Construction Environmental Management Plan

Remarkables Ski Area Upgrades and Doolans Expansion Project

May 2026

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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 det ct from the opinions expressed in this report.

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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 Distri Council (QLDC) Central Otago District Cou cil (CO C)	(03) 441 0499 rcmonitoring@qldc.govt.nz (03) 440 0056 info@codc.govt.nz
Internal contacts	Project anager	[redacted]
Internal contacts	Environ ntal Con ltant	[redacted]
Internal contacts	Ecology and Herpetology	[redacted]

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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 Con rol Assessment Report (ESCAR), prepared by Enviroscope, which provides the:

- Overarching erosion and sediment control principles and procedu s relev t to the Project.
- Suitable erosion and sediment control measures to minimise e sion and man ge sediment-laden runoff.
- An assessment of the effectiveness of those erosion and se ment control (ESC) p nciples and procedures in minimising potential sediment discharges to an acceptab level.
- Assessment of the receiving environment.

This document aligns with the objectives and policies o h Otago Regiona Council (ORC) Land and Water Regional Plan, and with the objectives and policies of Chapter 25 – *E rthwor* f the Queenstown Lakes District Council (QLDC) Proposed District Plan and associated Central Otago Dis rict C uncil (ODC) District Plan. This CEMP has been prepared in accordance with the QLDC Guid for Envir mental Management Plans (June 2019). This document has been prepared in accordance with th Ministry r the Env onment (MfE), *National works in waterways guideline - best practice guide for civil infrastructur works and maintenan e*.

This CEMP is prepared with reference to the *P ocol for the Rehabilitation of Natural Alpine Environments Following Ski Area Development betwe Depar ent of C servation and NZ Ski Ltd* (DOC Protocol). This document has been specifically designed for he mountaino alpine vironment and has informed environmental management for earthworks at the RSA sin 2015.

This CEMP serves as the overa hing envir nmental management framework for the expansion, supported by several sub-documents that address spec c wo k areas. The purpose of this CEMP is to be an effective and practical reference manual for construction personnel th t 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.

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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 uidelines, based on the preliminary design information available at the time of the consent application. An up ted CEMP and associated Erosion and Sediment Control Plans (ESCPs) will be submitted to the respective regulatory thorities prior to construction commencement, via the resource consent conditions.

1.3 Associated Resource Consents and Permits

This CEMP has been prepared in accordance with indu y best practice accompany the Fast Track application. Provided the activity is undertaken in accordance with th CEM it will comp with the relevant conditions set within the associated resource consents. The resource consen assoc te ith this project will be provided in **Table 3:** Associated Resource Consents & Applicable Documents

Table 3: Associated Resource Consen & Applicable Docu ents

Consent Number	Authority	Activit Descriptio	Date of Decision Issue	Date of Decision Expiry	Consent Status
-	DOC	A Protocol for e Rehabilitation of Natural Alpine Environ ents Following Ski Area velopment etween Department of Con rvation nd NZSki LTD.	-	-	-
TBC	FTAA	-	TBC	TBC	TBC

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2.0 CONSTRUCTION SEQUENCING

2.1 Overview

This methodology has been prepared following best practice, based on the preliminary designs available at the time of the fast-track consent application. 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 const ints 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 ef ed seasonal windows that reflect:

- Safe working conditions.
- Ground accessibility.
- Environmental protection requireme s
- Operational ski field c tr

Construction programmi has been develo ed on a conservative and realistic basis, recognising that weather-related delays are an inherent featur of alpine cons uction. Allowance will be made for temporary suspension of works during adverse conditions, with constr tion activ ies resuming when conditions permit.

Construction activities are typically oncentrated 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.

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- 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 high-level 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 Year 1

- 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 Constru on P forms
- Ratus Burn Gondola Towers
- Doolans Access and Services
- Rastus Burn Wastewater Investigations

Construction Season Year 2

- 33KV Power Upgrade
- Superstructure Base Building and Gondola
- Midstation Earthworks and Foundations
- Doolans Gondola Towers
- Doolans Access and Services (C ntinued)
- Reservoir and Pump Shed
- Doolans Ski Trails and Snowmaking I structure
- Doolans Base Area E hwor nd Wate Storage Tanks

Construction Season Yea 3

- Lower Carpark Expan ns
- Superstructure Base Buil ng an Gondola (Continued)
- Midstation Gondola and Pat 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 Year 4

- State Highway 6 Intersection
- Doolans Cabin Food and Beverage
- Snow Play Zone, Conveyor and Snowmaking Infrastructure

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- 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 re ch design levels. The process of uplifting and placement of uplifted vegetation will occur over a short period of tim Plant survival will depend on careful operation of the digger operator to ensure that much of the root structure affected plants and attached soil remains intact when being uplifted. Individual plants are not to be stacked n top of ach other.

- Ensure the current ESCP, CEMP and associated resource consents are availa le onsite and/or available electronically.
- Complete site induction with Environmental Consultant and olo st.
- Establish site laydown and hardstand. Ensure spill kits are onsi stocked, and ready for deployment in case of a spill.
- All plant and machinery must be cleaned and in pected p ior to arriv ng onsite to ensure it is free of soil or organic matter that could contain seeds or exotic p ant s cies t may contaminate the site.
- The surveyor is to mark out the earthw s extents he applicable stage of works.
- The site area is to be surveyed by suitably ualified e ologist or ornithologist for nesting avifauna.
- Avoid tracking plant and mach ery and ockpiling aterial within proximity of waterbodies and critical source areas.
- When tracking plant, do refully wi in the works zone extents.
- Established tracks ust be use wherever ey are available.
- Within tempora access areas, al machinery is to utilise a single defined track, with minimal back-and-forth movement, to redu ground distur ance.

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

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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 m inga kai species.
- Create safe habitats, especially for threatened, at-risk, taonga and mah nga kai species.
- Avoid, as far as practicable, effects on water quality and sediment clud g 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 tablishing pest pl ts or animals in freshwater habitats (including riparian margins).
- Avoid, as far as practicable, impacts on important habitats f the li cycle and ecology of freshwater fauna.
- Avoid, as far as practicable, disturbing archaeological or wāhi ta u (sacred) sites.

Management Measures

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

- Apply MfE (2021) in-water works uidance, nimising he active works footprint.
- Prior to construction, the bound ies of w lands with 10 m of the planned road should be marked out to ensure that all contractors are awar f he locatio f wetlands and to ensure they are not damaged.
- Soil binding polymers a o be used in direct proximity to water bodies.
- Dewater works are s using shor iversion nd pump sediment laden water to appropriate control devices.
- Stabilise disturb d streambanks w h geotextile matting and eco sourced native tussock plantings.
- Include cement use anagement p cedures in the CEMP.
- Biosecurity measures e in plac after the last Rastus Burn stream Crossing to ensure didymo is not transferred to Doolans Ba tri utary 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.

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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 prom ly and disposed of appropriately.
- Stockpiled material remains stabilised and isolated from flowing w ter.
- No loose material present that could mobilise during rainfall.
- Document inspections and maintenance in accordance with the inspection requ ments outlined in **Section 3.0** of the CEMP.

Waterbody Diversion - Contingency Measures

In the event of high rainfall or snow melt during the cour e o nstruction, o 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 mat ng, and ck availa le on site.
- Pipe-drop system remains capa e of safely conveying nticipated peak flows.
- Temporary works remain secured p or to ainf site shutdown.
- Any required stabilisation completed b fore leaving the site unattended.
- Additional geotextil erosion m ting will kept on site at all times.
- Extended workin hours (12 – 14 our days) will be considered where it is demonstrated that a significant programme or env nmental bene can be achieved.
- All existing and additi al erosion a d sediment control measures will be inspected, secured and maintained where required, should a ignific nt rainfall event be imminent.
- The wetted bed will be fully bilised 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.

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- 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 cabl s and sn wmaking infrastructure.

- Trench alignment should only be extended as far as it can b backfilled and rest ilised within 24-hours of a forecast significant rainfall event.
- Carefully strip topsoil and vegetation, maintain the plant roo tru ure and place it upslope of the trenching alignment.
- Dig the trench alignment and place the subsoil away from the veget on and topsoil.
- Undertake the required trenching within the earthworks su atchments and backfill as per the methodology above.
- Place snow machines and connect t ces.
- All existing and stockpiled vege tion, top oil, and r cks are to be immediately placed over the disturbed trench alignment to stabilise.

Service Trench Excavations – C gency M sures

Trench alignment shoul only extend as r as it can be backfilled and restabilised within 24 hours of a forecast significant rainfall event. H wever, if a trenc remains open, the following methodology should be followed.

- Place coconut coir matt g over th open trench. Ensure it is pinned/staked securely into the ground.
- Place coconut coir logs wit n he 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.

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- 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 roo d rootlets remain intact. Vegetation is to be stored upright until reinstatement is possible. Carefully up t rock ensuring they are not crushed or fragmented. Any relocated rocks must mimic their original plac ment and ble d with the surrounding natural terrain.
- In workable sections, undertake cut-and-fill earthworks f the mat ial to shape the trail to the required alignment and gradient. Sub-stages have been outlined on t cor sponding ESCP sheets to encourage the progressive installation of access routes and the installation of sion and sediment controls.
- Progressively install erosion and sediment con o in accordanc with the corresponding ESCP drawings. These controls generally comprise of temporary measu during construction, with some transitioning to permanent installations. Measures include the fol wing
    - **Temporary measures:** the i llation of diment sumps at the outlet of the armoured swale alignments, drop-out pits pipe-dro structur s, level spreaders, temporary culverts and coconut coir logs.
    - **Temporary into permanen mea ure** k armouring of culvert inlets and outlets, splash crossings and trafficable swales.
- Reinstatement is to ccur on aped b ers (upslope and downslope of the road cut) and in any areas requiring rehabili ation along the a cess rou e.

2.4.7 Ski Trail Construction

- For ski trails works withi a w terbody, wetland, or within a 10 m buffer of these features, refer to the methodology outlined above n **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.

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- 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 con ervative approach.
- Discharge onto stable ground or into pre-established clean water diver on systems.
- Groundwater should be appropriately treated and attenuated to sure at it is not adversely affected by contaminants.
- Remain in the same catchment it is taken from, only be a no consumptive tak and only occur for the time required to carry out the trenching works for the project.
- Establish an isolated work cell using bunding, impermeable ers, o sandbags to prevent interaction with the surrounding environment.
- Any water that does not meet the discharge cri in **Table 7** is to e pumped to a portable treatment pod or tank and trucked off-site for disposal into a trade waste tem.
- Divert via turkey next, discharging onto stable, ve etate grou or a temporary lined sump with sufficient residence time.
- Pumps must be sized to match in w rates preventin overtopping or scour.
- The discharge point must be vis lly monit ed for clar y and flow stability.

2.5 Construction Season Y

The Year 1 Construction Season will invo e the majority of the earthworks required to enable the infrastructure expansion within the Rem kables Rastus rn area. The Doolans Basin Access and Services works are proposed to occur concurrently, providing ccess into t upper portion of the proposed Doolans Basin expansion area.

Sub-stage boundaries have been p vid d 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.

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- 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, Ap endix 1

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

- Carefully track plant along the existing tracks within th Remarkables Ratu Burn area to access the designated works area.
- Construct a DWDB at the downslope end of the existing hal ipe This bund is to be constructed using site won rock and vegetation and shall be maintained for the dura n of the Project. The half-pipe fill area will function as a stockpile area throughout the Pro ec Any material r maining at the end of each construction season it is to be compacted and stabilised using ite won ck or vegetation.
- Install pipe drops across excavations that intersec and w ter bo s.
- Undertake cut-and-fill earthworks in ns to form he Rastus Burn to Midstation access track.
- Progressively install trafficable ales wit n the lo points of the access track. Install drop-out pits and coconut coir logs at the outlet to he traffic ble swales o reduce water flow velocities and capture sediment. Refer to Section **2.4.5** and **Section 4 6** or deta quirements.

2.5.3 Curvey Return Trail a d Doolan 4WD Tra – ESCP-004 & 005, Appendix 1

Doolans Access and Serv es involves cut-a d-fill earthworks, retaining wall construction, access road formation, service installation, and snow aking infras ucture.

- Refer to **Section 2.4.4**, **S tion 2 4.5**, and **Section 2.4.6**.
- Carefully track plant along he 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**.

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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 Year 2

Construction Season Year 2 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 4 D track taking care to avoid damaging existing rock and vegetation as much as practicable.
- Construct the DWDB (topsoil bund) along the northernmos point of the proposed l batter. Topsoil removed from the earthwork's footprint may be repurposed to cons uct the required bunding as shown on ESCP-006, **Appendix 1.**
- Install the DWDCs and corresponding sediment sumps along th south-east earthworks footprint as shown on ESCP-006, **Appendix 1.**
- Progressively undertake cut-and-fill earthworks, ompleti works in subsections to minimise the extent of exposed ground and stockpiled material at any on im Given the characteristically high winds on the ridge line, priority, must be given to the ra d a progress e stabilisation of exposed areas, using site won rock.

2.6.6 Doolans Blue Trail and 4WD Trac – ESCP 07, Appen x 1

- Carefully track plant along the existing acks to access the designated works area.
- Progressively install t e traffic le swale culverts, sediment sumps, level spreaders, pipe-drops, permeable road and coconut oir logs as sho n on ESC -007, **Appendix 1.**
- Progressively und take cut-and-fi earthworks, completing works in subsections to minimise the extent of exposed ground and ockpiled ma rial at any one time.
- Refer to **Section 2.4.6** a **Sectio 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**.

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- 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 co 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 lowing vegetat to be reinstated as works advance and enabling the earthworks area to be stabilised ogressively.
- Once design levels are reached for the gondola base s ion and he base building area, undertake the necessary infrastructure trenching in accordance with **Section 2 4**.
- Pour base slabs and undertake vertical construction in accordan with the design plans.

Doolans Base Station and Beginner Ski Slope – Conting ncy Me es

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

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

2.7 Construction Sea on Year 3

Construction Season Year will consist the earthworks associated with the Doolans Water intake access, commissioning of the water in ke and s owmaking infrastructure, and vertical construction associated with the previous construction season's ea w ks.

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 Year 4

Bulk earthworks are proposed to be undertaken in stages. Construction Season Year 4 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 t ils associated with e Project, and necessary operational improvements, will be undertaken.

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

2.8.5 Vertical Construction

- Undertake remaining vertical co structio and infr tructure development. Ensure the appropriate best practice methodologies are util d.

Decommissioning

- Any surplus vegeta on and/or top oil shall reinstated or redistributed across areas deemed appropriate for rehabilitation to sure no indigeno s material remains unused.
- Remove erosion an ediment con ol devices once stabilisation has occurred across the entire site. This is generally defined as 80 vegetativ or rock cover.

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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 th CEMP.
- Ensuring that inspections are carried out in accordance with the rel ant EMP.
- Restricting or stopping any activity that has the potential to or has caused ad rse environmental effects.
- Providing notification and reporting of Environmental Inciden to Council and o er environmental reports as required by The Guidelines and/or conditions of resource onsent.
- Delegating authority of the above responsibilities.

3.1.2 Environmental Representative

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

- Ensuring the installation of environ ental ontrols a per the CEMP.
- Undertaking environmental site nspections
- Undertake water quality sampling uring r ll events
- Overseeing the maintenance and imp ement of defective environmental controls.
- Providing environmen al indu ons to al taff and sub-contractors.
- Assisting the proj ct leadership in ttending o Environmental Incidents and Complaints.

The Environmental Represen tive shall be miliar with environmental risks associated with the project, the CEMP and best practice erosion and se iment c ntrol 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.

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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 environmen al controls are pre t, functional, and adequate. • Identify any activities t t may cause an environm ntal incident or actual or potential environmental ects. • Identify maintenance requirem nts for implemented management measures. • Review and c d the site weath tation rainfall and wind data. All weekly inspection shall b ec d 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 ens e that er ion and sediment controls are present, functional, and adequa e for foreca rain event. • his specti inform any preventative work required and may result in the R d Response Procedure being implemented (see **Section 4.6**).
Adverse Weather Event Monitoring	Durin significant weather ent (if safe to do s	• Erosion and sediment control devices continue to function correctly and inform ny 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.

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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 eco es aware of their occurrence. The response will generally involve oversight by the Environmental Consultant and will in ve:

- Immediate cessation of the activity that caused the inciden
- 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** f the de s of any Environmental Incident within 12 hours of becoming aware of the incident. Notification will be throu h a p one call o Council monitoring staff (see Emergency Contacts in **Table 2**). The Project Team shall de an Env nmental Incident Report within ten working days of the incident occurring. The Incident Report f m is attac ed as **Ap endix 6**.

3.6 Complaints Procedure

Any complaint received will e recorded d an inve igation will be carried out. The complainant will be provided with a response acknowledg g receipt of the mplaint and outlining corrective actions to be implemented. After the investigation, any necessary orrective act ns will be carried out, and a follow-up of the original complaint is to be conducted to ensure the action implemen ed 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.

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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 doc me 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 I ident or C rective Action.
- Where directed **QLDC, CODC, and ORC** by Monitoring and E orcement or Compliance teams.

All CEMP updates will be managed through the docume ntrol table on p ge one and shall be submitted to **QLDC, CODC, and ORC** for acceptance.

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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 th Auckland Region 2016 (Auckland Council Guideline Document GD2016/005).
- QLDC Guidelines for Environmental Management Plans, June 2019 (he idelines).
- Ministry for the Environment (MfE), National works in waterways guidel e-best practice guide for civil infrastructure works and maintenance.

Due to the Alpine environment, the practical installation of GD05 des n sedim nt controls for this project won't always be feasible and would ultimately incur greater disturbance of the local and fauna. Therefore, a focus on proactive erosion control is adopted to minimise erosion occur ing in this first i tance and reduce displaced sediments. Sediment control provided for in this plan are adopted to p ide low imp t design, whilst minimising potential adverse effects on surrounding receptors.

In line with Stantec's Stormwater Concept p t (Stante 026a), existing sheet flow and natural surface water pathways have been retained wherever racticab across ails and roads within the Rastus Burn Basin and the proposed access and ski trail in the Dool s basin. his has bee achieved by avoiding the construction of swales and channels that would otherwise intercept, di rt nd conc ate flow.

Instead, existing sheet flow atterns a d ephem al watercourse pathways have been preserved to maintain their natural function. Surface ater is encourag d to disp rse and pass across roads and trails, rather than being collected in swales and channels. is approach ma tains, as closely as practicable, the original natural surface sheet flow regime and reduces alteratio o the existin hydrological processes.

GD05 ARC Guidelines

QLDC Environmental Guidelines

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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 nat ral dispersal.
- Erosion and sediment controls are integrated with construction plannin
- Construction is staged to minimise the duration and area of exposed oi pen at any one time.
- A 'treatment train' approach so that the sediment retention devices opera as efficiently and effectively as possible.
- Separation of 'clean' and 'dirty' water, with clean water to e diverted around the s e 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 r co leted areas.
- The site is monitored, and erosion and sedimen contro p tices are adjusted to maintain the required performance standard.
- Soil erosion is minimised as far as ason le and pr ctical.
- Avoidance of sediment dischar off-site an protecti of receiving environments.

4.3 Erosion Control Practices

4.3.1 Non-Structural Co trols

Non-structural approache o erosion con ol are closely linked to the fundamental principles of ESC detailed in **Section 4.2**. The key erosion c trol practic s are outlined below. These principles and concepts provide guidance for ESC throughout the planning, con ructi n and maintenance phases of a project. Construction activities are typically concentrated within the spring/summ 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.**

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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 rovides rapid rehabilitation.

4.3.2 Stabilisation Measures

Revegetation

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

Access Tracks and Ski Trails

- Road and trail surfaces will be armoured us g well-gr ded granular material to resist erosion under sheet flow conditions.
- Localised rock armouring will be pr ide at flow sition points, splash crossings, culvert outlets, and roof runoff discharge areas as quired.

Erosion Matting

- There are many dif ent types of osion matting, and the product selected should be done so under the direction of an appropr ely qualif ed person.
- Biodegradable erosion ma ing ike 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

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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 ominated access tracks as shown in the ESCP's. Protective matting, or site won rock can be utilised in areas with n dire proximity of critical source areas, as directed by the project ecologist and where they can safely be deploy d without ca ing a slipping hazard.

4.3.4 "Clean Water" Diversion Channels and Bunds

Clean water diversion channels and bunds (CWDC/CWDB) will be ed t capture and divert clean water from the undisturbed surfaces above the exposed works site. The purpose of thes 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 av id dam gi indigenous vegetation as far as reasonably possible, the vegetative layer of topsoil and root zone shoul b pushed upwards above the intended cut area to form a vegetated earth bund. Where possible, th topso will be ca fully lifted and folded over to keep roots intact so it can be folded back with plants (e.g. tussock) tact to en ble quick r establishment. The clean water diversion bunds shall be installed on contour and direct upslope heet fl the adjoining flow paths.

4.3.5 "Dirty Water" Diversio ha ls and B nds

Dirty water diversion ch nnels and bund (DWDC/DWDB) will be installed to capture and carry sediment-laden stormwater to the respect sediment con l device.

Concentrated flows in the ste alpine nvironment are generally not advantageous, and with limited areas for sediment attenuation devices, im em nting 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.

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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 termin te m waterbodies or ephemeral flow paths without causing erosion through works areas. Due to the alpine environment, is common to encounter clean water seepages or flows generated from flow paths during rainfall ev nts and/or snow nd ice melt. While care has been taken to avoid all prominent waterbodies and flow paths, the oposed earthworks wi encounter some areas of clean water that will need to be conveyed around or over the works ea safel

4.3.10 Culverts

Culverts shall be used onsite to transport 'clean' or 'di y' wa under ski t ils and access tracks. Culverts shall consist of a PVC culvert, and follow the detailed design p ovided n S tec's Stormwater Concept Report (Stantec 2026a). Geofabric and rock shall be placed at the inlet and o l to prevent scour from the higher velocity water exiting the culvert.

4.3.11 Splash Crossings

Splash crossings will be used preferentially ov culverts for water body crossings where traffic volumes and gradients allow. Splash crossings mai ain hydro gical con nuity, reduce blockage risk, and minimise long-term maintenance requirements in alpine co ditions. Splash ossings will be rock lined using site won rock and mimic the existing bed of water bodies they inters t.

4.3.12 Trafficable Swales

Trafficable swales will be installed at w 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.

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4.3.14 Stockpiles

Stockpiling of materials on site will be required for stripped topsoil/vegetation/rock stockpiled for respreading across the site, suitable cut materials stockpiled for filling other areas of the site and imported fill materials stockpiled for sequenced filling works.

Ensuring they are placed on stable ground away from critical source areas is key. Employing sediment controls downslope of stockpiles is critical, as well as active stabilisation of stockpiles that may be present for some time. Stockpile locations will be carefully considered and demonstrated in the erosion and sediment control plans.

4.4 Sediment Control Practices

4.4.1 Decanting Earth Bund

Decanting earth bunds (DEBs) are to be used to capture flows from larger earth orks extents and allow sediment to settle out of the water column. These are initially earmarked to be utilised th base of larger earthworks extents, where gradient permits their installation, like the base building, lower gondola term l 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 ex vate area o form GD05 design DEB's may not be feasible, but every effort should be made to construct them to their m imum allowable size. If, through bench testing, it is determined that chemical treatment of the soils can provide tangible nvironmental benefit, then the DEBs will be chemically treated in accordance with an approved Ch m l Treatment M nagement Plan (CTMP). Final sizing and dimensions will be provided with the CEMP and ESCP prio to con uction.

4.4.2 Sediment Sumps

Sediment sumps or small sediment basi will be e cavated a the termination of the 'dirty' water diversion channels or bunds and manage smaller catchmen ≤2000m where fall nnot reach more formalised retention devices or the topography does not support the constructi o more for ised retention devices. Sediment sumps function as an important element of the 'treatm ain' appr ch, whereby flow velocity is reduced, and sediment can settle out of suspension before overflow ng into adjo ng overl d flow paths or waterbodies.

Sediment sumps shall typ ally be formed dimensions of 2.0 m W x 2.0 m L x 1.0 m D, though depth should vary depending on the subsoil med It is import nt that sediment deposits are regularly cleared from the sump to maintain exposure of these free-draining s s. A spi way should be constructed and lined on the downslope wall of the sediment sump, ensuring the lining is secured lace 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.

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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 en ure 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 educe velocities d allow sediment to settle out of the water. The use of SSFs is like that of SFs. However, SS s are more robust devic that are appropriate to control runoff from steeper or larger catchments than SFs. SSF can b utilised to greater effect in the alpine environment as they provide a greater level of tensile strength. SSFs are be utilised below any fill areas within direct proximity of waterbodies.

The anchoring of the SSF will ensure stability, and the ouble-l ed geotextile will ensure that finer grades of sediments will be captured prior to any water filtering thro h th fabric. This solution will be adopted in a restricted manner, as the nature of the alpine environm nt kes erec ng and maintaining SFs in wind zones very difficult. As a staged approach is being undertaken a ng with p ogressive rehabilitation, contributing exposed works areas are limited as far as reasonably practicable. act SSF cations are o be confirmed by the environmental consultant and ecologist, subject to ground conditions durin in ial excava ns. This is to ensure best practice control with the least ecological impact is selected.

4.4.6 Turkey Nest

A turkey nest is typically con ructed using physical structure wrapped in a layer of permeable geotextile matting to act as a means of filtration via ewaterin The turkey nest should be constructed utilising hessian sack sandbags wrapped in geotextile material with e mensions 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.

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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 ki trails if they become enveloped by snow.

4.5 As-Built Verification

The Environmental Consultant will provide the Council with as-b lt con rmation to verify that the erosion and sediment controls have been installed in accordance with the approved CP.

4.6 Maintenance of Erosion and Sediment Contro Device

Ongoing maintenance of the site shall be unde ken as follo and as summarised in **Table 5**:

Regular and Weather-Responsive Insp ctions

- Daily visual checks during active ea hw ks.
- Prior to and Post-Rainfall I pections: andatory within 24 hours before or after rainfall events.
- Weekly formal insp ctions by th Environm ntal Representative.

Prompt Corrective Action

- Address any identified amage, ockage, 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.

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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, rep rmouring (rock or geotextile) to avoid scour.

4.7 Rapid Response Procedure for Significant or Adverse W ather Events

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

Weather Forecast Monitoring

- The ER will check and documen daily weat er foreca s, including short-term severe weather warnings.

Pre-Rainfall ESC Inspections

- Conduct thorough in ection f all ESC vices (e.g., DEBs, silt fences, diversion channels/bunds, sediment sumps, drop-out ts, and check ams) at l ast 24 hours prior to the forecast event to confirm functionality and available cap city.

Stabilisation of Exposed Areas

- Apply temporary stabilisa n 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:

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- 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 del gated site personnel will monitor key ESC measures for overtopping, bypassing, or failure.

Emergency Repairs

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

Snow and Ice

- Remain vigilant of the forecast and inspect ESC d vices pr forecast snow events, during thaws.
- Where possible, avoid starting new earthworks just ef e snow or icy conditions.
- Direct meltwater away from expos soil d toward he DEB or sediment sump.
- Ensure ongoing maintenance of he drop-ou pits, sed ment sumps, and check dams to slow down meltwater flow to reduce erosion and promo sedim t settleme t.
- As soon as conditions allow, repair damaged ESC devices and reapply mulch or geotextile fabric where needed.

Record Keeping and Rep rting

All pre- and post-weather eve inspections maintenance actions, and site observations shall be recorded in the site's ESC inspection and maintenanc ogs pro ded in the CEMP. Where required by consent conditions, notifications and significant event reporting (e.g., tur y 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. This is generally defined as 80% vegetative cover. 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

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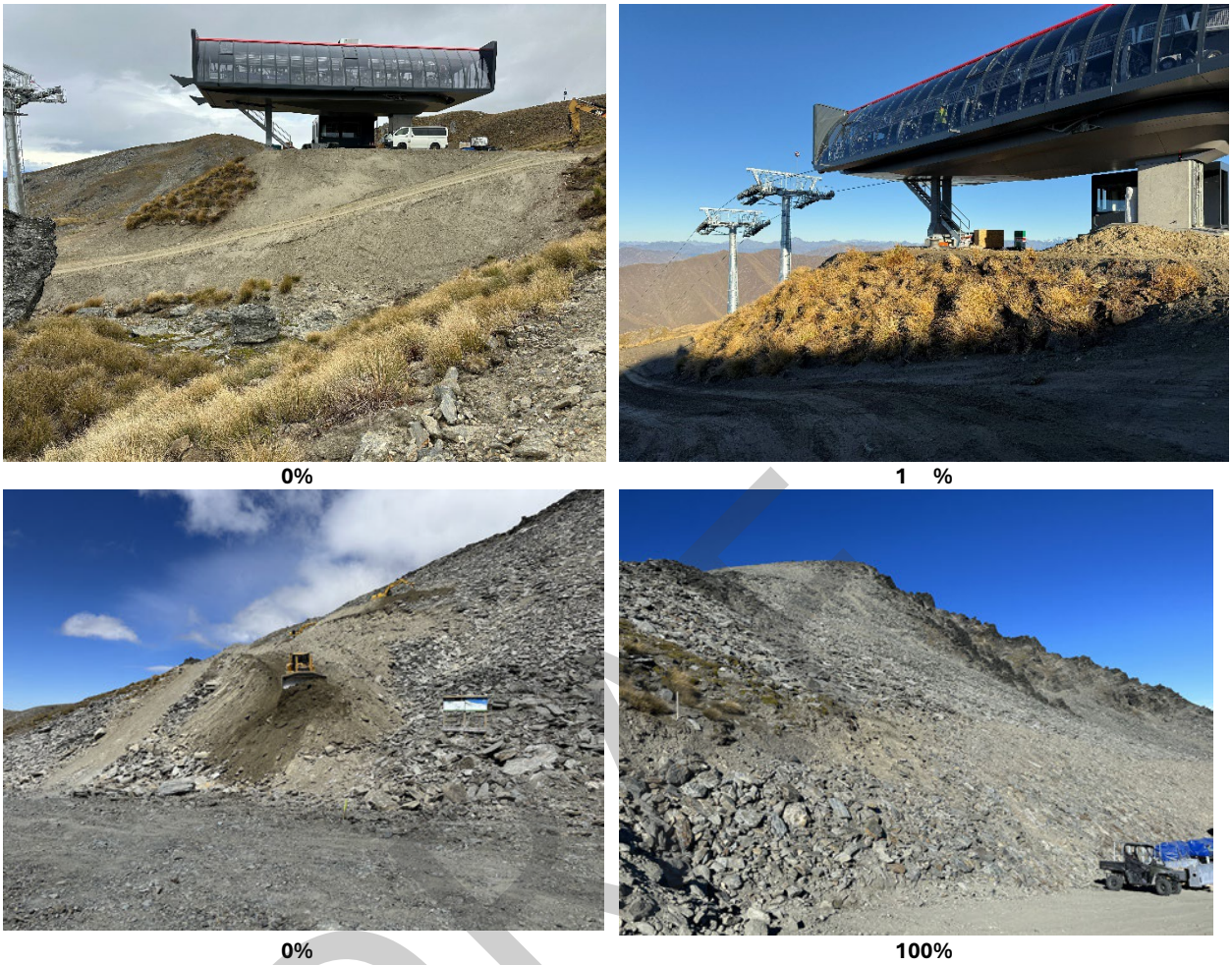
also provides a suitable level of stabilisation and will be adopted extensively. Examples of these are depicted in **Figure 1.**



Figur 1: Visual Cover

4.9 Contingency Measur

The following contingency measures **able 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 iled controls (e.g., collapsed silt fence, overtopped basin). • Reinstate or upgrade the c ntrol using m terials on-site (e.g., double silt fence, reinforce batter). • Assess whether ad ional or alternative mea ures are required (e.g., temporary stabilisation hemica reatment). • Environmental Consultant QEP) to update the ESCP and record actions taken. • Notify QLD COD d ORC.
The site is inappropriately exposed prior to imminent rain event	• pend furthe il disturbance activities immediately. • Priori se stabilis ion of exposed areas using: Vege tive or rock over. • lymer if < 48 hours (subject to ground conditions). • G fabric or jute matting for slopes and channels. Inspec and reinforce existing ESC devices before rainfall. • Activate **Section 4.7** Rapid Response Procedure.
Sediment retention devices are ear 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.

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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 ar desc ed in detail within the Ecological Assessment prepared by e3 Scientific and should be read in conjunction with this rep t To support wetland mapping across the study area, e3 Scientific have undertaken hydrological nalysis to model kely flow paths and water accumulation. Surface waterbodies, flow paths and wetlands iden fied within and in proxim y to the site are provided in **Figure 2** and **Figure 3** below.

The headwaters and upper tributaries of the Rastus Burn and Doolans Cr k Right Branch are located throughout the respective upper basins and faces where the ski area ex ans works are p posed to occur. There are also Natural Inland Wetlands and Alpine Tarns present within both upp r basins

Rastus Burn

The greater Rastus Burn watershed co ers an are of 1,460 ectares and is fed by Lake Alta and two prominent tributaries. Lake Alta is located at the hea of a cir basin, and its overflow feeds the Rastus Burn. The Rastus Burn and its tributaries are shaped by glacial, per cial, channel erosion and mass-movement processes, typical of the steep alpine environment. The s Burn flow into the Kawarau River, opposite Hayes Creek, which in turn feeds into the wider Clutha River atau Branch

The Rastus Burn catchmen s influenced b apid runoff due to its steep slopes and shallow soils. Seasonal snowfall and subsequent melt contrib e significan ly to baseflow patterns. NIWA's NZ River Maps indicate that the upper portion of the Rastus Burn genera s up t 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.

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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 Rastu Basin and Do lans Basin, due to the elevated nature of the subject site and relative depth of mapped aquifers in e area[2]. Typically, oundwater occurs only as shallow, discontinuous, low-volume storage in fractured rock, c uvium, talu and local moraine pockets. Perched groundwater and seepages are expected to be encountered during ea hwork , and the management of these localised flows are provided for in the CEMP and ESCP.

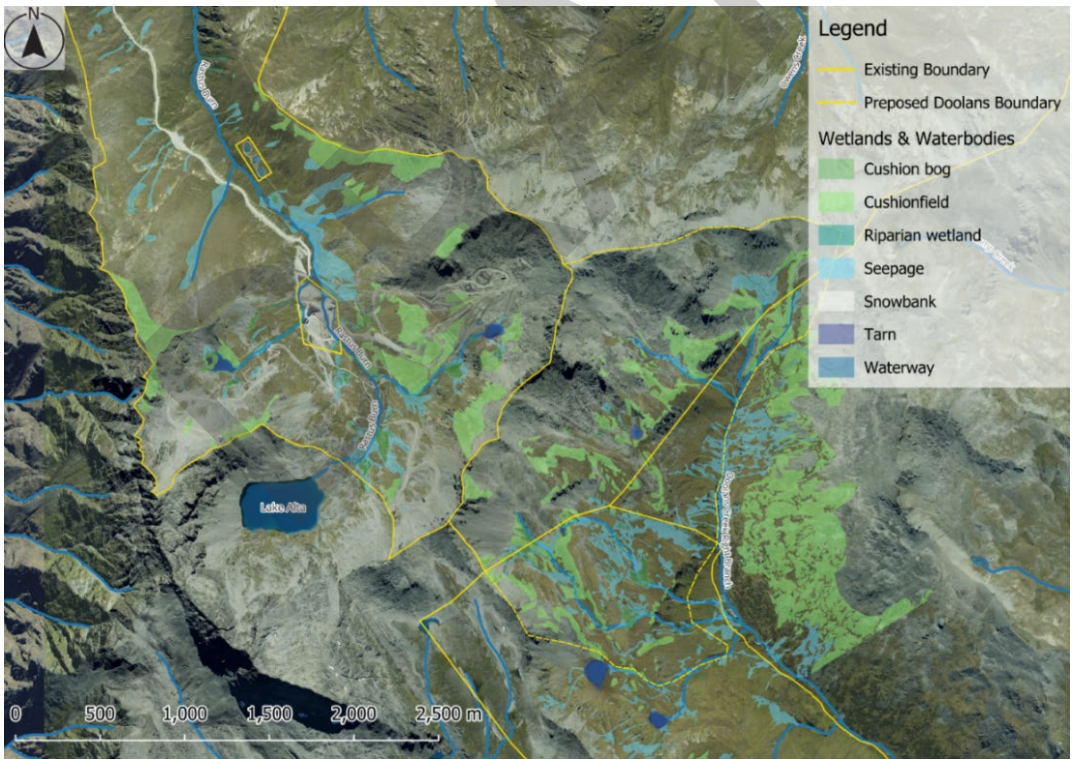

Figure 2: Waterbodies within and in proximity to the Site (Source: e3 Scientific)

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

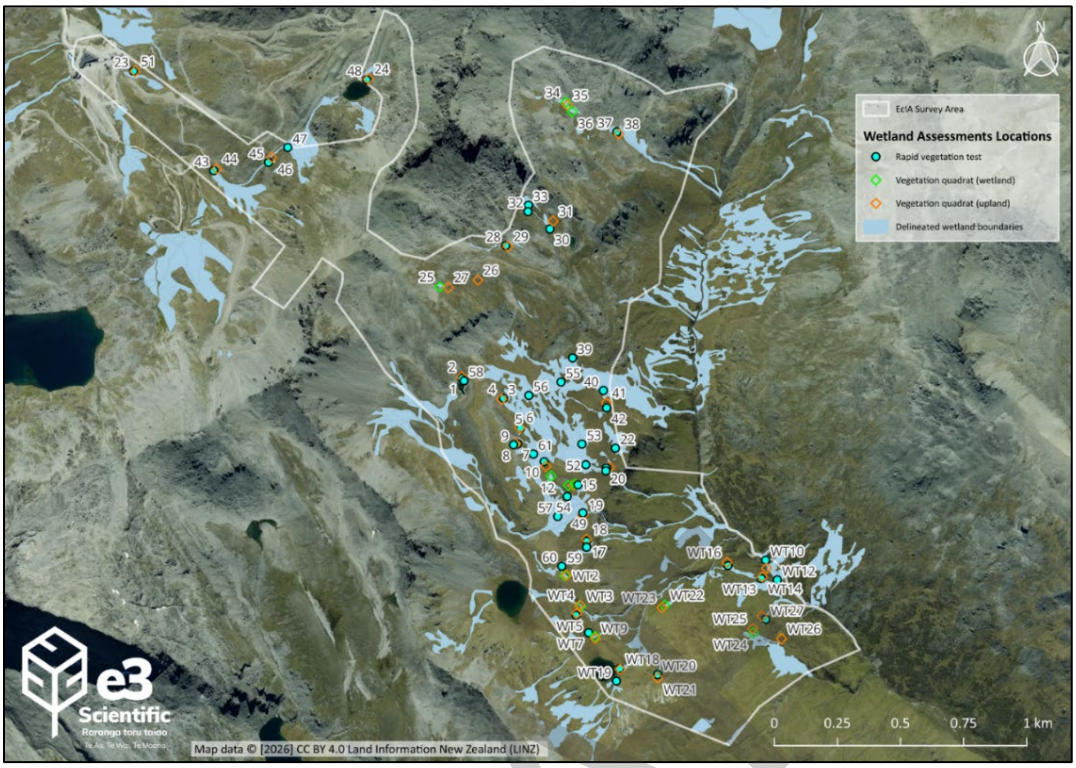

Figure 3: Wetland assessment results and deline ted etland undaries (Source: e3 Scientific)

5.3 Performance Criteria

The recommended water quality performan c teria hav een proposed following current accepted industry best practice, assessment of the pro works an he characteristics of the receiving environment.

Key considerations inclu :

- The existing environm nt/watershe and related water quality of adjoining waterbodies.
- Staged earthworks sequ cing ov a four-year construction window.
- Progressive rehabilitation o di urbed 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 conspicuou hange in colour or visual clarity
Turbidity[4] - Sediment control devices	≤ 150 NTU
Visual clarity (mm) - Sediment control devices	≥ 100 mm (As per G 5)
If Turbidity or Visual Cla ty exceeded, tes SS...	
Total Suspended Sediment (TSS)	≤ 50 g/L
pH[7]	5.5 – 8
Hydrocarbons or tannins	No visible race
Waste	N e or litter is visible

5.4 Management Mea ures

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

- Erosion and sediment co trols ill be implemented and maintained in accordance with the site-specific Erosion and Sediment Contr 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 Ecological Management Plans.

[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.

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- Undertake all works in accordance with the Department of Conservation and NZSKI Ltd. Protocol for the Rehabilitation of Natural Alpine Environments Following Ski Area Development.
- 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 co ed and unc olled discharge meets the Discharge Criteria referred to in **Section 5.3.**
Responsibility	On-site water qu ty sampl g is to be co pleted by the nominated Environmental Representative.
Spatial boundaries	Discharges from withi he sites' boundaries, receiving waterbodies and/or sediment control devi s.
Frequency	When there is a di harge of water across the site boundary or from a decanting earth bund, and ere a Significant in Event occurs through the night, monitoring must be undertaken the foll ing day. A signif nt rain ent is defined as any forecast/actual rain event of 20 mm within a 12-hour period or a rain ev t hat 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.

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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 t e Project Manager/ Environmental Consultant who will investigate and ensure appropriate corr ive actions are implemented immediately.

5.6 Contingency Measures

The following contingency measures in **Table 9** shall be a pted if uired.

Table 9: Water Quality Contingency Measur

Issue	Contingenc Measure
Exceedance of water quality criteria	• Contact e Proj ct er and Environmental Consultant (SQEP) immediately. • Works will ce e or be modified to remove further risk of contamination. • **QLD CODC an ORC** will be verbally notified. • The Envi nmental Incident procedure provided in the site Construction Environmental Managem nt Plan will commence. Remedia measures will be implemented, and the Environmental Incident will be closed ut by he Environmental Representative with a copy of an Environmental Incident report to e 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.

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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.

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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 c tribute to dust generation. Additionally, katabatic winds descending from nearby slopes may develop in the afte on, particularly during dry conditions when exposed soil surfaces are prone to rapid drying. Given t isolated alpine cation of the subject site, the number of sensitive receptors is limited. However, notable receptor nclu ecreationa sers of the surrounding DOC land, site staff and contractors working in the vicinity of the earthwo s area nd surrounding alpine flora and fauna.

Rastus Burn

The Rastus Burn area of the Remarkabl Ski Area c nsists of p rtially sheltered mid-mountain bowls, providing some natural protection from strong south and s uth-w s ds Within this environment, recreational users of the wider Remarkables recreation area, along with cont tors undertaking the works are considered sensitive receptors. These receptors may be exposed to calised ust plum during dry conditions or during periods of heightened construction activity.

Doolans

The Doolans expansion area sits a highe elevation and is markedly more open, exposed alpine basin compared with the opposing Rastus Burn side. The bination 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.

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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 erosi n should be temporarily stabilised by covering with site won rock or an approved polymer/soil stabiliser.
- Within two weeks of completion, all earthworked areas ould b stabilised by applying site won rock, reinstating indigenous vegetation, tracking and compacting of e dible subgrades on access tracks.

6.5 Monitoring

Site staff will maintain continual vigilance fo increase i wind to ensure measures are deployed prior to dust crossing site boundaries. Weekly Environmental In pections nd the Monthly SQEP Environmental Inspections will also ensure that the management meas es described above a sufficient and performing effectively.

6.6 Contingency Measures

The contingency measur in **Table 10** sha be adopted if required.

Table 10: Dust Contingency Measures

Issue	Contin ncy 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 acro s the boundary of the site.

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

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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 p j t area co prise indigenous avifauna, herpetofauna, and invertebrate species present across the Rastus Burn and Do ans env nments. Bird species, including pipit, kārearea and other alpine avifauna, may be disturb d by elevated co struction noise and associated human activity. Local lizard populations, such as the McCann's skin and Te Wahipo namu skink, are also considered sensitive given their reliance on stable refugia that can be affected by ibration an epeated disturbance.

Collectively, these ecological recept 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.

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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:

- Undertake the relocation of identified Avifauna and He etofauna, prior to undertaking ground disturbing activities in consented earthworks areas. This should b undert ken in accordance with the approved Ecological Management Plans and under the direction of the pr ct ecologist.
- Where practicable, select lower noise producin quipment or use wer noise generating alternatives.
- Regularly service equipment to ensure plant is ru ning imally.
- Plant and equipment to be fitted with noise contr /atten atio devices as appropriate and maintained and operated in accordance with the manuf cturer's sp ci cations.
- Revving of engines will be limited ll plant nd vehic s will be turned off when not in use and if safe to do so.
- The use of audible alarms on m ile equipment will be mited, and two-way communication will be used.
- Undertake activities that may lead nois or tion effects, during reasonable and practical hours.

7.5 Monitoring

All earthworks activity will b closely monito d by the project ecologist, environmental consultant and the operator to ensure that noise and vibratio emain with acceptable limits and not causing undue stress on surrounding flora and fauna. Weekly Environmental Insp ction and Monthly SQEP Environmental Inspections shall include an assessment of the site to determine the effective s 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.**

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Issue	Contingency Measure
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 w h earthwo s occurring for only five of the twelve months each year, over the four-year construction period, significan y re ces the likelihood of noise and vibration nuisance.

Construction noise and vibration best practice, focuse on ipment sel tion, activity planning, and adaptive management, as outlined in **Section 7.3**, will be implemented e re any noise and vibration effects remain temporary, intermittent, and within acceptable environmen l l mits.

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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 i n fied heritage buildings, historic reserves, Nohoanga or known archaeological features.

DOC has documented historic heritage values across the wider Ka rau / Remarkables Conservation Area, including Māori and Pākehā use, and gold-mining heritage in variou vall s. How er, these DOC records describe heritage across the general Remarkables area, not th stus Burn Doolans Basin specifically. The Doolans is typically characterised as a high-elevation alpine b sin with tle histo al land use, and most known archaeological or mining features in the region occur at lower elev ions (e.g Upper Nev Ben Nevis slopes, or historic routes).

A search of QLDC's database indicates that pa of the site is situated within the Wāhi taoka, mauka (36, Kawarau, The Remarkables), Wāhi Tūpuna ea. Wā Tūpuna e landscapes that embody the relationship of mana whenua and their culture and traditio s with their a estral la ds, water, sites, wāhi tapu (sacred places), and other taoka (treasure). The associated Wāhi Tūpuna is s own in **Figure 4** below.

A review of Chapter 39 of the Q C Propos d District Plan outlines that there is no description of the sites included in this area. Recognised threats are l ed :

- 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.

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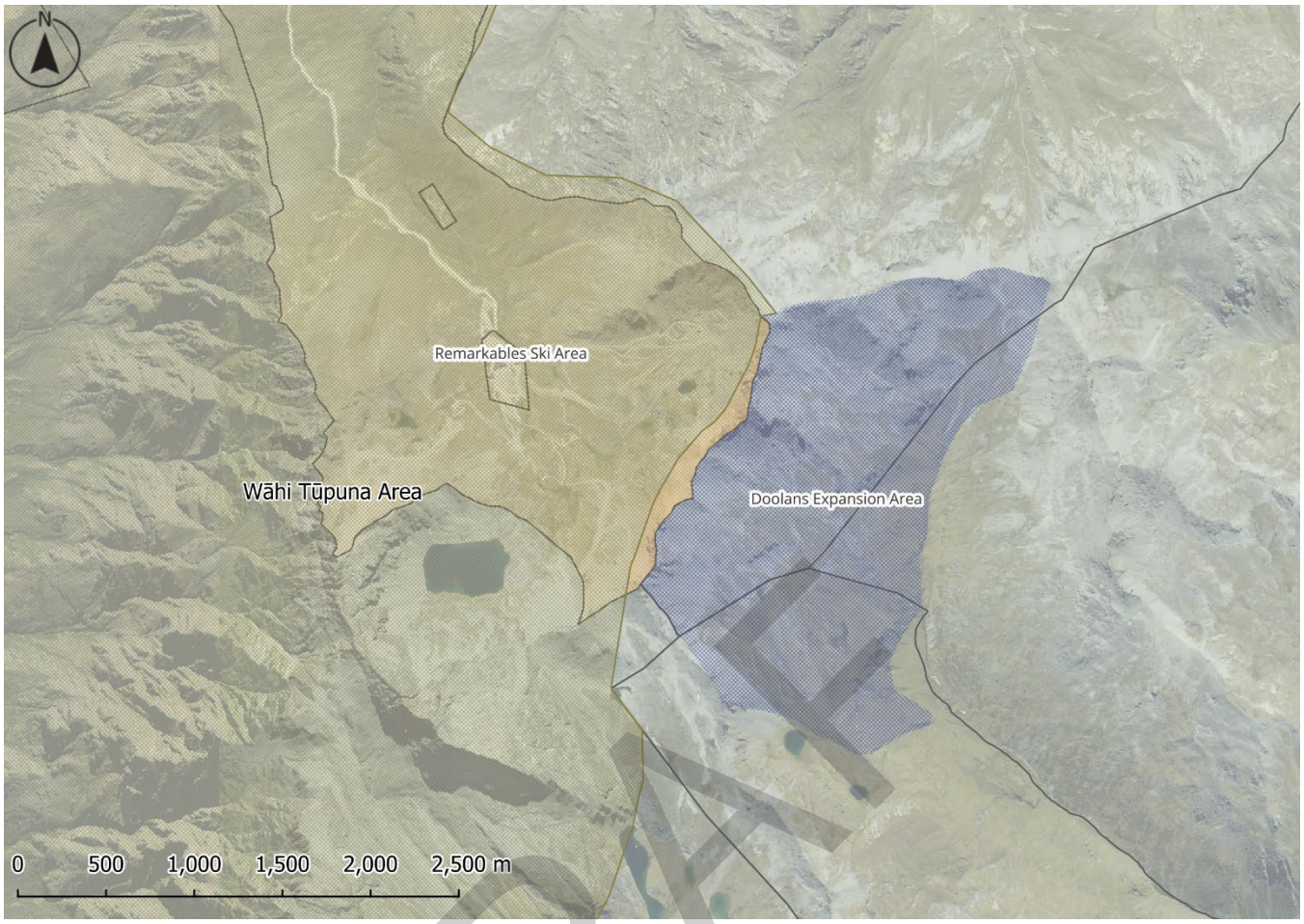

Figure 4: Location of reas w Cultural Significance (Source: QLDC GIS)

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8.3 Performance Criteri

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

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.

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9.0 FLORA AND FAUNA MANAGEMENT

9.1 Overview

The detailed ecological values, species-specific sensitivities, and impact assessments relevant to both the Rastus Burn and Doolans Basin are provided in the Ecological Impact Assessment (EcIA) prepared by e3Scientific. This CEMP should therefore be read in conjunction with that assessment, and all ecological management, mitigation, and monitoring measures described herein are to be interpreted alongside the findings and recommendations of the e3Scientific EcIA.

Flora and fauna management for the Project aims to identify and minimise potential ecological effects arising from construction activities. Management focuses on preventing avoidable disturbance to indigenous vegetation, habitats, and fauna species, while ensuring compliance with the Wildlife Act 1953, Conservation Act 1987, and DOC requirements for activities undertaken within the Remarkables Conservation Area.

Vegetation plays an essential natural function in alpine environments y stabilising fragile soils, reducing erosion, supporting hydrological processes, and providing habitat structure fo nvertebrates, lizards, and alpine birds. Effective management of vegetation and fauna will help maintain ecologica ntegrity wit in the Rastus Burn and Doolans Basin and will support the environmental resilience of the wider alpine eco stem during and after construction.

9.2 Flora

Vegetation within the Remarkables Conservation Area is pr dom antly rep esentative of intact, naturally functioning alpine ecosystems, with disturbance largely li d to areas dified by existing ski infrastructure, access tracks, and the Curvey Basin Chairlift alignment. Dist bed env onments ypically consist of bare ground, exotic ruderal species, and early colonising indigenous species

The e3Scientific EcIA identifies twelve distin vegetation communities, representing a range of ecosystem types consistent with the Remarkab es Ecol cal Distr including:

- Snow tussock gr sland, the domi nt vegetation community across both Rastus Burn and Doolans;
- Subalpine shrublan mosaics;
- Short tussock and cush nfield communities;
- Alpine herbfield in exposed ite ;
- 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.

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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 basi , 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 n ar he proposed construction footprint include:

- Indigenous avifauna using alpin hrubland tussock g assland, rock outcrops, and ridgelines;
- Skinks, particularly O. pluvialis in igher el ation zone and O. maccanni across mid-slopes;
- Invertebrates, including threatened d t-risk Lepi ptera and alpine ground-dwelling species;
- Localised wetland and p e vegetat n communities that support specialised flora and invertebrates;
- High-value tussock and alpine h field co munities.

9.5 Performance Criteri

- Avoid the clearance of indig n s 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.

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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 di ection from the project Ecologist/herpetologist.
- Avoid disturbance during any active nesting period if iden ed by the Ecologist.
- Manage noise, vibration and dust in accordance with mitig ion m asures in the CEMP and EcIA to reduce disturbance to avifauna and invertebrates.

9.7 Monitoring

Weekly Environmental Inspections and Month QEP Enviro ental Inspections shall include a visual assessment of the site to determine the effectiveness of getation managem nt controls.

9.8 Contingency Measures – Accident D covery P tocol

If a protected species (flora r fauna) ar acciden ly discovered on the site during construction or fauna enters the site, follow the accident discovery protoc as outlined below:

- If indigenous specie reach the sit boundaries, works are to cease until they safely exit or are safely removed (to be carried out under e directi n of the project Ecologist).
- Cease all works within 10m f t e 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;

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- 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.

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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 avoid contamination of the site and the surrounding environment.
- All spills are cleaned up immediately, and the contamina d soils/wat s are disposed of appropriately.

10.4 Management Measures

The following measures will be deployed to ensure chem als and ls associated with the project are appropriately managed.

- All hazardous substances to be st ed, tran ported an used according to the safety data sheet requirements.
- Storage of chemicals and fue shall be located a far as practicably possible from waterways and concentrated flows.
- Refuelling of vehicles and lant onsite will occur away from critical source areas, within identified laydown areas.
- All concrete was ng is to be unde aken in the designated concrete wash-out pit.
- 240 L Oil and Hyd carbon spill k s will be located in close proximity to the location of liquid hazardous materials storage and fuelling ar s. 50 L Oil and Hydrocarbons spill kits are to be kept in all utility vehicles and plant equipment trav sing t e site.
- The volumes of the hazardou 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.
Unleaded Fuel	500 L	Jerry cans in lockable container at the maintenance facility.

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Chemicals and Fuels	Maximum Volume	Storage Location
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 required.

Table 14: Chemicals and Fuels Contingency Measures

Issue	Contingency Measure
Spills response	• Stop works in proximity to the pill and sse he safety of all personnel. • Take immediat ion to con i the spill to prevent discharge into stormwater drains or natural wat ways. • Use spill s to contai and treat th spill. • Notify Environ en Consu o advise on next steps. • I sary, notif he Regional Council spill response unit. Remove c taminate material to a suitable contained location for remediation/disposal (require any cessary approvals/permits from ORC). The spill kits all be replaced by an approved supplier.
Inappropriate storage	• Upg de acility. • 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.

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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 w ere:

- A spill of more than five litres has occurred.
- A situation is discovered where a spill of more than five litres w ld likely have occurred before it happens, where the management measures listed above have t been follow d

The environmental incident procedures outlined in **Section 5** s all commence.

10.8 Chemicals and Fuels Assessm nt

Potential effects associated with the stor and use of chemicals and fuels will be managed through the implementation of the constru on m agemen measures outlined in **Section 10.3**, including the appropriate storage of fuels and hazardous sub tances, spill sponse p cedures, and refuelling controls. These measures are expected to ensure that any adver effects on land water, or cultural values arising from the use of chemicals and fuels are minimised as far as reasona y practicable

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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 u il recycling, reuse, or disposal.

11.4 Management Measures

The following measures will be deployed to ensure was e m agement ass ciated with the project is appropriately mitigated:

- The Waste Management Hierarchy ph phy will b mplemented, as illustrated in **Figure 5**.
- Measures will be implemented to nsure th site is m ntained in a safe, clean and tidy state.
- Where possible, waste shall be gregated nto labelle bins with lids: General, Hazardous and Recyclables.
- Wastes onsite shall be suitably con ine and pr ted from migrating offsite.
- The waste is to be contai d so it doesn contaminate soil, surface or groundwater, create unpleasant odours or attract vermin.
- Any material dro ped in or adjacen to open drains shall be recovered immediately after it occurs.
- Waste storage is n permitted in o ear drainage paths.
- The burning of waste is trictly proh bited.
- No wastes shall be dispos d of nsite.
- Wastes shall be removed from the site regularly and at completion of works.

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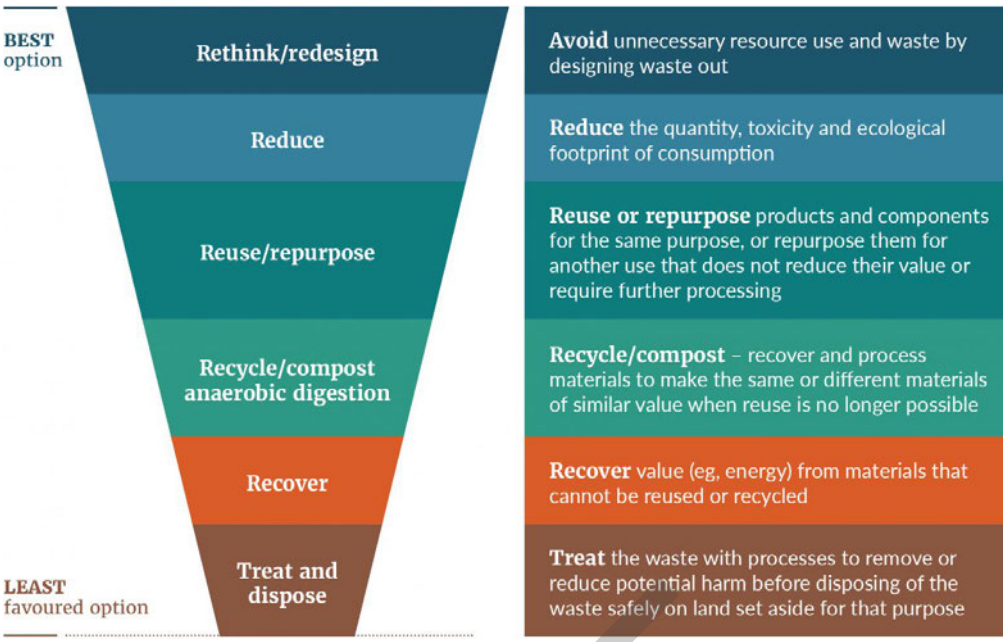

Figure 5: The Waste Hierarchy (Source: M istry for th Environment).

11.5 Monitoring

Site staff will be briefed on waste processes prior to wo s comm ncing and shall maintain continual vigilance for excess waste around the site and following appropriate dis osal rocedu s. Weekly Environmental Inspections and Monthly SQEP Environmental Inspections sh lude a vis assessment of the site to determine the effectiveness of waste management controls.

11.6 Contingency Measures

If waste items are accumul ing or are s kpiled, e following contingency measures will be adopted:

- Arrange for collec n by an approv licensed contractor.
- Provide additional bin with lids if a ailable.
- Remove waste offsite as on as ossible.

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.

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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.

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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 '*cceptable'*, with the summary noting: "*Single diesel tank removed in 2015. All results meet Tier 1 Criteria f commercial/industrial land use."*
- The Shadow Basin Chairlift Diesel Tank is a verified HAIL ite (ID: HA .00771.01), classified under category A17. The site's contamination status on the Otago Regional C unci (ORC) HAIL Register is currently recorded as '*acceptable'*, with the summary noting:" One *underground di el tank and fuel lined removed in 2016. One sample near dispenser exceeded maintenance i ia but likely du to small spill during removal."*
- A Detailed Site Investigation (DSI) was undertake by Pattl Delamore Partners (PDP) in March 2015 in relation to the removal of an underground petroleum orag system (UPSS) located within the Remarkables Maintenance Building Area. Soil sam were co ted and analysed for petroleum hydrocarbons, with results indicating concentrations elow th Ministry r the Environment (MfE, 2011) Tier 1 Soil Acceptance Criteria (All Pathways) for comm rcial/indu trial land u e.
- An Accidental Discovery – Surplus oil R use orandum was prepared by e3 Scientific for the site after Base Contracting identified visually ontaminated soil during demolition works for the Remarkables Maintenance Buildi g on the 1 Novemb 2025. A subsequent investigation by e3 Scientific confirmed that residual contami ation was prese at concentrations above background at some sample locations; however, all detected conc trations rema d below the adopted criteria for the protection of human health and groundwater quality.

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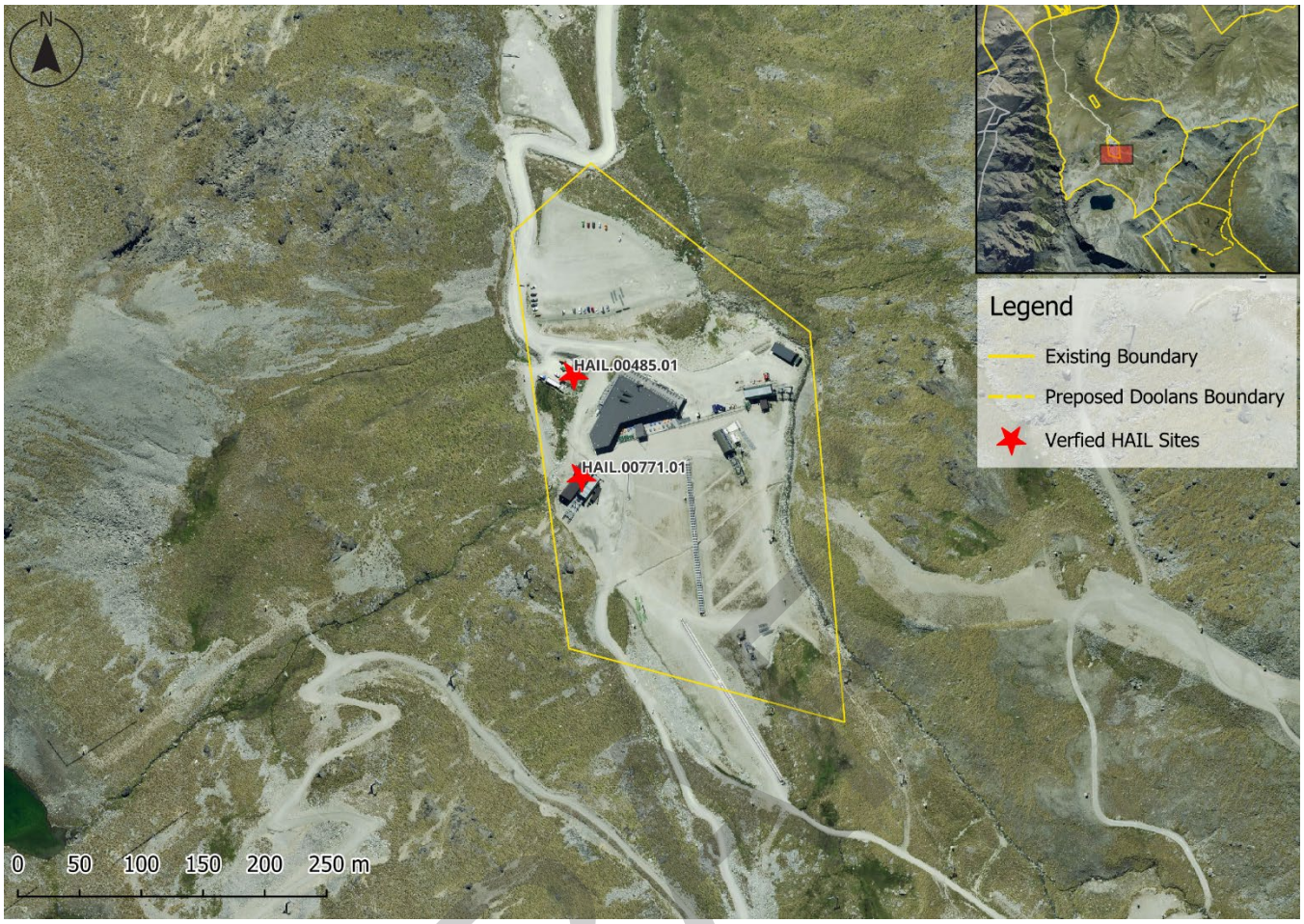

Figure 6 Verifie AIL Site (Source: ORC SLUS)

12.2 Identified Sensitive Receptors

Due to the isolated nature f the site, many the areas proposed to be developed have had limited human interaction and exposure to HAIL activiti and contam ants are not anticipated to be encountered.

If contaminants are accidentally u ov ed, 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 .0** (Dust Management). Both sections cover management of stockpiles.
- All surplus fill material requiring off-site disposal as clean f shall me t the Ministry for Environment definition of clean fill, as specified in Section 1 of the report "Technical ui elines for Disposal to Land, Revision 3.1", prepared by Waste Management Institute of New Zealand for t Ministry for the Environment and dated September 2023.
- Any soil removed from the site shall be dispos d of a cility approved to receive the material and documentation of that disposal shall be kept on sit
- Trucks removing or transporting any oil fr m the site ill be covered or sealed to prevent dust, leakage or loss of materials during transport.

12.5 Monitoring

Unless any higher-level ntamination acciden lly found during earthworks, no specific monitoring of soil, groundwater or water qua y will occur (oth than what is detailed in the water quality criteria outlined in **Section 5.3**. If contaminated material is i ntified during arthwork, it is expected that monitoring will be required at the direction of the Land Contamination Prac ioner.

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

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- 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 Con aminated Land Practitioner and advise on the appropriate course of action. The Contaminated Land Practitioner s ll:

- Notify the regulatory authorities (QLDC, CODC and ORC), if requir d that contamination has been discovered and contingency action is being implemente n g that depe ding on the nature and scale of the contamination identified on site, additional resou e conse may be required

12.7 Contamination Incident

An environmental incident is considered o have urred where inspection finds that excavation or other work continues within contaminated soil without re t or remedial action. The environmental incident procedures outlined in **Section 3.5** shall be followe

12.8 Contaminated La d Assessment

Potential effects associated wit contam ated soils will be managed through the implementation of the measures outlined in **Section 12.3**, including a r priate 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.

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13.0 REFERENCES

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- Ministry for the Environment (MfE), 2011, Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011), October.
- Otago Regional Council, 2023, Residential Earthworks in Otago, A guide for developers, landowners, contractors and service providers, March.
- Queenstown Lakes District Council (QLDC), 2019, Guidelines for Environmental Management Plans, June.
- Department of Conservation and NZSKI Ltd. Protocol for the Rehabilitation of Natural Alpine Environments Following Ski Area Development.
- Ministry for the Environment (MfE), National works in waterways guideline-best practice guide for civil infrastructure works and maintenance.
- The Remarkables Ski Area Upgrade & Doolans Expansion Roadin Stream Crossings and Stormwater Freshwater Ecological and Hydrological Impact Assessment, prepared by 3Scientific Limited for NZSki Limited (e3 scientific 2026b).
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APPENDIX 1 EROSION AND SEDIMENT CONTROL PLAN

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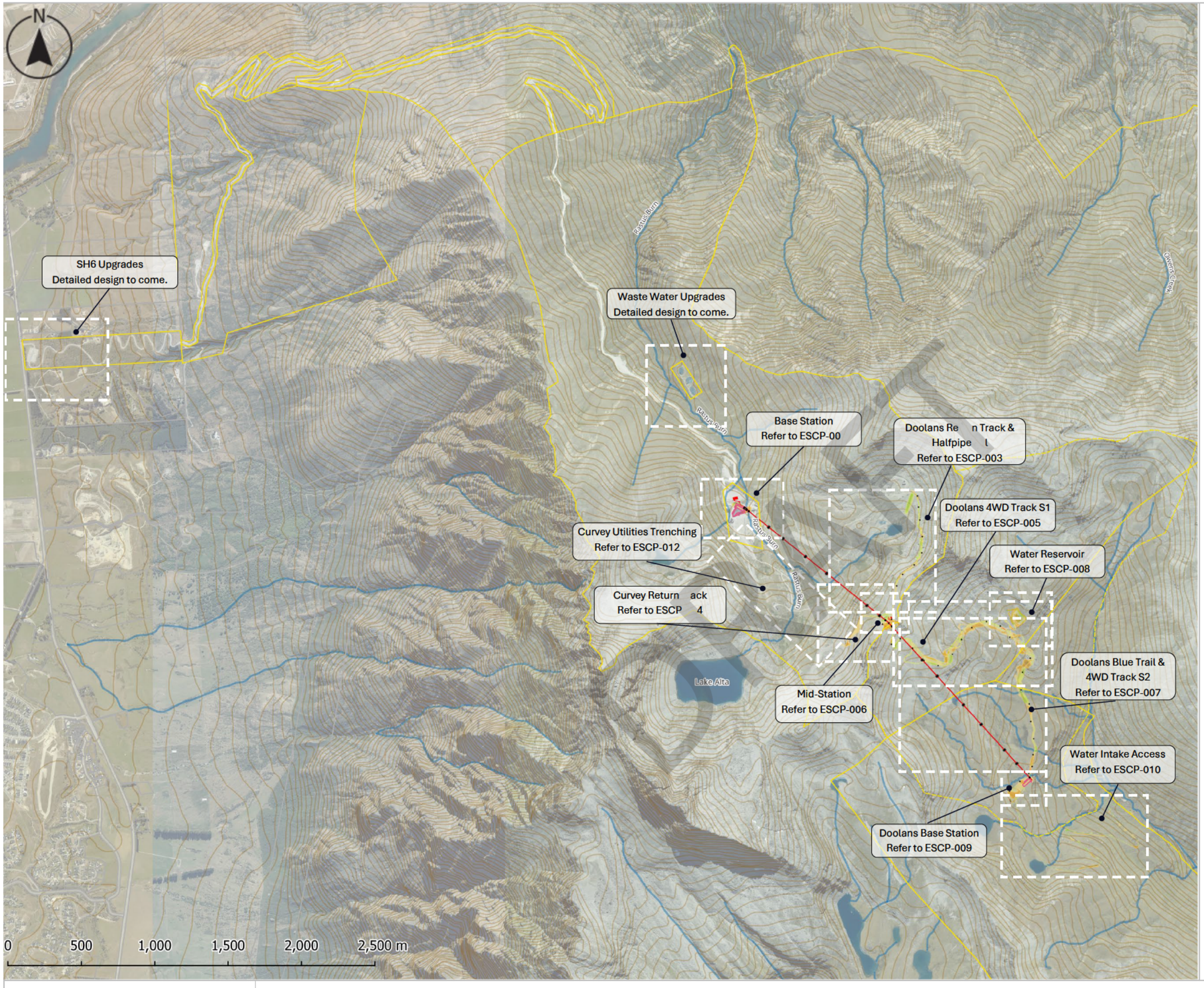

Legend

	Site boundaries
	Gondola alignment
	Waterbody

Notes

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

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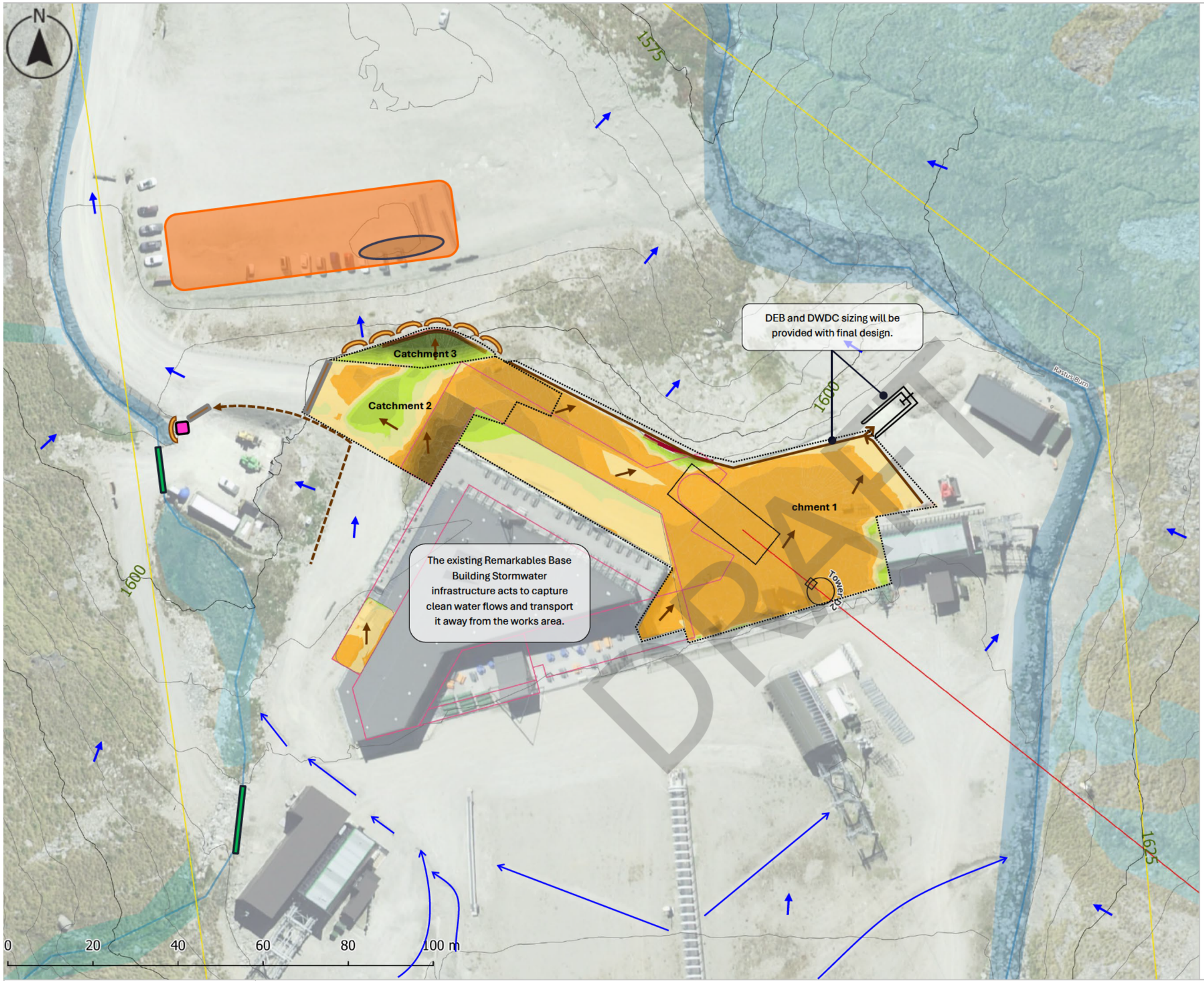
Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control Plan

Description: Site Overview

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	14/05/2026	ESCP – 001	1



Legend

	Seepage wetland
	Waterbody
	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
	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.
- Scale 1:900 @ A3

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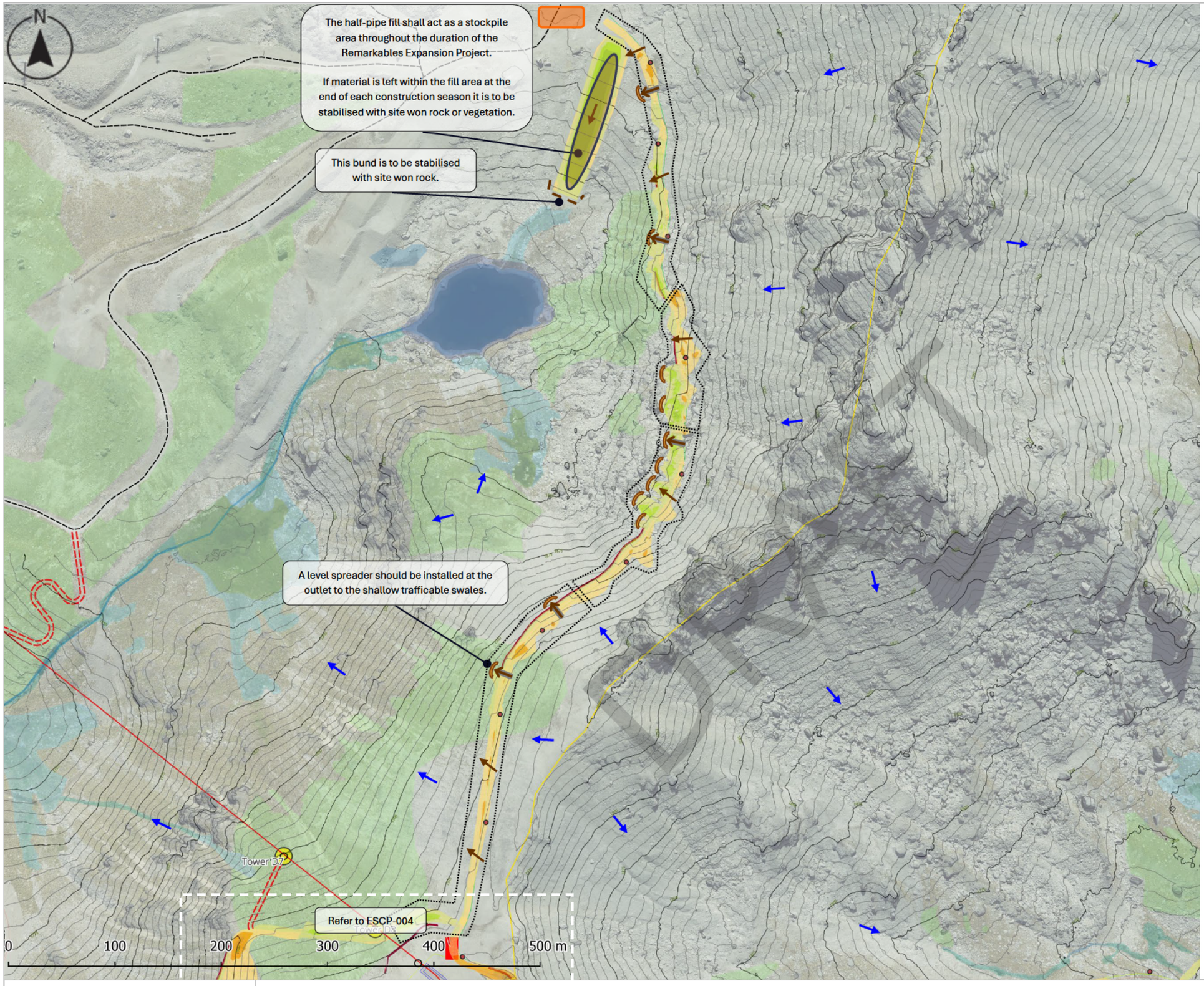
Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control

Plan **Description:** Rastus Burn Gondola Terminal and Base Building Extension (Construction Season Year 1)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	14/05/2026	ESCP – 002	1



Legend

	Seepage wetland
	Cushion bog
	Cushion field
	Waterbody
	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
	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.
- Scale 1:3600 @ A3

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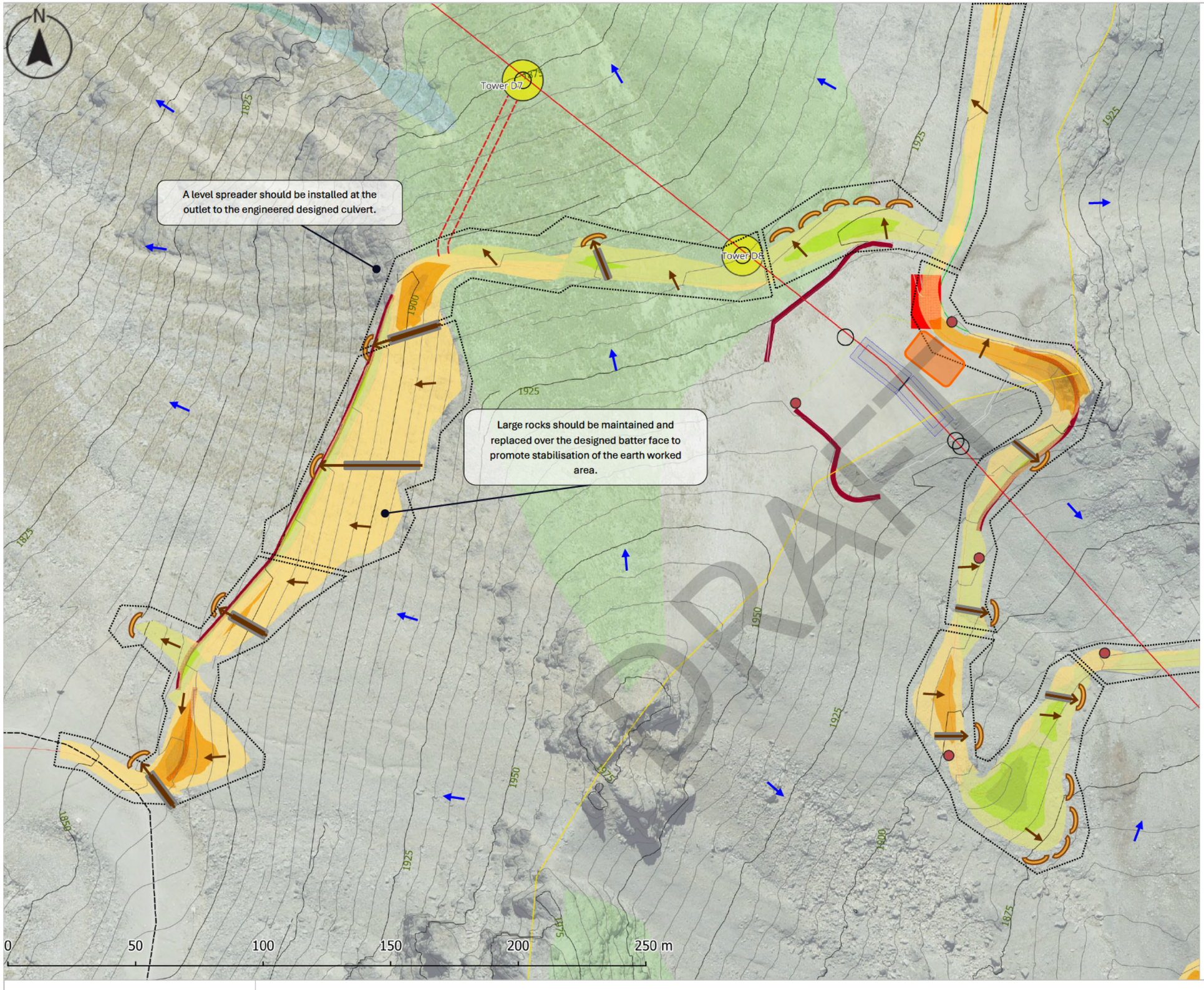
Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control

Plan **Description:** Rastus Burn to Mid-Station Access and Halfpipe Fill (Construction Season Year 1)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	14/05/2026	ESCP – 003	1



Legend

	Seepage wetland
	Cushion bog
	Cushion field
	Waterbody
	Existing access track
	Temporary access track
	Gondola alignment
	Clean water overland flow
	Dirty water overland flow
	Trafficable swale
	Coconut coir log
	Laydown area
	Proposed gabion basket
	Snow gun
	Sub-stage boundaries
	Wastewater main

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.
- Scale 1:1500 @ A3.

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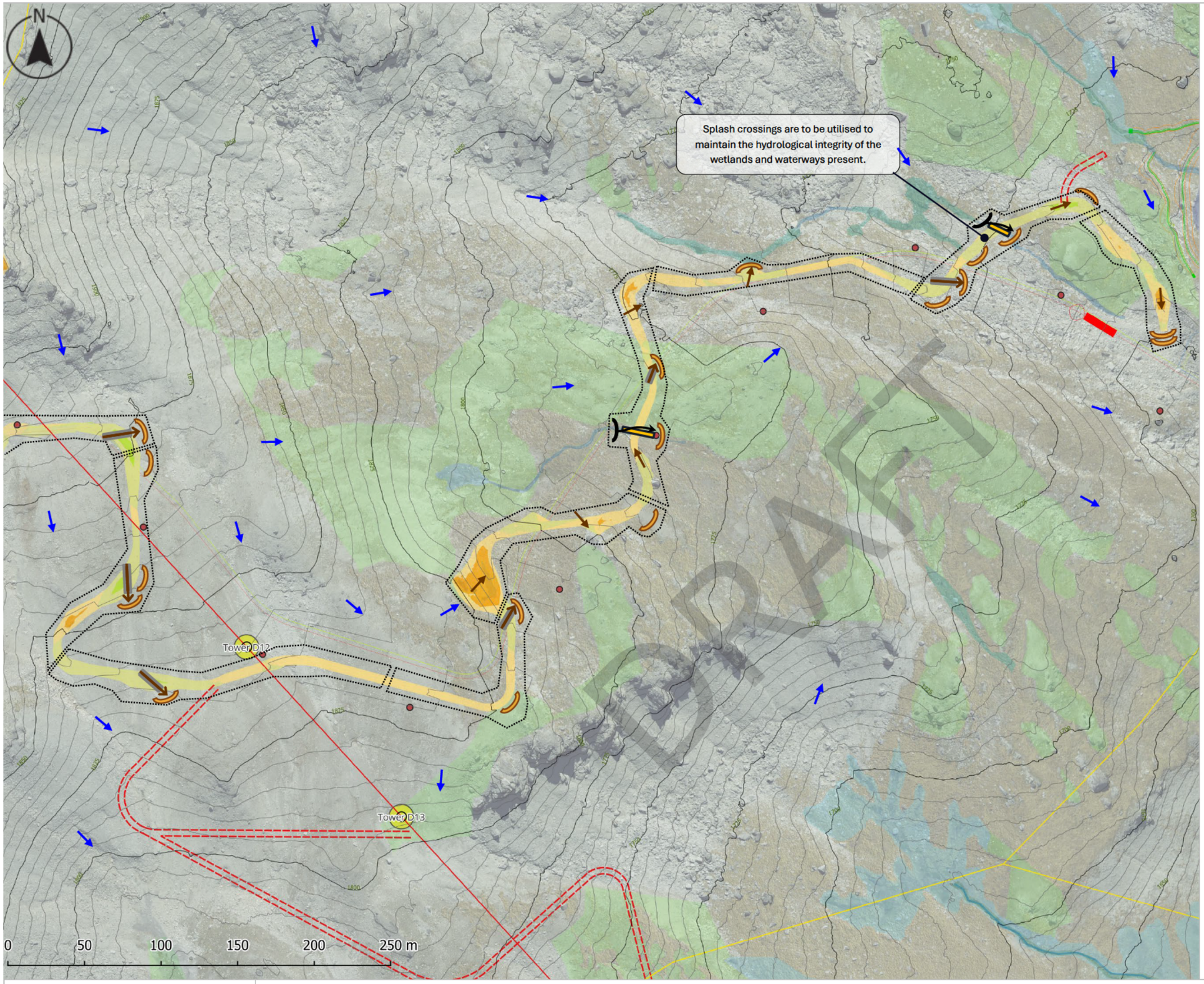
Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control

Plan **Description:** Curvey Return Trail and Doolans 4WD Track (Construction Season Year 1)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	14/05/2026	ESCP – 004	1



Legend

	Seepage wetland
	Cushion bog
	Cushion field
	Waterbody
	Temporary access track
	Gondola alignment
	Clean water overland flow
	Dirty water overland flow
	Pipe drop
	Coconut coir log
	Splash crossing
	Trafficable swale
	Snow gun
	Sub-stage boundaries
	Wastewater main

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.
- Scale 1:2500 @ A3

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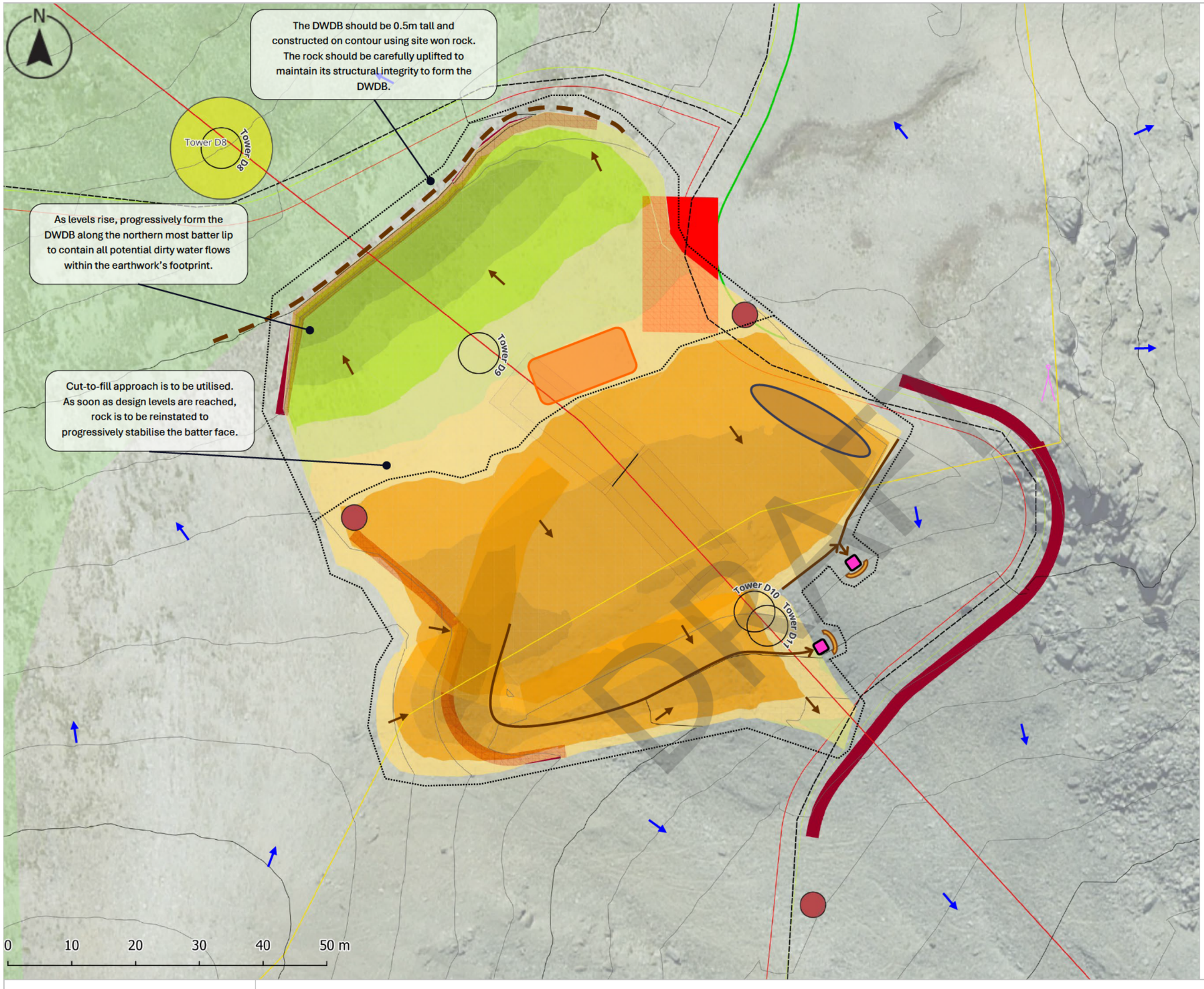
Project: Remarkables Ski Area Upgrades and Doolans Expansion Project – Erosion and Sediment Control

Plan **Description:** Doolans 4WD Track (Construction Season Year 1)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	14/05/2026	ESCP – 005	1



Legend

	Seepage wetland
	Cushion bog
	Cushion field
	Waterbody
	Existing access track
	Temporary access track
	Gondola alignment
	Clean water overland flow
	Dirty water overland flow
	Dirty water diversion channel (DWDC)
	Dirty water diversion bund (DWDB)
	Coconut coir log
	Laydown area
	Sediment sump
	Stockpile
	Proposed gabion basket
	Snow gun
	Sub-stage boundaries
	Wastewater main

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.
- Scale 1:600 @ A3

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

Plan **Description:** Gondola Mid-Station (Construction Season Year 2)

	Drawn	Approved	Date	Drawing Number	Version
	KB	TG	14/05/2026	ESCP – 006	1