/11/2026	ESCP – 023	2

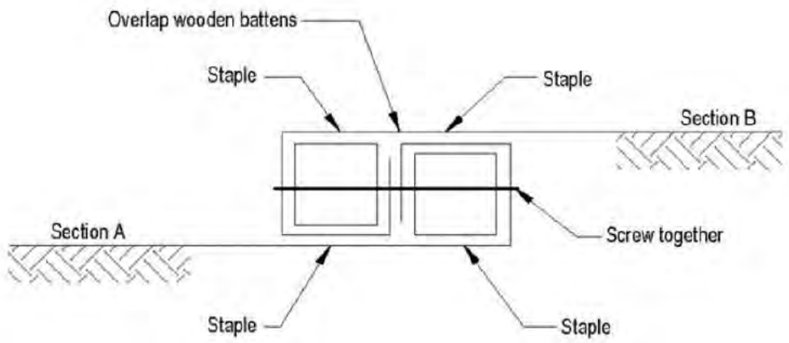
STANDARD SILT FENCE

(Page 112-119 from GD05)







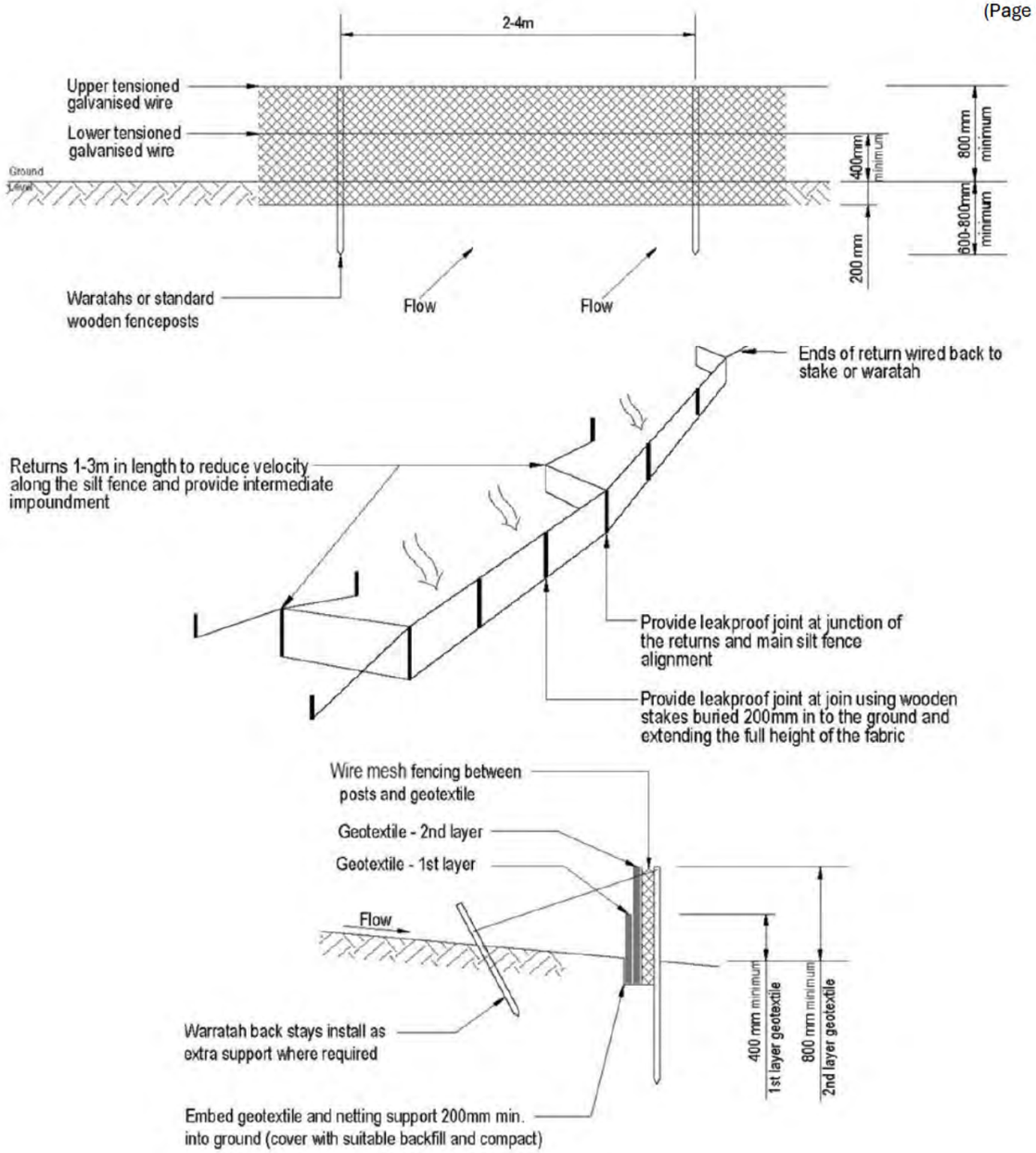


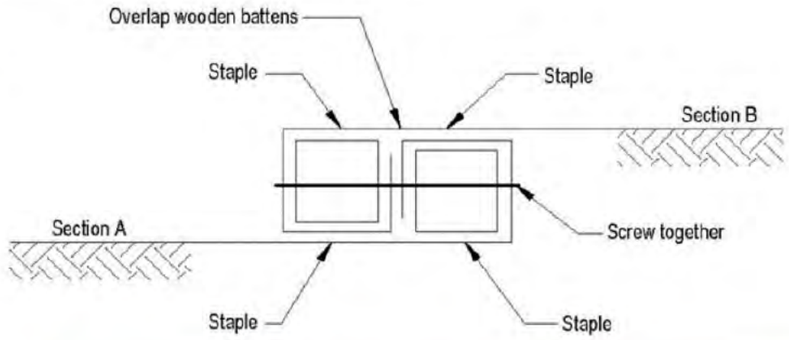
Slope steepness (%)	Slope length (m) (maximum)	Spacing of returns (m)	Silt fence length (m) (maximum)
Less than 2%	Unlimited	N/A	Unlimited
2- 10%	40	60	300
10- 20%	30	50	230
20- 33%	20	40	150
33- 50%	15	30	75
Greater than 50%	6	20	40

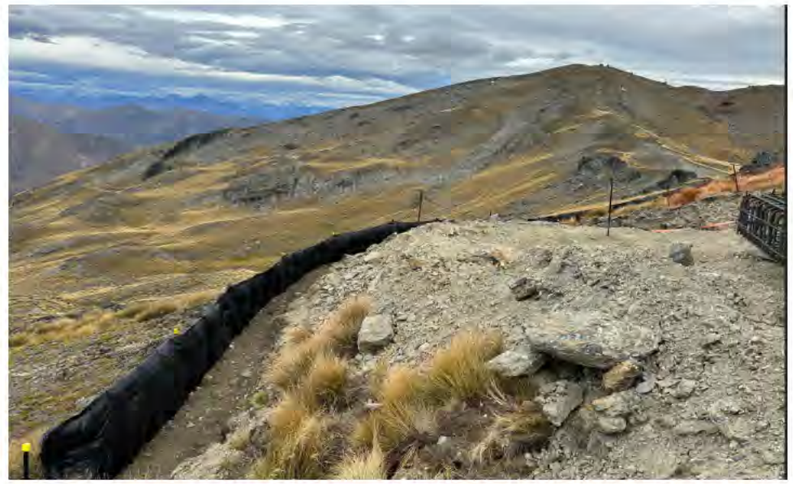
- Ensure the silt fence is 'keyed' into the ground to form a good seal at ground level to capture water and avoid undermining.
- Silt fences should be 600 mm above ground level and 200 mm below ground level.
- Supporting waratahs should be placed at 2-4 m intervals.
- Install silt fence returns at either end of the silt fence, projecting up-slope to a sufficient height to prevent outflanking.
- It is also important that silt fences are installed along the contour of the slope to prevent ponding of water in a concentrated area of the fence.

SUPER SILT FENCE

(Page 120-125 from GD05)







Slope steepness (%)	Slope length (m) (maximum)	Spacing of returns (m)	Silt fence length (m) (maximum)
0- 10%	Unlimited	60	Unlimited
10- 20%	60	50	450
20- 33%	30	40	300
33- 50%	30	30	150
Greater than 50%	15	20	75

- The super silt fence should be 800 mm above ground level and a minimum of 200 mm below ground level.
- The anchoring of the silt fence should ensure stability and the double layered geotextile should provide for drop-out prior to any water filtering through the upper portions of the fabric.
- It is imperative that the front face of the fence follows the contour as close as possible to ensure the designed holding capacity is achieved and to avoid creating pressure points on the fence.
- Supporting waratahs should be placed at 2-4 m intervals.
- Returns will be installed as per the table above. Install silt fence returns at either end of the silt fence, projecting up-slope to a sufficient height to prevent outflanking
- Stays to be installed with silt fence to provide additional structural support.

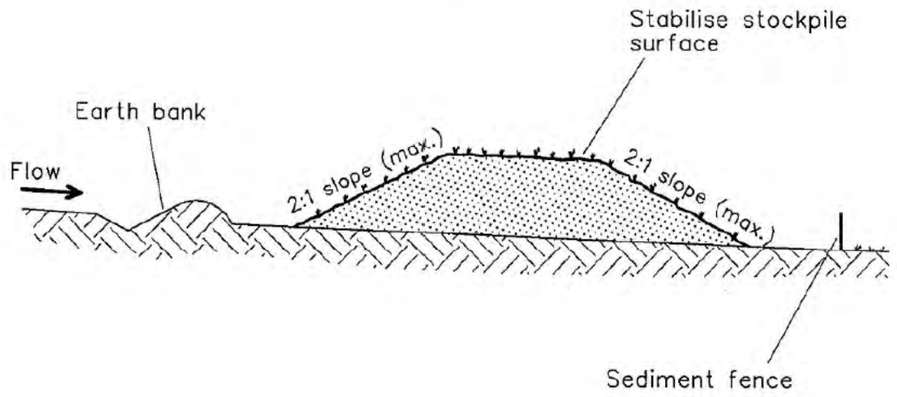
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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project
Description: Erosion and Sediment Control Schematics

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 025	2

TEMPORARY STOCKPILES

Image - GD05



- Temporary vegetation and topsoil stockpiles shall not exceed two metres in height to minimise wind erosion and maintain topsoil quality for revegetation.
- Install a CWDB upslope of stockpiles where required to divert clean water away from the stockpile area.
- Install silt fences and / or coconut coir logs on the downslope side of stockpiles to intercept sediment-laden runoff.
- Where stockpiles remain in place for four weeks or more, install a silt fence on the downslope side of the stockpile.
- Avoid layering indigenous vegetation within stockpiles to maintain vegetation viability for rehabilitation
- Water indigenous vegetation stockpiles during extended dry periods as required.
- Stabilise long-term stockpiles using shaping, compaction, erosion control matting, vegetation cover, or rock cover as appropriate to minimise erosion and sediment discharge.
- Inspect and maintain stockpiles and associated controls regularly to ensure ongoing effectiveness and stability.

COCONUT COIR LOGS

Page 126-130 from GD05





Slope steepness (%)	Slope length (m) (maximum)	Spacing of returns (m)
Less than 2%	100	N/A
2- 10%	40	30
10- 20%	30	25
20- 33%	10	10
33- 50%	5	10
Greater than 50%	2	5

- Coir logs should be placed within the DWDCs to reduce in-channel flow velocity and allow the capture of any residual sediment that infiltrates into 'clean' flows.
- Ensure coir logs are secured with waratahs and/or rope and pegs so that logs make firm contact with ground level, preventing water from flowing underneath.

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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project
Description: Erosion and Sediment Control Schematics

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 026	2

REFUELING





- Locate the hardstand as far as practicably possible from waterways and concentrated flows.
- Ensure spill kit is located nearby.

CONCRETE WASHOUT PIT



- The concrete wash out pit consists of a plastic-lined bunded pit constructed with fill or straw bales.
- After concrete washout any water shall be left to evaporate.
- Cured concrete is to be disposed of within the plastic sheet to a licensed facility.

SPILL KITS







- Spill kits should be located in the laydown area.
- Spill kits should be located in all of the plant on site.

WASTE





- Where possible, waste shall be segregated into labelled bins.
- Wastes on site will be suitably contained and prevented from escaping off site. This may include covering skip bins during high winds.
- Waste storage is not permitted in or near drainage paths.
- Waste will be removed from site when the bin is full.

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Project: Remarkables Ski Area Upgrades and Doolans Expansion Project
Description: Erosion and Sediment Control Schematics

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	2/11/2026	ESCP – 027	2

APPENDIX 3 ENVIRONMENTAL SITE INDUCTION HANDOUT

ENVIRONMENTAL SITE INDUCTION HANDOUT

Key Roles and Responsibilities

Roles	Responsibilities
Project Manager	The Project Manager is responsible for the effective implementation of the CEMP and has overall responsibility for the environmental performance of the project. Duties include: • Ensuring adequate resources are in place to implement the CEMP. • Ensuring all staff and sub-contractors operate within the guidelines of the CEMP. • Ensuring that a CEMP is prepared, and that environmental standards, processes and procedures meet relevant resource consent conditions. • Overseeing the successful implementation, monitoring and review of the CEMP. • Ensuring that inspections are carried out in accordance with the relevant CEMP. • Restricting or stopping any activity that has the potential to or has caused adverse environmental effects. • Providing notification and reporting of Environmental Incidents to Council and other environmental reports as required by The Guidelines. • Delegating authority of the above responsibilities.
Environmental Representative	The Environmental Representative supports the Project Manager in the day-to-day implementation of the CEMP. Duties include: • Ensuring the installation of environmental controls as per the CEMP. • Undertaking environmental site inspections. • Overseeing the maintenance and improvement of defective environmental controls. • Providing environmental inductions to all staff and sub-contractors. • Assisting the project leadership in attending to Environmental Incidents and Complaints. The Environmental Representative shall be familiar with environmental risks associated with the project, the CEMP and best practice erosion and sediment control principles and practices.
All staff and sub-contractors	All staff and sub-contractors have a responsibility to undertake all activities in accordance with the requirements of this CEMP. This includes reporting any activity that has the potential to or has resulted in an Environmental Incident to the Project Manager or Environmental Representative.

ENVIRONMENTAL RECEPTORS

Any work that disturbs the controls outlined on the ESCP must be reinstated before moving to the next task.

Environmentally sensitive receptors: Staff members working on the site, overland flow paths, wetlands, surrounding flora and fauna, and recreational users of the surrounding DOC land

ASSOCIATED RESOURCE CONSENTS

All resource consent conditions of TBC (issued by QLDC, CODC, & ORC) are important to comply with in order to avoid or mitigate adverse environmental effects.

The site CEMP has been prepared in response to all environmental-related conditions of consent and therefore provides directions for how compliance with these conditions will be achieved. Provided that the CEMP is followed, the project will at the same time comply with all conditions of consent.

SEQUENCING

The sequencing of works is a key component to ensure that the environmental effects of construction are appropriately managed. It is imperative that the sequencing outlined in **Section 2.0** of the CEMP is followed so that the site is stabilised in the most efficient manner.

All staff should be familiar with this sequence. Any potential changes to that sequence need to be approved by the Project Manager, which will be discussed first with the Environmental Consultant.

KEY ENVIRONMENTAL MANAGEMENT MEASURES IN CEMP

Erosion and Sediment Control (Section 4.0 of CEMP)

- Direction provided in Erosion and Sediment Control Plan (ESCP) in **Appendix 1** Erosion and Sediment Control Plan of the CEMP.
- Separation of clean and dirty water is the most important principle to ensure that the contributing catchment of dirty water that needs to be treated is as small as possible.
- Progressive stabilisation (revegetation) of disturbed areas will ensure that the extent and duration of exposed soil is minimised. Keep it covered!
- All controls to be checked immediately before storm events to ensure they are in good-working order.
- Erosion and sediment control devices to remain in place until site is stabilised (defined as 80% vegetative cover).

Water Quality Management (Section 5.0 of CEMP)

- Any water caught in the sediment devices to be re-used in dust suppression where possible and if required.
- Complete water quality monitoring and sampling as per resource consent requirements.
- Any observations of dirty water running offsite to be reported directly to the Project Manager.

Dust Management (Section 6.0 of CEMP)

- Dust suppression should occur on any exposed soil on unsealed roads.
- Avoid all unnecessary vegetation clearing that exposes soil and work should be conducted in stages as this can increase the impact from dust in the event of strong winds.
- During high wind events and dust suppression is becoming difficult works must cease until more favourable weather conditions.
- Constant vigilance should be maintained onsite to ensure that dust is appropriately managed and weekly monitoring should be completed to ensure that management measures are effective.

Noise and Vibration Management (Section 7.0 of CEMP)

- Noise producing works only be undertaken during the hours of 0730-1800 from Monday-Saturday and no works are to be undertaken on Sundays or public holidays.
- Particularly noisy work should be completed during the middle of the day during business hours.
- Noise dampening should occur when possible.
- Weekly site inspections should be undertaken by the Environmental Representative to ensure the strategies in place are effective.

Cultural Heritage Management (Section 8.0 of CEMP)

- If any artefacts are found, works must stop within 20 m of the discovery, and the site manager is to be notified immediately.
- The site manager must then secure the area and notify the Heritage New Zealand Regional Archaeologist, who will advise when works can begin again.

Vegetation Management (Section 9.0 of CEMP)

- Maintain vegetated surfaces as far as reasonably possible.
- Maintain protected or indigenous vegetation.
- Complete all landscaping and / or ecological restoration in accordance with approved plans.

Chemicals and Fuel Management (Section 10.0 of CEMP)

- Chemicals and fuels are stored and used so not to cause contamination of works areas and surrounding environment.

Waste Management (Section 11.0 of CEMP)

- Waste management on site will ensure waste is stored safely and in an organised manner until recycling, reuse or disposal.

Contaminated Land Management (Section 12.0 of CEMP)

- Prevent spread of contamination.
- Engage the Environmental Consultant (SQEP) to ensure that the site can be managed in accordance with statuary requirements (i.e., National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health).

ENVIRONMENTAL INCIDENTS

The procedure for managing environmental incidents is outlined in **Section 3.5** of the CEMP, however, these can be summarised as follows:

- Environmental incidents must be reported as soon as they occur, and the Project team must respond immediately to mitigate further environmental impacts.
- Investigation into the cause of the incident should be completed and a solution should be constructed to remediate the Environmental damage.
- The Project Manager must then notify the QLDC and ORC of the details of the incident within 12 hours of being made aware of the incident.

RAPID RESPONSE FOR STORM EVENTS

The procedure for rapid response to storm events is outlined in **Section 4.7** of the CEMP, however these can be summarised as follows:

- The Project Manager will observe and understand the **weather forecast** throughout the project to ensure appropriate preparation onsite.
- If a **significant storm** event is forecast all works should stop within an appropriate amount of time to inspect ESC devices and undertake any maintenance or site stabilisation required.
- The sediment controls should be in operating condition and fully functional.

  During the storm event the site should be monitored to ensure the functioning of the ESC devices and maintained if required.

When storms are forecast it is crucial that tools are downed in time for the rapid response procedure to be implemented. This will help avoid environmental incidents, potential enforcement action and site shutdown.

APPENDIX 4 ENVIRONMENTAL SITE INDUCTION REGISTER

ENVIRONMENTAL SITE INDUCTION REGISTER

Name	Organisation	Date Inducted	Induction Delivered by	Signature

APPENDIX 5 WEEKLY ENVIRONMENTAL SITE INSPECTION FORM

WEEKLY ENVIRONMENTAL SITE INSPECTION FORM

Environmental Representative: Date:

Item	Yes	No	Comment
General			
Is the CEMP available onsite?	☐	☐	
Have any environmental incidents occurred during the week? If so, provide details	☐	☐	*If yes, complete environmental incident report.
Complete description of weather for the upcoming week – circle applicable			

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
						

Are there any rain events forecasted for the coming week?	☐	☐	
Have pre rain event inspections been completed?	☐	☐	
Have post rain event inspections been completed?	☐	☐	
Water Quality			
Is water quality monitoring occurring when water is flowing across the site boundaries?	☐	☐	*If yes, complete water quality monitoring form
Erosion and Sediment Control			
Are works contained within the current site boundaries?	☐	☐	
Are completed areas being progressively stabilised?	☐	☐	
Is there any new evidence of erosion?	☐	☐	
Are erosion and sediment controls installed as per the ESCP?	☐	☐	
Is dirty water entering dirty water diversion channels during rain events?	☐	☐	
Do sediment controls have over 80% capacity?	☐	☐	
Cultural Heritage			
Have any finds of cultural significance been found?	☐	☐	
Noise and Vibration			
Have any complaints been received during the week?	☐	☐	*If yes, complete Complaints Register
The condition and operation of plant and equipment, including identification of any defective or excessively noisy equipment?	☐	☐	

Is there evidence of excessive vibration, including visible ground disturbance, instability, or complaints associated with construction activities?	☐	☐	
Are there any upcoming works with the potential to generate elevated noise or vibration levels and identification of any additional management measures required?	☐	☐	
Are works only occurring within the hours of operation?	☐	☐	
What is the proximity of construction activities to sensitive ecological receptors and recreational users?	☐	☐	
Dust			
Have any complaints been received during the week?	☐	☐	*If yes, complete Complaints Register
Have completed areas been revegetated or stabilised?	☐	☐	
Are works ceasing during high winds?	☐	☐	
Are only designated access points and haul routes being used?	☐	☐	
Is the site access and surrounding roads swept clean of sediment?	☐	☐	
Vegetation			
Are vegetated surfaces being maintained as far as reasonably possible?	☐	☐	
Contaminated Soils			
Have any contaminants been uncovered during excavations?	☐	☐	
Chemicals and Fuels			
Are all hazardous substances on site stored, transported and used according to the safety data sheet requirements?	☐	☐	
Are vehicles and plant being refuelled in the refuelling bay?	☐	☐	
Is concrete washing being undertaken in the concrete wash-out pit?	☐	☐	
Is there an adequate supply of spill kits onsite? Have any used materials been replaced?	☐	☐	
Waste			
Is the site in a safe, clean and tidy state?	☐	☐	
Are wastes segregated into labelled bins with lids?	☐	☐	
Are skip bins not overfilled?	☐	☐	
Is waste removed from open drains and drainage paths?	☐	☐	

Actions resulting from this inspection must be forwarded to the Project Manager. Any actions should be recorded in the Non-Conformance Register – **Appendix 8**.

Additional Comments: Names and Signatures of inspection attendees:

APPENDIX 6 ENVIRONMENTAL INCIDENT REPORT FORM

ENVIRONMENTAL INCIDENT REPORT FORM

Project Address:	**Consent Number:**
Brief Project Description?	

Instructions- Complete this form for all environmental incident that cause contaminants (including sediment) or environmental nuisance to leave the site. Be succinct, stick to known facts and do not make assumptions. Once completed submit to the Central Otago District Council (CODC) at (03) 440 0056 and info@codc.govt.nz, Queenstown Lakes District Council at RCMonitoring@qldc.govt.nz and Otago Regional Council at pollution@orc.govt.nz and compliance@orc.govt.nz. Call the QLDC Regulatory team immediately on 03 441 0499 and ORC's Pollution Hotline on 0800 800 033 for any serious or ongoing incidents that cannot be brought under immediate control.

Date and Time	**Date:** XX/XX/XXX **Time:** XX:XX **hours**
Description? Provide a brief and factual description of what happened during the incident, include relevant details such as: • The activity being undertaken when the incident occurred • The estimated distance to nearest waterway (including stormwater and dry courses) • The estimated distance to the nearest sensitive receiver Sketches/diagrams/photos may be referenced and appended to this report to aid in the description of the incident.	
Exact Location of the incident? Include address, landmarks, features, nearest tree, etc. Maps and plans can be attached.	
Quantity or volume of material escaped or causing incident? (provide an estimate quantity)	
Who identified the incident?	Contractor ☐ Council ☐ Community ☐ Other ☐

What immediate actions/control measures were taken to rectify or contain the incident?
What initial corrective action will be taken to prevent similar incidents recurring in the near future?
Has the Queenstown Lakes District Council been notified? Yes ☐ No ☐ Will be notified ☐ **Has the Otago Regional Council been notified?** Yes ☐ No ☐ Will be notified ☐

Role of person making report: Project Manager / Site Supervisor / Environmental Representative / SQEP

Name..... Signature.....

Organisation..... Date.....

Mobile phone number.....

APPENDIX 7 ENVIRONMENTAL COMPLAINTS REGISTER

ENVIRONMENTAL COMPLAINTS REGISTER

Complaint #	Date and Time Received	Complainant details (name, address, phone number)	Details of Complaint	Investigation and Findings	Outcome	Close out Date

APPENDIX 8 ENVIRONMENTAL NON-CONFORMANCE REGISTER

ENVIRONMENTAL NON-CONFORMANCE REGISTER

Ref Number	Date Observed	Found via (e.g., inspection, monitoring, complaint?)	Details of Non-conformance	Corrective Actions	Updated by	Close out Date

APPENDIX 9 WATER QUALITY MONITORING RESULTS FORM

WATER QUALITY MONITORING PLAN

Objectives and Sampling Scope

The primary objectives of this Water Quality Monitoring Plan are to:

- Demonstrate compliance with consented water quality limits (e.g., turbidity, TSS, pH).
- Establish baseline water quality of receiving environment (if required).
- Monitor discharges during earthworks to assess potential impacts on receiving environments.
- Inform adaptive management and corrective actions where needed.

Spatial Boundaries:

- **Upstream (Background) Site:** To establish baseline water quality.
- **Discharge Point(s):** At locations where site runoff enters the receiving environment.
- **Downstream Site(s):** To assess site impacts.

Frequency: When there is a discharge of water across the site boundary or from a sediment retention pond or decanting earth bund, and where a Significant Rain Event occurs through the night, monitoring must be undertaken the following morning by 8am.

Monitoring Trigger	Frequency
Rainfall Events (20 mm within a 12-hour period or a rain event that can generate overland flow, noting that this varies seasonally	During or immediately post-event
Active Discharges	During each discharge
Routine Consent Monitoring (if required)	E.g., monthly or as specified
Complaint / Incident	Within 24 hours

Sampling Design What to Sample:

Parameter	Method	Purpose
Turbidity	Field Meter (MTU/FNU)	Primary sediment indicator
Visual clarity	Clarity tube/secchi disk	Primary sediment indicator
Total Suspended Solids (TSS)	Laboratory analysis (mg/L)	E.g., monthly or as specified
pH	pH strips or pH meter	Within 24 hours
Optional (e.g. D.O,Metals, Hydrocarbons)	Lab analysis	If required by consented or if observed visually during inspections

Where to Sample

- Where water is flowing across the site boundaries.

How to Sample

Refer to the overview in the proceeding pages. If in doubt, contact your site SQEP or local authority.

Reporting

- Monitoring results will be compiled into event-based inspection sheet (refer to table below) and compiled in the monthly reports (as required).
- Any exceedances will trigger immediate review, corrective action, and notification to [QLDC, ORC, CODC].
- Final summary reporting at project completion or as per resource consent requirements.

WATER QUALITY SAMPLING

Select a Sampling Location		
Sampling a discharge Collect sample where water crosses the site boundary or enters a sensitive receptor from a retention device. Always photograph the location you sample from.		
Sampling a waterway Collect sample from the centre of the flow and the top third of the water column where possible.		
Sampling a from a Sediment Retention Device Collect sample from the discharge location, this is either near the decanting arms, spillway, hose or the outlet pipe.		

Collect a Water Sample

Taking a Water Sample

- Label container with site name, sampling location, date and time taken.
- Fill the container with water from the surface of your sampling location.

If you wade into the water to collect the sample, always collect the sample 'upstream' of where you're standing to avoid contamination by disturbed sediment.



Measure and Record Turbidity, Clarity and pH

Measuring Turbidity using a Turbidity meter

Fill the turbidity pottle with the sampled water. Wipe away any moisture on the outside of the pottle and insert it into the meter. Turn the meter on and once the standby value appears press read. Record the turbidity.

Contact Enviroscope for turbidity monitoring if required.



Measuring Clarity using a field-testing Secchi disk

Lower the secchi disc into the water sample until you can no longer see the disc. Then lift the secchi disc back up until the disc is just visible. Record the number where the water level sits.



Measuring pH using a pH meter

Submerge the probe of the pH meter into the water sample. Keep the probe in the water until the value on the meter is fixed. Record the pH value.

Measuring pH using pH strips

Dip a pH strip into the water sample for 1 second. Compare with the universal indicator paper and wat 5 seconds. Record the pH value.



WATER QUALITY SAMPLING RESULTS

Date and time	Sampling Location	pH	Clarity (mm)	Turbidity (NTU)	TSS (mg/L) Lab tested	Hydrocarbons / Waste?	Observations*

Observations: Note weather conditions at the time of sampling, have baseline water quality parameters been exceeded? If so, additional testing may be required, and performance standards may have been exceeded. Notify Project Manager and SQEP.

APPENDIX 10 ARCHAEOLOGICAL DISCOVERY PROTOCOL

HERITAGE NEW ZEALAND
POUHERE TAONGA

Heritage New Zealand Pouhere Taonga Archaeological Discovery Protocol

Under the Heritage New Zealand Pouhere Taonga Act (2014) an archaeological site is defined as any place in New Zealand that was associated with human activity that occurred before 1900 and provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand. For pre-contact Maori sites this evidence may be in the form of bones, shells, charcoal, stones etc. In later sites of European/Chinese origin, artefacts such as bottle glass, crockery etc. may be found, or evidence of old foundations, wells, drains or similar structures. Burials/koiwi tangata may be found from any historic period.

In the event that an unidentified archaeological site is located during works, the following applies;

1. Work shall cease immediately at that place and within 20m around the site.
2. The contractor must shut down all machinery, secure the area, and advise the Site Manager.
3. The Site Manager shall secure the site and notify the Heritage New Zealand Regional Archaeologist. Further assessment by an archaeologist may be required.
4. If the site is of Maori origin, the Project Manager shall notify the Heritage New Zealand Regional Archaeologist and the appropriate iwi groups or kaitiaki representative of the discovery and ensure site access to enable appropriate cultural procedures and tikanga to be undertaken, as long as all statutory requirements under legislation are met (Heritage New Zealand Pouhere Taonga Act, Protected Objects Act).
5. If human remains (koiwi tangata) are uncovered the Project Manager shall advise the Heritage New Zealand Regional Archaeologist, NZ Police and the appropriate iwi groups or kaitiaki representative and the above process under 4 shall apply. Remains are not to be moved until such time as iwi and Heritage New Zealand have responded.
6. Works affecting the archaeological site and any human remains (koiwi tangata) shall not resume until Heritage New Zealand gives written approval for work to continue. Further assessment by an archaeologist may be required.
7. Where iwi so request, any information recorded as the result of the find such as a description of location and content, is to be provided for their records.
8. Heritage New Zealand will determine if an archaeological authority under the Heritage New Zealand Pouhere Taonga Act 2014 is required for works to continue.

It is an offence under S87 of the *Heritage New Zealand Pouhere Taonga Act 2014* to modify or destroy an archaeological site without an authority from Heritage New Zealand irrespective of whether the works are permitted or a consent has been issued under the Resource Management Act. Heritage New Zealand Regional archaeologist contact details:

Regional Archaeologist Otago/Southland
Heritage New Zealand PO Box 5467
Dunedin
Ph. +64 3 470 2364, mobile 027 240 8715
Fax. +64 3 4773893
mschmidt@heritage.org.nz

In the event that the archaeological site is of Māori origin, the Project Manager shall notify the Heritage New Zealand Regional Archaeologist and Kāi Tahu rūnaka in Otago, via Aukaha (on behalf of mana whenua), and ensure site access is provided to enable appropriate cultural procedures and tikanga to be undertaken, provided all statutory requirements under the Heritage New Zealand Pouhere Taonga Act 2014 and Protected Objects Act 1975 are met.

Aukaha (Mana Whenua Representative Organisation)
Level 2, 266 Hanover Street
Dunedin 9016
PO Box 446, Dunedin 9054
Phone: (03) 477 0071
Email: admin@aukaha.co.nz or info@aukaha.co.nz

APPENDIX 11 ALPINE WORKS AND REHABILITATION PROTOCOL

A PROTOCOL FOR THE REHABILITATION OF NATURAL ALPINE ENVIRONMENTS FOLLOWING SKI AREA DEVELOPMENT

Between

DEPARTMENT OF CONSERVATION and NZSKI LTD.

1. Introduction

The protocol sets out practical means of achieving a high standard of environmental rehabilitation during and following development works at either Coronet Peak or The Remarkables Ski Areas. NZSki will require its staff and contractors to act in accordance with the protocol.

The scope includes any work that results in any environmental disturbance including (not limited to) the indigenous vegetation, native fauna, soil, wetlands, streams, lakes and natural landforms of the ski area. Works may only be exempted from the protocol with prior agreement from DOC.

DOC staff will conduct regular monitoring to observe progress and assess effectiveness of the measures. This will include providing advice, troubleshooting unexpected problems, adjusting management approaches and, if necessary, require corrective action to ensure the objectives of the protocol are met.

2. Objectives of the protocol

To ensure that during the course of ski area developments there is a minimum of interference with the natural environment, and avoidance of disturbance to areas outside approved work areas;

To ensure that any indigenous vegetation disturbed by development is restored as near as possible to its original density and diversity, within the shortest practical timeframe;

To minimise the erosion and sedimentation of exposed soils (and soil among transplanted vegetation), optimising the longer term regeneration of indigenous vegetation through natural dispersal;

To otherwise replicate a high standard of natural appearance to any ground not occupied by permanent structures or required to regularly bear mechanised traffic; and

To establish a clear understanding between the staff and contractors of both the Department of Conservation (DOC) and NZSki on the required standards for:

- Work site control measures;
- Removal and replacement of vegetation and top soil;
- Management of soil erosion and sediment control;
- Ongoing monitoring and maintenance of rehabilitated areas;
- Contracted monitoring; and
- DOC’s ability to suspend works.

3. Work Site control measures:

a. Only machinery operators with a demonstrated ability in low impact earthworks and vegetation rehabilitation in an alpine setting are to undertake construction;

b. Prior to works NZSki shall ensure that a briefing occurs between its staff, contractors and DOC to ensure a common understanding of how works will be conducted;

c. NZSki must minimise disturbing non target areas when accessing and working within development sites. If machinery is required to move off existing tracks the least damaging route must be used and any disturbed vegetation must be rehabilitated when works are completed;

d. The risk of soil erosion over denuded areas must be carefully managed until rehabilitation works are undertaken and soil is no longer exposed;

e. Works must be conducted to ensure no contaminants are discharged onto the land or into watercourses (directly or indirectly). All vehicles, machinery, equipment and aggregate material must be cleaned of weeds, seeds and soils before entering the works area. Refuelling must be undertaken on hard surfaces away from watercourses and vegetation.

f. Sensitive natural features including streams, wetlands, tarns, lakes and rare habitats are not to be disturbed, either for development works or access to development sites. Where disturbance is unavoidable prior approval must be sought and additional environmental protection measures may be required;

g. All development and rehabilitation works impacting the natural environment must be completed by the 1st May. Any unfinished work must be stabilised to prevent soil erosion until works can recommence.

4. Removal and replacement of vegetation and top soil:

a. Vegetation must be carefully removed in a manner to minimise damage to both the above ground plant and to protect as much soil material around the roots as possible;

b. The remaining topsoil must also be removed before excavation of rock material may commence. If not used quickly with the replanting of vegetation this topsoil may be stockpiled for later use;

c. All vegetation removed should be quickly replanted into areas where works have already been completed. This will usually occur through progressive reinstatement on completed formations behind the main work “face”;

d. Priority for replanting shall be given to areas prone to erosion;

e. Individual plants or clumps of vegetated material (“sod”) shall be reinstated by careful use of a digger bucket. Spacing should be no greater than 1 metre, unless directed otherwise by DOC.

f. Final positioning of transplanted vegetation and sods should be conducted by hand tools, with top soil packed around each plant or sod to maximise survivorship and to achieve a result that closely resembles the surrounding natural areas;

g. When transplanted plants and sods are insufficient to cover the disturbed area additional vegetation may be sourced through splitting indigenous vegetation from adjacent areas. This should only be done where there is sufficient plant and humic material to allow survival of both ‘parent’ and ‘split’ plants.

h. Nursery reared plants (usually tussocks) may also be used to supplement transplanted vegetation and sods. Only locally sourced seeds may be used to grow plants for the ski area. Nursery reared plants are susceptible to rapid die off and browsing and must be handled carefully as follows:

- Fertiliser is to be placed in the root well prior to planting;
- Plants must be well bedded to lessen risk of uprooting by feral animals; and
- Plants may be treated with suitable chemicals to deter browsing by feral animals.

i. Locally sourced seed of appropriate species may be broadcast to promote vegetation growth between transplanted vegetation and sods. Exotic seeds may be spread only with prior approval;

j. Special care must be taken when replanting on steep slopes between 30 and 45 degrees:

- Plants should be transplanted quickly, steep slopes require plants to be in the healthiest possible condition;
- Indented troughs or depressions should be formed to create "bedding" for the tussocks or sods to be transplanted. Replanting should not occur on sheer surfaces;
- Replanting should be as close together as practical, leaving little exposed ground;
- Large heavy plants and sods should be staked for support where possible;
- Steep slopes should be closely monitored and any plants or sods released from the slope quickly retrieved, split into smaller, lighter clumps and replanted back into the slope as described above;
- Consideration should be provided to planting small nursery reared plants where possible;
- Attempts at replanting vegetation on slopes steeper than 45 degrees should only proceed with prior approval;

k. The vegetation removed at one site may be used at another development site within the ski area only with prior approval;

l. If no areas are available for a quick reinstatement, vegetation may be temporarily stored in designated areas with prior agreement;

- All handling of vegetation for longer term storage must be done with great care to minimise cumulative damage to plants;
- Vegetation may only be stockpiled up to one metre high to avoid die off resulting from smothering and crushing; and
- All vegetation temporarily stored must be watered when protracted dry conditions may impact on survivorship.

m. If NZSki expects to have a surplus of vegetation and/or topsoil at the end of works, this must be replanted /spread over other areas of rehabilitation, under direction from DOC.

n. Any surplus rock material must not be stockpiled and/or spread over nearby terrain without prior approval.

o. NZSki will actively eradicate any noxious weeds from all development and rehabilitation areas; and

p. No rock landscaping may be used as a substitute for vegetation unless by prior agreement.

5. Management of soil erosion and sediment control

a. The surface of vehicle tracks, formed ski trails and any other disturbed ground without a cover of indigenous vegetation will be managed to improve water infiltration, minimise rilling and sheet erosion, reduce suspension of sediment and provide micro sites for wind borne seed to settle. Control measures include;

- shaping / crowning the surface;
- applying an appropriate gravel surface in problem areas;
- forming of earth, rock or vegetation bunds;
- Ripping or roughening soils perpendicular to the slope angle; and
- Constructing water tables/swale drains to intercept and divert surface flows.

b. Where the slope angle exceeds 30 degrees natural features such as rocks could be incorporated into the slope where this lends to the stability of the site; this would require prior approval from DOC and potentially the support of geotechnical experts. This solution would be considered on a site by site basis.

c. Water tables/swales must have a catchment area no greater than 2,000$m^{2.}$ Ski trails must have functioning swales no less than 60m apart. All water tables/swales must be clear of sediment and able to convey water.

d. Water tables and swales must lead to an appropriately designed and armoured settlement pond to capture sediment so only clear water disperses into the surrounding landscape.

- These ponds must be large enough to 'settle' the flow and allow sediment to be deposited, particularly from heavy rainfall events. Precise dimensions will depend on the area and erosion potential of catchment above, however, these may be graduated areas 1m wide x 2m long x 1m deep. They should be armoured with rocks or surrounded by soil mounds and tussocks or geotextile materials.
- Sediment captured by settlement ponds are to be redistributed to assist re-vegetation of disturbed areas, whether previous or planned earthworks e.g. used to fill gaps between transplanted tussocks or to improve the mineral soil content when planting nursery tussocks.
- Settlement ponds must be maintained such that they provide a means of monitoring the effectiveness of control measures thereby assist adjusting management approaches to reduce the potential for recurrent erosion.

e. To protect wetlands and wetland vegetation from sediment no surface water carrying sediment must be allowed to run into wetland areas. Settlement ponds must not exit onto wetland areas. Water tables and swales must be designed to maintain the hydrological integrity of adjacent seepages and wetlands.

f. Areas requiring erosion control measures are to be prioritised based on the following criteria:

- Vulnerability to erosion (e.g. slopes > 20 degrees, unconsolidated soils, disturbed ground adjacent to compacted soils)
- Saturated soils on cut faces where seepages have been intercepted,
- Remediation of slips or slumped land and stabilisation of land to prevent further or repeated slope failures.
- Settlement areas that require armouring or treatment in order to filter water,
- Stabilisation works required to facilitate revegetation.

g. Areas identified for erosion control and soil conservation work may vary from year to year as revegetation occurs and slope and soil stability is achieved. Areas prioritised for erosion control in the 2015 – 2016 works programme are outlined in **Attachment A** below.

h. Significant developments will have a soil conservation and erosion control plan in place prior to the commencement of works. This plan will demonstrate how the objectives of this protocol will be achieved.

6. Ongoing monitoring and maintenance of the rehabilitated area

a. The purpose of the monitoring is to assess the progress of rehabilitation and advise NZSki how to prevent or minimise risks to re-growth becoming self sustaining;

b. All development and rehabilitation works will be monitored at least once prior to the commencement of work and again at completion of works. Interim monitoring may be required, depending on the nature of work. Following completion, regular monitoring will continue until DOC resolves, at its sole discretion, that the rehabilitation of the natural environment can progress unaided;

c. Additional monitoring of erosion and sediment control measures will be made during or following significant periods of rainfall.

d. Where monitoring establishes significant risks to rehabilitation, DOC will require NZSki to take any reasonable steps to rectify the situation and return the area to its desired condition. Any additional work required will be carried out at the cost of NZSki;

e. In the event that an area is not rehabilitated following works, monitoring will continue until rehabilitation works have begun. Attention will be paid to preventing erosion during any lay period;

f. DOC should reserve the right to recover the actual and reasonable costs of monitoring work.

7. Contracted monitoring:

DOC may contract monitoring to an external person/s. This approach not only provides time savings, but can also source specialist expertise on how to rehabilitate the sensitive alpine vegetation. This expertise is also vital to advise on appropriate remedial actions for any issues, and to provide expert input to planning processes. Contracted monitoring will take place as follows;

a. The contractor is generally tasked to monitor the implementation of this protocol during any ski area development work that disturbs the natural environment;

b. The monitor is to resolve any concerns of a routine nature directly with NZSki. Issues should be referred to DOC when problems are recurrent, significant in scale, unconventional or if a mutual agreement cannot be reached;

c. To advise both DOC and NZSki whenever their action (or inaction) may present a problem for ski area environment, whether related to a specific development or any other activity;

d. The monitor is to immediately advise DOC and NZSki if unauthorised works may be occurring, of significant risks to the natural environment that warrant suspension of works, and of any concerns with geotechnical hazards and/or public safety;

e. Monitoring visits are to be scheduled in consultation with NZSki and DOC at a frequency of no more than once a week and no less than three times a summer (depending on nature of works over summer);

f. If agreement on scheduling cannot be reached, DOC will make a final decision and notify NZSKi of when monitoring is to occur;

g. A brief written report of each monitoring visit is to be forwarded to DoC and NZSki in a timely manner. Reports should take a broad approach to assess overall performance, record agreements reached on site and highlight unresolved issues. Reports should take advantage of photo monitoring where possible;

h. The time required for visits (and reports) are to be appropriate to the works in progress. The monitor is to notify and seek agreement from NZSki on where the combined time required for site visits and reporting is likely to exceed 5 hours;

i. Support tasks supplementary to monitoring and reporting (eg research and meetings) are to be agreed with DOC and NZSki prior work occurring;

j. The time spent on monitoring visits, reporting and support work will be billed directly to NZSki at a rate equivalent to DOC's current hourly rate for field staff, plus gst. Disbursements are to be billed separately.

k. All monitoring reports and discussions between the contractor, NZSki and DOC will be kept confidential.

8. Right to suspend works

a. DOC will, at its sole discretion, suspend any development work or activity should contracted monitoring, public feedback or DOCs own observations determine there are unexpected and/or significant impacts on the natural environment that are not being adequately rehabilitated.

b. Any suspension shall remain in place until a response plan is agreed with NZSki.