

# Infrastructure Assessment Report

## Proposed Subdivision

478 Cardrona Valley Road, Wanaka

|                      |                                                                                |
|----------------------|--------------------------------------------------------------------------------|
| <b>Applicant</b>     | Rachel Farrant, Shaun O'Brien & Keith Ferguson as Trustees of the Farien Trust |
| <b>Patersons Ref</b> | P250584                                                                        |
| <b>Date</b>          | 14/08/26                                                                       |

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# 1. Project Details

Table 1: Project details

|                          |                                  |
|--------------------------|----------------------------------|
| <b>Site Location</b>     | 478 Cardrona Valley Road, Wanaka |
| <b>Legal Description</b> | Lot 1 DP 533538                  |
| <b>Record of Title</b>   | 876977                           |
| <b>Area</b>              | 26.8973ha                        |

## 2. Executive Summary

This Infrastructure Assessment Report supports a resource consent application by The Farien Trust for a seven-lot rural lifestyle subdivision of Lot 1 DP 533538 (26.8973 ha) at 478 Cardrona Valley Road, Wānaka. It assesses the infrastructure required to service the proposed lots and demonstrates that each service can be provided to an appropriate standard.

Access is by upgrade of the existing accessway (Road 1, approximately 1,480 m), consented and engineering-accepted under RM150552, along its established alignment. Road 1 is designed to the QLDC Code of Practice E1 typology standard and retained as a private gravel right of way that will not vest in Council. Several departures from the Code of Practice are proposed, as set out in Table 4: adoption of the E1 access typology standard in preference to E2; short sections of Road 1 and Driveway 1 at approximately 19% (1 in 5.3) against the 16% maximum; a gravel carriageway in place of a sealed surface. The associated non-compliances with Chapter 29 of the Proposed District Plan are the subject of this resource consent application and are assessed against the relevant matters of discretion.

Stormwater, wastewater and water supply build on the servicing regime established under RM150552. Stormwater management is retained substantially unaltered, with diversion bunds above the lower platforms (proposed Lots 4–7) and on-site disposal deferred to future building consents. Wastewater will be deferred to future building consents and will be treated and disposed of on-site to AS/NZS 1547:2012. Water supply to service the lots will be via an existing groundwater bore (a permitted take), with lot storage and firefighting supply to SNZ PAS 4509:2008 installed at time of future development. Electricity (Aurora Energy) and telecommunications (Chorus fibre, or a wireless alternative) availability is confirmed and will be installed to each lot prior to 224c.

Design refinement, confirmatory testing and lot-level works are appropriately secured through detailed design, Engineering Acceptance and consent notices on Lots 2 to 7.

## 3. Proposed Infrastructure

### 3.1 Earthworks

#### 3.1.1 Supporting Documents

##### Drawings

- ▶ RCA Appendix G: Patersons – RC Earthworks & Roading

##### Other Documents

- ▶ Appendix D1: Geoconsulting Ltd – Geotechnical assessment
- ▶ Appendix D2: Geoconsulting Ltd – Email regarding Road 1
- ▶ RCA Appendix F: Enviroscope – Environmental Management Plan

#### 3.1.2 Background Information

A geotechnical assessment of the site has been prepared by Geoconsulting Ltd (**Appendix D1**), based on a desk study and a walkover of each proposed lot, assessing the proposed building platforms and the natural hazards affecting the site.

Geoconsulting describes the site as rolling hill country sloping to the north-east, underlain by glaciofluvial outwash gravels beneath a loess cover. It expects groundwater at considerable depth, and no springs or defined watercourses were identified. The assessment identifies two significant geohazards, being faulting and slope instability, both of which carry a high consequence, but a recurrence interval measured in thousands of years and are considered acceptable for residential development. A landslide feature mapped on the QLDC and ORC hazard web maps was examined in the field and classified by Geoconsulting as relict, with reactivation considered very unlikely other than as a coseismic event; the building platforms for proposed Lots 1 to 3 lie outside the mapped area. Geoconsulting notes that the principal surficial consideration is gully erosion of the loess within the forestry-cleared area, which can be managed through revegetation and diversion bunding, and recommends site-specific geotechnical investigations in support of any future building consent application.

Geoconsulting has also provided advice specific to the Road 1 earthworks (**Appendix D2**). It advises that the existing road batters are stable, and that new cuts of up to 3 m at 45° are feasible provided a vegetation cover is established promptly after excavation. It notes a localised erodible sand layer near Lot 7 (Road 1 CH700) that will require the cut to be trimmed back, adjacent trees removed, and the face protected during revegetation. Geoconsulting recommends that new fills be benched into sound ground and placed in compacted layers using suitable local gravels free of oversize material and contaminants.

#### 3.1.3 Current Proposal

The proposed earthworks are shown on the earthworks plans submitted with the resource consent application (refer to Appendix G). All levels are in terms of NZ Vertical Datum 2016.

The earthworks are required to improve the formation of Road 1 to a QLDC Code of Practice E1 standard, particularly in relation to grade and carriageway width, along the existing access alignment from Cardrona Valley Road. The proposal also includes the formation of driveways 1, 2 and 3 to serve the proposed residential building platforms.

The proposed earthworks quantities are summarised in Table 2 below.

Surplus cut and topsoil material will be re-spread across the proposed lots, used for any required overland flow deflection bunds and for landscaping.

Table 2: Earthworks summary table

| Proposed Earthworks Quantities                |                                              |
|-----------------------------------------------|----------------------------------------------|
| Earthworks area                               | 13,400m <sup>2</sup>                         |
| Volume: Topsoil strip                         | 2,500m <sup>3</sup>                          |
| Volume: Cut                                   | 4,700m <sup>3</sup>                          |
| Volume: Fill                                  | 800m <sup>3</sup>                            |
| Volume: Cut / fill balance                    | 3,900m <sup>3</sup> (excess of cut material) |
| Volume: Topsoil respread (berms & batters)    | 1,500m <sup>3</sup>                          |
| Volume: Topsoil respread (lots & landscaping) | 1,000m <sup>3</sup>                          |
| Depth: Maximum fill                           | 1.8m                                         |
| Depth: Maximum cut                            | 3.9m                                         |

### 3.1.4 Environmental Management Plan

An Environmental Management Plan (EMP) has been prepared by Enviroscope and is included as **Appendix F**. The EMP responds to the potential effects arising from the earthworks required to construct the roads and sets out the erosion and sediment control measures to be implemented prior to the commencement of the earthworks.

## 3.2 Road Design Statement

### 3.2.1 Supporting Documents

#### Drawings

- RCA Appendix G: Patersons – RC Earthworks & Roading

## Other Documents

- Appendix D2: Geoconsulting Ltd – Email regarding Road 1

### 3.2.2 Existing Access

The site is accessed by an existing formed accessway running approximately 1,480 m from Cardrona Valley Road, consented and constructed under RM150552 (The Larches Station Trust) and engineering-accepted by Council on 31 January 2017. The accessway comprises a 2.5m wide metal carriageway with a 0.5 m metal shoulder either side (3.5 m total formed width), on 150mm of AP40 pavement over a subgrade with CBR greater than 7, at a 4% cross-fall. Stormwater is managed by drainage swales and eleven culverts (a 525Ø culvert at the main stream crossing (Road 1 CH90) and ten 300Ø culverts), designed for the 1 in 100 year event, with the water tables lined with rock rip-rap where the grade exceeds 10%. The existing vehicle crossing to Cardrona Valley Road is sealed and was widened to 5.5 m under RM150552.

The existing accessway was designed with grades steeper than 1 in 6, Council having accepted that a 1 in 6 gradient was not practically achievable on this alignment. Cardrona Valley Road is classified as an arterial road under the Proposed District Plan and is posted at 100 km/h. The intersection is therefore existing and consented, and the current proposal upgrades it to suit the seven residential lots applied for.

### 3.2.3 Current Proposal

The proposed roading works are shown on the earthworks drawings in **Appendix G** and comprise the upgrading of the main access (Road 1) and the formation of access to three lots (Driveways 1, 2 and 3). Road 1 provides access from Cardrona Valley Road to the 7 proposed residential lots by way of a right of way over proposed Lot 1 and follows the existing alignment. The upgrading involves minor earthworks to widen corners and reduce gradients, sealing of the steeper section for the initial 70m and the intersection throat, confirmation of minimum 0.5m wide shoulders, and the provision of passing bays to suit the realignments proposed.

Road 1 will be retained as a private gravel formation. Gravel is appropriate because of the limited number of vehicle movements, rural nature of the lots/access, and notably the road carries ongoing farm traffic to Lot 2 DP 533538 (The Larches) and tractors and other farm vehicles are likely to degrade a sealed surface considerably faster than light residential traffic. As the road does is not proposed to be vested, there is also no Council maintenance obligation to support a sealed standard.

While the full accessway extends approximately 1,480 m, the road serves the seven proposed lots on a diminishing basis. The first section of approximately 800 m, to the point where Driveway 1 leaves the alignment, carries the full servicing load; the remaining approximately 680 m serves progressively fewer lots.

Section 3.2.4 of this report constitutes the Design and Access Statement required under clause 3.2.6 of the QLDC Code of Practice, addressing road dimensions and layout, place and link

function, and connectivity. The remaining matters listed in that clause are either addressed in Table 3 below or are not relevant to a rural E1 private way. Departures are set out in Section 3.2.5 and the PDP Chapter 29 assessment in Section 3.2.6.

### **3.2.4 Design and Access Statement**

#### **Road Dimensions and Layout**

This is a seven-lot subdivision. On its overall lot yield, the most applicable standard under Table 3-3 of the QLDC Code of Practice 2025 is an E2 road. Road 1 has instead been designed to the E1 standard. The reason is that complying with the E2 standard, and particularly its wider movement lane, would require substantially greater earthworks than the E1 standard, with the associated batters, earthworks volume and visual effects as set out in Section 3.2.5 of this report. E1 has therefore been adopted as the more appropriate standard for this rural site, and the basis for that choice is developed in Section 3.2.5 Item 1 below. The design is compared against the Code of Practice standard in Table 3 below. Typical cross-sections are shown on the RC Earthworks & Roding drawings, Sheet 380 (Details A, B and C).

The movement lane is 2.5m with a 0.5m metal shoulder either side, giving a 3.5m total formed width in accordance with the E1 standard. This maintains the formed width of the existing accessway.

Passing bays are provided along Road 1 as shown on Sheet 300 and are labelled Passing Bay 1, Passing Bay 2 and so on. The Code of Practice provides for passing bays at up to 100 m spacing on rural accesses where visibility is available from bay to bay, reducing to 50 m where it is not. The passing bays have been set accordingly: at up to 100 m spacing where the visibility criterion is met, as between approximately CH540 and CH800, and at not more than 50 m where forward visibility is limited. A turning head is not proposed. Each driveway junction provides an opportunity for vehicles to turn, and Road 1 will be signed as a private, no-exit road so that through traffic is not attracted to the alignment. A turning head can be provided along Road 1 if required by Council

#### **Place and Link Function**

Using Table 3.1 of the Code of Practice, the road is characterised as serving a "live and play" land use within a rural area type, providing access to lifestyle or clustered housing. In terms of link function, Road 1 operates as a lane, providing very high local access and no through movement. It is a private, no-exit right of way serving seven rural lifestyle lots at a low target operating speed of 20 km/h, consistent with the winding and undulating nature of the existing alignment.

#### **Connectivity**

Road 1 connects to the wider network at a single point, being the existing intersection with Cardrona Valley Road. As a private rural access serving a small number of lifestyle lots, the road is not part of a permeable public network, and the connectivity outcomes sought by the Code of Practice for urban subdivisions are not applicable. The relevant outcome for this proposal is a

safe, well-formed single connection to Cardrona Valley Road, which is achieved through the upgraded intersection shown on Sheet 311 of the earthworks drawings.

Table 3: Road 1 design information

| Design Element                       | QLDC CoP Table 3-3 Standard              | Proposed Design                                                                                                                                  | Comments                                                                                                                                                             |
|--------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Road Number                          | -                                        | Road 1                                                                                                                                           |                                                                                                                                                                      |
| CoP Figure Number                    | E2                                       | E1                                                                                                                                               |                                                                                                                                                                      |
| Typical cross-section reference      | -                                        | Sheet 380 Details A, B & C                                                                                                                       |                                                                                                                                                                      |
| Area Type                            | Rural                                    | Rural                                                                                                                                            |                                                                                                                                                                      |
| Land Use                             | Live and play                            | Live and play                                                                                                                                    |                                                                                                                                                                      |
| Local attributes                     | Access to lifestyle or clustered housing | Access to lifestyle or clustered housing                                                                                                         |                                                                                                                                                                      |
| Locality served                      | 1-20 du                                  | 7 du                                                                                                                                             | Refer to Section 3.2.5 <b>Item 1</b> of this report                                                                                                                  |
| Target operating speed               | 30km/hr                                  | 20km/hr                                                                                                                                          |                                                                                                                                                                      |
| Minimum road reserve width           | 9m                                       | Varies but minimum 8m to match existing right of way easement                                                                                    | Legal mechanism for access is an easement as opposed to vested road. Easement width will vary to suit the road formation including passing bays and swale formation. |
| Maximum vertical grade               | 16%                                      | 19%                                                                                                                                              | Refer to Section 3.2.5 <b>Item 2</b> of this report                                                                                                                  |
| Pedestrians                          | Shared (on shoulder and berm)            | Shared (on shoulder and berm)                                                                                                                    |                                                                                                                                                                      |
| Passing, parking, loading & shoulder | Total shoulder 0.5 m, sealed             | Passing bays included in the design<br>Shoulder 0.5m included<br>Road carriageway will be <u>gravel</u><br>except for the Diagram 9 intersection | Refer to Section 3.2.5 <b>Item 3</b> of this report                                                                                                                  |

|                            |                           |                                                |                                                                                              |
|----------------------------|---------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------|
|                            |                           | with Cardrona Valley Road and from CH0 to CH75 |                                                                                              |
| Cyclists                   | Shared (in movement lane) | Shared (in movement lane)                      |                                                                                              |
| Movement lane width        | 5.5m - 5.7m               | 2.50m                                          | Refer to Section 3.2.5 <b>Item 4</b> of this report                                          |
| Classification             | Lane (~ 200 vpd)          | 56 vpd plus farm vehicle movements             |                                                                                              |
| Turning head               | -                         | No                                             | Not required                                                                                 |
| Road to be vested (YES/NO) | -                         | No                                             | Road 1 will remain privately owned and maintained with all necessary rights of way provided. |

### 3.2.5 Departures from QLDC CoP 2025

All elements of the proposed roading layout are in accordance with the QLDC CoP 2025, except for the following items;

Table 4: Departures from QLDC CoP 2025

| Item | Road                | QLDC CoP Requirement                                                                                                                             | Alternative Solution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Road 1              | Table 3-3 classifies a road serving more than six dwelling units as E2 (1 to 20 du), with a 5.5 m to 5.7 m movement lane and a 9 m road reserve. | Road 1 is proposed as an E1 road. The seven-lot proposal sits far closer to the E1 range (1 to 6 du) than the E2 range (1 to 20 du). An E2 formation was modelled during the design exercise; its wider movement lane produces a substantial increase in cut batter height and extent, earthworks volumes, and adverse visual effects, none of which is practical or desirable in this rural landscape. An E1 standard is appropriate to the rural character and the low traffic volume (approximately 56 vpd plus occasional farm movements).                                                                                                                                                                                                                                                                         |
| 2    | Road 1 & Driveway 1 | The E1 standard sets a maximum vertical grade of 16%.                                                                                            | A short section of Road 1 (CH0 to approximately CH75) and Driveway 1 (approximately CH132 to CH204) reach approximately 19% (1 in 5.3). Road 1 follows the alignment of the existing accessway, with the horizontal and vertical geometry eased where practical to improve compliance with the Code of Practice. The residual grade over the first section is constrained by cut batter depth and the proximity of the alignment to the adjoining lot (Lot 2 DP 533538), which is not in the applicant's ownership; easing it further would require a significant cut batter. On Driveway 1, a compliant grade is feasible only by lengthening the alignment, which would increase earthworks, ongoing maintenance and visual effect. Driveway 1 has an average grade of approximately 1 in 9.6 over its 266 m length. |

|   |        |                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---|--------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   |        |                                                                                                   | <p>The steep sections on Road 1 and Driveway 1 will be chip sealed surface. The grades proposed are consistent with those on the existing accessway, which was engineering-accepted under RM150552 on the same alignment. The departure is assessed against PDP Rule 29.5.16 in Section 3.2.6.</p>                                                                                                                                                                                                                                                                                                                                                 |
| 3 | Road 1 | Table 3-3 provides for a total shoulder of 0.5 m, and private accesses are expected to be sealed. | <p>A 0.5 m shoulder either side is provided and passing bays are included in the design (Sheet 300) at not more than 50 m spacing, compliant in length and width.</p> <p>The carriageway will be gravel rather than sealed, except at the Diagram 9 intersection with Cardrona Valley Road, between Road 1 CH0 and CH75, and the steep section of Driveway 1 (approximately CH132 to CH204).</p> <p>Gravel is proposed because Road 1 carries farm traffic to The Larches, which would degrade a sealed surface more rapidly than light residential traffic, and because the road does not vest and carries no Council maintenance obligation.</p> |
| 4 | Road 1 | The E2 standard requires a movement lane width of 5.5 m to 5.7 m.                                 | <p>A 2.5 m movement lane is adopted, consistent with the E1 classification in Item 1. This avoids the additional earthworks and visual effects that the wider E2 formation would generate. The existing formation is already 2.5 m plus a 0.5 m shoulder either side, and suits the low target operating speed of 20 km/h.</p>                                                                                                                                                                                                                                                                                                                     |

### 3.2.6 Assessment against the Proposed District Plan – Chapter 29 Transport

The following provisions of Chapter 29 (Transport) are relevant to the proposal. Each is a Restricted Discretionary matter, with discretion restricted to the matters listed in the rule.

#### Rule 29.5.13 – Access and Road Design.

The rule refers to Table 3.2 of the 2018 Code of Practice, which has since been superseded; the current Table 3-3 of the Code of Practice 2025 has been applied. Road 1 is designed to the E1 standard

(refer to Table 3). The standards in clause (b) apply only to the Te Pūtahi Ladies Mile and specified urban zones and are not relevant to this rural site. Because the access adjoins an arterial road, the exception in clause (b)(i) applies, requiring a formed width of 5.5 m to 5.7 m and a legal width of at least 6.7 m for a minimum of 6 m from the road boundary; this is provided at the entrance as shown on the Earthworks drawings Sheet 311. Passing bays are provided in accordance with clause (b)(ii). Under clause (c), a private way may not serve sites with the potential for more than 12 units on the site and adjoining sites; the proposal is for seven lots and comfortably complies. A legally enforceable maintenance arrangement will be provided through the right of way (clause (d)), and the access design complies with Schedule 29.2 (clause (e)).

#### **Rule 29.5.15 – Design of Vehicle Crossings (Rural)**

The crossing is required to comply with Diagram 2 and one of Diagrams 8, 9 or 10. Cardrona Valley Road carries approximately 4,467 vpd (source: Mobile Roads 07/07/25), which is below the 10,000 vpd threshold, and the accessway will generate approximately 56 equivalent car movements per day (7 lots at 8 vpd). Over the life of the road, heavy vehicle use of the crossing is expected to be well below one movement per week; a short-term consolidation of heavy vehicle movements may occur during house construction, but it is not practical to design the crossing for that temporary condition. On this basis a Diagram 9 crossing is required. The Diagram 9 geometry is shown to be feasible on the Earthworks drawings Sheet 311, with detailed design to follow at Engineering Acceptance. The intersection is existing and consented and is being upgraded rather than newly formed.

#### **Rule 29.5.16 – Maximum Gradient for Vehicle Access**

The rule sets a maximum gradient of 1 in 6 for a private way used for vehicle access. Short sections of Road 1 and Driveway 1 reach approximately 1 in 5.3 (19%) and therefore do not comply with clause (a). The 1 in 5 allowance in clause (b) is expressed for residential zones serving no more than two units and is not relied on here. The exceedance is assessed against the matters of discretion in the rule, being the efficiency of land use, the safety and maintenance of the access, congestion, and emergency vehicle access. Road 1 follows the alignment of the existing accessway, which was engineering-accepted under RM150552 with grades steeper than 1 in 6, and the current design eases those grades where practical. Driveway 1 has an average grade of approximately 1 in 9.6 over its 266m length (well within 1 in 6), the steep section lies well away from any road boundary, and it will be sealed with a non-slip surface (i.e. chip seal). That the rule elsewhere contemplates grades of up to 1 in 5 for a single private way indicates that a grade steeper than 1 in 6 is not, of itself, a barrier to emergency vehicle access. Maintenance of the steep section is no different to that of a compliant grade, requiring occasional gravel top-up and grading, and a compliant grade could only be achieved with greater earthworks and effects. The vehicle break-over angles in Diagram 2 are not exceeded (clause (c)). The departure is sought through the resource consent application.

#### **Rule 29.5.17 – Minimum Sight Distances (roads other than State Highways)**

Cardrona Valley Road is posted at 100km/h. Because the accessway continues to provide for farm traffic to Lot 2 DP 533538 (The Larches) alongside the proposed residential lots, sight distance is assessed against the Other Activities standard of 250m, consistent with the assessment accepted under RM150552. Sight distances of more than 250m are available in both directions, as shown on Sheet 311. The Residential Activity standard of 170 m is therefore comfortably exceeded. The rule is complied with.

### **Rule 29.5.19 – Maximum Number of Vehicle Crossings**

Cardrona Valley Road is an arterial road, for which the rule permits at least one crossing. A single shared vehicle crossing is proposed. The rule is complied with.

### **Rule 29.5.21 – Minimum Distances of Vehicle Crossings from Intersections**

For an arterial road with a speed limit of 100km/h, a vehicle crossing must be no closer than 100m to an intersecting road. The nearest intersections are High Country Lane, approximately 1,750m to the west, and a continuation of Mount Barker Road approximately 475m to the east (the legal status of which is unclear). The crossing is well clear of the 100m separation distance. The crossing is also existing and consented and is being upgraded. The rule is complied with.

### **3.2.7 Rooding Stormwater**

The road upgrade follows the existing alignment, and the overland flow paths across the road are substantially unchanged, with the sag and crest points remaining in essentially the same locations. The contributing catchments are therefore not materially altered. The existing accessway was engineered under RM150552 with a network of drainage swales and eleven culverts (a 525Ø culvert at the main stream crossing (Road 1 CH90) and ten 300Ø culverts) designed for the 1 in 100-year event, together with rock riprap lining of the water tables where the grade exceeds 10%. Culvert locations and sizes, and a detailed catchment analysis, will be reviewed and confirmed at detailed engineering design to account for any changes arising from the rooding works. Rural side drains and water tables will be provided in accordance with Section 3.3.16.2 and 3.3.19.4 of the Code of Practice.

### **3.2.8 Geotechnical Considerations**

Geoconsulting Ltd has provided advice specific to the Road 1 earthworks (**Appendix D2**). It advises that the existing road batters are stable, and that new cuts of up to 3 m at 45° are feasible provided a vegetation cover is established promptly after excavation. It notes a localised erodible sand layer in the batter near proposed Lot 7 that will require the cut to be trimmed back, adjacent trees removed, and the face protected during revegetation. Geoconsulting recommends that new fills be benched into sound ground and placed in compacted layers using suitable local gravels free of oversize material and contaminants. These measures will be incorporated into the detailed design and the earthworks methodology.

### **3.2.9 Vesting and Maintenance**

Road 1 and the proposed lot accesses will remain private and will not vest in Council. Access will be provided by right of way easements over proposed Lot 1 in favour of the new lots. The existing right of way to Lot 2 DP 533538 (The Larches), held for farming purposes, will be surrendered and a new easement created to match the alignment and width of the upgraded Road 1. The right of way will carry a legally enforceable maintenance obligation, consistent with Rule 29.5.13(d).

### 3.3 Stormwater

#### 3.3.1 Supporting Documents

##### Drawings

- ▶ None

##### Other Documents

- ▶ None

#### 3.3.2 Existing Environment

The existing stormwater environment assessed here is the current state of the site following implementation of RM150552, rather than the natural pre-subdivision state.

The private accessway (Road 1) and its associated stormwater management have been constructed in accordance with the Engineering Acceptance granted under RM150552. Stormwater from the accessway and its contributing catchment is managed through a network of drainage swales and culverts, sized under RM150552 to convey the 1% AEP (1-in-100 year) event, with culvert capacity verified using the High Intensity Rainfall Design System (HIRDS). A 525Ø RCRRJ culvert conveys flows from the site's largest catchment (approximately 24 ha) beneath the accessway, with 300Ø culverts positioned at low points and where required to direct flow away from the developed area. The carriageway is formed to a minimum 4% cross-fall to prevent ponding, with swale inverts set at least 200 mm below the subgrade.

Consistent with the low impact design (LID) philosophy accepted under RM150552, widespread overland flow continues to cross the site largely unaltered, with accessway runoff discharged into existing gullies in a manner that mimics the pre-existing natural runoff regime.

The existing approved building platform on proposed Lot 1 is subject to consent notice condition 11(q) registered under RM150552. That condition requires that, at the time a dwelling is erected, a suitably qualified professional (as defined in Section 1.7 of the QLDC Code of Practice) design a stormwater disposal system for all impervious areas within the site, subject to the review of Council prior to implementation and installed prior to occupation of the dwelling.

#### 3.3.3 Current Proposal

The proposed subdivision retains the RM150552 accessway alignment substantially unaltered. Accordingly, the contributing catchments, sag and crest locations, and the accepted stormwater network that serves them are unchanged from the design accepted and constructed under RM150552. On this basis, detailed stormwater analysis is deferred to detailed design and Engineering Acceptance, for which the accepted RM150552 design provides the established baseline.

Three matters specific to the current proposal are identified for resolution at detailed design:

- ▶ Minor adjustments to the Road 1 stormwater flow arising from the subdivision layout;
- ▶ Detailed stormwater design for the individual lot driveways; and

- Management of overland flow originating above the residential building platforms.

### **Overland flow protection – Proposed Lots 4 to 7**

Geoconsulting Ltd identifies that the lower building platforms are affected by poorly defined drainage paths and ephemeral flows, with associated potential for soil mobilisation, and recommends the construction of diversion bunds to redirect runoff and mobilised soil to either side of the platforms. On this basis, and having regard to the site contours, a stormwater diversion bund is proposed above each of proposed Lots 4 to 7 (inclusive) to intercept overland flow before it reaches the building platform. The indicative form is an earth bund approximately 1 m high with batters of approximately 1V:3H, aligned as a shallow V (chevron) in plan so that intercepted flow is diverted to either side of the platform, consistent with the Geoconsulting recommendation. Final location and geometry will be confirmed at detailed design and implemented prior to the completion of this subdivision.

### **Building platform impervious areas**

Stormwater from the impervious areas associated with each future dwelling (roof, driveway and patio) is proposed to be disposed to ground via a soak pit at each building platform. As with the existing approved platform on proposed Lot 1 under RM150552 condition 11(q), the disposal system is best designed once the dwelling footprint, driveway extent and curtilage areas are known, rather than sized in advance of that information. Soakage device design will accordingly be undertaken at building consent stage in accordance with Section 4.3.8 of the QLDC Code of Practice 2025, informed by site-specific soakage testing (Section 4.3.8.11) undertaken as part of the building consent geotechnical investigation.

It is therefore recommended that a consent notice equivalent to RM150552 condition 11(q) be registered against proposed Lots 2 to 7, requiring that a suitably qualified professional design a stormwater disposal system for all impervious areas within each lot, subject to the review of Council prior to implementation and installed prior to occupation of the dwelling.

#### **3.3.4 Vesting of Assets**

The proposed stormwater infrastructure is private and will not vest in Queenstown Lakes District Council. Consistent with the private status of the Road 1 accessway, the associated stormwater assets (swales, culverts and diversion bunds) will remain private and will be maintained by the beneficiaries of the right of way, with future dwelling disposal systems secured through the consent notice mechanism described above.

## **3.4 Wastewater**

### **3.4.1 Supporting Documents**

#### **Drawings**

- None

#### **Other Documents**

- Appendix D3: RM150552 On-site Wastewater Disposal Report
- Appendix D4: BC191527 On-site Wastewater Disposal Application

### 3.4.2 Existing Infrastructure

There is no reticulated Council wastewater network in the vicinity of the site. On-site wastewater management is therefore the only feasible means of servicing future development.

Petherick Consultancy Ltd undertook an on-site wastewater site and soils assessment for the site (dated 22 April 2015, **Appendix D3**), drawing on earlier investigations by Riley Consultants (2010) and Geosolve (2014). That assessment concluded the platform area is underlain by gravelly colluvium and glacial till with permeability characteristics consistent with a Category 4, or possibly Category 5, soil, and adopted an indicative design loading rate of 6–10 mm/day. On this basis it concluded the site is suitable for on-site wastewater disposal, but that viable systems are limited to primary treatment with Low Pressure Effluent Disposal (LPED) or two-stage treatment systems, designed in accordance with AS/NZS 1547:2012.

Two past approvals are relevant to the current proposal:

RM150552 granted subdivision consent for a single residential building platform on the existing Lot 1 (DP 533538). Consent was granted on the basis that the Petherick Consultancy Ltd report was acceptable and that a consent notice was registered against the resulting title. Condition r) of that consent notice requires that, at the time a dwelling is erected, the owner engage a suitably experienced person (as defined in sections 3.3 and 3.4 of AS/NZS 1547:2012) to design an on-site effluent disposal system in compliance with AS/NZS 1547:2012, taking into account the Petherick Consultancy Ltd recommendations, subject to Council review prior to implementation and installed prior to occupation. Condition r) accordingly defers the disposal design to building consent stage rather than fixing a system at subdivision.

BC191527 subsequently granted building consent for a dwelling on the approved platform. The supporting on-site wastewater design (**Appendix D4**) was prepared to AS/NZS 1547:2012 and recorded a Category 3 soil at the platform — a more permeable, more favourable soil than the conservative Category 4/possibly 5 basis on which RM150552 was granted — with a compliant on-site system designed and installed prior to occupation. The building consent design therefore confirmed disposal conditions at least as favourable as those assumed at subdivision and demonstrates that the deferral mechanism under condition r) operated as intended.

### 3.4.3 Current Proposal

An individual on-site wastewater disposal system will be designed for each new residential building platform at time of future development, and a reticulated communal system is not proposed.

Geoconsulting Ltd's assessment of the proposed building platforms (**Appendix D1**) describes ground conditions that are consistent across the site and comparable to those underlying the existing Lot 1 platform. The soakage and effluent-disposal characteristics of the new platforms are therefore expected to be materially the same as those already established, and no new geological or soakage investigation specific to wastewater has been undertaken at this stage.

Consistent with the approach accepted under RM150552, each disposal system is best designed once the dwelling footprint and curtilage are known and informed by site-specific soils and soakage testing.

Design will accordingly be undertaken at building consent stage in accordance with AS/NZS 1547:2012.

It is therefore recommended that a consent notice equivalent to RM150552 condition r) be registered against proposed Lots 2 to 7, requiring that, at the time a dwelling is erected on the lot, the owner engage a suitably experienced person (as defined in sections 3.3 and 3.4 of AS/NZS 1547:2012) to design an on-site effluent disposal system in compliance with AS/NZS 1547:2012, informed by site-specific site and soils investigation, subject to Council review prior to implementation and installed prior to occupation. The existing consent notice will remain in force for proposed Lot 1.

#### **3.4.4 Vesting of Assets**

The proposed future on-site wastewater systems are intended to be private and will not vest in Queenstown Lakes District Council. Each system will remain the responsibility of the individual lot owner, with the design and installation obligation secured through the consent notice mechanism described above.

### **3.5 Water Supply**

#### **3.5.1 Supporting Documents**

##### **Drawings**

- ▶ None

##### **Other Documents**

- ▶ None

#### **3.5.2 Existing Infrastructure**

There is no QLDC reticulated water supply network in the vicinity of the site. Potable water to the existing residential building platform is supplied from an on-site groundwater bore.

The bore was constructed under Otago Regional Council land use consent RM17.008.01, which authorises the construction of one production bore for domestic and stock drinking water for an unlimited term, with construction to NZS 4411:2001. The consent authorises bore construction only and does not specify an abstraction limit, the taking of groundwater for domestic and stock use being a permitted activity under the Regional Plan: Water for Otago.

Under RM150552, the bore was accepted as the water supply to the Lot 1 DP 533538 building platform, with Engineering Acceptance granted on 3 April 2019. Southdrill's bore log (21 September 2018) records a 150 mm bore to approximately 107.5 m depth, with an observed yield of the order of 10 L/min over a 20-hour development and test period. The installed plant comprises a Lowara 1GS07 0.75 kW submersible pump and Kelco controller, rated to deliver approximately 18 L/min from 90 m, reticulated by a short lateral to the Lot 1 building platform as recorded on the RM150552 as-built.

Eurofins' water quality analysis (23 January 2019) records compliance with the health-related maximum acceptable values then applicable, with aesthetic exceedances for turbidity, iron and manganese consistent with an untreated schist-gravel groundwater source.

RM150552 secured the supply by consent conditions and a consent notice registered against the Lot 1 DP 533538 title. Condition s) required domestic water and firefighting storage at the time a dwelling is erected (a static firefighting reserve within a combination tank, to SNZ PAS 4509:2008), and conditions 10(d) and 10(e) required water quality testing and, if necessary, treatment to a potable standard. Consistent with condition s), a water storage tank has since been installed at the former lateral terminus.

### **3.5.3 Current Proposal**

The development will continue to rely on the existing bore to supply potable water to the residential building platforms, with a private reticulated supply extended to each new lot and storage provided at each platform.

#### **Water demand**

Adopting the QLDC Code of Practice (2025) design allowance of 700 L per person per day at three persons per dwelling, demand is 2,100 L/day per lot, or 14,700 L/day for the seven proposed lots.

#### **Abstraction**

Under Rule 12.2.2.1 of the Regional Plan: Water for Otago, the taking and use of groundwater for domestic needs and the needs of animals for drinking water is a permitted activity, provided no take exceeds 25,000 L/day and the taking has no adverse effect on the environment. No instantaneous rate limit applies to this take. The assessed demand of 14,700 L/day is within the permitted daily volume, so abstraction for the development is a permitted activity and no water permit is required. Any future farming operation on the balance land would be undertaken within the same permitted take.

#### **Capacity**

Southdrill's bore log indicates a yield of the order of 10 L/min, equivalent to approximately 14,400 L/day on continuous abstraction. This is of the same order as the conservative Code of Practice design demand; in practice average daily consumption is lower than the 700 L per person per day allowance, per-lot storage buffers peak demand from the abstraction rate, and the installed pump provides mechanical headroom. Confirmation of the sustainable bore yield, and any consequent pump or bore upgrade required to meet the full development demand, will be undertaken by pump testing at detailed design and is recommended as a condition of consent.

#### **Reticulation**

A private reticulated supply will be extended from the bore to each building platform. Detailed design of the reticulation and any pump upgrade will be undertaken at the engineering acceptance stage.

#### **Drinking water quality and regulation**

The supply will serve seven dwellings, an assessed population of approximately 21 persons at three persons per dwelling. As a supply serving fewer than 25 people in domestic dwellings, it is a shared domestic supply and falls outside the registration and drinking water safety plan requirements of the Water Services Act 2021. Eurofins' historical analysis indicates the source meets the health-related

standards with aesthetic exceedances; as this data predates the current standards and is more than five years old, the water will be re-tested against the Water Services Act 2021, the Water Services (Drinking Water Standards for New Zealand) Regulations 2022 and the Aesthetic Values for Drinking Water Notice 2022 at detailed design. Where treatment is required to meet those standards — anticipated to comprise filtration and UV disinfection to address the aesthetic determinants and provide a microbial barrier — it will be provided at each lot. This testing and treatment obligation will be secured on the new lots by consent notice, consistent with current QLDC practice.

## **Firefighting**

SNZ PAS 4509:2008 is the applicable firefighting water supply standard; as applied to the comparable RM150552 consent it required a static firefighting reserve of 20,000 L within a 30,000 L combination tank. Patersons is aware that QLDC's and FENZ's current position, as applied to comparable subdivisions, is to require a greater static reserve of 45,000 L within a 55,000 L combination tank. The development accordingly proposes a 45,000 L static firefighting reserve within a 55,000 L combination tank (or equivalent) at each lot, together with the FENZ access, coupling and signage requirements of SNZ PAS 4509:2008 in accordance with QLDC's standard practice. A domestic sprinkler alternative is not proposed. These arrangements will be secured on the new lots by consent notice and installed at the time each dwelling is erected.

## **Consent notices**

The reticulated supply network, and any bore works arising from confirmation of sustainable yield (including pump or bore upgrade), will be provided and resolved at the time of subdivision. Deferred to consent notice on Lots 2–7, to be completed at the time a dwelling is erected, are the lot-level works ie. the supply and installation of the potable and firefighting storage tanks, the FENZ hardstand, coupling and signage, and the ongoing monitoring and treatment of drinking water quality to the current standards. Lot 1 retains the existing dwelling and remains subject to its RM150552 consent notice obligations.

### **3.5.4 Vesting of Assets**

The water supply is private and no water supply or firefighting assets will be vested in Council. The bore, reticulation and per-lot storage will be privately owned and maintained, with supply to the new lots secured by easement and by the consent notices described above.

## **3.6 Electricity Supply**

### **3.6.1 Supporting Documents**

#### **Drawings**

- ▶ None

#### **Other Documents**

- ▶ Appendix D5: Aurora Energy Ltd – Electricity Supply Availability Letter

### 3.6.2 Existing Infrastructure

Aurora Energy Limited owns and operates the electricity network servicing the area surrounding the site. Lot 1 has an existing electrical supply to the approved residential building platform, installed under RM150552.

### 3.6.3 Current Proposal

Aurora Energy Limited has confirmed in writing that a Point of Supply can be made available for the proposed seven-lot subdivision, refer **Appendix D5**. The existing infrastructure will be extended to service each of the proposed residential building platforms prior to 224c certification. No street lighting is proposed.

### 3.6.4 Vesting of Assets

All new electrical assets will vest in Aurora Energy Limited. All necessary easements in gross will be provided.

## 3.7 Telecommunications Supply

### 3.7.1 Supporting Documents

#### Drawings

- ▶ None

#### Other Documents

- ▶ Appendix D6: Chorus NZ Ltd – Telecommunications Supply Availability Email

### 3.7.2 Existing Infrastructure

Chorus New Zealand Limited owns and operates the telecommunications network servicing the area. The nearest fibre infrastructure is understood to be at the intersection of Riverbank Road and Cardrona Valley Road. Chorus also holds infrastructure and easements in gross over the adjoining land to the north (Hill End Station / High Country Lane); whether this comprises fibre or the legacy copper network is not yet confirmed and will be investigated further during detailed design. Underground telephone services were required to be made available to the Lot 1 DP 533538 building platform under RM150552, consistent with a copper network servicing the immediate vicinity.

### 3.7.3 Current Proposal

Chorus New Zealand Limited has confirmed in writing that fibre connectivity can be provided to the development, refer **Appendix D6**. The high-level estimate to extend the fibre network reflects the approximately 1,940m extension required from 517 Riverbank Road, which for 6 (Lots 2-7) lots is potentially prohibitive. Chorus has further advised that it will not invest in extending the copper network.

The extent and capability of the existing Chorus infrastructure over the adjoining land to the north (Hill End Station / High Country Lane) will be investigated further during detailed design. Where fibre is

available and the network can be extended, an underground fibre connection will be provided to each residential building platform. Where extension of the Chorus fibre network is cost-prohibitive, each future lot owner will be responsible for installing their own wireless telecommunications solution, secured by consent notice on proposed Lots 2–7.

To retain flexibility, it is requested that Council consent an either/or scenario, being an underground fibre connection or a wireless solution.

### **Consent notice – suggested wording**

No hardwired telecommunication connection (wire or fibre optic) has been provided to the building platform. Any telecommunication reticulation that is subsequently installed shall be at the cost of the lot owner for time being and shall be underground and in accordance with the telecommunication network provider's requirements. Each lot owner will be responsible for installing necessary infrastructure (ie infrastructure such as, but not limited to, dish antennae and booster kits) to provide the wireless connection.

### **3.7.4 Vesting of Assets**

Where an underground fibre solution is provided, the telecommunications assets will vest in Chorus New Zealand Limited. Where a wireless solution is adopted, assets will be owned as required by the relevant service provider.

## **4. Conclusion**

The proposed seven-lot subdivision at 478 Cardrona Valley Road can be serviced by infrastructure that is appropriate to its rural character and consistent with the QLDC Land Development and Subdivision Code of Practice 2025. The assessment demonstrates that access, stormwater, wastewater, water supply, electricity and telecommunications can each be provided to the proposed lots, and that the associated effects can be appropriately managed.

Access is provided by upgrading the existing RM150552 accessway to the E1 standard along its established alignment, minimising earthworks and visual effect. Four departures from the Code of Practice are proposed, as set out in Table 4, and the associated non-compliances with Chapter 29 of the Proposed District Plan are the subject of this resource consent application and assessed against the relevant matters of discretion. Stormwater continues the regime accepted under RM150552, with overland-flow protection to the lower platforms. Wastewater and water supply rely on established on-site methods — on-site effluent disposal to AS/NZS 1547:2012 and the existing permitted groundwater bore — with per-lot storage and firefighting supply to SNZ PAS 4509:2008.

Road 1 and the water, wastewater and stormwater assets are to remain private; new electricity assets vest in Aurora Energy Limited, and, where fibre is provided, telecommunications assets vest in Chorus New Zealand Limited. Additional bore-yield testing, detailed design and lot-level servicing works can be secured through conditions of consent, Engineering Acceptance and consent notices on proposed Lots 2 to 7.

On this basis, the infrastructure required to service the subdivision can be delivered or secured via consent notices, and the proposal is considered acceptable from an infrastructure servicing perspective.



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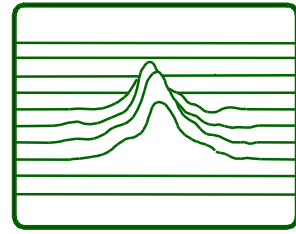
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# GEOTECHNICAL ASSESSMENT

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478 Cardrona Valley Road



Prepared for:

The Property Group

Client:

S & R Farrant

Date prepared:

18 November 2025

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## 1 INTRODUCTION

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Geoconsulting Ltd have been commissioned by S & R Farrant to carry out a geotechnical investigation for a proposed subdivision of their property at 478 Cardrona Valley Road (Lot 1 DP533538). The frontispiece provides a Google Earth view showing the approximate property outline.

### 1.1 BRIEF AND SCOPE

The brief for the work was provided to Geoconsulting from The Property Group Ltd by way of an email dated 29/10/25. On this property, it is proposed to create six new lots in addition to the main plot with existing house (to be known as Lot 1). Figure 1 shows a schematic layout of the subdivision.

The scope of work called for an assessment of the proposed building platforms to check their viability. In particular, to determine what impact natural hazards may have on each individual site.

### 1.2 WORK UNDERTAKEN

This assessment is based on a desk study of available Geoconsulting reports, other geotechnical reports available on QLDC Edocs and examination of relevant aerial photographs (1951 & 1958) from our library, lidar and satellite imagery. Of interest are the following documents:

- |                  |                                                                                                                                 |                      |
|------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------|
| • August 2018    | Branches Station                                                                                                                | Geoconsulting report |
| • September 2019 | 10 Curtis Rd                                                                                                                    | Geoconsulting report |
| • March 2014     | Larches Station                                                                                                                 | Geosolve report      |
| • March 2019     | General distribution and characteristics of active faults and folds in the Queenstown Lakes and Central Otago districts, Otago. |                      |
|                  |                                                                                                                                 | GNS report 2018/207  |

A walkover of all new lots was also undertaken.

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## 2 SITE DESCRIPTION

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The property occupies rolling hill country sloping to the northeast just off Cardrona Valley Road. The land is situated between a high and low level terraces with building platforms ranging in elevation from RL 387.89 (Lot 6) to RL 462.78 (Lot 3).

The bulk of the area to be subdivided was formerly part of a mixed conifer plantation but in recent years all trees have been felled and the ground cleared of stumps. Vegetation has yet to be re-established over most of the area. The remaining land comprising Lots 1 – 3 has retained the original grass pasture cover.

There are no well-established water courses running through the site and it is believed any runoff would drain towards the northeast being concentrated in shallow, ephemeral channels.

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### 3 GEOLOGY

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The lower Cardrona Valley is dominated by glaciofluvial sediments deposited following successive glacial advances. These sediments are mostly sandy gravels with interbedded sands and occasional bouldery horizons (collectively known as outwash gravels). The Geosolve report noted lake sediments (silts, silty sands and fine sands) in nearby outcrops adjacent to Cardrona Valley Rd which are presumed to underlie the outwash gravels. Schist forms the basement rock throughout the region and although exposed in the surrounding hills is expected to lie at substantial depth below the valley floor.

Loess, a wind-blown silt and fine sand, blankets the terrain throughout the area of interest. Exposures in cliff faces, cuttings and gullies show that a thickness between 0.8 – 1.0 m is typical. Erosion of steeper slopes has led to this overburden layer being thinner or absent altogether. In protected areas or areas of accumulation (e.g. Lot 3), loess thickness may be slightly greater.

No evidence for groundwater (e.g. springs or seepages) could be found on site. Although there is a significant catchment in the terrace above the property and slopes beyond it would appear that most rainfall infiltrates and drains away through the permeable gravels. The groundwater table is thus likely to lie at considerable depth unless some impervious layer is present that allows a perched water table to be present.

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### 4 GEOHAZARDS

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#### 4.1 FAULTING AND SEISMICITY

The lower Cardrona Valley marks the intersection of the Cardrona-Hawea Fault and the NW Cardrona Fault the latter of which is split into several strands of varying activity (Figure 2). The Cardrona-Hawea Fault has a calculated recurrence interval of 30,000 years whereas the NW Cardrona Fault is classified as 5,500 years<sup>1</sup> overall. A recent re-evaluation of the NW Cardrona Fault updates the recurrence interval to 13,200 years for overall fault rupture<sup>2</sup>. The former referenced report notes that the high glacial outwash terrace to the west of the site which is

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<sup>1</sup> Barrell DJA "General distribution and characteristics of active faults and folds in the Queenstown Lakes and Central Otago Districts" GNS Science Consultancy Report 2018/207, March 2019

<sup>2</sup> Barrell DJA "Review and update of active geological fault and fold characterisation in the Otago region" GNS Science Consultancy Report 2025/48, August 2025.

assigned to the Luggate Advance (60,000 years ago) shows no sign of displacement. However, suspected fault-related landforms have been recognised at the foot of the range northwest of the Hillend farm buildings. Although the evidence for fault activity is quite high, the recurrence interval is in the range of thousands of years rather than hundreds of years as with the Alpine Fault. This interval is acceptable for housing development.

## 4.2 SLOPE INSTABILITY

One landslide, described as an area of fine grained soils susceptible to sliding, is shown on both QLDC and ORC hazard webmaps (see Figure 3). Another landslide has been mapped in the Geosolve report but is outside the development area. Stereoscopic examination of 1951 and 1958 aerial photographs show a much larger feature leaving a well-defined rear scarp with a



Photo 1: View of rear scarp from east side of landslide.

Photo 2: Landslide from rear scarp looking down at building platform sites 4 & 5.

redistributed geometry leaving a displaced mass buttressing the toe.

Field work undertaken as part of this study indicates a very subdued and degraded feature (Photos 1 & 2). Field mapping found no evidence for hummocky topography, fresh scarps, tension cracks or other evidence for ongoing activity. A widely accepted framework for hazard assessment<sup>3</sup> considers landslide activity under three categories: active, dormant and relict. A relict classification is considered appropriate for this feature. Note that the building platforms for Lots 1, 2 & 3 lie outside the mapped landslide area shown on Figure 3.

## 4.3 GULLY EROSION

The loess cover in the area cleared of forest appears to be susceptible to gully erosion. This was noted in the Geosolve report dated 2014 and again during recent mapping. The gullying has been exacerbated by scarifying with a root raker during the forestry clearance. This has disturbed the

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<sup>3</sup> Cruden DM & Varnes DJ 1996 "Landslide types and processes; in 'Landslides – Investigation and Mitigation" Transportation and Research Board special report 247.

soil allowing rainfall to infiltrate and erode the soil to a greater depth causing new rills to develop and deepening of existing gullies (Photo 6).

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## 5 GEOTECHNICAL IMPLICATIONS OF DEVELOPMENT

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### 5.1 OVERVIEW

The seismicity and landslide hazards are probably interlinked; i.e. landslide reactivation is only likely to occur under localised fault movement. The likelihood of a coseismic event is thus considered very unlikely in the lifespan of residential buildings.

#### 5.1.1 LOT 2

Lot 2 building platform occupies an existing cut and fill platform currently used as a storage area (Photo 3). The fill portion of the platform is likely to have been loosely placed (end-tipped) and there may not have been any site stripping of topsoil at the interface of cut and fill. Foundation investigations are recommended beneath the footprint of any dwelling that overlies both cut and fill portions.



Photo 3: Lot 2 building platform marked by stake in centre.



Photo 4: Lot 3 building platform marked by stake in centre.

#### 5.1.2 LOT 3

The building platform is situated in a hollow between two hillocks with drainage towards the northwest (Photo 4). This area appears to be outside the area disturbed by landslide movement and forestry clearance. Loess accumulation is probably slightly greater in this saddle, however, the lack of disturbance and any catchment to concentrate runoff means gully erosion has not been able to establish. Determination of bearing capacity in the underlying soil is recommended.

#### 5.1.3 LOT 4

This site is located on gently dipping terrain at the foot of the rear scarp's concave slope (Photo 5). A poorly defined drainage line affects the site but only incipient rill erosion has developed above and below site. Soil mobilisation will be an issue but could be mitigated by slope revegetation and construction of a bund to redirect runoff either side of platform. Foundation investigations in scarified soil is recommended.

#### 5.1.4 LOT 5

The building platform is situated in an ephemeral drainage line with dip to the east. Active gullying is visible downslope (Photo 6) with incipient rill erosion in disturbed soil upslope. Soil mobilised by erosion is likely to accumulate on any formed platform. It is recommended to shift the building platform to higher ground on either side of the drainage line, revegetate surrounding bare soil and to undertake foundation investigations in the scarified soil.



Photo 5: Lot 4 building platform marked by stake in centre. Note rear scarp of landslide at back.



Photo 6: Lot 5 building platform marked by stake in centre. Note incipient gully erosion in front.

#### 5.1.5 LOT 6

This building platform is situated on a NNE facing slope at the foot of the property (Photo 8). A dry gully lies just to the west which probably carries ephemeral flows considering the catchment above. Some earthworks will be required on the 25° slope with a preference to locating any dwelling on the cut part of the platform. Investigations into cut slope stability and foundations are recommended.

#### 5.1.6 LOT 7

Lot 7 building platform sits in a shallow gully draining towards ESE (Photo 7). Catchment area above is very limited so ephemeral runoff is unlikely. Surrounding area was probably one of the first to be cleared and hence grass is slowly re-establishing. Minor earthworks are required on the 22° slope to form a platform for a dwelling. Foundation investigations are recommended.



Photo 7: Lot 7 building platform marked by stake in centre.



Photo 8: Lot 6 building platform behind pine tree in centre.

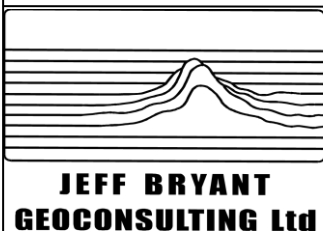
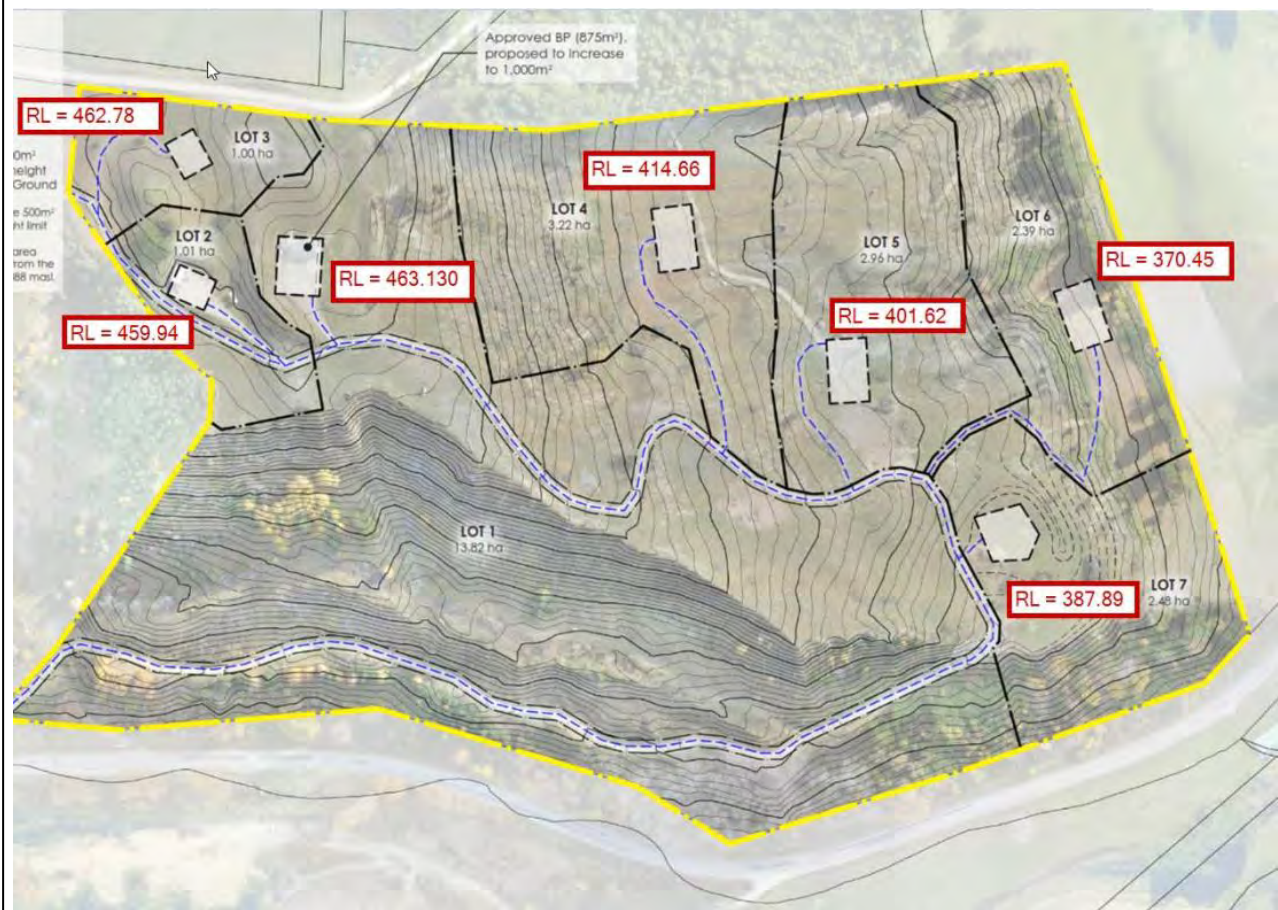
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## 6 CLOSURE

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The subdivision lies in rolling hill country dipping gently to the northeast. Slopes for each building platform range from flat to moderate (maximum 25°). Two significant hazards affecting the development are faulting and slope instability. The reactivation of the latter most likely would only occur as a coseismic event. Both have a high consequence potential but the recurrence interval is very long compared to the economic lifespan of residential dwellings. Gully erosion potential has increased in the area subject to forestry clearance but can be mitigated by appropriate measures such as revegetation and construction of diversion bunds for mobilised soil.

Geotechnical investigations are recommended in support of any building consent application.



PROJECT: 478 Cardrona Valley Road

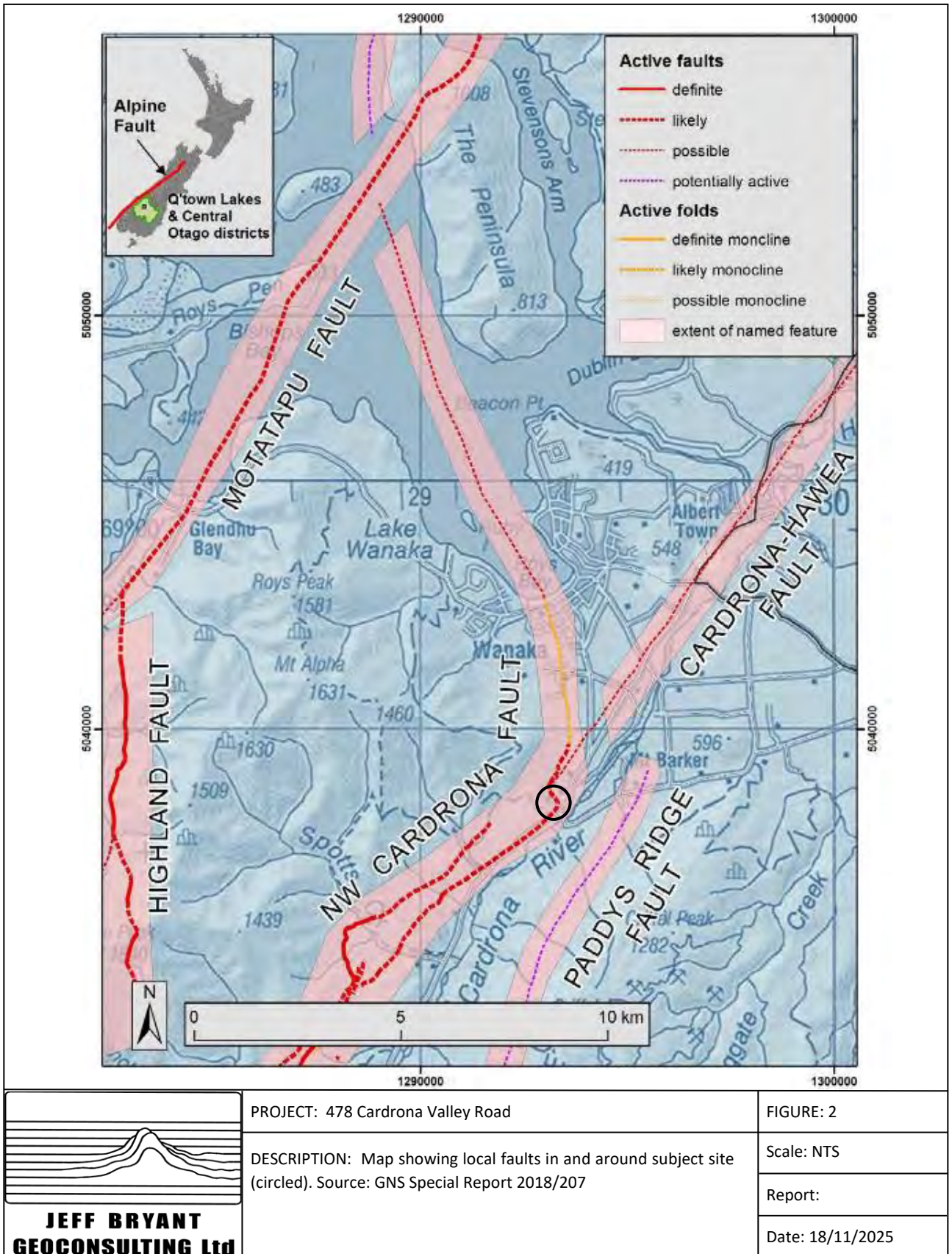
DESCRIPTION: Site plan showing scheme layout and location of building plots.

FIGURE: 1

Scale: NTS

Report:

Date: 18/11/2025





## Alex Todd

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**From:** Jeff Bryant <Jeff@geoconsulting.co.nz>  
**Sent:** Tuesday, 30 June 2026 9:55 am  
**To:** Alex Todd; Marc Bretherton; Rachel Farrant  
**Subject:** RE: [PAT P250584] 478 Cardrona Valley - Design update  
**Attachments:** DSCN3195.JPG; DSCN3198.JPG; DSCN3201.JPG

Morning all;

The following comments relate to the access road 1 leading up to the subdivision at 478 Cardrona Valley Road previously reported on by our earlier assessment (FarrantS251113) of last November. The current proposal requires some upgrading of the existing track to bring it up to minimum Council roading standards. The length of road under consideration is about 700 m from the Cardrona Valley Road intersection to the first property (Lot 7).

A site inspection was made on 11 June 2026 in the company of Marc Bretherton, Alex Todd and Shaun Farrant. The existing road has stable batters of 37-40° up to 15 m and smaller batters of 45 ° up to 2 m (photos 1 & 2). An exception is the batter adjacent to Lot 7 (photo 3) which has a sand layer interbedded in alluvial gravels. The sand has been susceptible to erosion by wind and frost heave leaving the overlying gravels unsupported and prone to collapse. It is not known how persistent this layer is but judging by the stability of the other batters, the erodible sand seems to be localised near that corner.

The proposed upgrading involves minor earthworks to ease corners and gradient but essentially follows the existing alignment.

Cuts at 45° up to 3 m high are considered feasible but long term performance will depend on establishing a comprehensive vegetation cover soon after excavation. This can be best achieved by prompt sowing of a grass seed and fertiliser mixture to ensure good coverage. The limited areas would suit sowing by hand. Preference should be given to staging the excavation to coincide with spring when germination and soil moisture are optimal. The eroding cut near Lot 7 should also be trimmed back and adjacent trees removed due to their likelihood of toppling with loss of underlying support. There are several proprietary products available for erodible soil slope protection during vegetation coverage but involve purchase of a 50 m roll e.g. A more economical way might be to apply a combination of hay bale slices and wire netting pinned to the slope by heavy duty wire or rebar staples to hold in place. Grass seed could be applied to the slope side of the hay first.

A few thin fill slopes are needed with the largest being at Section 4. Other sections show the edge of road coinciding with the existing slope. No information is available regarding whether the existing slope below the proposed upgrade is original ground or old, possibly end-tipped fill, associated with the existing road. Thin fills on old fill or topsoil plus vegetation will usually fail or settle due to an inability to compact when there is insufficient width. All new fills should first have the existing ground stripped and benched into good ground prior to placing fill. Bench width should be at least twice the width of

A heavy duty (450 kg) plate compactor and stepped progressively towards formation level. Fill placement should be in 200 mm thick layers and compacted with eight passes of the vibratory compactor. Local alluvial gravels, free of any oversize (>100 mm) particles and vegetation, topsoil or other contaminants should be used as fill. Such material should have suitable water content (5-8%) at this time of year but should be left to dry out if over wet and watered if too dry.

Regards

**Jeff Bryant**

**Geoconsulting Ltd.**

113 Peninsula Road  
 Queenstown 9300, N.Z.

 Mobile: 021 358035



E-mail: [jeff@geoconsulting.co.nz](mailto:jeff@geoconsulting.co.nz)

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# Onsite Wastewater Disposal Site & Soils Assessment

Use for Subdivision or Land Use Resource Consent



The design standard for waste water treatment and effluent disposal systems is AS/NZS 1547:2012. All references in this form relate to this standard.

Applications should provide sufficient information to demonstrate that all lots will be capable of accommodating an on-site system.

## Site Description

Property Owner: LARCHES STATION

Location Address: 446 CARDRONA VALLEY ROAD

WANAKA.

Legal Description (eg Lot3 DP1234) : SECI SO 453339

List any existing consents related to waste disposal on the site: N/A

General description of development / source of waste water: PROPOSED RESIDENCE.

The number and size of the lots being created: \_\_\_\_\_

## Site Assessment (refer to Tables R1 & R2 for setback distances to site features)

Land use TREES AND GRASS

Topography UNDULATING TERRACE AREA

Slope angle VARIES

Aspect NORTH EAST

Vegetation cover TREES WITH SOME GRASS

Areas of potential ponding NIL

Ephemeral streams GULLY TO SOUTHWEST OF PLATFORM AREA

Drainage patterns and overland paths NO DISTINCT PATTERNS AT PLATFORM

SITE

Flood potential (show with return period on site plan) NIL

Distance to nearest water body > 350m CARDRONA RIVER

NIL

---

Slope stability assessment details – summarise any areas unsuitable for waste water irrigation.

(Attach report if applicable): GEOSOLVE REPORT MARCH 2014 INDICATES THE AREA MAY BE SUBJECT TO SLOW CREEP DEFORMATION.

(Highest potential) Depth to ground water:

Summer >100m (IMPLIED IN GEOSOLVE REPORT.)

Winter \_\_\_\_\_

Information Source \_\_\_\_\_

What is the potential for waste water to short circuit through permeable soils to surface and / or ground water?

NIL

### Soil Investigation (Appendix C)

Field investigation date: RILEY CONSULTANTS (2010) GEOSOLVE (2014)

Number of test pit bores (C3.5.4): TWO (RILEY)

Soil investigation addendum to be attached that includes a plan showing test pit or bore location, log results and photos of the site profile.

If fill material was encountered during the soil investigation state how this will impact on the waste water system:

N/A

Average depth of topsoil: 250mm

Indicative permeability (Appendix G) : < 1.5m/day (Subsoil colluvium and till)

Percolation test method (refer to B6 for applicability) : —  
(attach report if applicable)

| Soil Category<br>(Table 5.1) | Soil Texture<br>(Appendix E) | Drainage         | Tick One                            |
|------------------------------|------------------------------|------------------|-------------------------------------|
| 1                            | Gravel and sands             | Rapid            |                                     |
| 2                            | Sandy loams                  | Free             |                                     |
| 3                            | Loams                        | Good             |                                     |
| 4                            | Clay loams                   | Moderate         | <input checked="" type="checkbox"/> |
| 5                            | Light clays                  | Moderate to slow |                                     |
| 6                            | Medium to heavy clays        | Slow             |                                     |

Reasons for placing in stated category:

SOIL DESCRIPTIONS BY RILEY CONSULTANTS AND GEOSOLVE

Loading rate, DLR (Table L1): 6 to 10 mm/day

Explanation for proposed loading rate: SUBJECT TO TEST PIT CONFIRMATION  
AT THE PLATFORM SITE.

### Recommendations from site and soils assessment

Specify any design constraints

Specify any areas unsuitable for location of the disposal field

Specify any unsuitable treatment and/or disposal systems

Propose suitable mitigation to enable successful effluent treatment

AVAILABLE EXISTING INFORMATION FROM WORK UNDERTAKEN  
CLOSE TO THE PLATFORM AREA BY RILEY CONSULTANTS AND  
GEO SOLVE CONFIRMS THE SITE LIES ON AN AREA  
UNDERLAIN VARIOUSLY BY GRAVELLY COLLUVIUM AND  
GLACIAL TILL. IN EACH CASE THE PERMEABILITY IS  
EXPECTED TO BE IN ACCORDANCE WITH THAT FOR A  
CATEGORY 4 SOIL, OR POSSIBLY CATEGORY 5.  
ON THE BASIS OF THIS INFORMATION IT IS CONCLUDED  
THAT THE SITE IS SUITABLE FOR ON-SITE WASTEWATER  
MANAGEMENT BUT APPROPRIATE SYSTEMS WILL BE  
LIMITED TO PRIMARY SYSTEMS WITH LPED EFFLUENT DISPOSAL  
OR TWO STAGE TREATMENT SYSTEMS.

### Attachments Checklist

☐

Copy of existing consents

☒

Soil investigation addendum

☒

To scale site plan, the following must be included on the plan:

Buildings

Boundaries

Retaining Walls

Embankments

Water bodies

Flood potential

Other septic tanks / treatment systems

Water bores

Existing and proposed trees and shrubs

Direction of ground water flow

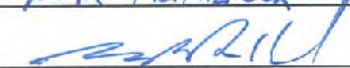
Note that an Otago Regional Council (ORC) consent may also be required to discharge domestic waste water to land if any of the following apply:

- Daily discharge volume exceeds 2,000 litres per day
- Discharge will occur in a groundwater protection zone
- Discharge will occur within 50 metres of a surface water body (natural or manmade)
- Discharge will occur within 50 metres of an existing bore/well
- Discharge will result in a direct discharge into a drain/water ace/ground water
- Discharge may runoff onto another persons' property

If any of these apply then we recommend that you correspond with the ORC;

Otago Regional Council  
 "The Station" (upstairs)  
 Cnr. Camp and Shotover Streets  
 P O Box 958  
 Queenstown 9300  
 Tel: 03 442 5681

I believe to the best of my knowledge that the information provided in this assessment is true and complete. I have the necessary experience and qualifications as defined in Section 3.3 AS/NZS 1547:2012 to undertake this assessment in accordance with the requirements of AS/NZS 1547:2012:

Company: PETHERICK CONSULTANCY LTD  
 Email: pethric@ihug.co.nz  
 Phone number: 03 448 6319 0274 736 657  
 Name: M R PETHERICK  
 Signature:   
 Date: 22-4-15

Queenstown Lakes District Council  
 Private Bag 50072  
 10 Gorge Road  
 QUEENSTOWN 9348

**Phone:** 03 441 0499  
**Fax:** 03 442 4778  
**Email:** services@qldc.govt.nz  
**Website:** www.qldc.govt.nz

|                                                                                           |      |
|-------------------------------------------------------------------------------------------|------|
| 10815-D11004                                                                              | REV. |
| FEELS (3)                                                                                 |      |
| AS SHOWN                                                                                  |      |
| DRAWING No.                                                                               |      |
| 10815-03                                                                                  |      |
|  NORTH |      |

HILLEND STATION SUBDIVISION GEOTECHNICAL ASSESSMENT  
SITE ENGINEERING GEOLOGY PLAN - UPPER TERRACE AREA

**RILEY**  
CONSULTANTS  
P.O. BOX 4355  
CHRISTCHURCH  
TEL. 03-3794402  
FAX. 03-3794403

|     |             |                    |                            |
|-----|-------------|--------------------|----------------------------|
| 0   | FIRST ISSUE | AW TOLO            | DATE DRAWN<br>OCTOBER 2010 |
| REV | DESCRIPTION | BY DATE            |                            |
|     |             | DRAWN BY           | (SIGNED)                   |
|     |             | CHECKED BY         |                            |
|     |             | DESIGN CHECKED BY  |                            |
|     |             | APPROVED FOR ISSUE |                            |

|                                                                     |  |                                                                                                            |  |                                  |  |                         |  |
|---------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------|--|----------------------------------|--|-------------------------|--|
| <b>RILEY CONSULTANTS</b><br><small>Engineers and Geologists</small> |  | <b>Riley Consultants</b><br>395 Madras Street<br>CHRISTCHURCH 8011<br>Tel: 03.379.4402<br>Fax: 03.379.4403 |  | TEST PIT LOG                     |  |                         |  |
| Project:<br>Hillend Station Subdivision                             |  | Location:<br>Wanaka, Central Otago                                                                         |  | Hole position:<br>Lot 10         |  | No.:<br><br><b>TP09</b> |  |
| Job No.:<br>10815                                                   |  | Start Date: 30-09-10<br>Finish Date: 30-09-10                                                              |  | Ground Level (m LINZ):<br>482.00 |  |                         |  |
| Client:<br>JIT Hillend Ltd                                          |  |                                                                                                            |  | Hole Depth:<br>6.05 m            |  | Sheet:<br>1 of 1        |  |

| Elevation (m LINZ) | Depth (m) | Geological Description                                                                                                               | Symbolic Log | Weathering | Field Strength | Scala Penetrometer (blows / 50 mm) | Samples | Tests                                                                                   |
|--------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|----------------|------------------------------------|---------|-----------------------------------------------------------------------------------------|
| +482.00            |           |                                                                                                                                      |              |            |                |                                    |         |                                                                                         |
| +481.75            | 0.25      | Brown SILT with minor gravel, rootlets (TOPSOIL)                                                                                     |              |            |                |                                    |         | No. 1<br>↓<br>2, 1, 3,<br>3, 5, 3,<br>3, 5, 3,<br>3, 2, 2,<br>3, 4, 4,<br>4, 4, 5,<br>6 |
|                    | 1         | Silty SAND with trace to minor gravel (penetration test) (COLLUVIUM)                                                                 |              |            |                |                                    |         |                                                                                         |
| +480.70            | 1.30      | Silty GRAVEL/COBBLE to gravelly SILT with minor sand. Gravel sub-rounded HW-MW schist (GLACIAL TILL)                                 |              |            |                |                                    |         |                                                                                         |
|                    | 2         | Light yellowish brown SAND with minor silt and gravel. Gravel                                                                        |              |            |                |                                    |         |                                                                                         |
|                    | 3         | 2.50 m - 3.20 m Lens of light yellowish brown SAND with minor silt and gravel. Gravel, HW-MW sub-rounded, moderately strong, tabular |              |            |                |                                    |         |                                                                                         |
|                    | 4         | 3.20 m Becomes less sandy                                                                                                            |              |            |                |                                    |         |                                                                                         |
| +477.00            | 5.00      | Silty GRAVEL/COBBLE with minor sand and boulders                                                                                     |              |            |                |                                    |         |                                                                                         |
| +475.95            | 6.05      | EOH @ 6.05 m                                                                                                                         |              |            |                |                                    |         |                                                                                         |
|                    | 7         |                                                                                                                                      |              |            |                |                                    |         |                                                                                         |
|                    | 8         |                                                                                                                                      |              |            |                |                                    |         |                                                                                         |

**SKETCH:**

**MAP**

|                                        |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                     |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Shoring/Support:<br>Stability: Stable  | Small Disturbed Sample<br>Large Disturbed Sample<br>U100 Undisturbed Sample<br>Permeability Test<br>Clegg Hammer, test repetitions (IV)<br>Insitu Vane Shear Strength (kPa)<br>P=Peak, R=Residual,<br>UTP=Unable to penetrate<br>Scale Penetrometer - blows/50mm | GROUNDWATER <input checked="" type="checkbox"/> None<br><input type="checkbox"/> Slow Seep (depth )<br><input type="checkbox"/> Rapid Inflow (depth )<br>PIT TERMINATED DUE TO:<br><input type="checkbox"/> Target depth <input type="checkbox"/> Collapse<br><input type="checkbox"/> Refusal <input checked="" type="checkbox"/> Machine limit | <b>Remarks</b><br>WP51, Referred to as TP8 in field notes.<br>Located at edge of slope below BP10<br>Note: tight ground encountered during installation fence posts down tree-line. |
| All dimensions in metres<br>Scale 1:75 |                                                                                                                                                                                                                                                                  | Contractor:<br>Rig/Plant Used:<br>Machine Excavator (20 tonne)                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                     |
|                                        |                                                                                                                                                                                                                                                                  | Logged by:<br>AvD                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                     |
|                                        |                                                                                                                                                                                                                                                                  | Checked by:                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                     |

RILEY AGS 3.1 NZ LIB 11.GLB Log RILEY TP - SCALA 10815 - HILLEND STATION.GPJ &lt;&lt;drawingfile&gt;&gt; 22/10/2010 16:36 Produced by gINT Professional

|                                                      |  |                                                                                                     |  |                               |  |                         |  |
|------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------|--|-------------------------------|--|-------------------------|--|
| <b>RILEY CONSULTANTS</b><br>Engineers and Geologists |  | Riley Consultants<br>395 Madras Street<br>CHRISTCHURCH 8011<br>Tel: 03.379.4402<br>Fax: 03.379.4403 |  | TEST PIT LOG                  |  |                         |  |
| Project: Hillend Station Subdivision                 |  | Location: Wanaka, Central Otago                                                                     |  | Hole position: Lot 12         |  | No.:<br><br><b>TP10</b> |  |
| Job No.: 10815                                       |  | Start Date: 30-09-10<br>Finish Date: 30-09-10                                                       |  | Ground Level (m LINZ): 467.00 |  |                         |  |
| Client: JIT Hillend Ltd                              |  |                                                                                                     |  | Hole Depth: 5.60 m            |  | Sheet: 1 of 1           |  |

| Elevation (m LINZ) | Depth (m) | Geological Description                                                                                                                                                                                                                                                                                                                                                                                                          | Symbolic Log | Weathering | Field Strength | Scale Penetrometer (blows / 50 mm) | Samples | Tests |
|--------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|----------------|------------------------------------|---------|-------|
| +467.00            |           | Soil Description: subordinate, particle size: MAJOR, minor, colour, structure, strength, moisture condition, grading, bedding, plasticity, sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).<br>Rock Description: weathering, colour, texture, fabric and orientation; NAME; strength; additional description. (GEOLOGIC UNIT). |              |            |                |                                    |         |       |
| +466.75            | 0.25      | Brown SILT with minor gravel, rootlets (TOPSOIL)                                                                                                                                                                                                                                                                                                                                                                                |              |            |                |                                    |         |       |
| +466.30            | 0.70      | Yellowish brown silty GRAVEL (COLLUVIUM OR GLACIAL TILL?)                                                                                                                                                                                                                                                                                                                                                                       |              |            |                |                                    |         |       |
|                    | 1         | 0.25 m - 0.45 m Grey fine GRAVEL lens, no fines. Gravel, sub-angular                                                                                                                                                                                                                                                                                                                                                            |              |            |                |                                    |         |       |
|                    | 2         | GCB with some to minor silt and sand. Homogeneous, moist to wet. Gravel, sub-angular to sub-rounded, MW, tabular, schist; 50%+ by volume 2-20mm diameter                                                                                                                                                                                                                                                                        |              |            |                |                                    |         |       |
|                    |           | 1.70 m Minor spalling when dug below here                                                                                                                                                                                                                                                                                                                                                                                       |              |            |                |                                    |         |       |
|                    | 3         |                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |            |                |                                    |         |       |
|                    | 4         |                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |            |                |                                    |         |       |
|                    | 5         |                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |            |                |                                    |         |       |
| +461.40            | 5.60      | EOH @ 5.60 m                                                                                                                                                                                                                                                                                                                                                                                                                    |              |            |                |                                    |         |       |

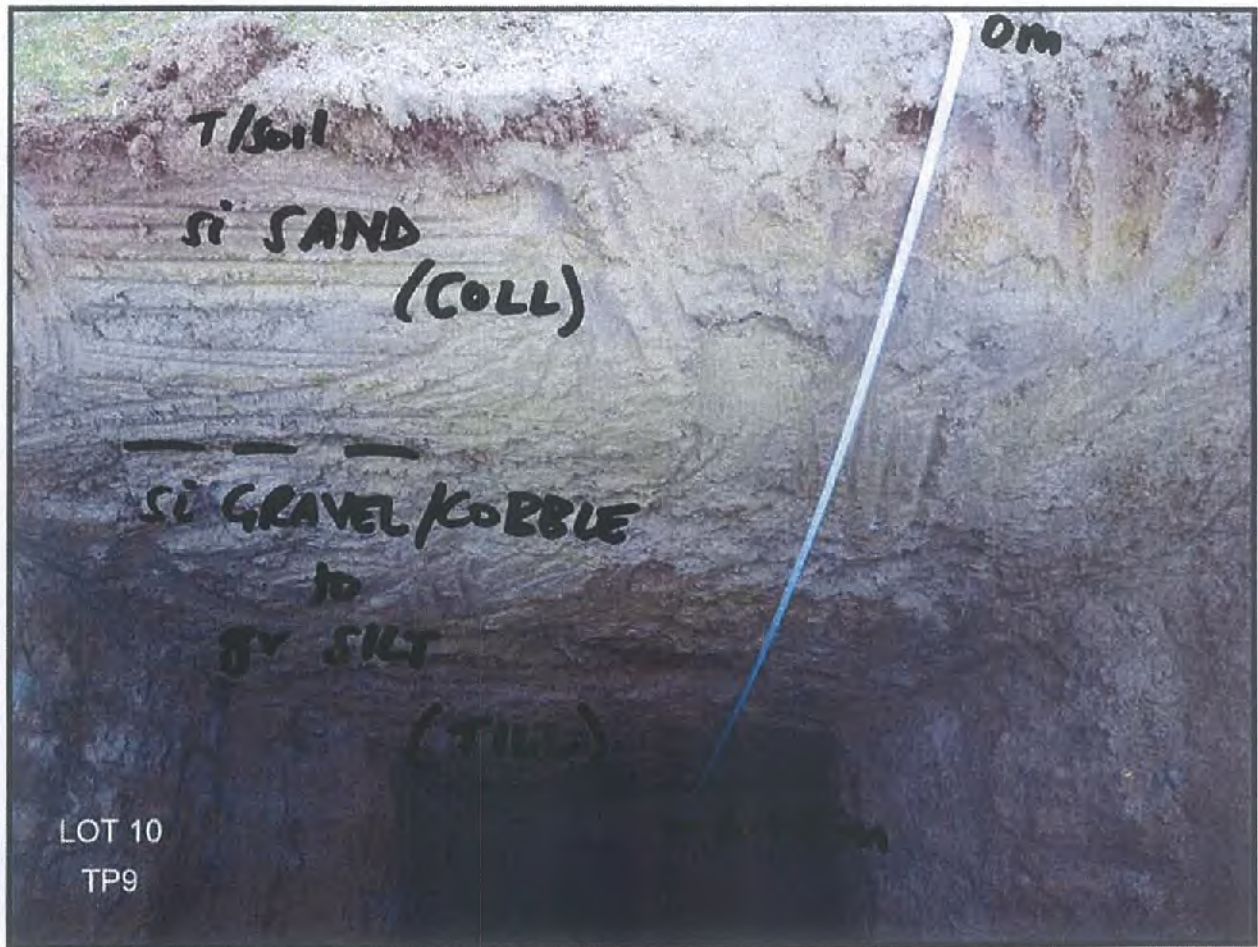
**SKETCH:**

**MAP**

|                                           |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                 |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Shoring/Support:<br>Stability: Stable<br> | <ul style="list-style-type: none"> <li>● Small Disturbed Sample</li> <li>○ Large Disturbed Sample</li> <li>■ U100 Undisturbed Sample</li> <li>• Permeability Test</li> <li>▼ Clagg Hammer; test repetitions (N)</li> <li>✓ Insitu Vane Shear Strength (kPa)</li> <li>P=Peak, R=Residual, UTP=Unable to penetrate</li> <li>▼ Scale Penetrometer - blows/50mm</li> </ul> | <b>GROUNDWATER</b> <input checked="" type="checkbox"/> None<br><input type="checkbox"/> Slow Seep (depth )<br><input type="checkbox"/> Rapid Inflow (depth )<br><b>PIT TERMINATED DUE TO:</b><br><input checked="" type="checkbox"/> Target depth <input type="checkbox"/> Collapse<br><input type="checkbox"/> Refusal <input type="checkbox"/> Machine limit | <b>Remarks</b><br>WP52, Referred to as TP9 in field notes.<br>Excavated at top of fault scarp 20m east of BP12. |
| All dimensions in metres<br>Scale 1:50    |                                                                                                                                                                                                                                                                                                                                                                        | Contractor:                                                                                                                                                                                                                                                                                                                                                    | Rig/Plant Used:<br>Machine Excavator (20 tonne)                                                                 |
|                                           |                                                                                                                                                                                                                                                                                                                                                                        | Logged by:<br>AvD                                                                                                                                                                                                                                                                                                                                              | Checked by:                                                                                                     |

RILEY AGS 3.1 NZ LIB 11.GLB Log RILEY TP + SCALA 10815 - HILLEND STATION.GPJ &lt;&lt;DrawingFile&gt;&gt; 22/10/2010 16:36 Produced by JNT Professional



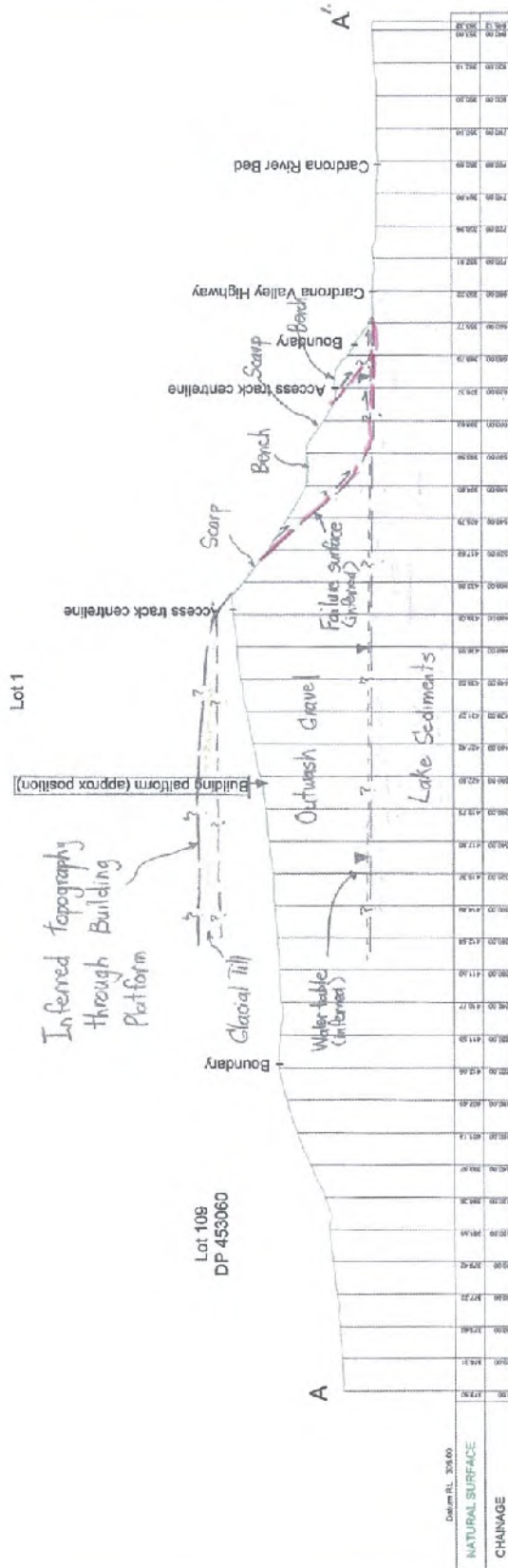


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## NOTES

1. The contractor shall be responsible for loading all existing services prior to commencement of work. The contractor shall make good all their own excavations and any damage to existing services.
2. Levels are in terms of Dunedin vertical datum 1958.
3. Station levels sourced from GDS1 (GDA) data obtained March 2014.
4. GDA source data courtesy of Land Information New Zealand.



Section A - A'  
 Hz & Vert Scale 1:3000 @ A3  
 (No vertical exaggeration)

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**J Robertson**  
 Larches Stn  
 Wanaka

Figure 2  
 Section A-A'

|             |            |               |     |       |                       |
|-------------|------------|---------------|-----|-------|-----------------------|
| Surveyed by | DR         | Original Size | A1  | Scale | Hz & Vert 1:3000 @ A3 |
| Designed by | DR         |               |     |       |                       |
| Drawn by    | DR         |               |     |       |                       |
| Checked by  | DR         |               |     |       |                       |
| Approved by | DR         |               |     |       |                       |
| Project No. | 104800     | Revision      | 200 | Scale | DO NOT SCALE          |
| Date        | 12/03/2014 | Drawn by      |     |       |                       |

# AF-OSW Onsite Wastewater Disposal Application Form



## INTRODUCTION

The objective of this form is to collate the required information that will support QLDC with evaluating the risk of the proposed Onsite Wastewater Disposal system in terms of Building Code compliance (G13), RMA Act and Environmental and Public Health requirements.

## REFERENCES

The design standard for waste water treatment and effluent disposal systems is **AS/NZS 1547:2012**. All references within this form relate to this standard.

## RISK BASED APPROACH

QLDC has adopted a risk based approach which involves evaluating key factors relating to the system design and site and soil features to ensure that any risk to environment or public health is fully mitigated. The key potential risks that QLDC will consider include, but are not limited to, the following:

### High risks

- Pathogen risks

### Moderate risk

- Odours
- Loss of amenity service due to technology failure, power outage
- High capital and/or operating costs

### Minor risks

- Slope instability on the steeper sites
- Noise
- Risk to cultural values
- Nutrients (nitrogen and phosphorus) and emerging contaminants

## HIGH RISK APPLICATIONS

Throughout this application form there are a number of information fields that are highlighted in red. These relate to key risk factors that the system designer must consider during their design process. If these risks are present then an explanation of what design mitigations have been taken is required.

For systems that breach the requirements of Section 3, you will be required to raise an application with the Otago Regional Council for a Resource Consent. Once the ORC Resource Consent has been granted it can be referenced as part of the QLDC Building Consent Application.

QLDC reserves the right to engage expert peer review of applications that are either very high risk, or system designs which appear to have inadequate design mitigations in place. The cost of this will be on-charged to the applicant as part of their building consent fees.

APPLICATION FORM CONTENTS

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1 SITE DESCRIPTION

|                                                                            |                             |
|----------------------------------------------------------------------------|-----------------------------|
| Property Owner:                                                            | Rob Mcphee                  |
| Location Address:                                                          | 478 Cardrona Road, Wanaka   |
| Legal Description (e.g. Lot3 DP1234) :                                     | Lot 1, DP 533538            |
| List any existing consents related to waste disposal on the site:          | RM191076 - Resource Consent |
| General description of development and describe all sources of wastewater: | Proposed Relocated Home.    |

2

SITE ASSESSOR, DESIGNER AND INSTALLER DETAILS

2.1

SITE ASSESSOR

|                                     |                                |       |             |
|-------------------------------------|--------------------------------|-------|-------------|
| Company                             | Riley Consultants              |       |             |
| Contact Name                        |                                | Phone | 03 379 4402 |
| Qualifications/Technical Experience | Civil & Geotechnical Engineers |       |             |

2.2

SYSTEM DESIGNER

|                                     |                                |       |            |
|-------------------------------------|--------------------------------|-------|------------|
| Company                             | Simply Plumb                   |       |            |
| Contact Name                        | Alastair Gillespie             | Phone | 0274995273 |
| Qualifications/Technical Experience | Certified Drainlayer & Plumber |       |            |

2.3

SYSTEM INSTALLER

|                                     |                                |       |            |
|-------------------------------------|--------------------------------|-------|------------|
| Company                             | Simply Plumb                   |       |            |
| Contact Name                        | Alastair Gillespie             | Phone | 0274995273 |
| Qualifications/Technical Experience | Certified Drainlayer & Plumber |       |            |

2.4

SERVICING TECHNICIAN/COMPANY

|         |              |       |            |
|---------|--------------|-------|------------|
| Company | Simply Plumb | Phone | 0274995273 |
|---------|--------------|-------|------------|

3

ORC RESOURCE CONSENT REQUIREMENTS:

Please complete below checklist to confirm whether an Otago Regional Council (ORC) resource consent will be required to discharge domestic waste water in the Queenstown Lakes District:

| Yes                      | No                                  | System Requirement                                                                                                                     |
|--------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Daily discharge volume exceeds 2,000 litres per day                                                                                    |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Discharge will occur in a groundwater protection zone or in the Lake Hayes catchment                                                   |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Discharge will occur within 50 metres of a surface water body                                                                          |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Discharge will occur within 50 metres of an existing bore/well used to supply water for domestic needs or drinking water for livestock |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | There will be a direct discharge into a drain, water race or groundwater                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Discharge may runoff onto another persons' property                                                                                    |

If any of these apply then you will need to make an ORC resource consent application for domestic wastewater discharges to land with a maximum volume of 14,000 litres. The application form for this is [Form 6A](#).

Once the ORC consent has been granted please enter the reference number below and provide a copy of the approved ORC consent.

|                              |          |
|------------------------------|----------|
| ORC Resource Consent Number: | RM191076 |
|------------------------------|----------|

4

SITE ASSESSMENT DETAILS

For the areas where the treatment plant and land application system and reserve area are to be located, please provide the following information:

|                                                                            |                                        |
|----------------------------------------------------------------------------|----------------------------------------|
| Land use description:                                                      | Trees & Grass                          |
| Topography:                                                                | Undulating terraced area.              |
| Slope angle:                                                               | Varies                                 |
| Vegetation cover:                                                          | Trees with some grass                  |
| Are there areas of potential ponding?                                      | No                                     |
| Are there risks associated with drainage patterns and overland flow paths? | No distinct patterns at platform area. |

|                                                                                                                               |                                                                                                                                                        |                            |
|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Does site have Flood potential?<br>(show with return period on site plan)                                                     | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                    |                            |
|                                                                                                                               | If Yes, please provide information below on what design considerations have been adopted to mitigate this risk (e.g. elevated tanks, sealed lids etc.) |                            |
|                                                                                                                               |                                                                                                                                                        |                            |
| Is the system within 100m distance to nearest open water bodies, ephemeral streams and wetland?                               | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                    |                            |
|                                                                                                                               | If Yes, please provide information below on what design considerations have been adopted to mitigate this risk.                                        |                            |
|                                                                                                                               |                                                                                                                                                        |                            |
| Is the system within 50m distance to stormwater drains and stormwater soakage areas?                                          | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                    |                            |
|                                                                                                                               | If Yes, please provide information below on what design considerations have been adopted to mitigate this risk.                                        |                            |
|                                                                                                                               |                                                                                                                                                        |                            |
| Are Water bores within 50m?<br>(reference ORC Maps)                                                                           | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                    |                            |
|                                                                                                                               | If Yes then an ORC resource consent is required                                                                                                        |                            |
| Are there are other key site features that may affect the system design?                                                      | No                                                                                                                                                     |                            |
| Slope stability assessment- For land slopes greater than 15° (25%) summarize any areas unsuitable for waste water irrigation. | No on proposed platform site.                                                                                                                          |                            |
| What is the depth to the highest potential ground water level:                                                                | Summer:                                                                                                                                                | >100m                      |
|                                                                                                                               | Winter:                                                                                                                                                |                            |
|                                                                                                                               | Information Source:                                                                                                                                    | Implied in Geosolve Report |
| Is there potential for waste water to short circuit through permeable soils to surface and / or ground water?                 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                    |                            |
|                                                                                                                               | If Yes, please provide information below on what design considerations have been adopted to mitigate this risk.                                        |                            |
|                                                                                                                               |                                                                                                                                                        |                            |

5 SOIL INVESTIGATION

For the areas where the land application system and reserve area are to be located, provide the following information

|                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Has a Site Specific Field investigation been completed? Is Report attached?                                                                                                                    | <div><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</div> <div>Note: Report shall include a plan showing test pit or bore location, and a detailed soils report in accordance with Table B2 and Figure B1 or and equivalent format and detail.</div> <div>Photos of the profiles and soils shall be included including photos of soil ribbon tests (Section E4.1)</div> |
| Field investigation date:                                                                                                                                                                      | 2010 & 2014                                                                                                                                                                                                                                                                                                                                                                                  |
| Number of test pits or bores:                                                                                                                                                                  | 2                                                                                                                                                                                                                                                                                                                                                                                            |
| If fill material was encountered during the soil investigation, describe the fill material and explain how this will impact on the waste water land application system design and performance? | N/A.                                                                                                                                                                                                                                                                                                                                                                                         |
| Has the soil permeability beneath the proposed land application field been tested?                                                                                                             | <div><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</div> <div>If Yes please provide details of test method and results (e.g. Percolation test method (refer to B6 for applicability):</div> <div></div>                                                                                                                                                                |

6 SOIL CATEGORY

Based on the site investigation report please confirm the soil category that is present for the land application system.

| Select One                          | Soil Category (Table 5.1) | Soil Texture (Appendix E) | Drainage Characteristic | Risk limits for Groundwater Setback |
|-------------------------------------|---------------------------|---------------------------|-------------------------|-------------------------------------|
| <input type="checkbox"/>            | 1                         | Gravel and sands          | Rapid                   | 5m                                  |
| <input type="checkbox"/>            | 2                         | Sandy loams               | Free                    | 5m                                  |
| <input type="checkbox"/>            | 3                         | Loams                     | Good                    | 1.5m                                |
| <input checked="" type="checkbox"/> | 4                         | Clay loams                | Moderate                | 1.5m                                |
| <input type="checkbox"/>            | 5                         | Light clays               | Moderate to slow        | 0.6m                                |
| <input type="checkbox"/>            | 6                         | Medium to heavy clays     | Slow                    | 0.6m                                |

Is the groundwater level (refer section 4) within the above risk limits for the site?

☐ Yes ☒ No

If Yes, please provide information below on what system design considerations have been adopted to mitigate the risk to groundwater. For example:

- Secondary treatment
- Tertiary UV treatment
- Modified trench or bed details for category 1 soils to ensure even distribution

Note: The soil category and groundwater level will determine the required loading rate for the land application system. This needs to be specified in section 7.2 and should be referenced from L1, M1 or N1 tables.

7 SYSTEM DESIGN

7.1 SYSTEM INPUT INFORMATION

|                                                              |                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Property Water Supply                                        | <div><input type="checkbox"/> Council reticulation</div> <div><input checked="" type="checkbox"/> Water bore</div> <div><input type="checkbox"/> Rainwater collection</div> <div><input type="checkbox"/> Other- please provide details: <a href="#">Click to enter text.</a></div> |
| Total number of bedrooms that will be serviced by the system | 3                                                                                                                                                                                                                                                                                   |
| Maximum design occupancy                                     | 6-10                                                                                                                                                                                                                                                                                |



|                                                                                                      |                                                                         |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Flow allowance litres / day per person:<br>Refer to Appendix H, Table H3 and H4. Justify variations. |                                                                         |
| List any water conservation devices or water recycling details and volume estimates (Table H3):      | N/A                                                                     |
| Specify flow allowance for any other activity on the site such as spa baths, luxury showers etc:     | N/A                                                                     |
| List any allowance for seasonal variations and loads:                                                | N/A                                                                     |
| Total design flow allowance (litres per day):                                                        | Note: If above 2,000 litres per day an ORC resource consent is required |

7.2

SYSTEM SELECTION & CAPACITY

| Select One                                           | Proposed Treatment System               | Manufacturers Details | No. of Chambers and Capacity (litres) | Emergency Storage (litres) |
|------------------------------------------------------|-----------------------------------------|-----------------------|---------------------------------------|----------------------------|
| <input checked="" type="checkbox"/>                  | Primary System (e.g. Septic tank)       | Humes                 | 3300L                                 |                            |
| <input type="checkbox"/>                             | Secondary Treatment system <sup>1</sup> |                       |                                       |                            |
| <input type="checkbox"/>                             | Tertiary Treatment System               |                       |                                       |                            |
| <input type="checkbox"/>                             | Other:                                  |                       |                                       |                            |
| Rated treatment capacity of the system (litres/day): |                                         |                       |                                       |                            |
| Details of effluent filter:                          |                                         |                       |                                       |                            |

<sup>1</sup> For on-site wastewater management systems requiring secondary or better treatment, QLDC strongly recommends that applicants select treatment plants certified by the On-site Effluent Treatment National Testing Programme (OSET NTP), or an equivalent or better independent certifying organisation. These have been verified as meeting the secondary effluent treatment requirements of AS/NZS 1547.



| Select One                          | Proposed Land Application System | Design Description.<br>Please attach site plans/drawings | Design Loading Rate mm/day (DLR or DIR) |
|-------------------------------------|----------------------------------|----------------------------------------------------------|-----------------------------------------|
| <input type="checkbox"/>            | Surface dripper irrigation       | NOT PERMITTED IN QLDC DUE TO FREEZING                    | N/A                                     |
| <input type="checkbox"/>            | Sub-surface dripper irrigation   | NOTE: MUST BE MINIMUM OF 300mm TO PREVENT FREEZING       |                                         |
| <input type="checkbox"/>            | Conventional Bed                 |                                                          |                                         |
| <input checked="" type="checkbox"/> | Conventional trench              | 40m total 400mm deep trenches                            |                                         |
| <input type="checkbox"/>            | Deep trench                      |                                                          |                                         |
| <input type="checkbox"/>            | Discharge control bed or trench  |                                                          |                                         |
| <input type="checkbox"/>            | Mound system                     |                                                          |                                         |
| <input type="checkbox"/>            | Other (specify):                 |                                                          |                                         |

Note: The land application system site plans/drawings are to include dimensions, location, layout and component labels, cross-section details (with dimensions) and where appropriate; filter cloth, material type, structural details, flushing points, venting, valving, special fittings, intercepting drains and other detail specific to the design.

| Select One                          | Proposed Loading Method                | Details |
|-------------------------------------|----------------------------------------|---------|
| <input checked="" type="checkbox"/> | Trickle load, gravity                  |         |
| <input type="checkbox"/>            | Gravity dosing: Flout, siphon or other |         |
| <input type="checkbox"/>            | Pump                                   |         |
| <input type="checkbox"/>            | Other                                  |         |

7.3 ADDITIONAL SYSTEM REQUIREMENTS

AF-OSW Onsite Wastewater Disposal

Application Form



| Select One               | Additional design considerations                                        | Details |
|--------------------------|-------------------------------------------------------------------------|---------|
| <input type="checkbox"/> | Specify details or alarm system(s)                                      |         |
| <input type="checkbox"/> | Specify available reserve area (5.5.3.4)                                |         |
| <input type="checkbox"/> | Specify fencing, warning signs and vegetation and planting requirements |         |
| <input type="checkbox"/> | Storm / surface water management:                                       |         |
| <input type="checkbox"/> | Depths pipes to buried:                                                 |         |
| <input type="checkbox"/> | Flood protection:                                                       |         |
| <input type="checkbox"/> | Cut off / diversion drains (show on site plan):                         |         |
| <input type="checkbox"/> | Other:                                                                  |         |

8 ATTACHMENTS CHECKLIST

| Select One                          | Required Documents                                                                                                                                                                                       |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | Copy of any existing QLDC or ORC consents                                                                                                                                                                |
| <input type="checkbox"/>            | Copy of QLDC Site & Soils Assessment (if previously completed)                                                                                                                                           |
| <input type="checkbox"/>            | Copy of slope stability geotechnical report (if required)                                                                                                                                                |
| <input type="checkbox"/>            | Copy of flood hazard assessment (if required)                                                                                                                                                            |
| <input checked="" type="checkbox"/> | Site Specific Field Investigation Report.<br><i>Ensure it covers information requirements covered in sections 5 &amp;6</i>                                                                               |
| <input checked="" type="checkbox"/> | Detailed plans of system layout showing treatment unit, drains/pipes and land application field including cross-section detail<br><i>Ensure it covers information requirements covered in sections 7</i> |
| <input type="checkbox"/>            | For secondary treatment units provide evidence of OSET NTP (or equivalent) certification                                                                                                                 |
| <input checked="" type="checkbox"/> | Independent certification of in-ground tanks in terms of AS/NZS 1546.1 2008, or an equivalent standard. Provide details of performance criteria to which certification applies.                          |
| <input checked="" type="checkbox"/> | Design Producer Statement of the on-site wastewater management service                                                                                                                                   |
| <input checked="" type="checkbox"/> | Loading certificate in accordance with Section 7.4.2 (d)                                                                                                                                                 |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Operation & Maintenance guidelines for the treatment plant and land application system                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | Homeowner's operation manual for the treatment plant and land application system                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <input checked="" type="checkbox"/> | <div>To scale site plan. The following must be included on the plan:<ul style="list-style-type: none"><li>Buildings Boundaries</li><li>Treatment system components Reserve disposal area Retaining Walls</li><li>Embankments</li><li>Cutoff drains / diversion bunds Water bodies</li><li>Stormwater drains, discharge points or soakage facilities</li><li>Flood risk areas</li><li>Other wastewater treatment units and discharge systems</li><li>Water bores</li><li>Direction of ground water flow</li><li>Existing and proposed trees and shrubs</li><li>North arrow</li></ul></div> |

9

APPLICANT STATEMENT:

I believe to the best of my knowledge that the information provided in this application is true and complete. I have the necessary experience and qualifications to design the above proposed waste water treatment system in accordance with the requirements of AS/NZS 1547:2012:

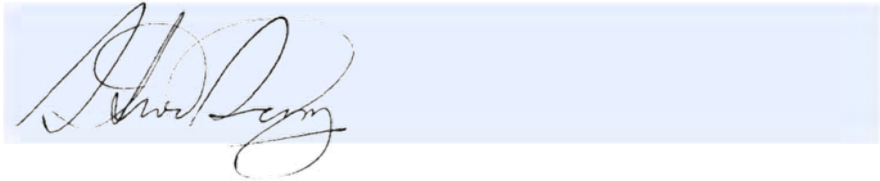
Company:

Email:                   scurrs18@gmail.com

Phone number:       027 258 5009

Name:                   Steve Scurr

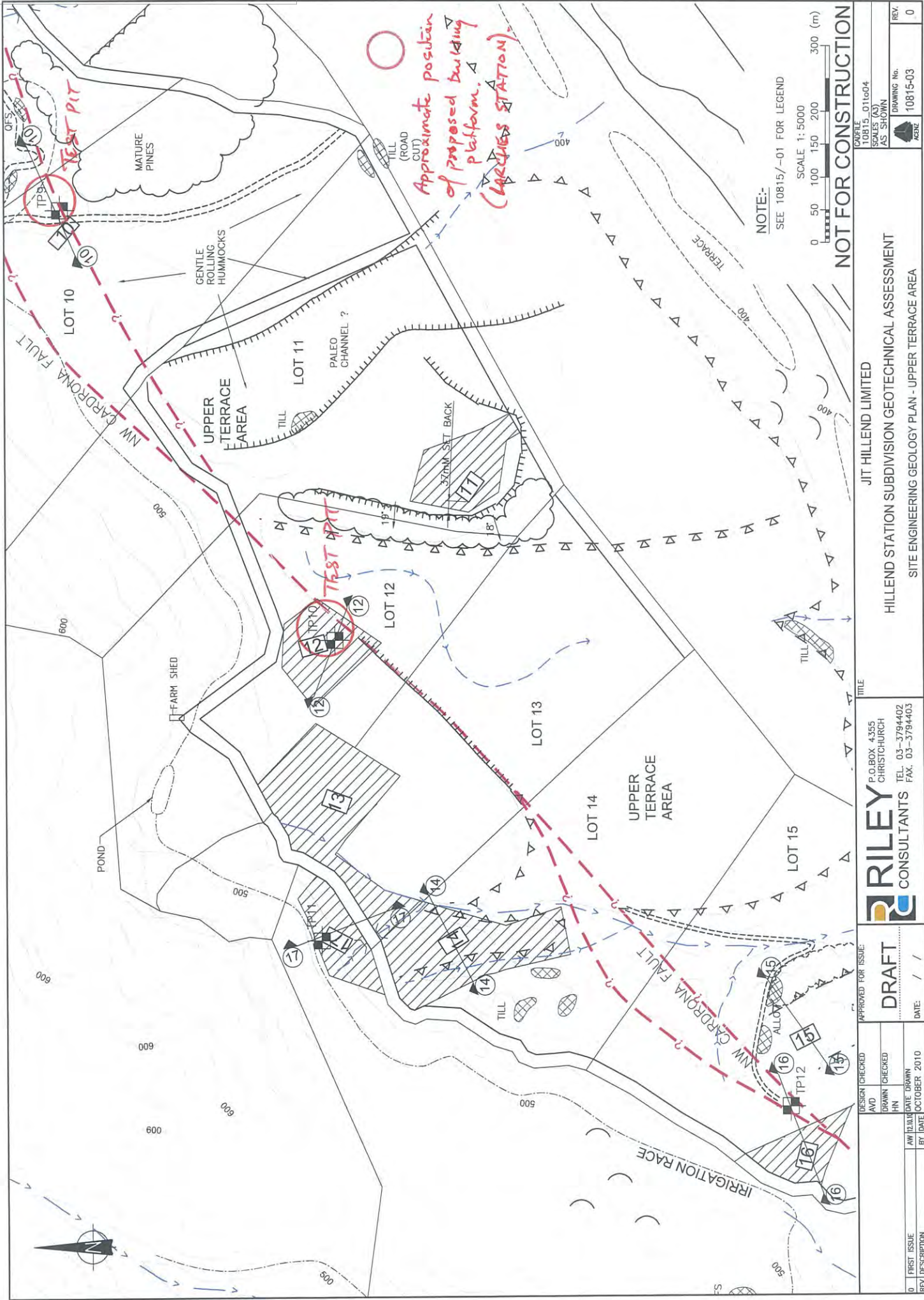
Signature:



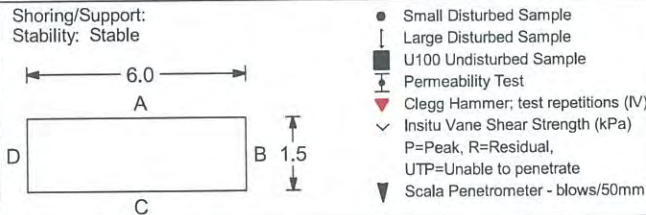
Date:   22/11/2019

Please scan this completed document to PDF and upload along with supporting Building Consent application information to the QLDC Sharefile portal:

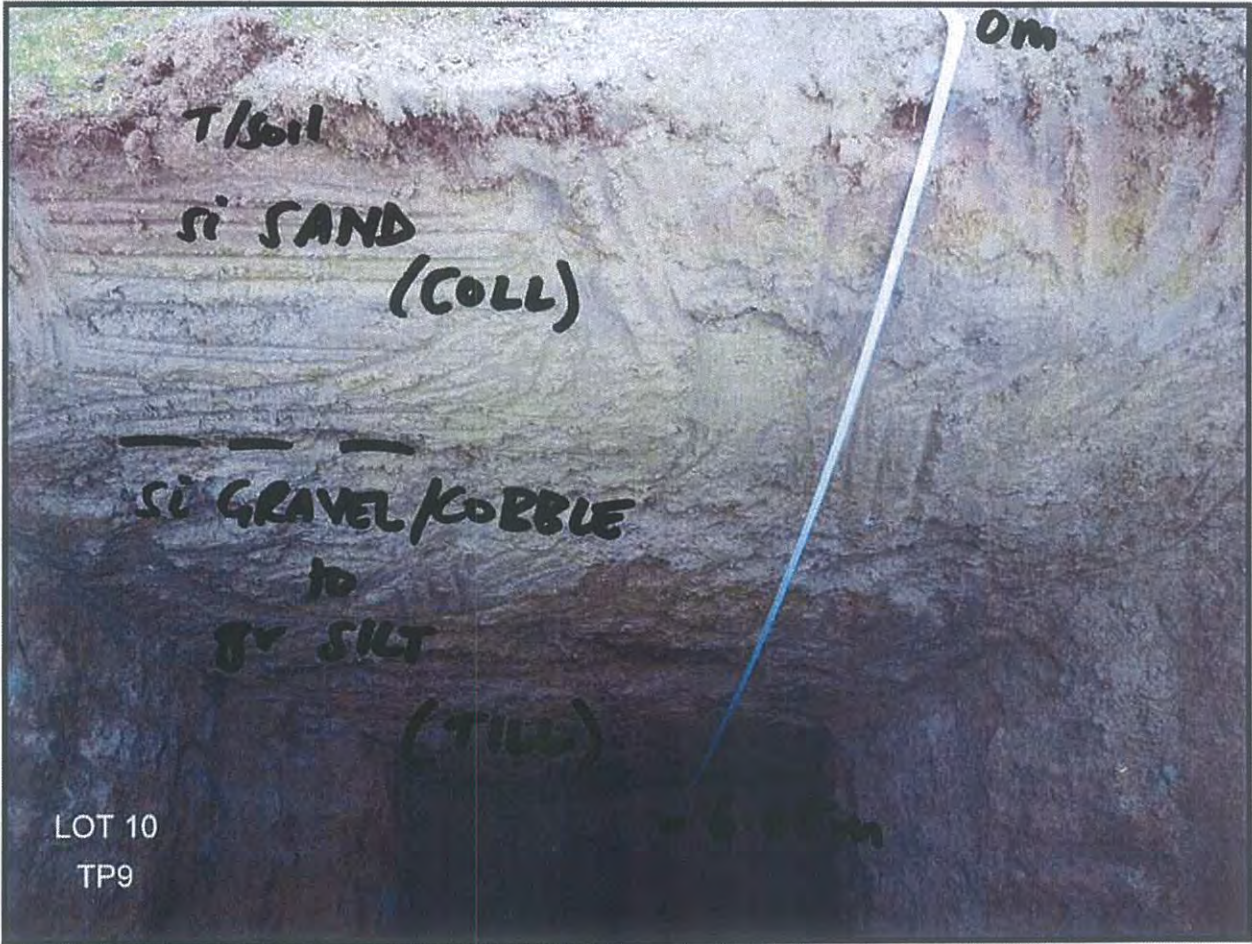
<http://www.qldc.govt.nz/planning/building-consents/apply-online/>

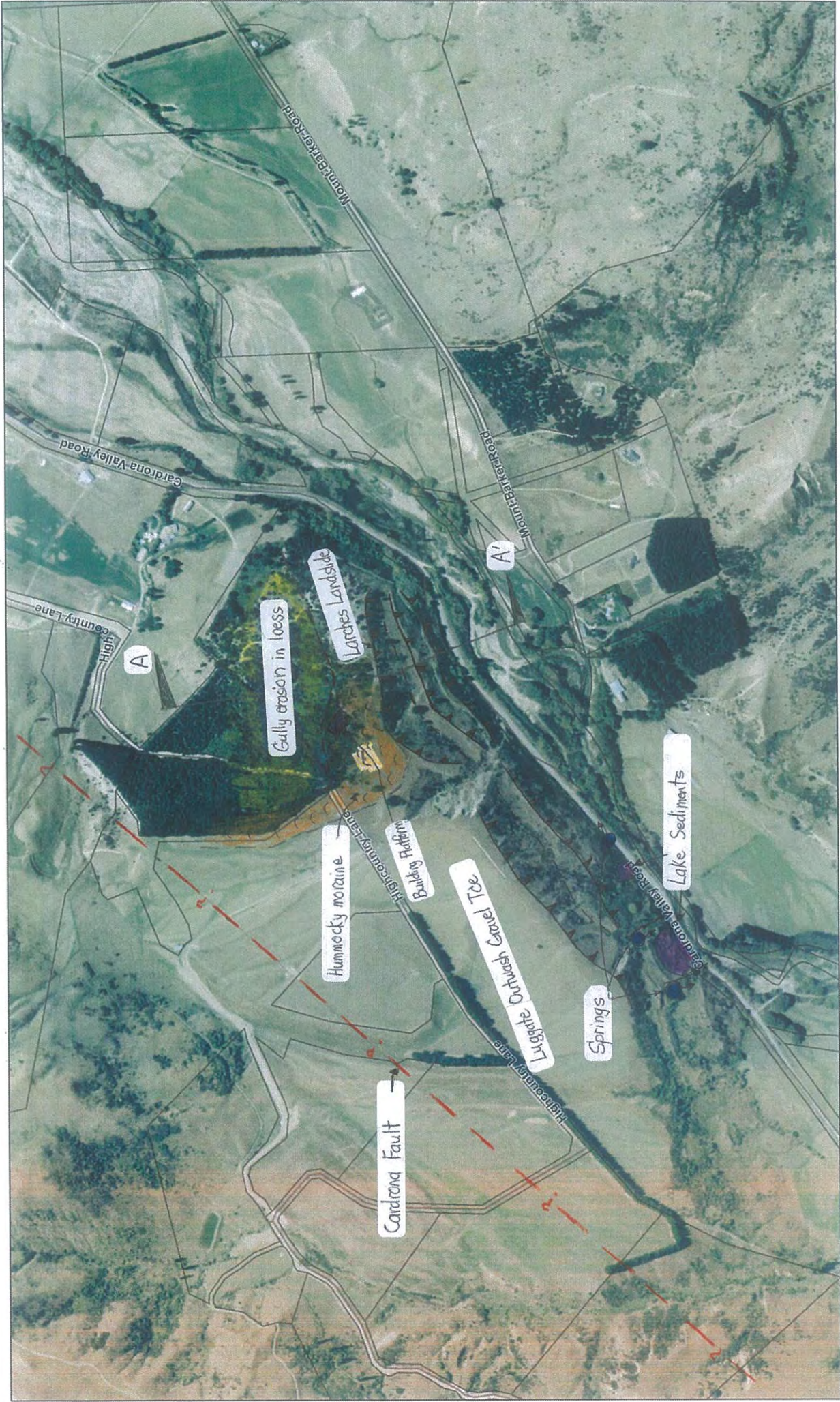


RILEY \CS2\1N7\B11\GIB\∞ RILEY TP + SCALE 10815 - H11 END STATION.GPJ <<DrawingFile>> 22/10/2010 16:36 Produced by qINT Professional

|                                                                                                                                        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------|---|---------------------|---|---|----|---------|-------|
|  <b>RILEY CONSULTANTS</b><br>Engineers and Geologists |           | Riley Consultants<br>395 Madras Street<br>CHRISTCHURCH 8011<br>Tel: 03.379.4402<br>Fax: 03.379.4403                                                                                                                                                                                                                                                                                                                                                                              |  | <b>TEST PIT LOG</b>                             |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
| Project:<br>Hillend Station Subdivision                                                                                                |           | Location:<br>Wanaka, Central Otago                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |                                                 |            | Hole position:<br>Lot 12                                                                                                                                                                                                                                                                                                                                       |                                       |                   |   | No.:<br><b>TP10</b> |   |   |    |         |       |
| Job No.:<br>10815                                                                                                                      |           | Start Date: 30-09-10<br>Finish Date: 30-09-10                                                                                                                                                                                                                                                                                                                                                                                                                                    |  | Ground Level (m LINZ):<br>467.00                |            | Co-Ordinates (NZMG):<br>E 2,202,173.7   N 5,599,913.6                                                                                                                                                                                                                                                                                                          |                                       |                   |   |                     |   |   |    |         |       |
| Client:<br>JIT Hillend Ltd                                                                                                             |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | Hole Depth:<br>5.60 m                           |            |                                                                                                                                                                                                                                                                                                                                                                |                                       | Sheet:<br>1 of 1  |   |                     |   |   |    |         |       |
| Elevation<br>(m LINZ)                                                                                                                  | Depth (m) | <b>Geological Description</b><br><small>Soil Description: subordinate, particle size, MAJOR, minor, colour, structure, strength, moisture condition; grading, bedding, plasticity; sensitivity; major qualifications; weathering of clasts; subordinate qualifications; minor qualifications; additional structure; (GEOLOGIC UNIT).<br/>Rock Description: weathering; colour; texture; fabric and orientation; NAME, strength; additional description, (GEOLOGIC UNIT).</small> |  | Symbolic Log                                    | Weathering | Field Strength                                                                                                                                                                                                                                                                                                                                                 | Scala Penetrometer<br>(blows / 50 mm) |                   |   |                     |   |   |    | Samples | Tests |
|                                                                                                                                        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                | Soil                                  | Rock              | 0 | 3                   | 6 | 9 | 12 |         |       |
| +467.00                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
| +466.75                                                                                                                                | 0.25      | Brown SILT with minor gravel, rootlets (TOPSOIL)                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
| +466.30                                                                                                                                | 0.70      | Yellowish brown silty GRAVEL (COLLUVIUM OR GLACIAL TILL?)                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
|                                                                                                                                        | 1         | 0.25 m - 0.45 m Grey fine GRAVEL lens, no fines, Gravel, sub-angular                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
|                                                                                                                                        | 2         | GCB with some to minor silt and sand. Homogenous, moist to wet, Gravel, sub-angular to sub-rounded, MW, tabular, schist; 50%+ by volume 2-20mm diameter                                                                                                                                                                                                                                                                                                                          |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
|                                                                                                                                        |           | 1.70 m Minor spalling when dug below here                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
|                                                                                                                                        | 3         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
|                                                                                                                                        | 4         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
|                                                                                                                                        | 5         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
| +461.40                                                                                                                                | 5.60      | EOH @ 5.60 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                 |            |                                                                                                                                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
| SKETCH:                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                 |            | MAP                                                                                                                                                                                                                                                                                                                                                            |                                       |                   |   |                     |   |   |    |         |       |
|                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                 |            | <b>GROUNDWATER</b> <input checked="" type="checkbox"/> None<br><input type="checkbox"/> Slow Seep (depth )<br><input type="checkbox"/> Rapid Inflow (depth )<br><b>PIT TERMINATED DUE TO:</b><br><input checked="" type="checkbox"/> Target depth <input type="checkbox"/> Collapse<br><input type="checkbox"/> Refusal <input type="checkbox"/> Machine limit |                                       |                   |   |                     |   |   |    |         |       |
|                                                                                                                                        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                 |            | <b>Remarks</b><br>WP52. Referred to as TP9 in field notes.<br>Excavated at top of fault scarp 20m east of BP12.                                                                                                                                                                                                                                                |                                       |                   |   |                     |   |   |    |         |       |
| All dimensions in metres<br>Scale 1:50                                                                                                 |           | Contractor:                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | Rig/Plant Used:<br>Machine Excavator (20 tonne) |            |                                                                                                                                                                                                                                                                                                                                                                |                                       | Logged by:<br>AvD |   | Checked by:         |   |   |    |         |       |

RILEY AGS 3\_1 NZ LIB 11.GLB Log RILEY TP + SCALA 10815 - HILLEND STATION.GPJ <<DrawingFile>> 22/10/2010 16:36 Produced by gINT Professional





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 Queenstown Lakes District Council

Webmaps your view of your information

Larches station

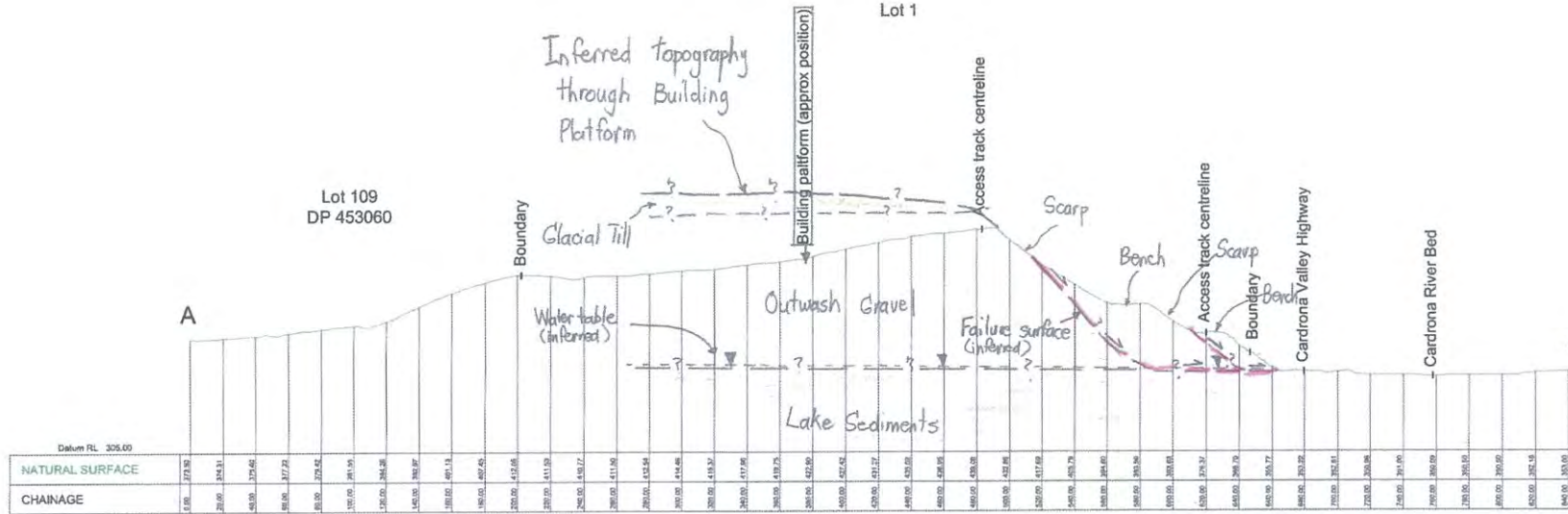
Figure 1 Site Geology

0 75 150 225 300 Metres

11 March 2014



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Section A - A'  
Hz & Vert Scale 1:3000 @ A3  
(No vertical exaggeration)

NOTES

1. The contractor shall be responsible for locating all existing services prior to commencement of works. The contractor shall make good at their own expense any damage to existing services.
2. Levels are in terms of Dunedin vertical datum 1958.
3. Section levels sourced from QLDG LIDAR data obtained March 2014. LIDAR source data contour interval 0.5m.

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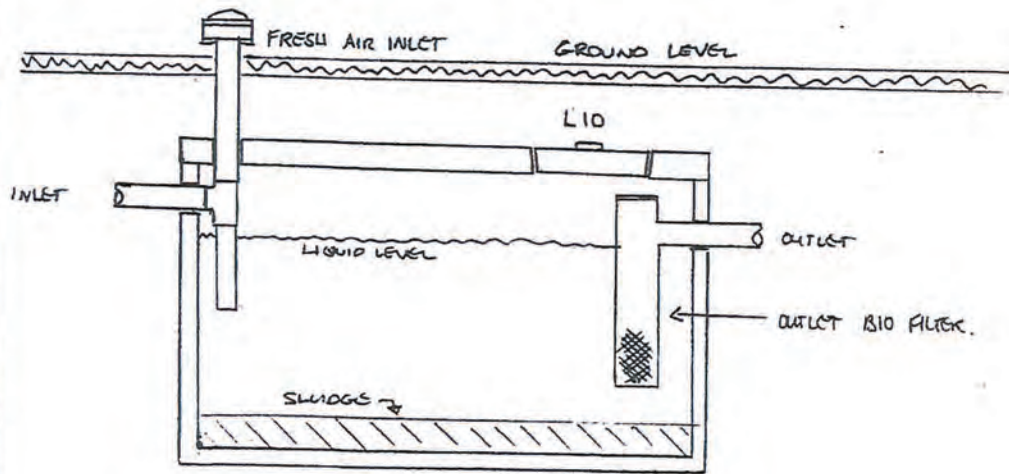
Client & Location:

**J Robertson**  
Larches Stn  
Wanaka

Purpose & Drawing Title:

**Figure 2**  
Section A A'

|              |       |                |                       |
|--------------|-------|----------------|-----------------------|
| Surveyed by: | xxx   | Original Size: | Scale:                |
| Designed by: | DW    | A1             | HZ & Vert 1:3000 @ A3 |
| Drawn by:    | BW    |                |                       |
| Checked by:  | DW    |                | DO NOT SCALE          |
| Approved by: | DW    |                |                       |
| Job No:      | W4300 | Sheet No:      | Revision No:          |
|              |       | 200            | A                     |
|              |       |                | Date Created:         |
|              |       |                | 12/03/2014            |



PROPRIETARY SINGLE STAGE SEPTIC TANK  
WITH FILTERED OUTLET  
HUMES 3300 LITRE MIN

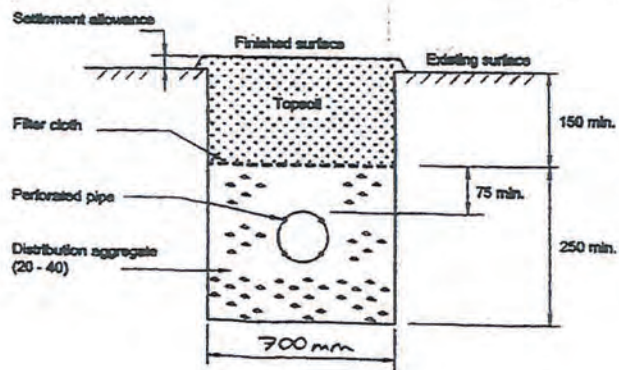
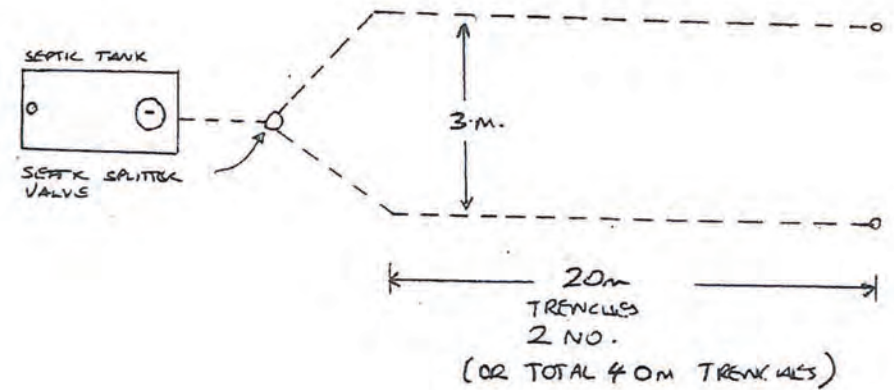
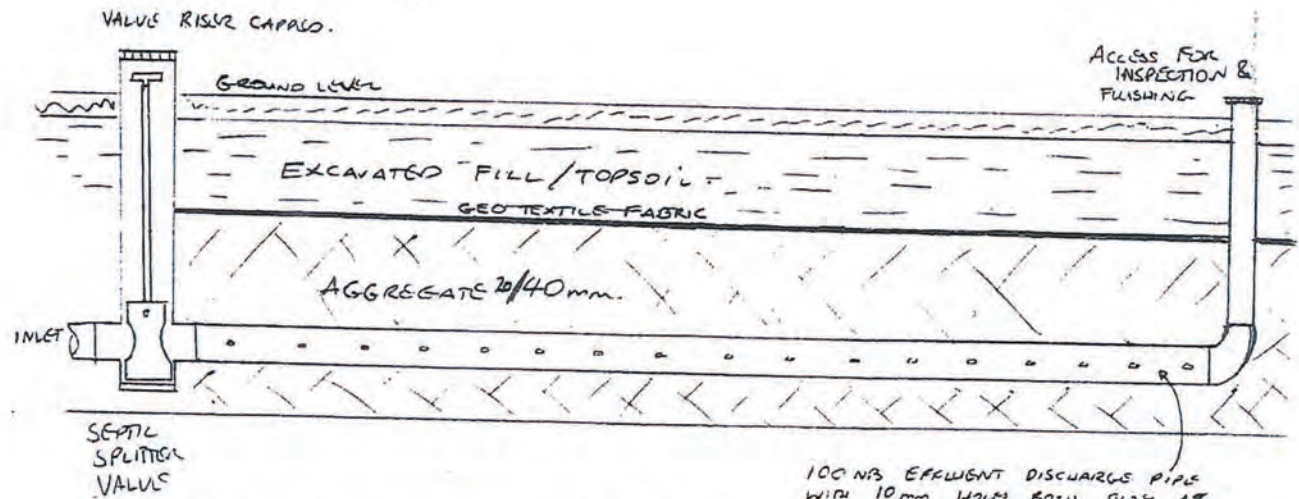


FIGURE 4.5A1 CONVENTIONAL PIPED TRENCH



ELEVATION OF SEWAGE TRENCH

100mm EFFLUENT DISCHARGE PIPE  
WITH 10mm HOLES BOTH SIDES AT  
STAGGERED 500mm CENTRES.  
PIPE LAID PERFECTLY LEVEL

**AURORA ENERGY LIMITED**

PO Box 5140, Dunedin 9058

PH 0800 22 00 05

WEB [www.auroraenergy.co.nz](http://www.auroraenergy.co.nz)

28/07/2026

REF: 133274

Alex Todd  
 Patersons  
[alex.todd@patersons.co.nz](mailto:alex.todd@patersons.co.nz)

Dear Alex,

**ELECTRICITY SUPPLY AVAILABILITY FOR A PROPOSED 7 LOT SUBDIVISION  
 478 CARDRONA VALLEY ROAD, WANAKA LOT 1 DP 533538 .**

Thank you for your inquiry outlining the above proposed development.  
 Subject to technical, legal and commercial requirements, Aurora Energy can make a Point of Supply<sup>1</sup> (PoS) available for this development.

**Disclaimer**

This letter confirms that a PoS **can** be made available. This letter **does not** imply that a PoS is available now, or that Aurora Energy will make a PoS available at its cost.

**Next Steps**

To arrange an electricity connection to the Aurora Energy network, a connection application will be required. General and technical requirements for electricity connections are contained in Aurora Energy's Network Connection Standard. Connection application forms and the Network Connection Standard are available from [www.auroraenergy.co.nz](http://www.auroraenergy.co.nz).

Yours sincerely

**Niel Frear**

CUSTOMER INITIATED WORKS MANAGER

<sup>1</sup> Point of Supply is defined in section 2(3) of the Electricity Act 1993.

**Alex Todd**

---

**From:** Chorus Property Development Do Not Reply <npdnoreply@chorus.co.nz>  
**Sent:** Tuesday, 28 July 2026 1:56 pm  
**To:** npdnoreply@chorus.co.nz  
**Subject:** [PAT P250584] Chorus 11690592 : We can service your development



Hi

**Your reference:** 478 Cardrona Valley Road  
**Development address:** 478 Cardrona Valley Road, Wanaka,  
Queenstown-Lakes District, 9382

**Good news:** We can provide fibre connectivity to your development.

In the below notes you'll find an indicative cost for the work we'd need to do (excluding any work required inside your site boundary):

A high level estimate to extend our fibre network to your development is in [REDACTED], as this would need to come approx. 1940m from 517 Riverbank Road.

Please note: The communications technology available to serve customers in our rural areas is rapidly changing. Copper is no longer the only option for customers, and is in some cases, not the best option. New Zealand runs on fibre, and the UFB roll-out has gone past 87 per cent of Kiwis. We would like to extend fibre further to enable more Kiwis to receive the best technology available. We will not be investing in extending the copper network further.

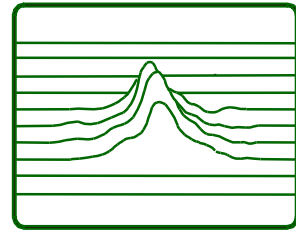
### **Next steps**

If you'd like this formalised into a quote, or you need to update connection numbers, [log into your account](#) and let us know.

### **From your Chorus New Property Development team**

Please do not reply to this email as this inbox is not monitored. For any follow up queries please visit [www.chorus.co.nz/develop-with-chorus](http://www.chorus.co.nz/develop-with-chorus) or [log in to your account](#). If you do not yet have an account with us, you will need to [create an account](#) to view your job progress and documentation.

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# GEOTECHNICAL ASSESSMENT

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478 Cardrona Valley Road



Prepared for:

The Property Group

Client:

S & R Farrant

Date prepared:

18 November 2025

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## 1 INTRODUCTION

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Geoconsulting Ltd have been commissioned by S & R Farrant to carry out a geotechnical investigation for a proposed subdivision of their property at 478 Cardrona Valley Road (Lot 1 DP533538). The frontispiece provides a Google Earth view showing the approximate property outline.

### 1.1 BRIEF AND SCOPE

The brief for the work was provided to Geoconsulting from The Property Group Ltd by way of an email dated 29/10/25. On this property, it is proposed to create six new lots in addition to the main plot with existing house (to be known as Lot 1). Figure 1 shows a schematic layout of the subdivision.

The scope of work called for an assessment of the proposed building platforms to check their viability. In particular, to determine what impact natural hazards may have on each individual site.

### 1.2 WORK UNDERTAKEN

This assessment is based on a desk study of available Geoconsulting reports, other geotechnical reports available on QLDC Edocs and examination of relevant aerial photographs (1951 & 1958) from our library, lidar and satellite imagery. Of interest are the following documents:

- |                  |                                                                                                                                 |                      |                     |
|------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------|
| • August 2018    | Branches Station                                                                                                                | Geoconsulting report |                     |
| • September 2019 | 10 Curtis Rd                                                                                                                    | Geoconsulting report |                     |
| • March 2014     | Larches Station                                                                                                                 | Geosolve report      |                     |
| • March 2019     | General distribution and characteristics of active faults and folds in the Queenstown Lakes and Central Otago districts, Otago. |                      | GNS report 2018/207 |

A walkover of all new lots was also undertaken.

---

## 2 SITE DESCRIPTION

---

The property occupies rolling hill country sloping to the northeast just off Cardrona Valley Road. The land is situated between a high and low level terraces with building platforms ranging in elevation from RL 387.89 (Lot 6) to RL 462.78 (Lot 3).

The bulk of the area to be subdivided was formerly part of a mixed conifer plantation but in recent years all trees have been felled and the ground cleared of stumps. Vegetation has yet to be re-established over most of the area. The remaining land comprising Lots 1 – 3 has retained the original grass pasture cover.

There are no well-established water courses running through the site and it is believed any runoff would drain towards the northeast being concentrated in shallow, ephemeral channels.

---

### 3 GEOLOGY

---

The lower Cardrona Valley is dominated by glaciofluvial sediments deposited following successive glacial advances. These sediments are mostly sandy gravels with interbedded sands and occasional bouldery horizons (collectively known as outwash gravels). The Geosolve report noted lake sediments (silts, silty sands and fine sands) in nearby outcrops adjacent to Cardrona Valley Rd which are presumed to underlie the outwash gravels. Schist forms the basement rock throughout the region and although exposed in the surrounding hills is expected to lie at substantial depth below the valley floor.

Loess, a wind-blown silt and fine sand, blankets the terrain throughout the area of interest. Exposures in cliff faces, cuttings and gullies show that a thickness between 0.8 – 1.0 m is typical. Erosion of steeper slopes has led to this overburden layer being thinner or absent altogether. In protected areas or areas of accumulation (e.g. Lot 3), loess thickness may be slightly greater.

No evidence for groundwater (e.g. springs or seepages) could be found on site. Although there is a significant catchment in the terrace above the property and slopes beyond it would appear that most rainfall infiltrates and drains away through the permeable gravels. The groundwater table is thus likely to lie at considerable depth unless some impervious layer is present that allows a perched water table to be present.

---

### 4 GEOHAZARDS

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#### 4.1 FAULTING AND SEISMICITY

The lower Cardrona Valley marks the intersection of the Cardrona-Hawea Fault and the NW Cardrona Fault the latter of which is split into several strands of varying activity (Figure 2). The Cardrona-Hawea Fault has a calculated recurrence interval of 30,000 years whereas the NW Cardrona Fault is classified as 5,500 years<sup>1</sup> overall. A recent re-evaluation of the NW Cardrona Fault updates the recurrence interval to 13,200 years for overall fault rupture<sup>2</sup>. The former referenced report notes that the high glacial outwash terrace to the west of the site which is

---

<sup>1</sup> Barrell DJA "General distribution and characteristics of active faults and folds in the Queenstown Lakes and Central Otago Districts" GNS Science Consultancy Report 2018/207, March 2019

<sup>2</sup> Barrell DJA "Review and update of active geological fault and fold characterisation in the Otago region" GNS Science Consultancy Report 2025/48, August 2025.

assigned to the Luggate Advance (60,000 years ago) shows no sign of displacement. However, suspected fault-related landforms have been recognised at the foot of the range northwest of the Hillend farm buildings. Although the evidence for fault activity is quite high, the recurrence interval is in the range of thousands of years rather than hundreds of years as with the Alpine Fault. This interval is acceptable for housing development.

## 4.2 SLOPE INSTABILITY

One landslide, described as an area of fine grained soils susceptible to sliding, is shown on both QLDC and ORC hazard webmaps (see Figure 3). Another landslide has been mapped in the Geosolve report but is outside the development area. Stereoscopic examination of 1951 and 1958 aerial photographs show a much larger feature leaving a well-defined rear scarp with a



Photo 1: View of rear scarp from east side of landslide.

Photo 2: Landslide from rear scarp looking down at building platform sites 4 & 5.

redistributed geometry leaving a displaced mass buttressing the toe.

Field work undertaken as part of this study indicates a very subdued and degraded feature (Photos 1 & 2). Field mapping found no evidence for hummocky topography, fresh scarps, tension cracks or other evidence for ongoing activity. A widely accepted framework for hazard assessment<sup>3</sup> considers landslide activity under three categories: active, dormant and relict. A relict classification is considered appropriate for this feature. Note that the building platforms for Lots 1, 2 & 3 lie outside the mapped landslide area shown on Figure 3.

## 4.3 GULLY EROSION

The loess cover in the area cleared of forest appears to be susceptible to gully erosion. This was noted in the Geosolve report dated 2014 and again during recent mapping. The gullying has been exacerbated by scarifying with a root raker during the forestry clearance. This has disturbed the

---

<sup>3</sup> Cruden DM & Varnes DJ 1996 "Landslide types and processes; in 'Landslides – Investigation and Mitigation" Transportation and Research Board special report 247.

soil allowing rainfall to infiltrate and erode the soil to a greater depth causing new rills to develop and deepening of existing gullies (Photo 6).

---

## 5 GEOTECHNICAL IMPLICATIONS OF DEVELOPMENT

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### 5.1 OVERVIEW

The seismicity and landslide hazards are probably interlinked; i.e. landslide reactivation is only likely to occur under localised fault movement. The likelihood of a coseismic event is thus considered very unlikely in the lifespan of residential buildings.

#### 5.1.1 LOT 2

Lot 2 building platform occupies an existing cut and fill platform currently used as a storage area (Photo 3). The fill portion of the platform is likely to have been loosely placed (end-tipped) and there may not have been any site stripping of topsoil at the interface of cut and fill. Foundation investigations are recommended beneath the footprint of any dwelling that overlies both cut and fill portions.



Photo 3: Lot 2 building platform marked by stake in centre.



Photo 4: Lot 3 building platform marked by stake in centre.

#### 5.1.2 LOT 3

The building platform is situated in a hollow between two hillocks with drainage towards the northwest (Photo 4). This area appears to be outside the area disturbed by landslide movement and forestry clearance. Loess accumulation is probably slightly greater in this saddle, however, the lack of disturbance and any catchment to concentrate runoff means gully erosion has not been able to establish. Determination of bearing capacity in the underlying soil is recommended.

#### 5.1.3 LOT 4

This site is located on gently dipping terrain at the foot of the rear scarp's concave slope (Photo 5). A poorly defined drainage line affects the site but only incipient rill erosion has developed above and below site. Soil mobilisation will be an issue but could be mitigated by slope revegetation and construction of a bund to redirect runoff either side of platform. Foundation investigations in scarified soil is recommended.

#### 5.1.4 LOT 5

The building platform is situated in an ephemeral drainage line with dip to the east. Active gullying is visible downslope (Photo 6) with incipient rill erosion in disturbed soil upslope. Soil mobilised by erosion is likely to accumulate on any formed platform. It is recommended to shift the building platform to higher ground on either side of the drainage line, revegetate surrounding bare soil and to undertake foundation investigations in the scarified soil.



Photo 5: Lot 4 building platform marked by stake in centre. Note rear scarp of landslide at back.



Photo 6: Lot 5 building platform marked by stake in centre. Note incipient gully erosion in front.

#### 5.1.5 LOT 6

This building platform is situated on a NNE facing slope at the foot of the property (Photo 8). A dry gully lies just to the west which probably carries ephemeral flows considering the catchment above. Some earthworks will be required on the 25° slope with a preference to locating any dwelling on the cut part of the platform. Investigations into cut slope stability and foundations are recommended.

#### 5.1.6 LOT 7

Lot 7 building platform sits in a shallow gully draining towards ESE (Photo 7). Catchment area above is very limited so ephemeral runoff is unlikely. Surrounding area was probably one of the first to be cleared and hence grass is slowly re-establishing. Minor earthworks are required on the 22° slope to form a platform for a dwelling. Foundation investigations are recommended.



Photo 7: Lot 7 building platform marked by stake in centre.



Photo 8: Lot 6 building platform behind pine tree in centre.

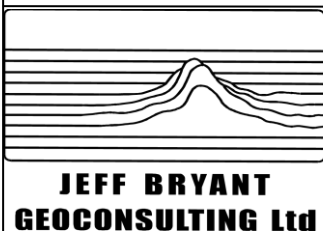
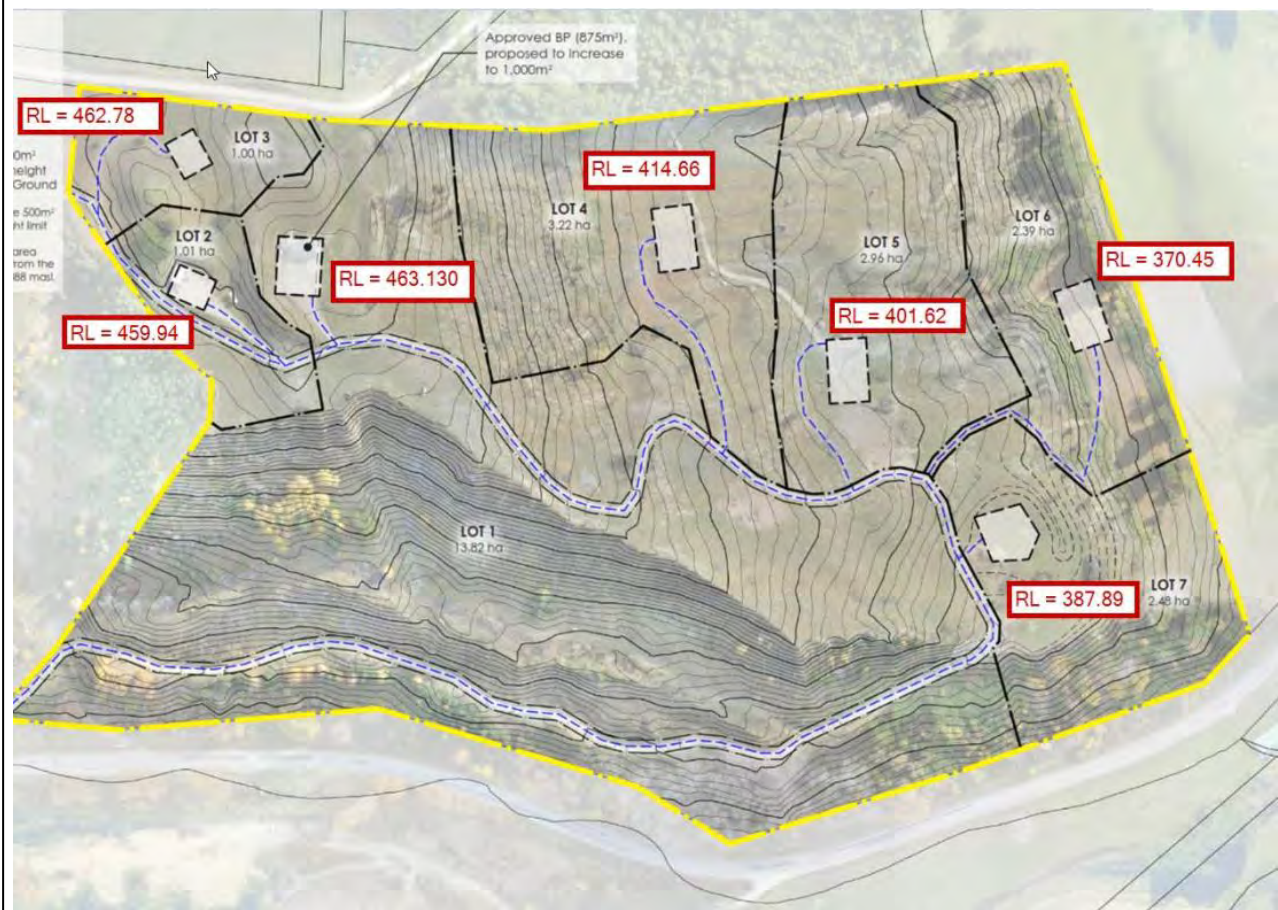
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## 6 CLOSURE

---

The subdivision lies in rolling hill country dipping gently to the northeast. Slopes for each building platform range from flat to moderate (maximum 25°). Two significant hazards affecting the development are faulting and slope instability. The reactivation of the latter most likely would only occur as a coseismic event. Both have a high consequence potential but the recurrence interval is very long compared to the economic lifespan of residential dwellings. Gully erosion potential has increased in the area subject to forestry clearance but can be mitigated by appropriate measures such as revegetation and construction of diversion bunds for mobilised soil.

Geotechnical investigations are recommended in support of any building consent application.



PROJECT: 478 Cardrona Valley Road

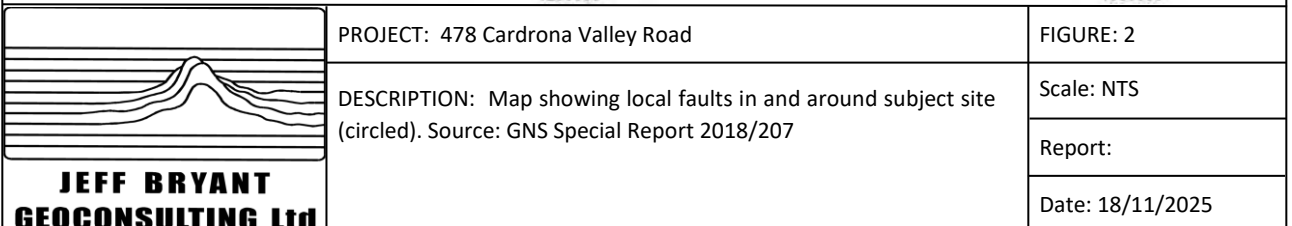
DESCRIPTION: Site plan showing scheme layout and location of building plots.

FIGURE: 1

Scale: NTS

Report:

Date: 18/11/2025







**478 Cardrona Valley Road**  
**Environmental Management Plan**  
**August 2026**

| Document control      |                                                          |
|-----------------------|----------------------------------------------------------|
| <b>Report title</b>   | 478 Cardrona Valley Road - Environmental Management Plan |
| <b>Address</b>        | 478 Cardrona Valley Road, Cardrona                       |
| <b>Client</b>         | Farrant & O'Brien                                        |
| <b>Project number</b> | 26071                                                    |

| Document control |               |                            |             |             |             |
|------------------|---------------|----------------------------|-------------|-------------|-------------|
| Revision         | Revision date | Revision details           | Prepared by | Reviewed by | Approved by |
| A                | 10/08/2026    | Prepared for client review | MG          | TG          | TG          |

| Revision A:        | Name            | Position                                               | Signature                                                                                                                                                                  |
|--------------------|-----------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Prepared by</b> | Michael Guthrie | Principal Environmental Consultant - Contaminated Land |       |
| <b>Reviewed by</b> | Tom Grandiek    | Principal Environmental Consultant                     |   |
| <b>Approved by</b> | Tom Grandiek    | Principal Environmental Consultant                     |   |

#### Suitably Qualified and Experienced Professional

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

Michael is a certified Environmental Professional (CEnvP) and holds a Bachelor of Science (BSc). He has over 15 years' experience in the environmental industry across Australia, New Zealand, and the Pacific Islands, and leads Enviroscope's contaminated land service offering.

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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 1** below.

**Table 1: Emergency contacts**

| Element                        | Emergency contact                        | Details                                                                                                                                                |
|--------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pollution incident             | Otago Regional Council (ORC)             | 0800 800 033<br><a href="mailto:pollution@orc.govt.nz">pollution@orc.govt.nz</a><br><a href="mailto:compliance@orc.govt.nz">compliance@orc.govt.nz</a> |
| Environmental complaint        | Environmental Representative             | TBC                                                                                                                                                    |
| Discovery of contaminated land | Environmental Representative             |                                                                                                                                                        |
| Unexpected heritage finds      | Environmental Representative             |                                                                                                                                                        |
| Human remains                  | New Zealand Police                       | 111                                                                                                                                                    |
| Fire including bushfire        | Fire and Emergency New Zealand (FENZ)    | 111                                                                                                                                                    |
| Public utilities               | Queenstown Lakes District Council (QLDC) | (03) 441 0499<br><a href="mailto:rcmonitoring@qldc.govt.nz">rcmonitoring@qldc.govt.nz</a>                                                              |
| Internal contacts              | Project Manager                          | TBC                                                                                                                                                    |
| Internal contacts              | Environmental Consultant                 | Enviroscope                                                                                                                                            |

## 1.0 INTRODUCTION

### 1.1 Purpose and Scope

On behalf of Farrant & O'Brien, Enviroscope has prepared this Environmental Management Plan (EMP) for the upgrading of a driveway accessway associated with a seven-lot subdivision at 478 Cardrona Valley Road, Cardrona.

This EMP has been prepared in accordance with the ORC publication *Residential Earthworks in Otago – A Guide for Developers, Landowners, Contractors and Service Providers* (June 2026), as well as the QLDC *Guidelines for Environmental Management Plans* (June 2019).

This document aligns with the objectives and policies of the Otago Regional Council (ORC) Land and Water Regional Plan, specifically Section 14.5 – *Earthworks for Residential Developments*, and with the objectives and policies of Chapter 25 (Earthworks), of the Queenstown Lakes District Council (QLDC) Proposed District Plan.

A high-risk EMP is required under the QLDC EMP Guidelines, as the proposed earthworks exceed one hectare. The ORC Residential Earthworks Guide classify the activity as having a low to medium environmental risk profile, based on the site's characteristics. **Table 2** presents an environmental risk category matrix that consolidates the relevant QLDC and ORC criteria into a single assessment framework.

**Table 2: Environmental risk category matrix**

| Environmental risk category | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High                        | QLDC <ul style="list-style-type: none"> <li>Projects which have greater than one hectare of land exposed at any one time.</li> </ul> And / or <ul style="list-style-type: none"> <li>Projects which have &gt; 2500m<sup>2</sup> disturbed surface area open at any one time and include any of the following characteristics:</li> <li>The Project is working within or discharging to Sensitive Environmental Receptors such as a Waterbody.</li> <li>Subject site has a steep topography (&gt;15% slope).</li> <li>Erodible or dispersive soil types.</li> </ul> |
| Medium                      | ORC <ul style="list-style-type: none"> <li>Close proximity to sensitive receivers, including waterbodies</li> <li>Sloping area of works, known instability concerns or soil type prone to erosion</li> </ul>                                                                                                                                                                                                                                                                                                                                                       |

This EMP aims to reduce the effects of the project's construction activities on the environment and sensitive receptors. The purpose of this EMP is to be an effective and practical reference manual for construction personnel that applies to all project activities during the construction phase and includes the following:

- Strategies to manage environmental aspects and risks, based on associated best practice.
- Provides for contingency planning.
- Provides a framework for monitoring, reporting, review and continual improvement.

- Defines roles and responsibilities.
- Procedures to investigate and resolve environmental non-conformances and initiate corrective and preventative actions.

This EMP has been prepared following best practice, based on the designs available at the time of the consent application. Once appointed, the Contractor's details will be updated and the EMP amended in accordance with the Contractor's proposed methodologies of construction, programme of works. An overview of the project and sequencing can be found in the construction methodology at **Section 2.0**.

## 1.2 Site Overview

The subject site, legally described as Lot 1 DP 533538, is a 26.89 ha property located at 478 Cardrona Valley Road, Cardrona. An existing residential dwelling and shed are present on the western corner of the site, accessed via a metal driveway off Cardrona Valley Road which runs along the southern site boundary, across which is the Cardrona River. The site is further summarised in **Table 3** and shown below in **Figure 1**.

**Table 3: Site characteristics**

| 478 Cardrona Valley Road |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Legal description        | Lot 1 DP 533538                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Territorial authority    | QLDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Regional authority       | ORC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Topography               | The site occupies hill country immediately north of Cardrona Valley Road and is situated between an elevated terrace to the west and lower terrace land adjacent to the Cardrona Valley floor. Ground levels across the site vary significantly, with proposed building platforms ranging from approximately RL 388 m to RL 463 m, resulting in generally moderate to steep slopes across portions of the property. The subdivision area generally falls toward the north-east and is characterised by a series of shallow drainage features and ephemeral flow paths which convey runoff during and following rainfall events. |

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Geology and soils | <p>A geotechnical assessment report has been prepared by Geoconsulting Limited dated November 2025 which details site investigations and reports on the geotechnical conditions primarily around the impact of natural hazards may have the viability of each proposed building platform and the corresponding lot. No intrusive subsoil investigations were carried out as part of the geotechnical assessment. The report notes that “the Cardrona Valley is dominated by glaciofluvial sediments deposited following successive glacial advances. These sediments are mostly sandy gravels with interbedded sands and occasional bouldery horizons (collectively known as outwash gravels)”. A Geosolve report, completed for the underlying subdivision and referenced in the Geoconsulting assessment noted “lake sediments (silts, silty sands and fine sands) in nearby outcrops adjacent to Cardrona Valley Road which are presumed to underlie outwash gravels. Schist forms the basement rock throughout the region and although exposed in the surrounding hills is expected to lie at substantial depth below the valley floor”.</p> <p>The GNS database identifies the underlying geology as Middle Pleistocene glacier deposits of Luggate Formation, consisting of slightly to moderately weather, loose, bouldery gravel, sand, silt and clay.</p> <p>The growOtago ORC database also classifies the soil group of the area as fragic pallic. The soil codes identify the dominant soil as gently undulating Cluden moderately deep, silt loam.</p> |
| Waterbodies       | <p>An ephemeral flow path passes through the north-west and south-west corners of the site, before crossing the Cardrona Valley Road and entering the Cardona River. Anecdotal evidence and on-site observations indicate this rarely has any base flow, but based on incised channel erosion present, has the ability to convey surface water during and after intense or frequent rainfall events.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Climate (Wind, precipitation, temperature) | <p><b>Wānaka</b></p> <p>The majority of the information within this section was taken from NIWA's The Climate and Weather of Otago 2nd Edition (2015)<sup>1</sup>. The data and figures were compiled from observations over a 30-year period from 1981-2010. It is likely that present-day weather patterns have a slightly larger range and scale due to climate shifts. Unless otherwise noted, Wānaka specific data was taken from readings at the Wānaka airport.</p> <p><b>Wind</b></p> <p>The prevailing wind direction is predominantly from the West and the Southeast with a yearly average windspeed of approximately 9 km/hr in Autumn/Winter and 14km/hr in Spring/Summer. Wind velocity is typically highest later in the afternoon, and lowest in the early morning. Additionally, the Wānaka airport only experiences approximately three days per summer and spring season where average windspeeds exceed 30 km/hr; although, gusts exceeding 61 km/hr are experienced approximately 29 days per year.</p> <p><b>Precipitation</b></p> <p>The seasonal average rainfall ranges from approximately 50 mm/month in Autumn and Winter to 52 mm/month in Spring and Summer. The wettest month is shown to be December, with a 66 mm/month average rainfall.</p> <p><b>Temperature</b></p> <p>Daily average temperatures show a seasonal trend, with temperatures generally being higher through the summer and lower through the winter. The average daily temperatures range from around 5°C in July to 18°C in January.</p> |
| Vegetation                                 | <p>The site is predominantly covered in pasture grasses and modified rural vegetation. The upper portions of the site have been previously cleared of wilding pines and are generally characterised by grazed grassland. Areas of established conifer vegetation remain on the steeper lower slopes, while several small pockets of planted native vegetation are present in the vicinity of the existing dwelling and within fenced restoration areas associated with the underlying subdivision.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Contaminated land                          | <p>A search of the ORC Selected Land Use Register has not provided any indication of the site being used for a past or present HAIL activity.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

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<sup>1</sup> Macara, G. R. (2015). Climate and weather of Otago (2nd ed.). National Institute of Water and Atmospheric Research (NIWA). <https://webstatic.niwa.co.nz/library/NIWAsts67.pdf>

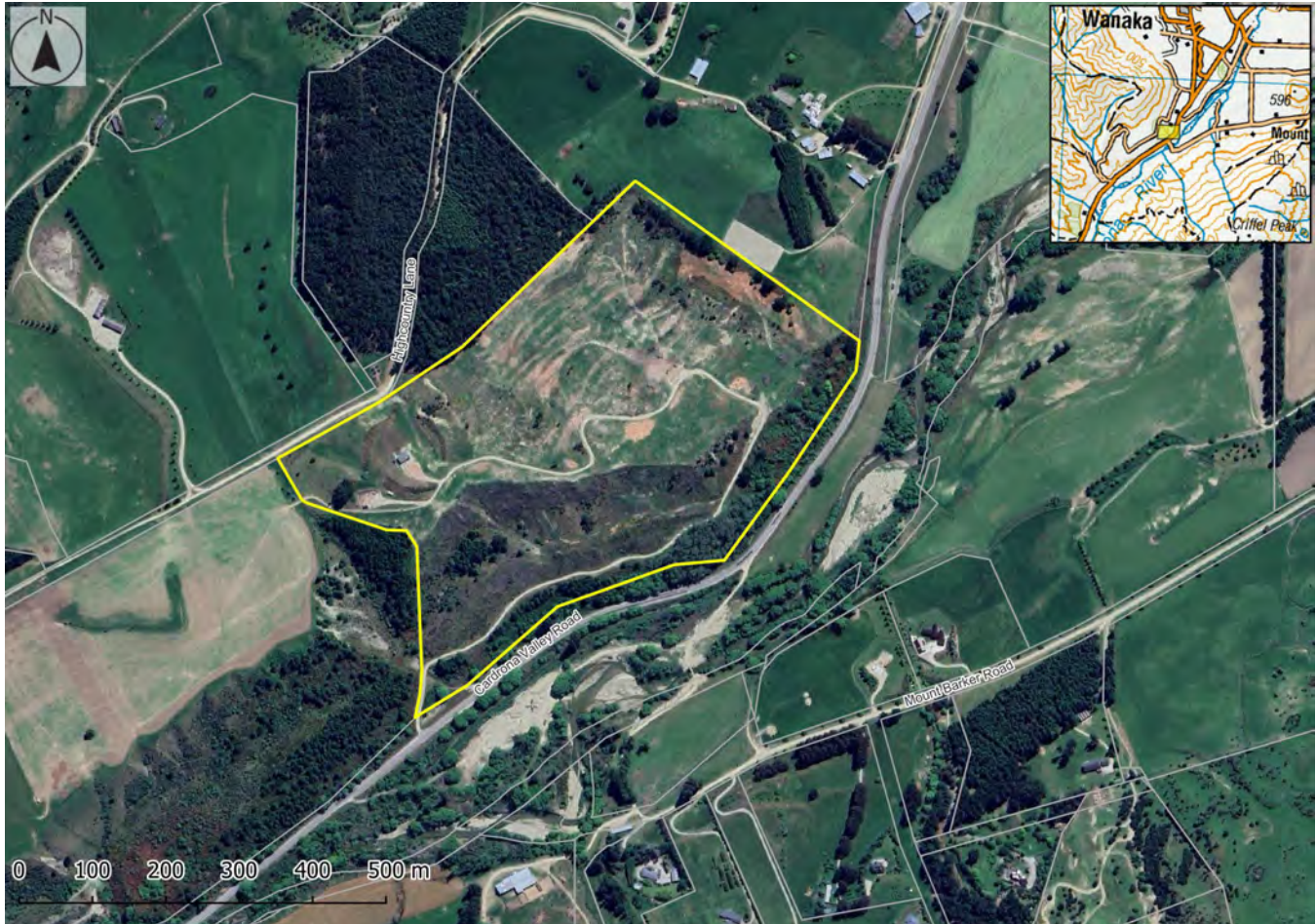


**Figure 1: Location of the site (Source: LINZ)**

### 1.3 Description of Activity

Earthworks are limited to forming and upgrading the existing access which will consist of topsoil stripping, minor cut to fill to form appropriate grades and widths and topsoil respread for the establishment of the shared access. **Table 4** summarises proposed earthworks volumes and excludes the quantities of imported materials required for road base construction and trench bedding and backfill materials. Topsoil stripping will form most of the material cut from the site, and it is expected that site filling will comprise both site won and clean imported engineered fill materials.

**Table 4: Earthworks quantities**

| Description   |  | Volume m <sup>3</sup> | Area m <sup>2</sup> |
|---------------|--|-----------------------|---------------------|
| Topsoil strip |  | 2,500                 |                     |
| Cut           |  | 4,700                 |                     |
| Fill          |  | 800                   |                     |
| <b>Total</b>  |  | <b>8,000</b>          | <b>13,400</b>       |

## 1.4 Associated Resource Consents and Permits

This EMP has been prepared in accordance with industry best practice to accompany the resource consent application. The resource consents associated with this project are listed in **Table 5**, and are attached as **Appendix 11**.

**Table 5: Associated resource consents**

| Resource consent number | Related council | Activity description | Date of decision issue | Date of decision expiry |
|-------------------------|-----------------|----------------------|------------------------|-------------------------|
| TBC                     | QLDC            | TBC                  | TBC                    | TBC                     |
| TBC                     | ORC             | TBC                  | TBC                    | TBC                     |
| TBC                     | ORC             | TBC                  | TBC                    | TBC                     |

## 2.0 CONSTRUCTION METHODOLOGY

### 2.1 Sequencing of Works

The following sequencing will ensure the earthworks are undertaken efficiently while ensuring good environmental outcomes. Generally, earthworks will be undertaken in accordance with the recommendations and limitations of the Geotechnical Assessment Report. It is expected the Geotechnical Engineer will be onsite during earthworks to inspect and advise on the earthworks being undertaken and provide guidance to the contractor and civil engineering consultant on any impacts on the design of any findings on site. The extent of earthworks and staging is depicted on the ESCP drawing in **Appendix 1**.

Once appointed, the Contractor's details will be updated and the EMP amended in accordance with the Contractor's proposed methodologies of construction, programme of works. This methodology shall be read in conjunction with the ESCP attached as **Appendix 1**.

The proposed earthworks comprise construction and upgrading of an approximately 1.8 km long shared access road traversing a sloping hillside. Runoff generated during construction arises from numerous small and discrete catchments distributed along the road alignment rather than a single concentrated catchment. Construction will generally follow the following sequencing.

- Site establishment and ESC installation
- Vegetation clearance and topsoil stripping
- Access road upgrading
- Culvert installation and culvert extension
- Stabilisation and rehabilitation
- ESC removal

#### Preliminary works and site establishment

- Ensure the current EMP and associated resource consents are available onsite and/or available electronically.
- Complete site induction with Environmental Consultant.

#### Road Formation Earthworks ESCP-001, Appendix 1

- Maintain the existing stabilised construction entrance and establish the erosion and sediment controls identified on ESCP-001, **Appendix 1** prior to commencement of earthworks.
- Undertake vegetation clearance and topsoil stripping progressively along the access road alignment to minimise the extent and duration of exposed soils.
- Establish the permanent roadside swale network (DWDCs) progressively as road formation advances. The access road is cambered back into the slope, directing runoff into the uphill swales where it can be conveyed through the ESC treatment train.
- Install culverts, drop-out pits, check dams, sediment sumps, level spreaders and silt socks in accordance with the locations shown on the ESCP. Refer to the ESCP ESCP-001 - 009, **Appendix 1** schematics for detailed specifications.
- Direct runoff collected within the DWDC network to downstream treatment devices in accordance with the ESCP.
- Manage temporary stockpiles in designated areas and install downslope sediment controls where required.

- Progressively stabilise completed sections of the road corridor through aggregate placement, hydroseeding, hydromulching and erosion matting as appropriate.
- Inspect and maintain all ESC measures throughout construction, particularly prior to and following rainfall events.
- Remove temporary ESC measures once contributing catchments have achieved permanent stabilisation and there is no ongoing risk of sediment discharge.

#### **Culvert Extension and Installation - ESCP-001, Appendix 1**

- Confirm a suitable construction window using weather forecasting and schedule the works during a period of stable weather, with no significant rainfall forecast for a minimum of five days.
- Prior to commencing works, inspect the ephemeral flow path and confirm that no surface water is present and that dry conditions exist.
- Excavate around the existing culvert and undertake the culvert extension in accordance with the final engineering design.
- Backfill and compact around the extended culvert using suitable fill material in accordance with the engineering specification.
- Stabilise the culvert inlet and outlet with appropriately sized rock rip rap to prevent scour and erosion during future flow events.
- Reconstruct the surrounding batters and drainage line to match the proposed design levels and maintain positive drainage through the ephemeral flow path.
- Apply hydromulch or erosion matting to all disturbed fill batters immediately following earthworks to minimise the duration of exposed soils.
- Inspect the works following completion and ensure all disturbed areas are stabilised prior to reopening the catchment to natural runoff.

#### **Decommissioning**

- Remove erosion and sediment control devices once stabilisation has occurred across the entire site. This is generally defined as 80% vegetative cover.

## **2.2 Hours of Operation**

Construction activities and the associated hours of operation shall comply with *NZS 6803:1999 Acoustics - Construction Noise Guidelines*. Site works may be undertaken between 0730 and 1800 hours, Monday to Saturday. No works are to be undertaken on Sundays or Public Holidays. However, this does not preclude any emergency works or works required for incident investigation or response. Additional detail relating to noise-producing activities are to be undertaken in accordance with **Section 7.0** of this EMP.

## 3.0 EMP IMPLEMENTATION

### 3.1 Environmental Roles and Responsibilities

#### 3.1.1 Environmental Representative

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

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

#### 3.1.2 Environmental Representative

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

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

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

#### 3.1.3 Environmental Consultant

The Environmental Consultant (SQEP) will provide technical environmental management advice as required. Key tasks include delivering the site environmental induction to core staff and providing as-built confirmation of erosion and sediment controls to Council. The Environmental Consultant (SQEP) shall undertake monthly monitoring of the site and submit Monthly Environmental Reports to QLDC 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 EMP. This includes reporting any activity that has the potential to or has resulted in an environmental incident to the Project Manager or Environmental Representative.

### 3.2 Site Environmental Induction

All staff and subcontractors shall attend an environmental induction to ensure they are aware of the project's environmental risks as well as their responsibilities to help manage these risks. Prior to ground-disturbing activities, the Environmental Consultant will deliver the induction to core staff. During the project, the Environmental Representative will induct sub-contractors 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 6** outlines the regular environmental inspections to be undertaken.

**Table 6: Environmental inspections**

| Environmental inspection         | Timing                                                                    | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Weekly inspection                | Every seven days                                                          | <ul style="list-style-type: none"> <li>Confirm that all environmental controls are present, functional, and adequate.</li> <li>Identify any activities that may cause an environmental incident or actual or potential environmental effects.</li> <li>Identify maintenance requirements for implemented management measures.</li> <li>Review and record the site weather station rainfall and wind data.</li> <li>All weekly inspections shall be recorded on the Weekly Site Inspection form attached as <b>Appendix 5</b>.</li> </ul> |
| Pre-event inspection             | Prior to a significant rainfall and or/adverse weather event <sup>2</sup> | <ul style="list-style-type: none"> <li>To ensure that erosion and sediment controls are present, functional, and adequate for forecast rain event.</li> <li>This inspection will inform any preventative work required and may result in the Rapid Response Procedure being implemented (see <b>Section 4.8</b>)</li> <li>All pre-event inspections shall be recorded in <b>Appendix 5</b>.</li> </ul>                                                                                                                                   |
| Adverse weather event monitoring | During a significant weather event (if safe to do so)                     | <ul style="list-style-type: none"> <li>Erosion and sediment control devices continue to function correctly and inform any necessary emergency responses.</li> <li>Complete water quality monitoring and sampling.</li> <li>Record any non-conformances and identify any areas of improvement.</li> </ul>                                                                                                                                                                                                                                 |
| Post-event inspection            | Post a significant rainfall and/or adverse weather event                  | <ul style="list-style-type: none"> <li>Erosion and sediment control devices are repaired and/or maintained.</li> <li>Any observations and corrective actions should be recorded in <b>Appendix 8</b>.</li> <li>All post event inspections shall be recorded in <b>Appendix 5</b>.</li> </ul>                                                                                                                                                                                                                                             |

<sup>2</sup> A significant rain event is defined as any forecast/actual rain event of 20 mm within a 12-hour period (as per QLDC EMP 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 EMP and ORC Earthworks Guidelines.

| Environmental inspection         | Timing                                      | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Monthly environmental inspection | Monthly, at intervals not exceeding 30 days | <ul style="list-style-type: none"> <li>Undertake a comprehensive review of the site's overall environmental performance and compliance with consent conditions and QLDC EMP Guidelines and ORC Erosion and Sediment Control Guidelines.</li> <li>Confirm that erosion and sediment controls are appropriately designed, installed, and maintained for the current stage of works, site conditions, and seasonal risk profile.</li> <li>Verify that corrective actions identified through inspections or incidents have been implemented and are effective.</li> <li>Identify opportunities for improvement to environmental controls or site management practices, particularly in advance of higher-risk seasonal periods.</li> </ul> |

### 3.4 Monthly Environmental Inspection and Reporting by SQEP

The Environmental Consultant (SQEP) will monitor the site monthly to ensure that the EMP 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 and ORC within five working days of the end of each month. The report will include the following information:

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

### 3.5 Environmental Incident Management

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

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

The Project Manager must notify QLDC and ORC of the details of any environmental incident within 12 hours of becoming aware of the incident. Notification will be through a phone call to council monitoring staff (see Emergency Contacts in **Table 1**). The project team shall provide an Environmental Incident Report within ten working days of the incident occurring. The Environmental Incident Report form is attached as **Appendix 6**.

### 3.6 Complaints Procedure

Any complaint received will be recorded and an investigation will be carried out. The complainant will be provided with a response acknowledging receipt of the complaint and outlining corrective actions to be implemented. After the investigation, any necessary corrective actions will be carried out, and a follow-up of the original complaint is to be

conducted to ensure the actions implemented have been effective. All complaints will be recorded on the Complaints Register attached as **Appendix 7**.

### 3.7 EMP Non-Conformance and Corrective Actions

EMP non-conformances found during site inspections, monitoring or as a result of environmental incidents or complaints shall be recorded in the EMP 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 register ensures that issues do not escalate or are missed, as well as, providing a clear record of evidence that can be used to defend any potential complaint or formal enforcement action.

### 3.8 Records and Registers

The records listed below will be collated onsite. If a request is made by an QLDC 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**.
- Environmental Inspection Forms - **Appendix 5**.
- Environmental Incident Reports - **Appendix 6**.
- Complaints Register - **Appendix 7**.
- EMP Non-Conformance Register - **Appendix 8**.
- Water Quality Monitoring Results - **Appendix 9**.

### 3.9 EMP Updates

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

- Significant changes to the construction methodology.
- Improvements identified as a result of an environmental incident or corrective action.
- Where directed by QLDC and/or ORC's monitoring and enforcement or compliance teams.

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

## 4 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:

- Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016 (Auckland Council Guideline Document GD2016/005).
- QLDC Guidelines for Environmental Management Plans, June 2019 (The Guidelines).
- ORC Residential Earthworks in Otago – A guide for developers, landowners, contractors and service providers June 202 (Guide — Residential Earthworks in Otago).

Please see **Figure 2** below for the QR code links.



GD05 ARC guidelines



ORC earthworks guidelines



QLDC environmental guidelines

**Figure 2 – QR Codes**

### 4.2 Site Specific Erosion and Sediment Control Principles

Erosion and sediment control ('ESC') devices shall be installed, maintained and decommissioned in accordance with the following principles:

- Erosion and sediment controls are integrated with construction planning.
- Construction is staged to minimise the duration and area of exposed soil open at any one time.
- A 'treatment train' approach so that the sediment retention devices operate as efficiently and effectively as possible.
- Separation of 'clean' and 'dirty' water with clean water to be diverted around the site to minimise the volume of dirty water needing management onsite.
- The extent and duration of soil exposure is minimised.
- Controls are always maintained in proper working order.
- Progressively stabilise and revegetate disturbed or completed areas.

- The site is monitored, and erosion and sediment control practices are adjusted to maintain the required performance standard.
- Soil erosion is minimised as far as reasonable and practical.
- Avoidance of sediment discharge off-site and protection of receiving environments.

### 4.3 Site Specific Erosion and Sediment Control Approach

The proposed earthworks comprise construction of an approximately 1.8 km long shared access road traversing a sloping hillside environment. Runoff generated during construction arises from numerous small and discrete catchments distributed along the road alignment rather than a single concentrated catchment.

Consequently, the erosion and sediment control strategy adopts a source-control and treatment-train approach, whereby sediment is managed as close as practicable to where it is generated rather than relying on large end-of-line sediment retention devices. The primary ESC measures include:

- Dirty water diversion channels/driveway swales
- Check dams
- Drop-out pits
- Sediment sumps
- Standard silt fences
- Silt socks
- Level spreaders
- Erosion matting (where required)
- Application of aggregate to the road surfaces

The proposed works comprise a linear road, traversing across a moderately steep hillside and do not generate runoff from a single concentrated catchment. Instead, runoff is produced from multiple small catchments located along the length of the road corridor.

Collection of these dispersed catchments into one or more formal sediment retention ponds (SRPs) or Decanting Earth Bunds (DEBs) would require significant additional earthworks, increased disturbance areas, and extensive diversion infrastructure. Such an approach would likely generate greater environmental effects than the proposed source-control methodology. These guidelines for the devices employed on this project shall be read in conjunction with the ESCP attached as **Appendix 1** of this document.

### 4.4 Site Specific Erosion Control Practices

#### 4.4.1 Site Definition

At the commencement of the project, the following components onsite will be clearly defined as detailed in **Table 7**.

**Table 7: Site definition specifications**

| Site component         | Method of demarcation                   |
|------------------------|-----------------------------------------|
| Designated site access | Installation of stabilised access/signs |

#### 4.4.2 Non-Structural Controls

Non-structural approaches to erosion control are closely linked to the fundamental principles of ESC detailed in **Section 4.2**. The key principles (best practice management) of key relevance to erosion control are outlined below. These principles and concepts provide guidance for ESC throughout the planning, construction and maintenance phases of a project.

##### 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. This includes isolating work areas and completing them in manageable sections. Staging is demonstrated in the ESCP attached as **Appendix 1**.

##### Timing

It is recommended that works are undertaken outside of significant or adverse weather events<sup>3</sup> 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

It is important that when completed, exposed or disturbed areas are progressively stabilised. Stabilisation methods will vary around the site due to differing gradients and growing mediums. Stabilisation and rehabilitation measures are outlined below:

#### 4.4.3 Stabilisation Measures

##### Revegetation

- Hydroseeding and hydromulching will be used to stabilise completed batters, disturbed areas and other exposed surfaces that are not receiving aggregate cover. These treatments will provide rapid surface protection while permanent vegetation establishes.
- The use of hydroseeding and hydromulching is particularly appropriate given the relatively large linear extent of disturbed batters associated with the access road. Progressive application will minimise the duration of exposed soils and reduce the potential for sediment mobilisation during rainfall events.

##### Erosion matting

- Erosion matting may be installed on steeper cut and fill batters where additional surface protection is required. Erosion matting provides immediate stabilisation of exposed soils and reduces the risk of rilling and scour while revegetation establishes.
- The need for erosion matting will be determined based on final slope gradients, soil conditions and construction sequencing. The control is considered particularly valuable on steeper sections of the road corridor where vegetation establishment alone may not provide sufficient short-term erosion protection and is to be installed in accordance with the reference image on ESCP-002, **Appendix 1**.

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<sup>3</sup> Significant or adverse weather events as referred to in the QLDC and ORC Earthworks and EMP Guidelines.

## Aggregate

- Road formation surfaces will be progressively stabilised through the placement of aggregate as design levels are achieved. Aggregate surfacing will provide immediate protection against raindrop impact, reduce sediment generation and limit dust generation from construction traffic.

### 4.4.4 Stabilised Entranceway

An existing stabilised construction entrance is present at the site access from Cardrona Valley Road. The entrance will be retained and maintained throughout the construction period to minimise the tracking of sediment onto Cardrona Valley Road and provide a durable all-weather surface for construction traffic accessing the site. Given the relatively low frequency of heavy vehicle movements anticipated during construction, the existing stabilised surface is considered an appropriate control for managing sediment tracking risks associated with the works. The stabilised entranceway will be maintained in accordance with the schematic diagram in ESCP-004, **Appendix 1** (complete guidelines on pages 60-65 of GD05).

### 4.4.5 “Dirty Water” Diversion Channels and Bunds

Dirty Water Diversion Channels (DWDCs) will be established within the alignment of the permanent roadside swales and constructed in accordance with the final engineering design. The access road has been designed with a crossfall that is cambered back into the hillside, directing runoff from the road surface, cut batters and disturbed road corridor into the uphill swale network. During construction, these swales will function as the primary runoff collection system and form a key component of the site's erosion and sediment control.

The DWDCs will convey sediment-laden runoff in a controlled manner to downslope treatment devices including drop-out pits, sediment sumps, culverts, silt socks and level spreaders, avoiding uncontrolled flows across exposed soils or fill batters. Their use is considered appropriate given the linear nature of the project and the presence of numerous small catchments distributed along the road alignment and that they discharge to land.

DWDCs will be constructed in accordance with the schematic diagram in ESCP-005, **Appendix 1** (complete guidelines on pages 43-46 of GD05).

### 4.4.6 Check Dams

Rock check dams are an erosion controls and will be deployed primarily to reduce the velocity of concentrated flows in the DWDCs. The check dams will reduce flow velocities within the swales, minimise erosion of the channel bed and promote deposition of coarse sediment before runoff reaches downstream treatment devices.

The use of check dams is appropriate given the longitudinal grades associated with sections of the access road corridor and the need to manage runoff velocities within the permanent swale system during construction. Check dams will form part of the treatment train approach adopted for the project and will remain functional until permanent stabilisation is achieved.

The check dams will be constructed in accordance with the schematic diagram in ESCP-007, **Appendix 1** (complete guidelines on pages 50-54 of GD05).

#### 4.4.7 Drop-Out Pits

Drop-out pits will be installed immediately upstream of culvert inlets throughout the road corridor as shown on the ESCP. These structures will provide primary sediment treatment within the drainage network by slowing runoff and promoting settlement of coarse sediment prior to entering culverts.

The drop-out pits are considered appropriate because they intercept sediment close to the source and reduce the potential for culvert blockages and downstream sediment transport. Locating the pits at culvert inlets also provides convenient access for routine inspection and sediment removal. Drop-out pits will be constructed in accordance with the image reference in ESCP-006, **Appendix 1** (complete guidelines on page 45 of GD05).

#### 4.4.8 Culvert

Culverts will be installed beneath the access road in accordance with the final engineering design and the locations identified on the ESCP. The culverts will convey runoff collected within the roadside swale network beneath the road formation and maintain existing drainage pathways across the site. Culvert inlets and outlets will be stabilised to minimise erosion and scour.

One existing culvert located within an ephemeral flow path will be extended as part of the works. The flow path is typically dry, and no flowing water is anticipated during construction. Accordingly, no temporary stream diversion is proposed. Works will be undertaken during suitable weather conditions and disturbed areas will be stabilised as soon as practicable following completion of the extension works.

Geofabric and rock shall be placed at the outlet to prevent scour from the higher velocity water exiting the culvert. Culverts shall be constructed in accordance with the schematic diagram in ESCP-005, **Appendix 1**.

#### 4.4.9 Level Spreader

Level spreaders will be installed at selected discharge locations as shown on the ESCP. Their purpose is to convert concentrated flows collected within the swale and culvert network into shallow sheet flow prior to discharge onto stable vegetated surfaces.

The level spreaders are particularly important on this site due to the sloping topography and the potential for concentrated discharges to create erosion pathways downslope of the road corridor. By dispersing runoff across a wider area, they reduce discharge velocities. These shall be constructed in accordance with the schematic diagram in ESCP-009, **Appendix 1**.

#### 4.4.10 Stockpiles

Temporary stockpiles will be generated from topsoil stripping and earthworks activities undertaken along the access road alignment. Stockpiles will be located within designated construction areas where practicable and outside defined drainage pathways. Downslope sediment controls will be installed where required and stockpiles will be progressively reinstated or reused as construction advances.

Given the staged and linear nature of the project, stockpiles are expected to be relatively small and temporary. Long-term stockpiles or stockpiles remaining inactive for more than four weeks will be stabilised through seeding, to minimise erosion and dust generation. Stockpiles shall be constructed in accordance with the schematic diagram in ESCP-002, **Appendix 1**.

## 4.5 Site Specific Sediment Control Practices

### 4.5.1 Sediment Sumps

Sediment sumps or small sediment basins will be excavated at the termination of the 'dirty' water roadside swales. The sumps will provide secondary sediment treatment by reducing flow velocities and allowing sediment to settle. Sediment sumps function as an important element of the 'treatment train' approach, whereby flow velocity is reduced and sediment can settle out of suspension before overflowing into vegetated paddocks.

Sediment sumps shall typically be formed to dimensions of 2.0 m W x 3.5 m L x 1.0 m D. It is important that sediment deposits are regularly cleared from the sump to maintain exposure of these free-draining soils. A spillway should be constructed and lined on the downslope wall of the sediment sump, ensuring the lining is secured in place to avoid erosion and undercutting. Sediment sumps will be constructed in accordance with the reference image in ESCP-006, **Appendix 1**.

### 4.5.2 Standard Silt Fence

A silt fence 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.

Standard silt fencing will be installed around temporary stockpiles and other localised areas identified on the ESCP where sheet flow runoff may mobilise sediment. The fences will intercept sediment-laden runoff and reduce the risk of sediment leaving disturbed areas during rainfall events. The silt fence will be installed in accordance with the schematic diagram in ESCP-008, **Appendix 1** (complete guidelines on pages 112-119 of GD05).

### 4.5.3 Silt Socks

Silt socks will be installed immediately downslope of level spreaders, as shown on the ESCP, to provide tertiary sediment treatment prior to discharge from the construction corridor. The socks will assist in reducing flow velocities and capturing any residual sediment remaining within runoff following treatment through the upstream controls.

The use of silt socks is considered appropriate due to the relatively small discharge volumes generated from each individual catchment and their ability to provide additional protection without creating significant disturbance areas. The silt socks form the final component of the project's treatment train approach. Silt socks will be installed in accordance with the schematic diagram in ESCP-009, **Appendix 1** (complete guidelines on pages 120-125 of GD05).

## 4.6 As-Built Verification

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

## 4.7 Maintenance of Erosion and Sediment Control Devices

Ongoing maintenance of the site shall be undertaken as follows and as summarised in **Table 8**:

### Regular and Weather-Responsive Inspections

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

### Prompt Corrective Action

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

### Structural Integrity

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

### Access and Health & Safety

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

**Table 8: Typical maintenance requirements**

| ESC device                       | Maintenance requirements                                                                                                                                  |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Culverts                         | Remove sediment and debris from inlets and outlets and repair any scour or erosion.                                                                       |
| Silt socks                       | Remove sediment when approximately 20% full and replace damaged sections as required.                                                                     |
| Dirty Water Diversion channels   | Remove sediment build-up and repair any erosion, scour or blockages.                                                                                      |
| Drop out pit                     | Remove accumulated sediment when approximately 20% full and maintain flow into culverts.                                                                  |
| Stabilised construction entrance | Maintain rock surfacing depth, clean any tracked sediment off public roads, maintain track matt regularly.                                                |
| Check dams / level spreaders     | Remove sediment buildup, repair armouring (rock or geotextile) to avoid scour.<br>Maintain design levels and repair any scour or concentrated flow paths. |
| Sediment sumps                   | Remove accumulated sediment when approximately 20% full and repair outlet protection if required.                                                         |
| Silt fences                      | Remove sediment when approximately one-third full and repair damaged fabric or posts.                                                                     |

## 4.8 Rapid Response Procedure for Significant or Adverse Weather Events

The Environmental Representative will maintain active and ongoing monitoring of weather forecasts from reliable sources (e.g., MetService, NIWA) throughout the duration of earthworks. The Environmental Representative will ensure

that sufficient preparation time is allowed for site crews to inspect, maintain, and reinforce erosion and sediment control (ESC) measures prior to any significant or adverse weather event.

#### **Weather Forecast Monitoring**

- Will check and document daily weather forecasts, including short-term severe weather warnings.

#### **Pre-Rainfall ESC Inspections**

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

#### **Stabilisation of Exposed Areas**

- Apply temporary stabilisation measures (e.g., polymers/soil binders, hydroseeding, erosion 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 Silt socks, or silt fences) and repair any structural damage or undercutting identified.

#### **Active Monitoring During Rainfall (Where Safe)**

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

#### **Emergency Repairs**

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

#### **Snow and Ice**

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

#### **Record Keeping and Reporting**

All pre- and post-weather event inspections, maintenance actions, and site observations shall be recorded in the site's ESC inspection and maintenance log. Where required by consent conditions, notifications and significant event reporting (e.g., turbidity exceedances or ESC failures) will be provided to the relevant Council Compliance Monitoring Officer (e.g., ORC, QLDC) in accordance with consent timeframes. Spare erosion and sediment control products should be always stored onsite including but not limited to:

- Silt fencing (remainder of roll).
- Waratahs (x 10).
- Silt socks

#### 4.9 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, chipseal, concrete or asphalt sealing, mulching or cleanfill aggregate, as depicted in **Figure 3**. It is noted that the removal of controls may result in minor soil exposure.



**Figure 3: Ground stabilisation**

#### 4.10 Inspections and Monitoring

Details of inspections and monitoring are stated in **Section 3.3**.

## 4.11 Contingency Measures

The following contingency measures in **Table 9** shall be deployed as required.

**Table 9: Erosion and sediment control contingency measures**

| Issue                                                                  | Contingency measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sediment-laden stormwater flowing across the site boundary             | <ul style="list-style-type: none"> <li>• Cease all earthworks immediately in the contributing catchment.</li> <li>• Deploy sandbags, silt socks, or bunding to redirect and contain overland flow.</li> <li>• Install emergency silt fence or geofabric barriers where practical.</li> <li>• Divert clean water away from disturbed areas to reduce further mobilisation.</li> <li>• Notify the Environmental Consultant (SQEP) and initiate a site-specific incident response plan.</li> <li>• Conduct incident documentation (location, cause, volume, response time). Submit to regulatory authority.</li> </ul> |
| Controls do not appear to be working as intended                       | <ul style="list-style-type: none"> <li>• Undertake immediate inspection of failed controls (e.g., collapsed silt fence).</li> <li>• Reinstate or upgrade the control using materials on-site (e.g., double silt fence, reinforce batter).</li> <li>• Assess whether additional or alternative measures are required.</li> <li>• Environmental Consultant (SQEP) to update the ESCP and record actions taken.</li> <li>• Notify QLDC and ORC.</li> </ul>                                                                                                                                                             |
| The site is inappropriately exposed prior to imminent rain event       | <ul style="list-style-type: none"> <li>• Suspend further soil disturbance activities immediately.</li> <li>• Prioritise stabilisation of exposed areas using: <ul style="list-style-type: none"> <li>• Hydroseed/hydromulch if &gt; 48 hours before rain (subject to ground conditions).</li> <li>• Polymer if &lt; 48 hours (subject to ground conditions).</li> <li>• Geofabric or jute matting for slopes and channels.</li> </ul> </li> <li>• Inspect and reinforce existing ESC devices before rainfall.</li> <li>• Activate <b>Section 4.8</b> Rapid Response Procedure.</li> </ul>                           |
| Sediment retention devices are near capacity and more rain is forecast | <ul style="list-style-type: none"> <li>• Temporarily reduce contributing catchment using diversion bunds if feasible.</li> <li>• Engage hydrovac truck if overtopping risk is imminent and discharge parameters are not met.</li> <li>• Document actions and notify the Environmental Consultant (SQEP) and Council.</li> </ul>                                                                                                                                                                                                                                                                                     |

#### 4.12 Erosion and Sediment Control Incident

An erosion or sediment control incident is considered to have occurred where performance criteria outlined in **Section 4.1** is not met. The incident procedures outlined in **Section 3.5** shall commence.

## 5 WATER QUALITY MANAGEMENT

### 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. Where flow must be reduced or diverted, mitigation is required to ensure the values of the watercourse are not degraded.

### 5.2 Identified Sensitive Receptors

Two surface waterbodies are identified within and/or in proximity to the site (refer to **Figure 4**). An ephemeral flow path passes through the site from the north-west corner before re-entering the property near the south-west corner of the site. The Cardrona River is located approximately 100 metres to the south of the property boundary and separated by the Cardrona Valley Road.

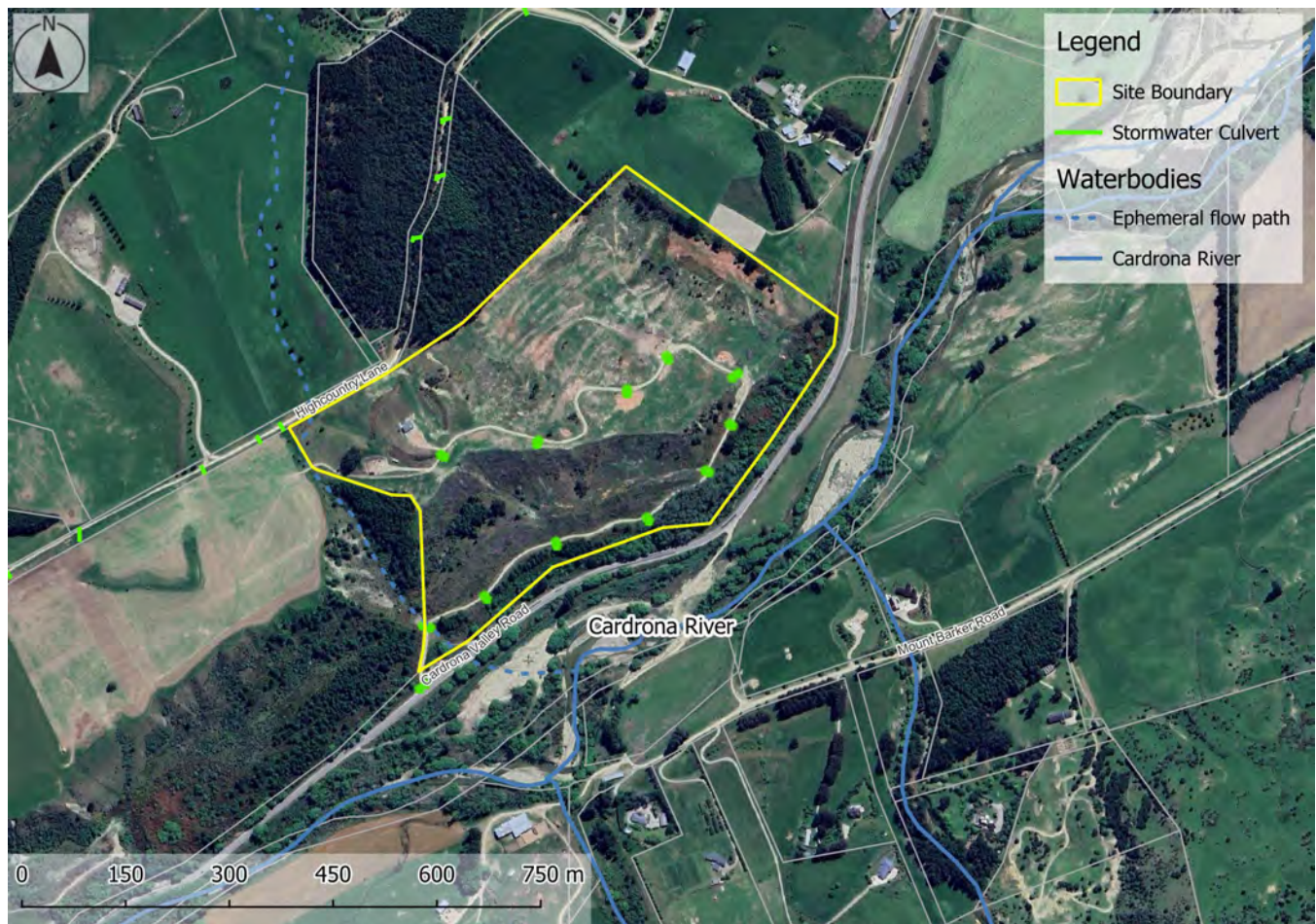


**Figure 4: Waterbodies within and in proximity to the site (Source: LINZ)**

## 5.3 Legislative Considerations

### 5.3.1 NPS-FM

The Otago Regional Council has proposed a progressive implementation plan for meeting the NPS-FM 2017 and includes objectives and targets for FMUs in accordance with the requirements of the NPS-FM. However, it is noted that this process has been required by the current government to be ceased. Given the industry best practice erosion and sediment control measures proposed, potential adverse effects on surface water bodies are considered to be appropriately managed and mitigated. Overall, the proposal is consistent with the objectives and policies of the partially operative NPS-FM.

### 5.3.2 Regional Plan: Water for Otago

The schedules, maps and associated values or controls that are stipulated in the Water Plan for the area in around the site, include:

#### Cardrona River

- **Schedule 1A – Natural Values:** The Cardrona River, located in the ‘Lakes subregion’, is characterised by a range of ecosystem values and is specifically recognised as providing significant habitat for flathead galaxiid (a native fish species). The river is also recognised as having a high degree of naturalness above 900 metres asl.
- **Schedule 1D – Kai Tahu Values:** Mana whenua interests identified as being associated with the Cardrona River include kaitiakitanga, mauri, waahi tapu and/or waiwhakaheke and waahi taoka. Access and customary use interests associated with the Cardrona River include: mahika kai (places where food is procured and produced); kōhanga (important nursery, spawning areas or breeding grounds for native fish or birds); trails (part of traditional routes, including landing places for canoes); and, cultural materials (source of traditional weaving materials or medicines).

## 5.4 Performance Criteria

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

- There is no concentrated, point source discharge to water bodies. Sheet flow is primarily maintained across the road by frequent culvert locations discharging into vegetated paddocks.
- The nearest receiving waterbody is the Cardrona River, located approximately 100 metres south of the site. Runoff from the site would generally travel via roadside swales before entering the roadside stormwater network, providing some opportunity for sediment settlement, dilution, and attenuation prior to reaching the receiving environment.
- The existing environment/water shed and related water quality of adjoining waterbodies.

Turbidity and/or visual clarity has been proposed for on-site water quality monitoring, consistent with the Auckland Council Erosion and Sediment Control Guide for Land Disturbing Activities (GD05). GD05 identifies 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. 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' works areas, or erosion and sediment control devices will meet the criteria in **Table 10**.

**Table 10: Water quality discharge criteria**

| Parameter                                                | Discharge criteria            |
|----------------------------------------------------------|-------------------------------|
| Turbidity <sup>4</sup>                                   | ≤ 100 NTU                     |
| Visual clarity (mm)                                      | ≥ 100 mm (As per GD05)        |
| If Turbidity or Visual Clarity are exceeded, test TSS... |                               |
| Total Suspended Sediment (TSS)                           | ≤ 50 mg/L                     |
| pH <sup>5</sup>                                          | 5.5 – 8.5                     |
| Hydrocarbons or tannins                                  | No visible trace              |
| Waste                                                    | No waste or litter is visible |

## 5.5 Management Measures

The following measures will be deployed to ensure the protection of water quality:

- Erosion and sediment controls will be implemented and maintained in accordance with the Erosion and Sediment Control Measures in **Section 4.0**.
- Schedule earthworks during periods of settled weather, to reduce the risk of weather-related erosion and sediment runoff.
- Refuelling, servicing and storage of hydrocarbons will be in accordance with the relevant procedures in the Chemicals and Fuels Management in **Section 10.0**.
- All plant and equipment onsite 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 line, unless appropriate controls are in place.

## 5.6 Water Quality Monitoring Plan

Water quality will be monitored in accordance with **Table 11** and outlined in further detail in **Appendix 9**.

**Table 10: Water quality monitoring measures**

| Sampling scope |
|----------------|
|----------------|

<sup>4</sup> 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.

<sup>5</sup> pH to be tested only when chemical treatment is undertaken.

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective              | To assess whether controlled and uncontrolled discharge, meets the Discharge Criteria referred to in <b>Section 5.4</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Responsibility         | On site water quality sampling is to be completed by the nominated Environmental Representative.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Spatial boundaries     | Discharges from within the sites' boundary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Frequency              | <p>When there is a discharge of water across the site boundary or from a sediment retention pond or decanting earth bund, and where a Significant Rain Event occurs through the night, monitoring must be undertaken the following morning by 8am.</p> <p>A significant rain event is defined as any forecast/actual rain event of 20 mm within a 12-hour period or a rain event that can generate overland flow, noting that this varies seasonally. Where a Significant Rain Event occurs through the night, monitoring shall be undertaken the following morning.</p> |
| <b>Sampling design</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Water quality criteria | As outlined in the Discharge Criteria referred to in <b>Section 5.4</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Sampling locations     | <p>At boundaries of the site where any water is flowing, specifically the following location:</p> <ul style="list-style-type: none"> <li>Roadside swale – eastern boundary – NZTM2000: E 1,293,449 m, N 5,037,973 m</li> </ul>                                                                                                                                                                                                                                                                                                                                           |
| Sampling method        | <ul style="list-style-type: none"> <li>TSS – Registered laboratory.</li> <li>Turbidity (NTU) – Nephelometer.</li> <li>Visual clarity – Clarity tube/secchi disk.</li> <li>pH – pH meter, only if utilising chemical treatment.</li> <li>Gross pollutants – visual observations.</li> <li>Tannins – visual observations (any unusual darkening of waters?).</li> <li>Hydrocarbons – visual observations (is there any oily film on surface or smell?).</li> </ul>                                                                                                         |
| Quality control        | Any water quality meters will be calibrated according to manufacturer instructions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Recording</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Recording results      | All results will be entered into a spreadsheet and kept onsite (form attached as <b>Appendix 9</b> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Actions</b>         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Non-conformances       | Any exceedances observed will be reported to the Project Manager/ Environmental Consultant who will investigate and ensure appropriate corrective actions are implemented immediately.                                                                                                                                                                                                                                                                                                                                                                                   |

## 5.7 Contingency Measures

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

**Table 11: Water quality contingency measures**

| Issue                                | Contingency measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exceedance of water quality criteria | <ul style="list-style-type: none"> <li>• Contact the Project Manager and Environmental Consultant (SQEP) immediately.</li> <li>• Works will cease or be modified to remove further risk of contamination.</li> <li>• QLDC and ORC will be verbally notified.</li> <li>• The Environmental Incident procedure will commence.</li> <li>• Remedial measures will be implemented, and the Environmental Incident will be closed out by the Environmental Representative with a copy of an Environmental Incident report to the Project Manager, QLDC and ORC.</li> </ul> |

## 5.8 Water Quality Incidents

A water quality incident is considered to have occurred where the water quality performance criteria outlined in **Section 5.4** is breached. The incident procedures outlined at **Section 3.5** shall commence.

## 5.9 Assessment of Effects

### 5.9.1 Actual or Potential Effects on Waterbodies

Overall, it is anticipated that the proposed ESC management approach will ensure that the sediment yield from the works will be minimised to an acceptable level and that any adverse sediment-related effects will be temporary, and consistent with the NPS:FM and the relevant regional and district plan provisions.

### 5.9.2 Cumulative Effects on Waterbodies

Under the Resource Management Act (RMA), "cumulative effect" is defined as an effect that arises over time or in combination with other effects.

The proposed works are temporary in nature and are not expected to result in significant or lasting changes to the quality or quantity of water in the receiving environment. At the time of writing, there are no concurrent earthworks activities within the surrounding catchment that would contribute to cumulative sediment or contaminant loading. As detailed above, the site's erosion and sediment controls will be maintained and adapted throughout the project duration. Any discharges are expected to be minor and temporary in nature. Therefore, cumulative adverse effects on Cardrona River, as a result of the proposed works, are not anticipated.

### 5.9.3 Kai Tahu Tikanga and Natural Values

The Cardrona River is both naturally and culturally significant, as detailed in **Section 5.3**. In addition, the Cardrona River is considered a Wāhi Tūpuna, as described further in **Section 8.0**. The proposed erosion and control measures are designed to avoid degradation of the Cardrona River and to protect its mauri through the prevention of sediment-laden discharges. This ensures the protection of aquatic habitats and downstream users and recognises and respects Kāi Tahu tikanga and values.

## 6 DUST MANAGEMENT

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### 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

Key sensitive receptors include the Cardrona River, the workers on site and neighbouring residential dwellings to the east.

### 6.3 Performance Criteria

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

### 6.4 Management Measures

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

- Stage works where possible to minimise soil exposure extents and timeframes.
- Revegetate disturbed areas progressively throughout construction.
- Dust suppression of exposed areas and stockpiles by water trucks or other methods (e.g., sprinklers, k-lines) approved by the Environmental Representative.<sup>6</sup>
- If dust activities cannot be controlled during high winds, works will cease until favourable conditions return.
- Site access to be constructed in accordance with GD05 (detail at **Section 4.4.4**).
- All site access and surrounding roads to be swept clean regularly.
- 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.

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<sup>6</sup> Ensure a consented water take permit is approved by the local authority. If taking water from lakes and or rivers, ensure that the permitted volume of water is taken.

- Stockpile heights are to be minimised where possible (< two metres) and should be temporarily stabilised (e.g. an erosion matting, soil stabilising polymer, temporary cover crop or mulched).
- Long-standing topsoil stockpiles shall be stabilised using a cover crop (if within growing season) and cleanfill or aggregate stockpiles that are easily erodible should have erosion matting or soil stabilising polymer applied to them.
- Within two weeks of completion, all earth worked areas should be stabilised by applying aggregate, sealing, sown out with grass, landscaped or otherwise stabilised by an appropriate erosion control.

## 6.5 Monitoring

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

## 6.6 Contingency Measures

The contingency measures in **Table 13** shall be adopted if required.

**Table 12: Dust contingency measures**

| Issue                                           | Contingency measure                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Excessive dust creation from soil disturbance   | <ul style="list-style-type: none"> <li>• Increase frequency of water truck spraying or increase irrigation.</li> <li>• Spray down excavation areas and activities where excavator bucket is operating.</li> <li>• Cease excavation during high winds, particularly if wind direction is likely to impact sensitive receivers.</li> </ul> |
| Excessive dust creation from hauling operations | <ul style="list-style-type: none"> <li>• Reduce truck speeds. Remove if no traffic in site.</li> <li>• Cover or spray down loads causing dust impacts.</li> <li>• Apply skim of aggregate over the haul road surface.</li> <li>• Install shakedown devices at entry and exit points.</li> </ul>                                          |
| Excessive dust creation from stockpiles         | <ul style="list-style-type: none"> <li>• Spray stockpiles with water or apply a temporary soil stabilising polymer.</li> <li>• Hydro-mulch, seed or stabilise stockpiles, cover stockpiles with geofabric.</li> <li>• Locate stockpiles further away from sensitive receptors.</li> </ul>                                                |

## 6.7 Dust Incident

A dust incident is considered to have occurred where:

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

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

## 6.8 Dust Assessment

The potential for dust nuisance will be actively managed through the implementation of the management measures outlined in **Section 6.4**, including staging of works and surface stabilisation. In addition, the limited duration of earthworks involved will reduce the likelihood of dust impacts. These measures are expected to ensure dust generation is minimised as much as reasonably practicable.

## 7 NOISE AND VIBRATION MANAGEMENT

### 7.1 Noise and Vibration

Many construction and demolition activities can incur noise and vibration effects. However, noise generated during construction, maintenance, and demolition work is generally of a temporary nature. Provided ongoing noise does not occur at inconvenient times, the adverse effects can generally be avoided or mitigated.

NZS 6803:1999 Acoustics - Construction Noise, recommends higher noise criteria for construction activities during daytime hours (Monday to Saturday) for residential areas and rural dwellings, while for Sundays and public holidays lower noise criteria are set to provide days of rest from construction noise. Similarly, night—time criteria are low to avoid sleep disturbance.

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.
- Compaction equipment.
- Reversing alarms.

### 7.2 Identified Sensitive Receptors

Key sensitive receptors include Cardrona Valley Road, the workers on site and neighbouring residential dwelling.

### 7.3 Performance Criteria

- Construction activities shall meet relevant noise limits specified under Rule 36.5.13 of the Queenstown Lakes Proposed District Plan. This rule requires Construction sound at any point within the site must comply with the limits specified in Tables 2 and 3 of NZS 6803:1999 Acoustics - Construction Noise, when measured and assessed in accordance with that standard (see Table 14 below).
- Construction activities shall meet relevant vibration limits specified under Rule 36.5.10 of the Queenstown Lakes Proposed District Plan. This rule requires vibration from any activity must not exceed the guideline values given in DIN 4150-3:1999 Effects of vibration on structures on any structures or buildings on any other site (see **Table 15** below).
- Construction activities shall be undertaken in accordance with the permitted hours of operation outlined at **Section 2.2** of this EMP.

**Table 13: Upper limits in dB(A) for construction work noise in residential areas for less than 20 weeks**

| Time of week | Time period | L <sub>Aeq(t)</sub> | L <sub>Afmax</sub> |
|--------------|-------------|---------------------|--------------------|
| Weekdays     | 0630 – 0730 | 60 dB               | 75 dB              |
|              | 0730 – 1800 | 75 dB               | 90 dB              |
|              | 1800 – 2000 | 70 dB               | 85 dB              |

|           |             |       |       |
|-----------|-------------|-------|-------|
| Saturdays | 0630 – 0730 | 45 dB | 75 dB |
|           | 0730 – 1800 | 75 dB | 90 dB |

**Table 14: 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:

- Notify surrounding sensitive receptors prior to commencing particularly noisy or vibration inducing activities.
- Where practicable, select lower noise producing equipment or use lower noise generating alternatives.
- Regularly service equipment to ensure plant is running optimally.
- Revving of engines will be limited. All plant and vehicles will be turned off when not in use and if safe to do so.
- The use of audible alarms on mobile equipment will be limited, and two-way communication will be used.
- Undertake activities that may lead to noise or vibration effects, during reasonable and practical hours.

## 7.5 Monitoring

All earthworks activity will be closely monitored by the operator to ensure that noise and vibration remain within the required limits. If monitoring finds the activity cannot comply with performance criteria, an Acoustic Specialist may need to be engaged to assess the project and provide appropriate mitigation measures and monitoring. Weekly Environmental Inspections and Monthly SQEP Environmental Inspections shall include an assessment of the site to determine the effectiveness of noise and vibration management controls.

## 7.6 Contingency Measures

The following contingency measures in **Table 16** shall be adopted if required.

**Table 15: 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 <b>Section 3.6</b> .                                                                                               |
| 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

The effects of noise and vibration will be actively managed through the implementation of the management measures outlined in **Section 7.4**. In addition, the limited duration of earthworks involved, and the isolated nature of the site will reduce the likelihood of adverse effects of noise and vibration. These measures are expected to ensure that adverse effects of noise and vibration are minimised as much as reasonably practicable.

## 8 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

The site is located adjacent to the Cardrona River Wāhi Tūpuna. Wāhi Tūpuna are landscapes that embody the relationship of mana whenua and their culture and traditions with their ancestral lands, water, sites, wāhi tapu (sacred places), and other taoka (treasure). The specific values that Cardrona River holds are Ara Tawhito, mahika kai, and nohoaka. This is shown in **Figure 5** below.



**Figure 5: Location of areas with cultural significance (Source: QLDC, PDP)**

### 8.3 Performance Criteria

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

## 8.4 Management Measures

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

## 8.5 Monitoring

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

## 8.6 Accidental Finds

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

## 8.7 Cultural Heritage Assessment

The potential effects of ground disturbance on archaeological and cultural heritage values will be appropriately managed through the implementation of the measures outlined in **Section 8.4**, including accidental discovery protocols and, where required, archaeological oversight during earthworks.

## 9 VEGETATION MANAGEMENT

### 9.1 Vegetation

Vegetation is a fundamental component of site environmental management, providing natural functions that minimise adverse effects during both construction and operational phases. Effective protection and integration of vegetation support compliance with district and regional plan requirements and contributes to overall site resilience.

All practicable attempts to mitigate the risks of environmental effects to indigenous vegetation or protected trees within the site, should be undertaken when either clearing indigenous vegetation directly or working in proximity to indigenous vegetation or protected trees.

### 9.2 Identified Sensitive Receptors

The northern half of the site has recently been cleared of wilding pines and replaced with pasture. Several small pockets of fenced native vegetation, planted as part of the underlying subdivision, were observed to the east and south-west of the site residence on proposed Lot 1. The lower and steep sections of the site feature mature conifers (predominately wilding pines) and limited shrubs and bracken. This is shown in **Figure 6**.



Fenced native vegetation in the vicinity of the site residence on proposed Lot 1.



Brown top grasses along the upper portions of the existing access track



Mature established conifers are present along the steeper slopes of southern half of the site.



Established conifers and a sporadic bracken present along the lower portions of the existing access track

**Figure 6: Vegetation cover onsite (Photos by Enviroscope)**

### 9.3 Performance Criteria

- Undertake disturbance within the consented earthworks extent.
- Avoid the clearance of indigenous or protected vegetation where possible during excavation works.
- Avoid the spread of noxious weeds onsite or to other sites.

### 9.4 Management Measures

The following measures will be deployed to manage vegetation:

- Demarcate protected vegetation areas as no go zones.
- Treating weeds prior to disturbance of the natural surface.
- Maintain existing indigenous and or any protected vegetation.
- Weed free topsoil will be retained for reuse in site rehabilitation.

### 9.5 Monitoring

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

### 9.6 Vegetation Incident

A vegetation incident is considered to have occurred where:

- Protected vegetation is damaged or removed.
- A no-go zone is breached.

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

## 9.7 Vegetation Assessment

Potential effects on vegetation will be managed through the implementation of the management measures outlined in **Section 9.4**, including limiting vegetation clearance to the minimum extent necessary for construction and protecting vegetation outside approved disturbance areas. The limited extent of vegetation clearance, combined with the absence of significant or protected vegetation on site, is expected to reduce the potential for adverse effects. As a result, any effects on vegetation values are anticipated to be minimised as far as reasonably practicable.

## 10 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 receptors include The Cardrona River, overland flow paths and the workers on site.

### 10.3 Performance Criteria

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

### 10.4 Management Measures

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

- All hazardous substances to be stored, transported and used according to the safety data sheet requirements.
- Storage of chemicals and fuels shall be located as far as practicably possible from waterways and concentrated flows.
- Refuelling of vehicles and plant onsite will occur in the designated refuelling bay as shown in ESCP-011, **Appendix 1**.
- All concrete washing is to be undertaken in the designated concrete wash-out pit as per the design specifications in ESCP-011, **Appendix 1**.
- One 100 L Oil and Hydrocarbon spill kit will be located in close proximity to the location of liquid hazardous materials storage and refuelling areas.
- The volumes of the hazardous substances listed in **Table 17** will not be exceeded.

**Table 16: Maximum volumes of chemicals and fuels**

| Chemicals and fuels         | Maximum volume | Storage location                                                    |
|-----------------------------|----------------|---------------------------------------------------------------------|
| Diesel                      | 1,000 L        | Portable fuel trailer/Fuel tank or Jerry cans in lockable container |
| Unleaded Fuel               | 100 L          | Jerry cans in lockable container                                    |
| Oil                         | 10 L           | Packaging in lockable container                                     |
| Lubricant (WD40 or similar) | Six Cans       | Packaging in lockable container                                     |
| Grease                      | 5 L            | Packaging in lockable container                                     |

| Chemicals and fuels | Maximum volume | Storage location                |
|---------------------|----------------|---------------------------------|
| Spot marking paint  | 2 L            | 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 18** shall be adopted if required.

**Table 17: Chemicals and fuels contingency measures**

| Issue                                        | Contingency measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Spills response                              | <ul style="list-style-type: none"> <li>Stop works in proximity to the spill and assess the safety of all personnel.</li> <li>Take immediate action to contain the spill to prevent discharge into stormwater drains or natural waterways.</li> <li>Use spill kits to contain and treat the spill.</li> <li>Notify Environmental Consultant to advise on next steps.</li> <li>If necessary, notify the Regional Council spill response unit.</li> <li>Remove contaminated material to a suitable contained location for remediation/disposal (require any necessary approvals/permits from ORC).</li> <li>The spill kits shall be replaced by an approved supplier.</li> </ul> |
| Inappropriate storage                        | <ul style="list-style-type: none"> <li>Upgrade facility.</li> <li>Clean-up of storage area.</li> <li>Notify and train staff.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Inappropriate handling/transport             | <ul style="list-style-type: none"> <li>Notify and train staff through toolbox meetings on the appropriate handling and transport methods.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Inadequate spill kit materials               | <ul style="list-style-type: none"> <li>Order more materials.</li> <li>Investigate types of chemicals onsite and consult a supplier for advice on appropriate equipment.</li> <li>Develop or revise spill material monitoring and ordering system.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Inappropriate disposal of chemicals or fuels | <ul style="list-style-type: none"> <li>Provide appropriate disposal facilities or service providers.</li> <li>Notify and train staff.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Inaccurate or insufficient records           | <ul style="list-style-type: none"> <li>Advise staff and update records.</li> <li>Monitor through inspections.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## 10.7 Chemicals and Fuels Incident

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

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

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

## 10.8 Chemicals and Fuels Assessment

Potential effects associated with the storage and use of chemicals and fuels will be managed through the implementation of standard construction management measures outlined in **Section 10.4**, including the appropriate storage of fuels and hazardous substances, spill response procedures, and refuelling controls. These measures are expected to ensure that any adverse effects on land, water, or cultural values arising from the use of chemicals and fuels are avoided or minimised as far as reasonably practicable.

## 11 WASTE MANAGEMENT

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### 11.1 Waste

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

### 11.2 Identified Sensitive Receptors

Key sensitive receptors include Cardrona Valley Road, the workers on site and neighbouring residential dwelling.

### 11.3 Performance Criteria

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

### 11.4 Management Measures

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

- The Waste Management Hierarchy philosophy will be implemented, as illustrated in **Figure 7**.
- Measures will be implemented to ensure the site is maintained in a safe, clean and tidy state.
- Where possible, waste shall be segregated into labelled bins with lids: General, Hazardous and Recyclables.
- Wastes onsite shall be suitably contained and prevented from migrating offsite.
- The waste is to be contained so it doesn't contaminate soil, surface or ground water, create unpleasant odours or attract vermin.
- Any material dropped in or adjacent to open drains shall be recovered immediately after it occurs.
- Waste storage is not permitted in or near drainage paths.
- The burning of waste is strictly prohibited.
- No wastes shall be disposed of onsite.
- Wastes shall be removed from site regularly and at completion of works.

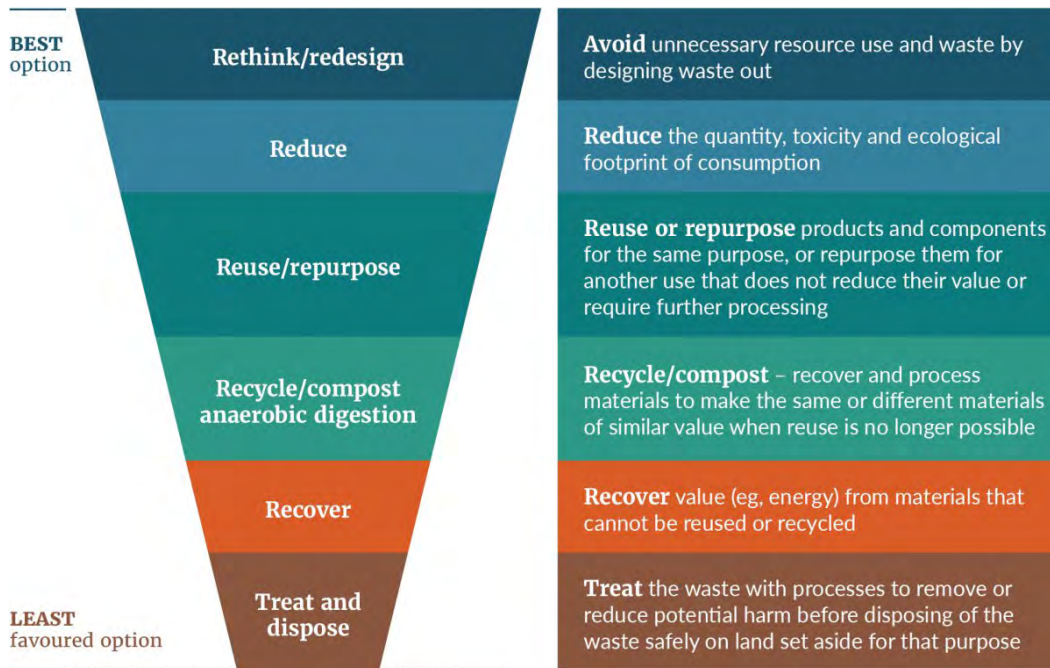


*Figure 7: The waste hierarchy (Source: Ministry for the Environment).*

## 11.5 Monitoring

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

## 11.6 Contingency Measures

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

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

## 11.7 Waste Incident

A waste incident is considered to have occurred where:

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

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

## 11.8 Waste Assessment

Potential effects associated with the generation, and disposal of waste will be managed through the implementation of standard construction 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 avoided or minimised as far as reasonably practicable.

## 12 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.

### 12.2 Identified Sensitive Receptors

A search of the ORC Selected Land Use Register database has not provided any indication of the site being used in the past for a Hazardous Activities and Industries List (HAIL) activity.

While contaminants are not anticipated to be encountered, if contaminants are accidentally uncovered, key sensitive receptors to protect include the Cardrona River, nearby stormwater infrastructure, members of the public and workers on site.

### 12.3 Performance Criteria

- Effectively identify and manage any sites where contaminants are found and ensure they do not contaminate beyond the location they are found (including offsite) or present a risk to human health.

### 12.4 Management Measures

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

- Undertake appropriate assessment of potential HAIL activities identified on property by a Contaminated Land Practitioner prior to undertaking earthworks on site.
- 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 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 m<sup>3</sup> of imported soil.
- Many of the controls required to manage potential for effects associated with low level contaminated soil is based on best practice erosion and sediment control and dust management techniques. These are outlined in **Section 4.0** (Erosion and Sediment Controls) and **Section 6.0** (Dust Management). Both sections cover management of stockpiles.

- All surplus fill material requiring off-site disposal as clean fill shall meet the Ministry for Environment definition of clean fill, as specified in Section 1 of the report “Technical Guidelines for Disposal to Land, Revision 3.1”, prepared by Waste Management Institute of New Zealand for the Ministry for the Environment and dated September 2023.
- Any soil removed from the site shall be disposed of at a facility approved to receive the material and documentation of that disposal shall be kept on site
- Trucks removing or transporting any soil from the site will be covered or sealed to prevent dust, leakage or loss of materials during transport.

## 12.5 Monitoring

Unless any higher-level contamination is accidentally found during earthworks, no specific monitoring of soil, groundwater or water quality will occur (other than what is detailed in the water quality criteria outlined in **Section 5.4**). If material is found it is expected that monitoring may be required but this shall be at the direction of the soil contamination expert.

## 12.6 Contingency Measures – Unexpected Contamination Discovery

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

- Unusual odours
- Discoloured or stained water seeps and soils
- Petroleum hydrocarbon contaminated soil and/or free product
- Liquid waste, putrescible waste, household refuse and any material that normally would be sent to a licensed landfill
- Suspected asbestos containing material
- Intact or broken drums and containers
- Evidence of burning (charcoal fragments, nails, deformed metal fragments)

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

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

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

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

## 12.7 Contamination Incident

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

## 12.8 Contaminated Land Assessment

Potential effects associated with contaminated soils will be managed through the implementation of the measures outlined in **Section 12.4**, including appropriate procedures for identifying, handling, and disposing of any contaminated material encountered during earthworks. The site is not known to be associated with activities listed on the HAIL, and earthworks are of limited extent and depth, reducing the likelihood of encountering contaminated soils. 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.

## **APPENDIX 1 EROSION AND SEDIMENT CONTROL PLAN**

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| Legend |                                      |
|--------|--------------------------------------|
|        | Stabilised access                    |
|        | Clean water overland flow            |
|        | Dirty water overland flow            |
|        | Dirty water diversion channel (DWDC) |
|        | Water body                           |
|        | Ephemeral Water body                 |
|        | Laydown area                         |
|        | Standard silt fence                  |
|        | Culvert                              |
|        | Drop-out pit                         |
|        | Sediment sump                        |
|        | Check dams                           |
|        | Stockpile                            |
|        | Level spreader                       |
|        | Silt sock                            |
|        | Water quality sampling location      |

- Notes**
- This plan is to be read in conjunction with the Environmental Management Plan document prepared by Enviroscope.
  - Cut and fill batters should be stabilised rapidly by applying hydro mulch to surfaces or where steep cuts are present, lined with erosion matting.
  - Progressively stabilise the road base with aggregate as it is formed.
  - Check dams should be placed at regular intervals in accordance with the table below ESCP-007. Locations shown in the ESCP are indicative only.
  - Scale 1: 2500 @ A3



**Project:** 478 Cardrona Valley Road, Wanaka  
**Description:** Erosion and Sediment Control Plan

|  | Drawn | Reviewed | Date       | Drawing Number | Revision |
|--|-------|----------|------------|----------------|----------|
|  | MG    | TG       | 10/08/2026 | ESCP – 001     | A        |

## **APPENDIX 2 SCHEMATICS FOR EROSION AND SEDIMENT CONTROLS**

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EROSION MATTING

(Images from Enviroscope)

- Erosion matting may be used on short steep slopes or batters once formed.
- Erosion matting can come in the form of temporary biodegradable geotextiles (e.g. coconut fibre or biowool) or permanent non-biodegradable geotextiles (e.g. synthetic geofabric or plastic).



TEMPORARY STOCKPILES

Image from Enviroscope



- Temporary stockpiles should be a maximum height of two metres to mitigate wind effects and to preserve the quality of the topsoil as future planting media for revegetation.
- If the stockpile is to be left insitu for a period of 4 weeks or more it shall be seeded with grass or erosion control matting to provide erosion and dust protection.
- A silt fence should be installed on the downslope of the stockpile.

HYDROSEEDING/HYDROMULCHING

(Source: Hydroseeding NZ and Images from Enviroscope)



- Application of hydroseed is designed to promote rapid stabilisation. While this is not considered instant stabilisation, this does provide limited protection from raindrop impact for a short duration until grass cover is established.
- The seed mix contained in the hydroseed should be considered relative to the soil type of each respective site. This should be determined at the direction of the SQEP.
- It is noted that newly sowed hydroseed may be mobilised by intense run-off and require re-application. This should be considered when assessing the timing of application, prioritising application during warmer seasonal periods.

DUST SUPPRESSION

(Page 169-172 of GD05)



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

AGGREGATE APPLICATION

(Page 68 of GD05)

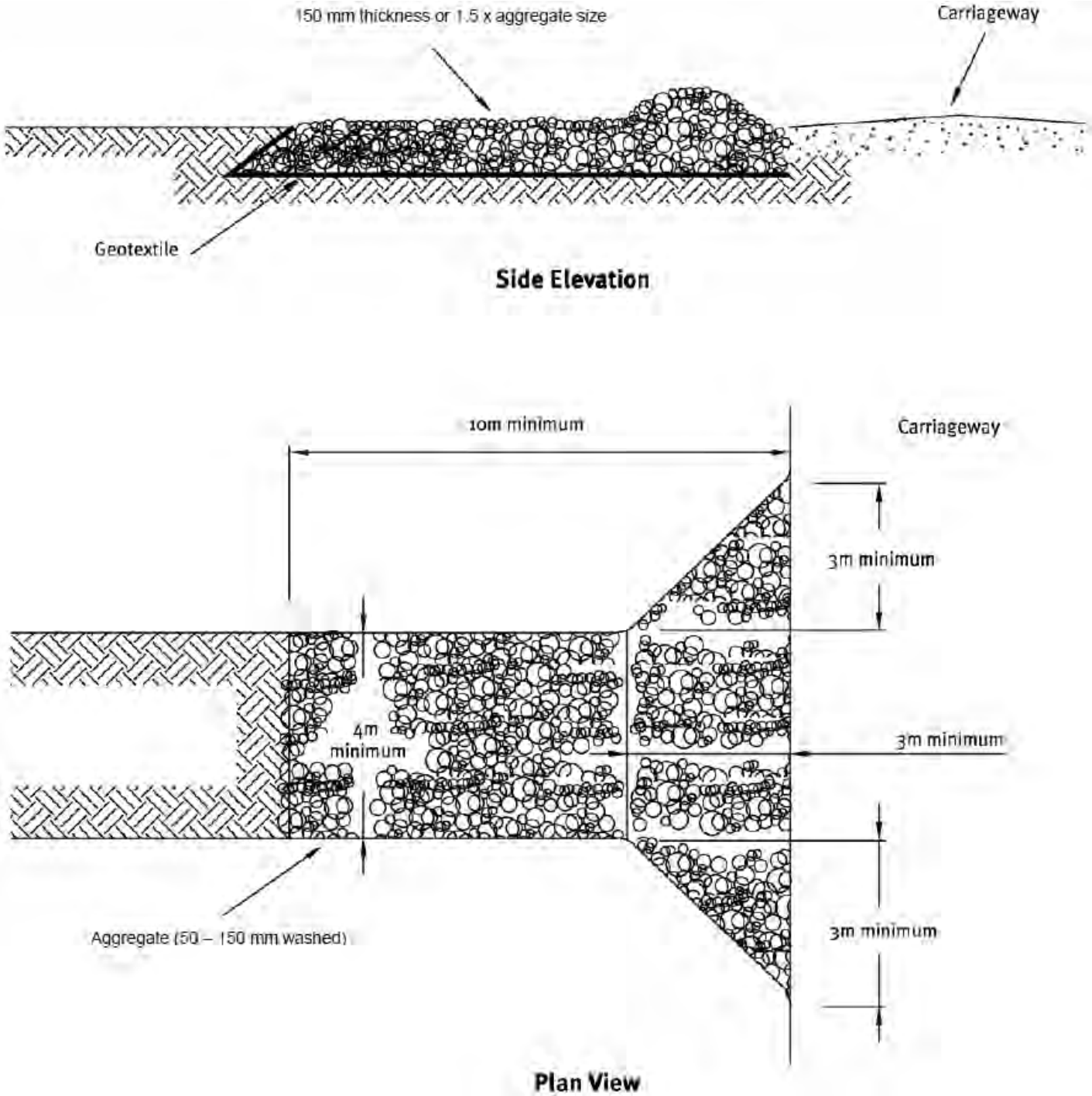


- Application of aggregate on road carriageways and/or building platforms reduces the potential for windborne dust generation and raindrop impact generating sediment run-off.
- Particularly applicable to haul road carriageways where vehicle activity will be frequent.



**Project:** 478 Cardrona Valley Road, Wanaka  
**Description:** Erosion and Sediment Control Schematics

| Drawn | Reviewed | Date       | Drawing Number | Revision |
|-------|----------|------------|----------------|----------|
| MG    | TG       | 10/08/2026 | ESCP – 003     | A        |

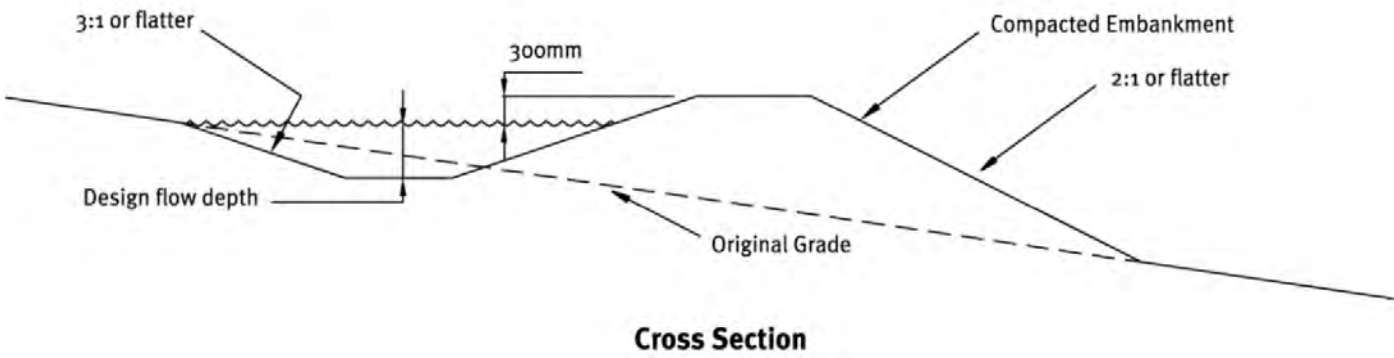


| Design Parameter  | Specification              |
|-------------------|----------------------------|
| Aggregate size    | 50-150 mm washed aggregate |
| Minimum thickness | 150 mm                     |
| Minimum length    | 10 m                       |
| Minimum width     | 4 m                        |

- Additional aggregate may need to be added to the stabilised entranceway throughout the project to maintain the thickness.
- Any sediment that has been tracked onto the surrounding roads must be swept away at regular intervals.
- Enviroscope recommends utilising the track mat, a rumble grid, or aggregate between 50 - 100 mm to reduce impact on machinery.

DIRTY WATER DIVERSION CHANNEL – DRIVEWAY  
SWALE

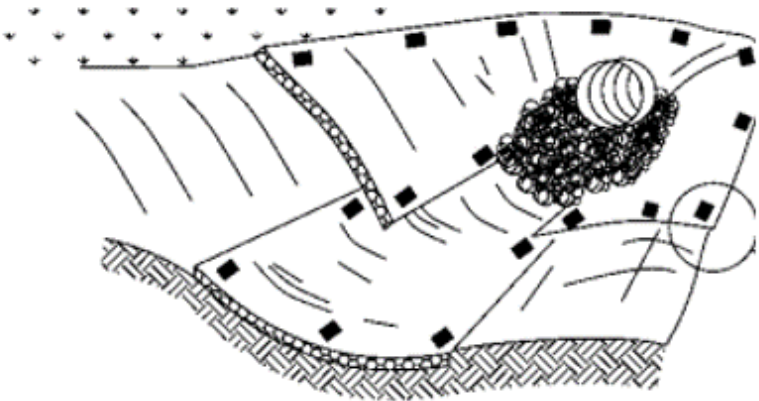
(Pages 43-46 from GD05)



- Dirty water diversion channels (DWDCs) will be installed within the road corridor in accordance with the final design. These channels will provide capacity significantly exceeding that required to meet the standard GD05 design criteria.
- The DWDCs will be constructed with a trapezoidal cross-section and incorporate check dams, as detailed in the ESCP drawings.

CULVERT

(Diagram from TP90 – now GD05)



- Culverts will be installed in accordance with the final design to safely convey clean water beneath the road corridor and maintain existing drainage pathways.
- Culvert inlets and outlets will be stabilised using appropriate erosion protection measures, as detailed in the ESCP drawings, to minimise scour, maintain channel integrity, and ensure long-term performance of the drainage system.



**Project:** 478 Cardrona Valley Road, Wanaka  
**Description:** Erosion and Sediment Control Schematics

|  | Drawn | Reviewed | Date       | Drawing Number | Revision |
|--|-------|----------|------------|----------------|----------|
|  | MG    | TG       | 10/08/2026 | ESCP – 005     | A        |

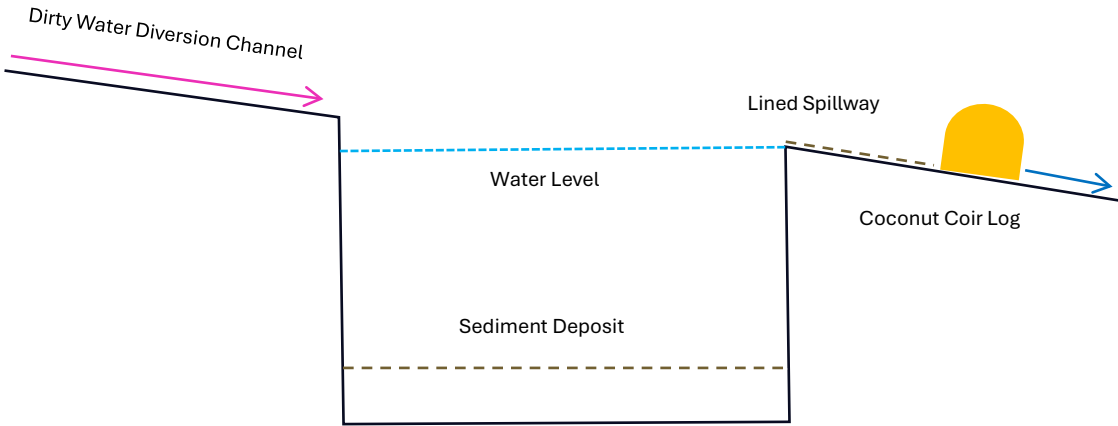
DROP-OUT PIT

Page 45 from GD05



- Dropout pits will be constructed as 1 m × 1 m × 1 m structures and installed immediately upstream of culvert inlets.
- The dropout pits will function as an erosion and sediment control device by reducing runoff velocities and promoting the settlement of coarse sediment prior to discharge into the culvert system. The location and details of the dropout pits are shown on the ESCP drawings.

SEDIMENT SUMP



- Sediment sumps shall be installed at the outlets of driveways with larger contributing catchments, where concentrated flows have the potential to cause erosion or transport sediment off-site.
- Sediment sumps shall be constructed to dimensions of 1.0 m (W) × 2.5 m (L) × 1.0 m (D), unless otherwise shown on the ESCP drawings.
- A spillway shall be constructed to safely convey overtopping flows from the sediment sump to the downstream coconut coir log. The spillway shall be lined with geotextile fabric and securely anchored to prevent erosion, scour, and undercutting.
- Sediment sumps shall be inspected regularly and cleaned out when sediment accumulation reaches 20% of the available storage capacity. Removed sediment shall be disposed of in a stable location and any disturbed areas shall be stabilised to prevent further erosion.

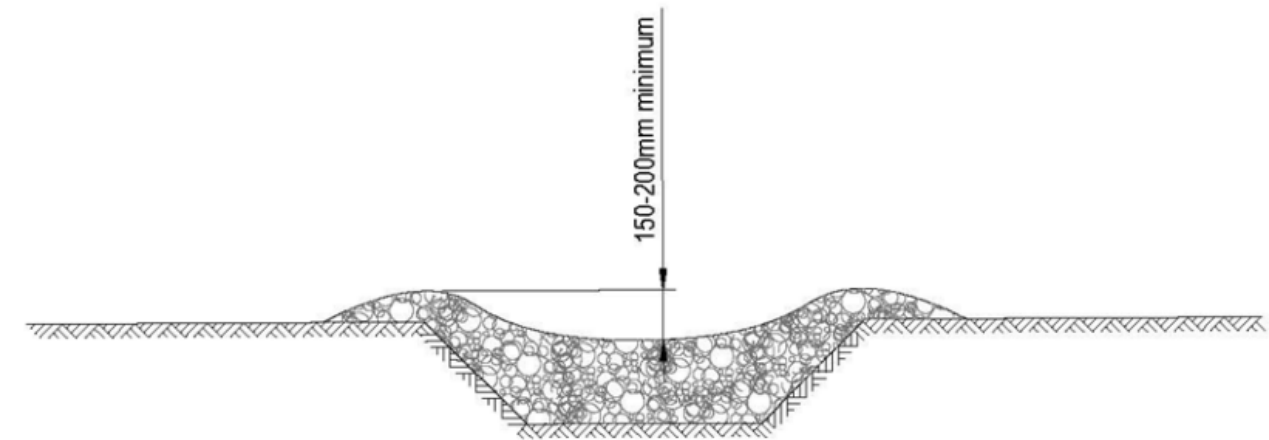
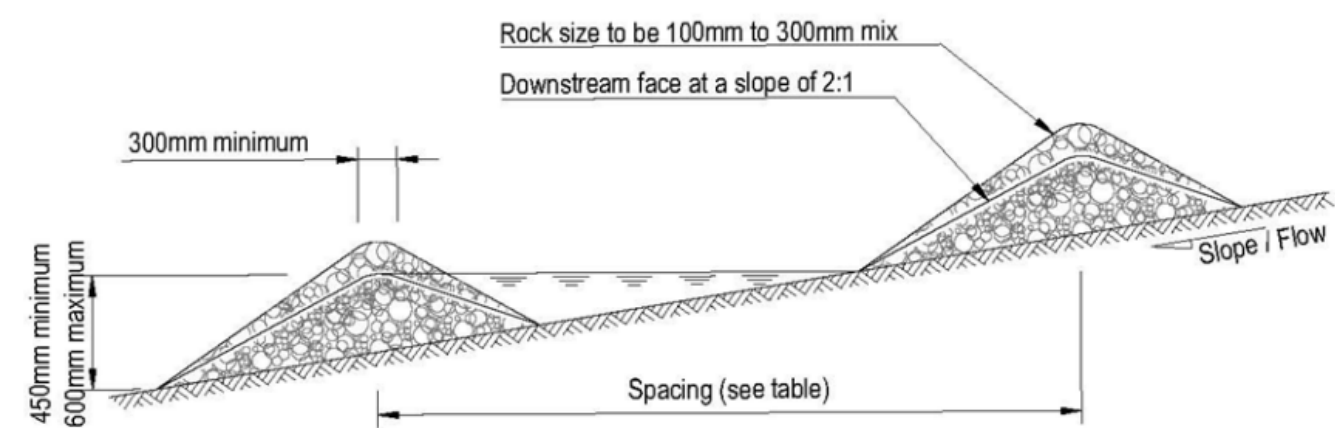


**Project:** 478 Cardrona Valley Road, Wanaka  
**Description:** Erosion and Sediment Control Schematics

|  | Drawn | Reviewed | Date       | Drawing Number | Revision |
|--|-------|----------|------------|----------------|----------|
|  | MG    | TG       | 10/08/2026 | ESCP – 006     | A        |

358  
CHECK DAMS

(Page 50-54 from GD05)



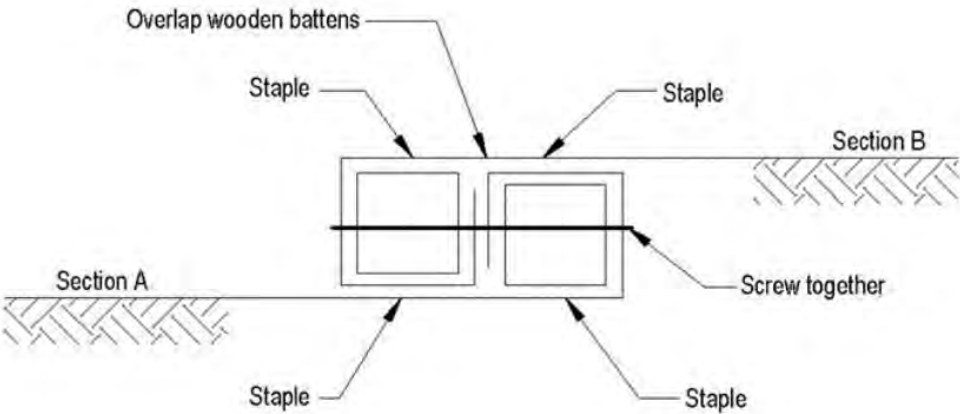
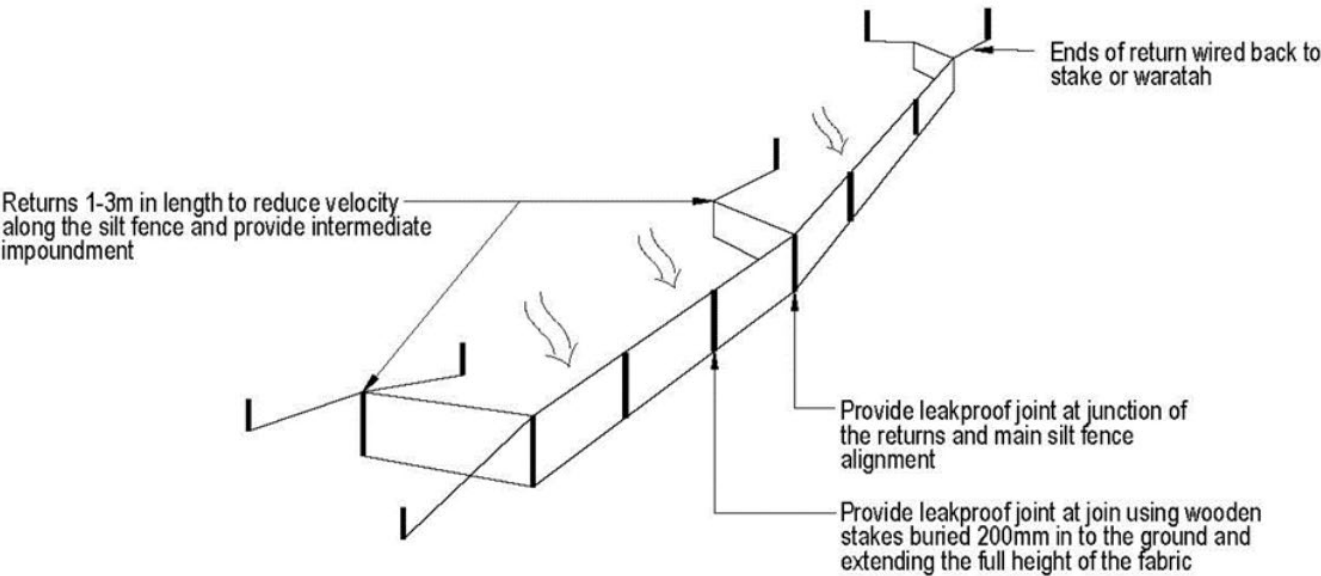
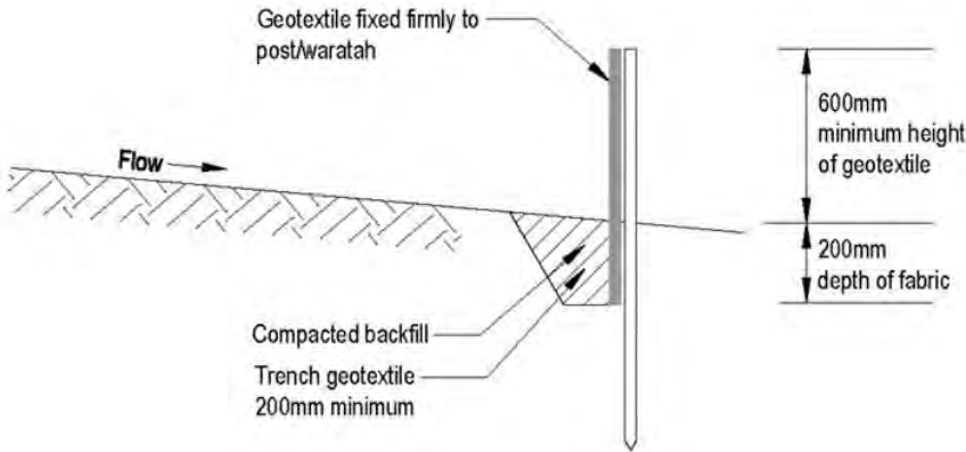
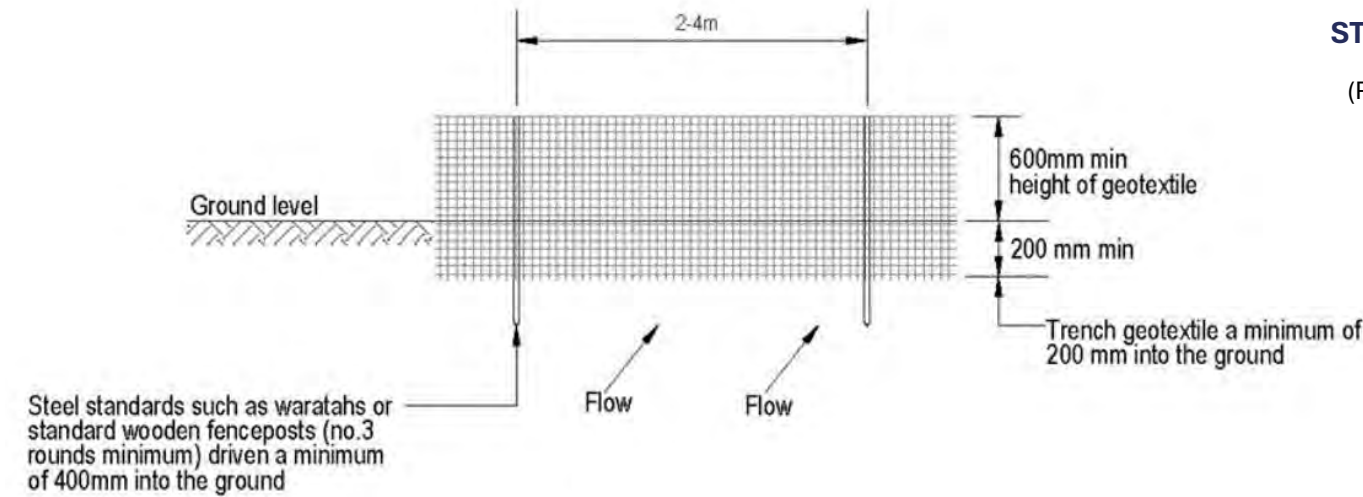
| Slope of site (%) | Spacing (m) of dams with a 450 mm centre height                   | Spacing (m) of dams with a 600 mm centre height                   |
|-------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|
| Less than 2%      | 24                                                                | 30                                                                |
| 2- 4%             | 12                                                                | 15                                                                |
| 4- 7%             | 8                                                                 | 11                                                                |
| 7- 10%            | 5                                                                 | 6                                                                 |
| Greater than 10%  | Unsuitable – use stabilised channel or specific engineered design | Unsuitable – use stabilised channel or specific engineered design |

- Check dams will be constructed out of the existing rock rip rap located in the driveway sales on site.
- Check dams should be 100 mm lower than the outside edges to form a spillway.

|                                                                   | Drawn | Reviewed | Date       | Drawing Number | Revision |
|-------------------------------------------------------------------|-------|----------|------------|----------------|----------|
| Document Set ID: 10232096<br>Version: 1, Version Date: 19/08/2026 | MG    | TG       | 10/08/2026 | ESCP – 007     | A        |

STANDARD SILT FENCE

(Page 112-119 from GD05)

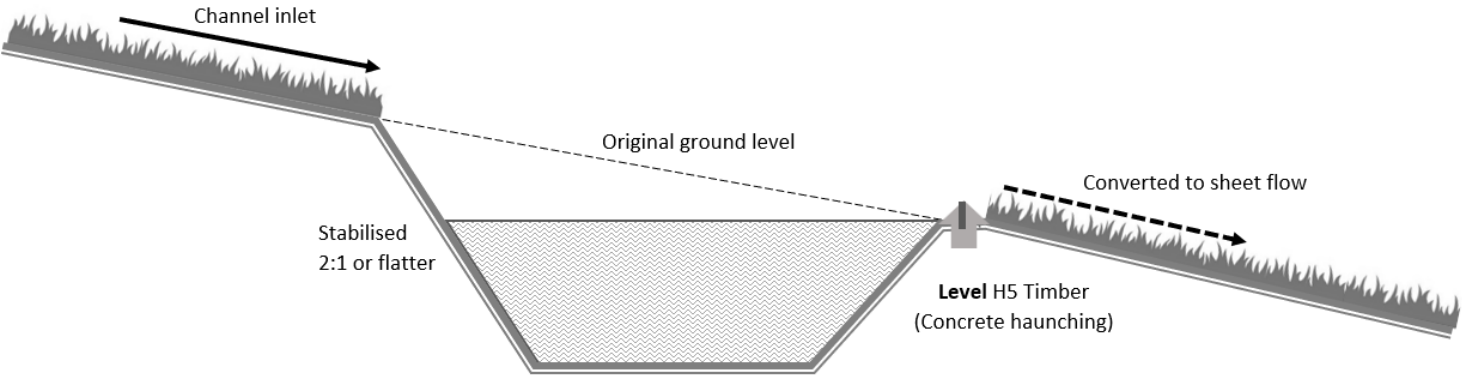


| Slope steepness (%) | Slope length (m) (maximum) | Spacing of returns (m) | Silt fence length (m) (maximum) |
|---------------------|----------------------------|------------------------|---------------------------------|
| Less than 2%        | Unlimited                  | N/A                    |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

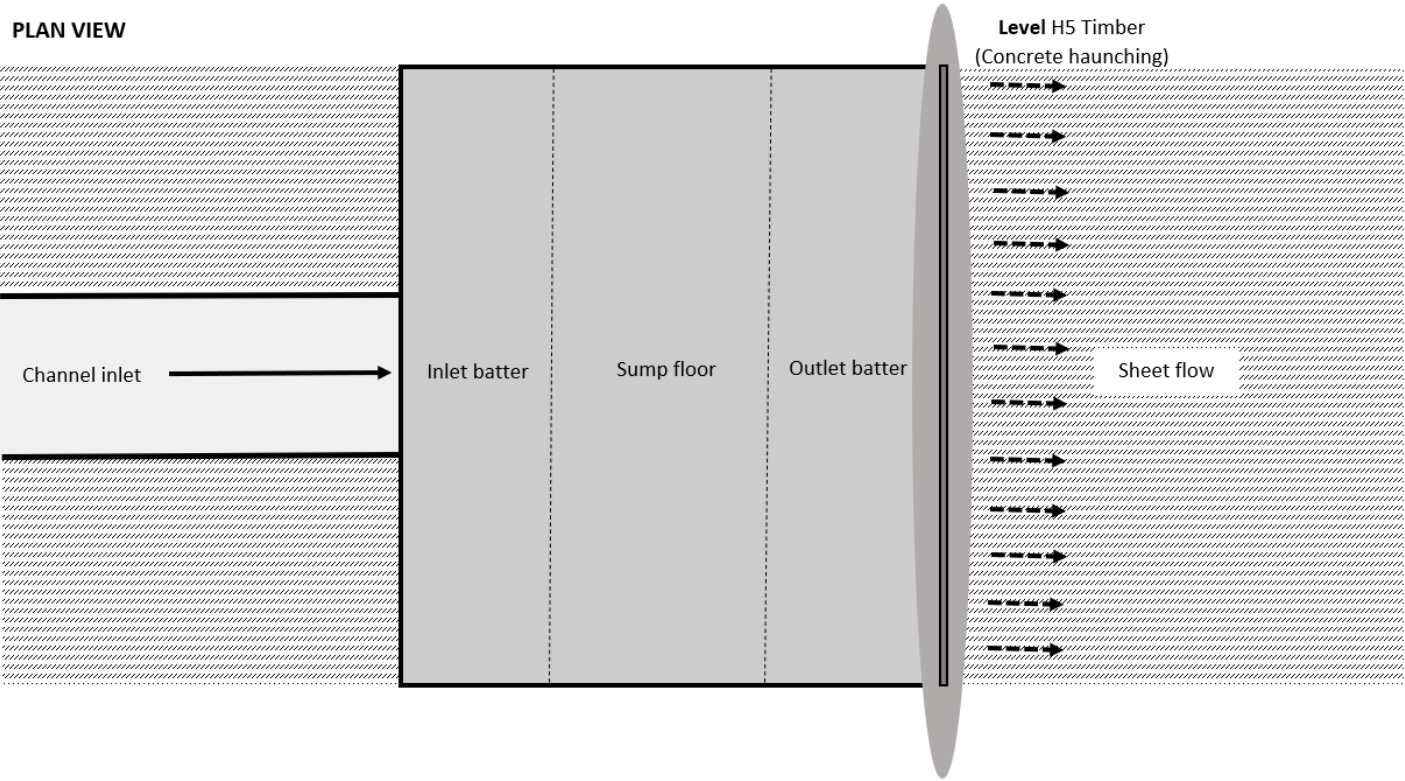
- Ensure the silt fence is ‘keyed’ into the ground to form a good seal at ground level to capture water and avoid undermining.
- Silt fences should be 600 mm above ground level and 200 mm below ground level.
- Supporting waratahs should be placed at 2-4 m intervals.
- Install silt fence returns at either end of the silt fence, projecting up-slope to a sufficient height to prevent outflanking.
- It is also important that silt fences are installed along the contour of the slope to prevent ponding of water in a concentrated area of the fence.
- To be mucked out once 20% capacity reached.

LEVEL SPREADER

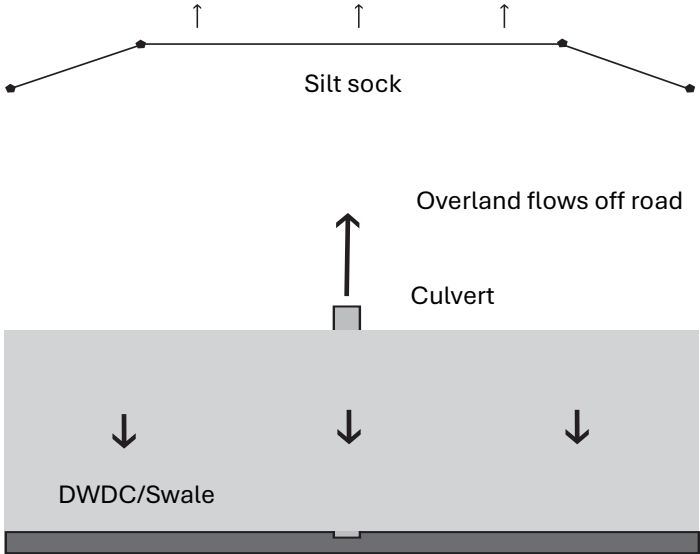
CROSS SECTION



PLAN VIEW



SILT SOCK



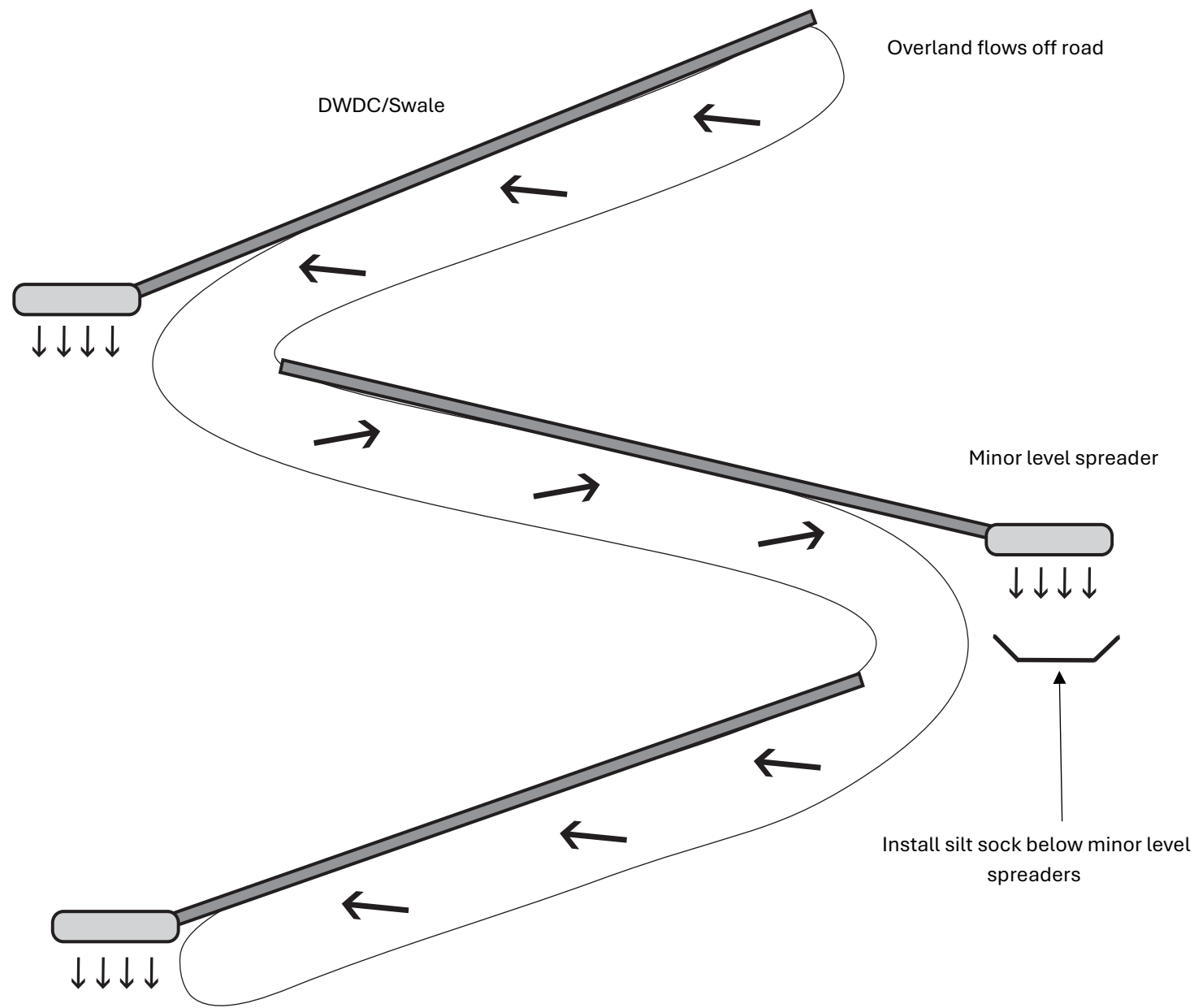
- Silt socks shall be installed at the outlets of level spreaders to provide tertiary sediment treatment and reduce the potential for sediment-laden runoff to discharge.
- Silt socks shall be placed on a level and stable surface, keyed into the ground where practicable, and installed in accordance with the manufacturer's specifications.
- Silt socks shall be inspected regularly and following significant rainfall events to ensure they remain functional, properly seated, and free from excessive sediment accumulation.
- Sediment accumulated against the silt socks shall be removed when it reaches approximately 20% of the sock height, or earlier if performance is compromised.



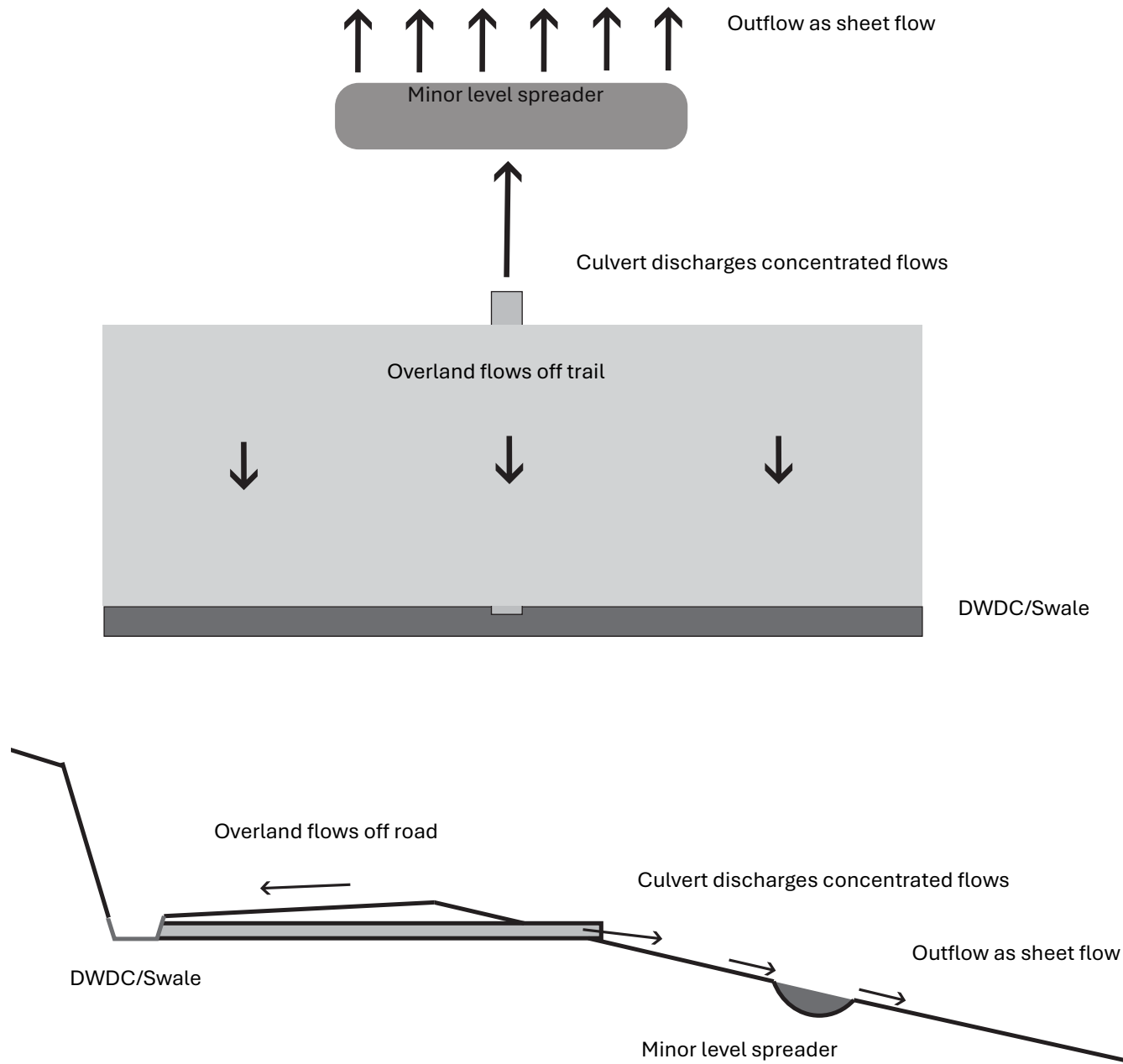
**Project:** 478 Cardrona Valley Road, Wanaka  
**Description:** Erosion and Sediment Control Schematics

| Drawn | Reviewed | Date       | Drawing Number | Revision |
|-------|----------|------------|----------------|----------|
| MG    | TG       | 10/08/2026 | ESCP – 009     | A        |

SWITCHBACK



MINOR LEVEL SPREADER



**Project:** 478 Cardrona Valley Road, Wanaka  
**Description:** Erosion and Sediment Control Schematics

|  | Drawn | Reviewed | Date       | Drawing Number | Revision |
|--|-------|----------|------------|----------------|----------|
|  | MG    | TG       | 10/08/2026 | ESCP – 010     | A        |

REFUELING TRAILER



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

SPILL KITS



- Spill kits should be located in the laydown area.

CONCRETE WASHOUT PIT



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

WASTE



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

## **APPENDIX 3 ENVIRONMENTAL SITE INDUCTION HANDOUT**

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## ENVIRONMENTAL SITE INDUCTION HANDOUT

### Key Roles and Responsibilities

| Roles                         | Responsibilities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Manager               | <p>The Project Manager is responsible for the effective implementation of the EMP and has overall responsibility for the environmental performance of the project. Duties include:</p> <ul style="list-style-type: none"> <li>• Ensuring adequate resources are in place to implement the EMP.</li> <li>• Ensuring all staff and sub-contractors operate within the guidelines of the EMP.</li> <li>• Ensuring that an EMP is prepared, and that environmental standards, processes and procedures meet relevant resource consent conditions.</li> <li>• Overseeing the successful implementation, monitoring and review of the EMP.</li> <li>• Ensuring that inspections are carried out in accordance with the relevant EMP.</li> <li>• Restricting or stopping any activity that has the potential to or has caused adverse environmental effects.</li> <li>• Providing notification and reporting of Environmental Incidents to Council and other environmental reports as required by The Guidelines.</li> <li>• Delegating authority of the above responsibilities.</li> </ul> |
| Environmental Representative  | <p>The Environmental Representative supports the Project Manager in the day-to-day implementation of the EMP. Duties include:</p> <ul style="list-style-type: none"> <li>• Ensuring the installation of environmental controls as per the EMP.</li> <li>• Undertaking environmental site inspections.</li> <li>• Overseeing the maintenance and improvement of defective environmental controls.</li> <li>• Providing environmental inductions to all staff and sub-contractors.</li> <li>• Assisting the project leadership in attending to Environmental Incidents and Complaints.</li> </ul> <p>The Environmental Representative shall be familiar with environmental risks associated with the project, the EMP and best practice erosion and sediment control principles and practices.</p>                                                                                                                                                                                                                                                                                     |
| All staff and sub-contractors | <p>All staff and sub-contractors have a responsibility to undertake all activities in accordance with the requirements of this EMP. This includes reporting any activity that has the potential to or has resulted in an Environmental Incident to the Project Manager or Environmental Representative.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## ENVIRONMENTAL RECEPTORS

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Any works that disturb the controls outlined on the Erosion Sediment Control Plan must be reinstated before moving to the next task.

Environmentally sensitive receptors: Neighbouring properties, overland flow paths, and workers on site.

## ASSOCIATED RESOURCE CONSENTS

---

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

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

## SEQUENCING

---

The sequencing of works is a key component to ensure that environmental effects of construction are appropriately managed. It is imperative that the sequencing outlined in **Section 2.1** of the EMP is followed so that the site is stabilised in the most efficient manner.

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

## KEY ENVIRONMENTAL MANAGEMENT MEASURES IN EMP

---

### Erosion and Sediment Control (Section 4.0 of EMP)

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

### Water Quality Management (Section 5.0 of EMP)

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

### Dust Management (Section 6.0 of EMP)

- Dust suppression should occur on any exposed soil on unsealed roads.

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

#### **Noise and Vibration Management (Section 7.0 of EMP)**

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

#### **Cultural Heritage Management (Section 8.0 of EMP)**

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

#### **Vegetation Management (Section 9.0 of EMP)**

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

#### **Chemicals and Fuel Management (Section 10.0 of EMP)**

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

#### **Waste Management (Section 11.0 of EMP)**

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

#### **Contaminated Land Management (Section 12.0 of EMP)**

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

## **ENVIRONMENTAL INCIDENTS**

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

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

## RAPID RESPONSE FOR STORM EVENTS

---

The procedure for rapid response to storm events is outlined in **Section 4.8** of the EMP, however these can be summarised as follows:

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

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

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

## APPENDIX 4 ENVIRONMENTAL SITE INDUCTION REGISTER

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## ONSITE ENVIRONMENTAL SITE INDUCTION REGISTER

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| Name | Organisation | Date Inducted | Induction Delivered by | Signature |
|------|--------------|---------------|------------------------|-----------|
|      |              |               |                        |           |
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## **APPENDIX 5 WEEKLY ENVIRONMENTAL SITE INSPECTION FORM**

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## WEEKLY ENVIRONMENTAL SITE INSPECTION FORM

Environmental Representative:

Date:

| Item                                                                                                        | Yes                                                                               | No                                                                                | Comment                                                                           |                                                                                    |                                                                                     |                                                                                     |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>General</b>                                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Is the EMP available onsite?                                                                                | <input type="checkbox"/>                                                          | <input type="checkbox"/>                                                          |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Have any environmental incidents occurred during the week?<br>If so, provide details                        | <input type="checkbox"/>                                                          | <input type="checkbox"/>                                                          | *If yes, complete environmental incident report.                                  |                                                                                    |                                                                                     |                                                                                     |
| Complete description of weather for upcoming week – circle applicable                                       |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Monday                                                                                                      | Tuesday                                                                           | Wednesday                                                                         | Thursday                                                                          | Friday                                                                             | Saturday                                                                            | Sunday                                                                              |
|                            |  |  |  |  |  |  |
| Are there any rain events forecasted for the coming week?                                                   |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            |                                                                                     |
| Have pre rain event inspections been completed?                                                             |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            |                                                                                     |
| Have post rain event inspections been completed?                                                            |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            |                                                                                     |
| <b>Water Quality</b>                                                                                        |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Is water quality monitoring occurring when water is flowing across the site boundaries?                     |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            | *If yes, complete water quality monitoring form                                     |
| <b>Erosion and Sediment Control</b>                                                                         |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Are works contained within the current site boundaries?                                                     |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            |                                                                                     |
| Are completed areas being progressively stabilised?                                                         |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            |                                                                                     |
| Is there any new evidence of erosion?                                                                       |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            |                                                                                     |
| Are erosion and sediment controls installed as per the ESCP?                                                |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            |                                                                                     |
| Is dirty water entering dirty water diversion channels during rain events?                                  |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            |                                                                                     |
| Do erosion and sediment controls have over 80% capacity?                                                    |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            |                                                                                     |
| <b>Cultural Heritage</b>                                                                                    |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Have any finds of cultural significance been found?                                                         |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            |                                                                                     |
| <b>Noise and Vibration</b>                                                                                  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Have any complaints been received during the week?                                                          |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            | *If yes, complete Complaints Register                                               |
| Are nearby sensitive receptors being notified before significant noise and/or vibration causing activities? |                                                                                   |                                                                                   |                                                                                   | <input type="checkbox"/>                                                           | <input type="checkbox"/>                                                            |                                                                                     |

|                                                                                                                    |                          |                          |                                       |
|--------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|---------------------------------------|
| Are works only occurring within the hours of operation?                                                            | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| <b>Dust</b>                                                                                                        |                          |                          |                                       |
| Have any complaints been received during the week?                                                                 | <input type="checkbox"/> | <input type="checkbox"/> | *If yes, complete Complaints Register |
| Have completed areas been revegetated or stabilised?                                                               | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| Are works ceasing during high winds?                                                                               | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| Are only designated access points and haul routes being used?                                                      | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| Are the site access and surrounding roads swept clean of sediment?                                                 | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| <b>Vegetation</b>                                                                                                  |                          |                          |                                       |
| Are vegetated surfaces being maintained as far as reasonably possible?                                             | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| <b>Contaminated Soils</b>                                                                                          |                          |                          |                                       |
| Have any contaminants been uncovered during excavations?                                                           | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| <b>Chemicals and Fuels</b>                                                                                         |                          |                          |                                       |
| Are all hazardous substances on site stored, transported and used according to the safety data sheet requirements? | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| Are vehicles and plant being refuelled in the refuelling bay?                                                      | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| Is concrete washing being undertaken in the concrete wash-out pit?                                                 | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| Is there an adequate supply of spill kits onsite? Have any used materials been replaced?                           | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| <b>Waste</b>                                                                                                       |                          |                          |                                       |
| Is the site in a safe, clean and tidy state?                                                                       | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| Are wastes segregated into labelled bins with lids?                                                                | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| Are skip bins not overfilled?                                                                                      | <input type="checkbox"/> | <input type="checkbox"/> |                                       |
| Is waste removed from open drains and drainage paths?                                                              | <input type="checkbox"/> | <input type="checkbox"/> |                                       |

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

Additional Comments:

Names and Signatures of inspection attendees:

## PRE RAINFALL EVENT INSPECTION FORM

Project:

Inspector:

Date:

Predicted Rainfall (if known):

| Item                                                                                                      | Yes                      | No                       | Comments |
|-----------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|----------|
| Are erosion and sediment controls installed in accordance with the ESCP?                                  | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Do any areas need to be temporarily stabilised?                                                           | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Are perimeter controls (e.g. clean and dirty water diversions bunds and channels) intact and functioning? | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Do sediment controls have 80% available capacity?                                                         | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Are sediment control inlet and outlet structures stabilised and operational?                              | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Are controls functioning properly (no blockage or short-circuiting)?                                      | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Chemical treatment system (if used) operational?                                                          | <input type="checkbox"/> | <input type="checkbox"/> |          |

## POST RAINFALL EVENT INSPECTION FORM

Project:

Inspector:

Date:

Rainfall amount (if known):

| Item                                                                                                                               | Yes                      | No                       | Comments |
|------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|----------|
| Are erosion and sediment controls installed in accordance with the ESCP?                                                           | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Do any disturbed areas require stabilisation following the rainfall event?                                                         | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Are perimeter controls (e.g. clean water and dirty water diversion bunds and channels) intact and functioning following the event? | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Do sediment controls retain at least 80% of their design capacity following the event?                                             | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Has water quality sampling been completed?                                                                                         | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Did controls function properly (no blockage or short-circuiting)?                                                                  | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Chemical treatment system (if used) needs adjusted and topped up?                                                                  | <input type="checkbox"/> | <input type="checkbox"/> |          |

## APPENDIX 6 ENVIRONMENTAL INCIDENT REPORT FORM

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## ENVIRONMENTAL INCIDENT REPORT FORM

|                                   |                        |
|-----------------------------------|------------------------|
| <b>Project Address:</b>           | <b>Consent Number:</b> |
| <b>Brief Project Description?</b> |                        |

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

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Date and Time</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Date:</b> <input type="text"/> / <input type="text"/> / <input type="text"/> <b>Time:</b> <input type="text"/> : <input type="text"/> hours |
| <b>Description?</b><br>Provide a brief and factual description of what happened during the incident, include relevant details such as: <ul style="list-style-type: none"> <li>• The activity being undertaken when the incident occurred</li> <li>• The estimated distance to nearest waterway (including stormwater and dry courses)</li> <li>• The estimated distance to the nearest sensitive receiver</li> </ul> Sketches/diagrams/photos may be referenced and appended to this report to aid in the description of the incident. |                                                                                                                                                |
| <b>Exact Location of the incident?</b><br>Include address, landmarks, features, nearest tree, etc. Maps and plans can be attached.                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                |
| <b>Quantity or volume of material escaped or causing incident?</b> (provide an estimate quantity)                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                |
| <b>Who identified the incident?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Contractor <input type="checkbox"/> Council <input type="checkbox"/> Community <input type="checkbox"/> Other <input type="checkbox"/>         |

|                                                                                                                |
|----------------------------------------------------------------------------------------------------------------|
| <b>What immediate actions/control measures were taken to rectify or contain the incident?</b>                  |
| <b>What initial corrective action will be taken to prevent similar incidents recurring in the near future?</b> |

**Has the Queenstown Lakes District Council been notified?** Yes ☐ No ☐ Will be notified ☐

**Has the Otago Regional Council been notified?** Yes ☐ No ☐ Will be notified ☐

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

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

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

Mobile phone number.....

## APPENDIX 7 ENVIRONMENTAL COMPLAINTS REGISTER

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## ENVIRONMENTAL COMPLAINTS REGISTER

| Complaint # | Date and time received | Complainant details (name, address, phone number) | Details of complaint | Investigation and findings | Outcome | Close out date |
|-------------|------------------------|---------------------------------------------------|----------------------|----------------------------|---------|----------------|
|             |                        |                                                   |                      |                            |         |                |
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## **APPENDIX 8 ENVIRONMENTAL NON-CONFORMANCE REGISTER**

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## ENVIRONMENTAL NON-CONFORMANCE REGISTER

| Ref number | Date observed | Found via (e.g., inspection, monitoring, complaint?) | Details of non-conformance | Corrective actions | Updated by | Close out date |
|------------|---------------|------------------------------------------------------|----------------------------|--------------------|------------|----------------|
|            |               |                                                      |                            |                    |            |                |
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## APPENDIX 9 WATER QUALITY MONITORING RESULTS FORM

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## WATER QUALITY MONITORING PLAN

### Objectives and Sampling Scope

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

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

### Spatial Boundaries:

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

### Frequency:

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

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

### What to Sample:

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

## Where to Sample

Sampling locations are defined in the **ESCP drawing – Appendix 1**.

- Where water is flowing across the site boundaries.

## How to Sample

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

## Reporting

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

## WATER QUALITY SAMPLING

### Select a sampling location

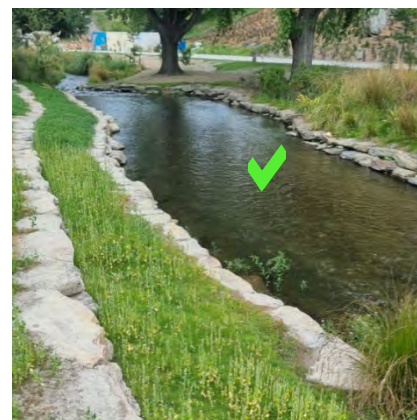
#### Sampling a discharge

Collect sample where water crosses the site boundary or enters a sensitive receptor from a retention device. Always photograph the location you sample from.



#### Sampling a waterway

Collect sample from the centre of the flow and the top third of the water column where possible.



#### Sampling a from a sediment retention device

Collect sample from the discharge location, this is either near the decanting arms, spillway, hose or the outlet pipe.



## Collect a water sample

### Taking a water sample

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

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



## Measure and record turbidity, clarity and pH

### Measuring turbidity using a turbidity meter

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

*Contact Enviroscope for turbidity monitoring if required.*



### Measuring clarity using a field-testing secchi disk

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



### Measuring pH using a pH meter

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

### Measuring pH using pH strips

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



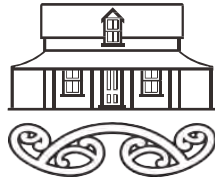
## WATER QUALITY SAMPLING RESULTS

| Date and time | Sampling location | pH | Clarity (mm) | Turbidity (NTU) | TSS (mg/L)<br>Lab tested | Hydrocarbons / waste? | Observations* |
|---------------|-------------------|----|--------------|-----------------|--------------------------|-----------------------|---------------|
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**Observations:** Note weather conditions at the time of sampling, have baseline water quality parameters been exceeded? If so, additional testing may be required, and performance standards may have been exceeded. Notify Project Manager and SQEP.

## APPENDIX 10 ARCHAEOLOGICAL DISCOVERY PROTOCOL

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## HERITAGE NEW ZEALAND POUHERE TAONGA

### **Heritage New Zealand Pouhere Taonga Archaeological Discovery Protocol**

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

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

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

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

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

## **APPENDIX 11 ASSOCIATED RESOURCE CONSENT CONDITIONS (TBC)**

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**Volunteered Conditions***Landscape*

1. A Landscape Management Plan (LMP) shall be prepared by a suitably qualified and experienced person and shall be implemented for all areas identified as Landscape Management Area.

The primary objective of the LMP shall be the long-term enhancement of natural character through the passive regeneration of indigenous vegetation, supported by the adjacent context planting areas as a seed source, and the systematic removal and ongoing control of wilding conifers and other woody weed species.

- identification of existing indigenous vegetation and areas of regeneration to be protected;
  - methods for the staged removal and long-term control of wilding conifers and other woody weeds; measures to prevent re-establishment of exotic woody species;
  - management practices to support natural regeneration without the need for active planting, earthworks, or irrigation; and
  - monitoring and maintenance requirements to ensure the objectives of the Landscape Management Area are achieved over time.
2. The following consent notice conditions shall be registered on the title for Lots 2 – 7:
    - a) All context planting shown on the approved Structural Landscape Plan, dated 5 August 2026, including planting approved under earlier consents, shall be implemented progressively and completed within seven (7) years of the date of consent commencement.

The timing and sequencing of context planting shall allow for staged establishment across the site and shall not preclude the construction of residential buildings on Lots 1, 2, 3, and 6 during the planting period.

This condition shall not apply to screen planting subject to separate performance-based standards. Context planting shall be undertaken in a manner that prioritises areas adjacent to building platforms, residential curtilage, and publicly visible slopes, and shall be maintained to ensure successful establishment and long-term contribution to landscape integration and natural character enhancement.
    - b) All planting shown on the Structural Landscape Plan, dated 5 August 2026, shall comprise indigenous species appropriate to the Mount Alpha and Cardrona Valley context and shall be arranged in naturalistic groupings that reflect local vegetation and landform patterns and conditions.
    - c) All planting shown on the Structural Landscape Plan, dated 5 August 2026, shall be maintained in perpetuity, with any dead or failed plants replaced to ensure the intended visual and landscape mitigation outcomes continue to be achieved.

**Lots 4, 5, and 7:**

- d) Prior to the construction of any residential building within the approved building platform on Lots 4, 5, and 7, the screen planting shown on the approved shown on the

Structural Landscape Plan, dated 5 August 2026, shall be established and shall have achieved:

- i. an average height of not less than 3.5 metres; and
- ii. a density of foliage sufficient to achieve a high degree of effective screening of residential buildings and associated domestic activity when viewed from public viewpoints to the north, including Riverbank Road, through all seasons.

Screen planting shall comprise indigenous species only, appropriate to the Mount Alpha and Cardrona Valley context, and shall be planted to a depth and arrangement sufficient to achieve the intended screening outcome, rather than as a single linear shelterbelt.

Two view corridors through the screen planting shall be permitted, generally in the locations shown on the approved Structural Landscape Plan, provided that these corridors do not materially reduce the overall effectiveness of the screening when viewed from public locations.

Prior to the construction of any residential building within the approved building platform on Lots 4, 5, and 7, the screen planting shall be inspected and certified by a suitably qualified and experienced landscape architect. A monitoring report shall be submitted to the Council confirming compliance with this condition. The report shall include:

- confirmation of species composition and planting locations, planting height and density
- representative photographs of the planting from both on-site and off-site viewpoints for each relevant lot.

Where the required height or density has not been achieved, additional planting, replacement planting, or remedial works shall be undertaken as necessary to achieve compliance prior to the construction of any residential building.

## **Lots 2 – 7**

- e) Building height shall not exceed 5.5 metres above existing ground level on lots 2-6, except for Lot 7 where building height shall not exceed 4.5 metres above existing ground level.
- f) All residential buildings shall be contained within the Building Platform as shown as Covenant Area X as shown on Land Transfer Plan XXXXX.
- g) Building form shall be articulated to reduce visual bulk, including the use of broken roof forms, stepped building massing, and variation in façade planes.
- h) Eaves, overhangs, or recessed windows shall be incorporated into building design, with particular attention to elevations facing public viewpoints, to reduce glare and the visual prominence of glazing.
- i) External building materials and colours shall be recessive and drawn from a palette of natural hues appropriate to the surrounding landscape, with low reflectivity/matte finishes to minimise contrast with the natural environment.
- j) Domestic landscaping, lighting, outdoor living areas, and ancillary structures shall be confined to the approved residential curtilage areas and shall be designed to avoid visual spill into the wider landscape, particularly during night-time hours.

### *Infrastructure*

3. Prior to certification pursuant to section 224(c) of the Resource Management Act 1991, the consent holder shall complete the following:
  - a) Provide a minimum supply of 2,100 litres per day of potable water to building platforms on Lots 2-7 that can be treated to consistently comply with the requirements of the Drinking Water Standard for New Zealand 2005 (Revised 2008).
4. The following consent notice conditions shall be registered on the title for Lots 2 – 7:
  - a) At the time of building consent for a residential unit, the owner for the time being shall engage a suitably qualified professional as defined in Section 1.7 of Queenstown Lakes District Council's Land Development and Subdivision Code of Practice to design a stormwater disposal system that is to provide stormwater disposal from all impervious areas within the site.
  - b) At the time of building consent for a residential unit, the owner for the time being shall engage a suitably qualified professional as defined in Section 1.7 of Queenstown Lakes District Council's Land Development and Subdivision Code of Practice to design a stormwater disposal system that is to provide stormwater disposal from all impervious areas within the site.
  - c) At the time of building consent, the consent holder must demonstrate provision of a minimum supply of 2,100 litres per day of potable water to the building platform that can be treated to consistently comply with the requirements of the Drinking Water Standard for New Zealand 2005 (Revised 2008).
  - d) At the time a residential unit is erected, domestic water and firefighting storage is to be provided. A minimum of 45,000 litres shall be maintained at all times as a static firefighting reserve within a 55,000 litre tank. A firefighting connection in accordance with Appendix B - SNZ PAS 4509:2008 (or superseding standard) is to be located no further than 90 metres, but no closer than 6 metres, from any proposed building on the site. Where pressure at the connection point/coupling is less than 100kPa (a suction source - see Appendix B, SNZ PAS 4509:2008 section B2), a 100mm Suction Coupling (Female) complying with NZS 4505, is to be provided. Where pressure at the connection point/coupling is greater than 100kPa (a flooded source - see Appendix B, SNZ PAS 4509:2008 section B3), a 70mm Instantaneous Coupling (Female) complying with NZS 4505, is to be provided. Flooded and suction sources must be capable of providing a flow rate of 25 litres/sec at the connection point/coupling.

The connection point/coupling shall have a hardstand area adjacent to it (within 5m) that is suitable for parking a fire service appliance.

Underground tanks or tanks that are partially buried (provided the top of the tank is no more than 1 metre above ground) may be accessed by an opening in the top of the tank whereby couplings are not required. A hardstand area adjacent to the tank is required in order to allow a fire service appliance to park. The Fire Service connection point/coupling/fire hydrant/tank must be located so that it is clearly visible and/or provided with appropriate signage to enable connection of a fire appliance.

Firefighting water supply may be provided by means other than the above if the written approval of the New Zealand Fire Service Central North Otago Area Manager is obtained for the proposed method.

- e) The landowner is advised that no hardwire connection has been provided for telecommunication. If a physical telecom connection is sought, this shall be at the landowners cost.



**RECORD OF TITLE**  
**UNDER LAND TRANSFER ACT 2017**  
**FREEHOLD**  
**Search Copy**



  
 R.W. Muir  
 Registrar-General  
 of Land

**Identifier** **876977**  
**Land Registration District** **Otago**  
**Date Issued** 20 June 2019

**Prior References**  
 673826

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**Estate** Fee Simple  
**Area** 26.8973 hectares more or less  
**Legal Description** Lot 1 Deposited Plan 533538  
**Registered Owners**  
 Keith James Ferguson, Rachel Helen Farrant and Shaun Paul O'Brien

---

**Interests**

Subject to Part IVA Conservation Act 1987

Subject to Section 11 Crown Minerals Act 1991

Appurtenant hereto is a droving of sheep with or without farm dogs, motorcycles or ATV's easement created by Deed of Easement 9170812.1 CIR 594776 issued - 3.9.2012 at 7:00 am

11472919.2 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 20.6.2019 at 11:17 am

Subject to a right of way over part marked A and B a right to convey water over part marked B and D a right to convey electricity and telecommunications over part marked F and C and a right to operate and maintain pump and right to convey water over part marked C all on DP 533538 created by Easement Instrument 11472919.3 - 20.6.2019 at 11:17 am

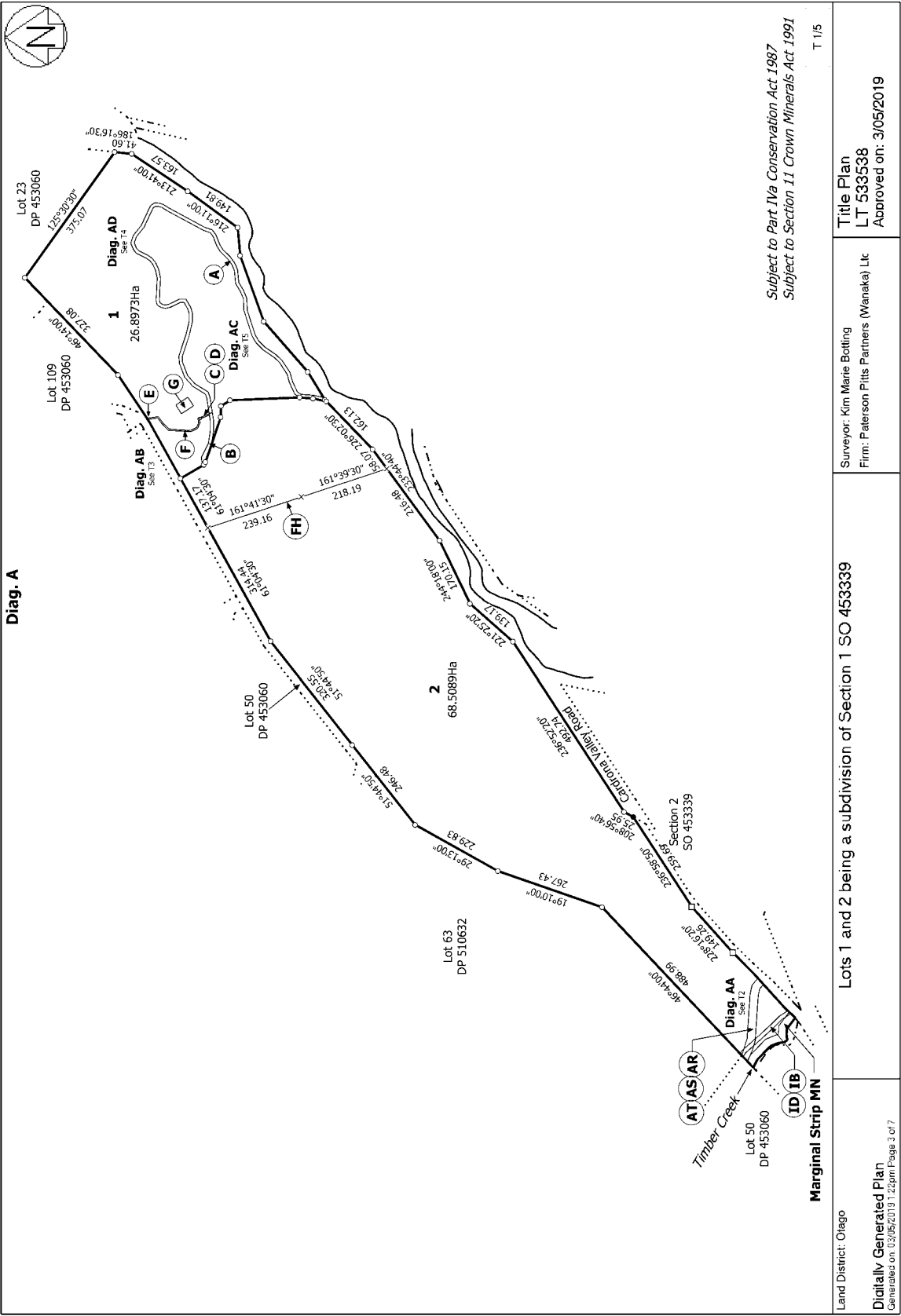
The easements created by Easement Instrument 11472919.3 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right (in gross) to convey electricity over part marked E on DP 533538 in favour of Aurora Energy Limited created by Easement Instrument 11472919.4 - 20.6.2019 at 11:17 am

The easements created by Easement Instrument 11472919.4 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right (in gross) to convey telecommunications over part marked E on DP 533538 in favour of Chorus New Zealand Limited created by Easement Instrument 11472919.5 - 20.6.2019 at 11:17 am

The easements created by Easement Instrument 11472919.5 are subject to Section 243 (a) Resource Management Act 1991



# View Instrument Details



**Instrument No** 11472919.5  
**Status** Registered  
**Date & Time Lodged** 20 June 2019 11:17  
**Lodged By** Moore, Evan Richard  
**Instrument Type** Easement Instrument



| Affected Records of Title | Land District |
|---------------------------|---------------|
| 876977                    | Otago         |

**Annexure Schedule:** Contains 4 Pages.

## Grantor Certifications

I certify that I have the authority to act for the Grantor and that the party has the legal capacity to authorise me to lodge this instrument ☒

I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument ☒

I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply ☒

I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period ☒

I certify that the Mortgagee under Mortgage 10119593.5 has consented to this transaction and I hold that consent ☒

## Signature

Signed by Evan Richard Moore as Grantor Representative on 24/05/2019 12:16 PM

## Grantee Certifications

I certify that I have the authority to act for the Grantee and that the party has the legal capacity to authorise me to lodge this instrument ☒

I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument ☒

I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply ☒

I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period ☒

## Signature

Signed by Evan Richard Moore as Grantee Representative on 24/05/2019 12:16 PM

\*\*\* End of Report \*\*\*

**Easement instrument to grant easement or *profit à prendre***  
Section 109, Land Transfer Act 2017

**Grantor***Surname(s) must be underlined.*

**JEREMY JAMES ROBERTSON AND POLSON HIGGS NOMINEES (2014) LIMITED**

**Grantee***Surname(s) must be underlined.*

**CHORUS NEW ZEALAND LIMITED**

**Grant of Easement or *Profit à prendre***

**The Grantor**, being the registered owner of the Burdened Land set out in Schedule A, **grants to the Grantee** (and, if so stated, in gross) the easement(s) or *profit(s)* set out in Schedule A, with the rights and powers or provisions set out in the Annexure Schedule(s).

**Schedule A***Continue in additional Annexure Schedule, if required.*

| Purpose of Easement, or<br><i>profit</i>      | Shown (plan reference) | Burdened Land<br>(Record of Title) | Benefited Land<br>(Record of Title) or in<br>gross |
|-----------------------------------------------|------------------------|------------------------------------|----------------------------------------------------|
| <b>Right to convey<br/>telecommunications</b> | E on DP 533538         | Lot 1 DP 533538<br>CFR 876977      | <b>Chorus New Zealand<br/>Limited (in gross)</b>   |

**Easements or profits à prendre rights and powers (including terms, covenants and conditions)**

*Delete phrases in [ ] and insert memorandum number as required; continue in additional Annexure Schedule, if required.*

Unless otherwise provided below, the rights and powers implied in specific classes of easement are those prescribed by the Land Transfer Regulations 2018 and/or the Fifth Schedule of the Property Law Act 2007.

The implied rights and powers are ~~varied/negated/added to or substituted~~ by:

~~Memorandum number~~ \_\_\_\_\_, registered under section 209 of the Land Transfer Act 2017.

the provisions set out in the Annexure Schedule.

## Annexure Schedule

### Insert type of instrument

Easement      Dated       Page 2 of  Pages

*Continue in additional Annexure Schedule, if required.*

### Continuation of "Easement rights and powers":

1 The rights and powers in this easement are in addition to those rights and powers contained in Schedule 5 of the Land Transfer Regulations 2018 ("the Fifth Schedule") and where the terms of this easement are in conflict with either the Fifth Schedule or any of the statutory rights and authorities which the Grantee may have in respect of the Burdened Land, the terms of this easement shall prevail.

### 2 Grant of Easement

2.1 In addition to the above rights and powers the Grantor grants to the Grantee as an easement in gross the following rights and powers at all times and in any quantity:

- (a) to lay, install (including construct), locate, upgrade, add to, inspect, maintain, replace, repair, renew, enlarge, alter, retain, remove any Lines and Works on, in, over and under the Easement Land (and for the avoidance of doubt, the Grantor's consent shall be deemed for the purposes of clause 10(1)(b) of Schedule 5 of the Land Transfer Regulations 2018 by virtue of this easement);
- (b) subject to clauses 4.1 and 4.2, to enter with all necessary equipment and remain upon the Burdened Land for the purposes of laying, installing (including constructing), locating, upgrading, adding to, inspecting, maintaining, replacing, repairing, renewing, enlarging, altering, retaining or removing Lines or Works and make any access ways, cuttings, fillings, grades, batters and to re-open the same and generally to do and perform such acts or things upon the Burdened Land as may be necessary or desirable (or incidental thereto) to enable the Grantee to receive, enjoy and give effect to the full free use and enjoyment of the rights and powers granted under this easement; and
- (c) to use and operate Lines and Works (such use and operation may include the granting of such use to third party telecommunications service providers) for the purpose of conveying telecommunications without interruption or impediment,

provided however that nothing shall compel the Grantee to exercise the above rights at any time or in a particular way

### 3 Grantee's Covenants

3.1 The Grantee shall be responsible for:

- (a) the installation of and maintenance of the Lines and Works located on the Easement Land; and
- (b) using its best endeavors to prevent the Lines and Works located on the Easement Land becoming a danger to any user or occupier of the Burdened Land.

3.2 The Grantee will, in exercising the rights granted to the Grantee under this easement cause as little damage as reasonably possible to the Burdened Land and to any building or building improvement (including, without limitation, any interior fitout) located on the Burdened Land.

3.3 The Grantee will at the Grantee's own cost repair and make good any damage to the Burdened Land (including without limitation any damage to any building(s), fences or other improvements) caused by the Grantee in exercising the Grantee's rights and powers under this

## Annexure Schedule

### Insert type of instrument

Easement

Dated

Page

3

of

Pages

*Continue in additional Annexure Schedule, if required.*

easement as reasonably close as possible to the original condition of the Burdened Land prior to such damage and to the reasonable satisfaction of the Grantor.

#### 4 Access

- 4.1 The Grantee may, at any time (but subject to clause 4.2) from time to time enter the Burdened Land (including, for the avoidance of doubt, any areas of Common Property on the Burdened Land) using such routes as prescribed by the Grantor (acting reasonably) and with or without its employees, contractors and agents and with or without vehicles, machinery and implements of any kind for purposes associated with the creation and exercise of its rights and powers under this easement. If relevant, the Grantor shall invoke its rights pursuant to section 80 of the Unit Titles Act 2010 (or procure that such rights are invoked) as may be necessary to allow the Grantee access to its Lines and Works as agent of the body corporate.
- 4.2 In exercising the rights granted to the Grantee under this easement, the Grantee shall use reasonable efforts to give the Grantor prior notice that the Grantee intends to enter upon the Burdened Land (except in the case of an Emergency, when notice will not be required) and for the avoidance of doubt, clause 12(2) of Schedule 5 the Land Transfer Regulations 2018 does not apply. Without limitation to the preceding provisions, the Grantor shall not at any time restrict or impede access to the Easement Land (including by way of subdivision of the Land) by the Grantee and, upon request by Grantee, will provide the Grantee with all necessary keys and / or access cards required from time to time to gain access to the Burdened Land and the Easement Land.

#### 5 Grantor's Covenants

- 5.1 The Grantor will not without the written permission of the Grantee (not to be unreasonably withheld or delayed):
- (a) grow or permit to be grown any natural or cultivated vegetation (including trees and shrubs) on or in the near vicinity, or encroaching on the Easement Land. The Grantee may at all times at the Grantor's cost remove any natural or cultivated vegetation or improvement on the Easement Land which may interfere with the rights granted by this easement; or
  - (b) erect or permit to be erected any improvement (including but not limited to buildings, sheds, fences, roads, walls or driveways) on the Easement Land; or
  - (c) do anything on the Easement Land that may damage or endanger the Grantee's Lines or Works; or
  - (d) do any act which will interfere with the rights granted by this easement and will not at any time do permit or suffer any act whereby the full and free use and enjoyment by the Grantee of the rights and privileges granted by this are interfered with.

#### 6 Removal

- 6.1 The Lines and Works are and shall remain the sole property of the Grantee and the Grantee shall not be required to remove the Lines and/or Works at any time. No person shall have any interest in such Lines and Works by reason only of having an interest or estate in the Burdened Land.

## Annexure Schedule

### Insert type of instrument

Easement      Dated       Page 4 of  Pages

*Continue in additional Annexure Schedule, if required.*

6.2 No power is implied for the Grantor to determine this easement for any breach of covenant or for any other cause whatsoever. The parties intend this easement to subsist forever or until it is duly surrendered or extinguished at the election of the Grantee.

### 7 Further Assurances

7.1 Each party shall make all applications, including executing and delivering any documents, and doing all acts and things, as may reasonably be required by the other party to obtain the full benefit of this easement according to its true intent.

### 8 Telecommunications Act 2001 and End User Terms

8.1 Notwithstanding anything to the contrary in this easement, the terms contained in this easement shall be without prejudice to, and do not reduce or limit, the rights and powers of the Grantee under the Telecommunications Act 2001 or any other document or arrangement conferring rights or powers on the Grantee in relation to Lines and Works at the Burdened Land, and the Grantee may, in its discretion, rely on or exercise any of its rights and powers, whether in addition to or instead of the rights and powers granted by this easement.

### 9 Definitions and interpretation

9.1 In this easement:

- (a) **"Common Property"** has the same meaning ascribed to that term under the Unit Titles Act 2010.
- (b) **"Easement Land"** means that part of the Burdened Land identified in Schedule A in this easement as Easement Land and those other parts of the Burdened Land (including buildings) on which the Grantee has installed and located its Lines and Works.
- (c) **"Emergency"** means a situation in which there is a probable danger to life or property or immediate risk to the continuity or safety of supply of telecommunications.
- (d) **"Grantee"** means Chorus New Zealand Limited and includes all its subsidiaries (within the meaning of Sections 5 and 6 of the Companies Act 1993) and its successors, assigns, personal representatives, employees, contractors, agents, licensees and invitees.
- (e) **"Grantor"** includes the successors in title, assigns, tenants, transferees and personal representatives of the Grantor.
- (f) **"Line"** and **"Works"** shall have the meanings ascribed to those terms under the Telecommunications Act 2001.

# View Instrument Details



|                               |                                                              |
|-------------------------------|--------------------------------------------------------------|
| <b>Instrument No</b>          | 11472919.2                                                   |
| <b>Status</b>                 | Registered                                                   |
| <b>Date &amp; Time Lodged</b> | 20 June 2019 11:17                                           |
| <b>Lodged By</b>              | Moore, Evan Richard                                          |
| <b>Instrument Type</b>        | Consent Notice under s221(4)(a) Resource Management Act 1991 |



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|                                  |                      |
|----------------------------------|----------------------|
| <b>Affected Records of Title</b> | <b>Land District</b> |
| 876977                           | Otago                |

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**Annexure Schedule:** Contains 5 Pages.

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## Signature

Signed by Evan Richard Moore as Territorial Authority Representative on 24/05/2019 12:16 PM

\*\*\* End of Report \*\*\*

**IN THE MATTER** of Lots 1 and 2 Being a  
Subdivision of Section 1 SO 453339

**AND**

**IN THE MATTER** of Consent RM 150552  
Queenstown Lakes District Council.

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**CONSENT NOTICE PURSUANT TO SECTION 221  
OF THE RESOURCE MANAGEMENT ACT 1991**

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**PATERSON PITTS LIMITED PARTNERSHIP  
SURVEYING PLANNING ENGINEERING  
WANAKA**

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**BACKGROUND**

Queenstown Lakes District Council (**Council**) has granted consent **RM 150552** for the Subdivision of the land comprised in Record of Title 673826 subject to conditions which are to be complied with in perpetuity by the owner of the land, being the conditions specified in the Operative Part hereof.

**OPERATIVE PART**

The following conditions of the consent shall be complied with in perpetuity and shall be registered on the relevant Titles by way of Consent Notice pursuant to s.221 of the Act.

**OPERATIVE PART A**

*The following Conditions a) – w) shall apply to the following lot:*

*Lot 1 Deposited Plan 533538 held in record of title 876977*

**CONDITIONS**

- a) All residential buildings shall be contained within the Building Platform as shown as Covenant Area G as shown on Land Transfer Plan 533538.
- b) All mounding and landscape planting as per Structural Landscape Plan, J. Robertson – Cardrona Valley Road, Wanaka, Ref 0919-SLP4 dated 19/02/2016 shall be fully implemented and certified by Council prior to construction of any building within the consented building platform.
- c) The maximum height for all buildings within the building platform shall be 5m above the finished ground level of 463.4 masl.
- d) Up to two flues can exceed the 5 metre height limit by a maximum of 1.2 metres. These flues shall be dark grey, brown or green coloured (light reflectivity value between 7% and 20%) and have a matte finish with a maximum diameter of 400mm.
- e) Roofs shall be limited to tray or colorsteel finished in a dark recessive grey, brown or green colour with a light reflectance value of between 7% and 20% and a matte finish. Opaque or pale coloured PVC panels or similar shall not be installed on any roof.
- f) External wall claddings shall be limited to plaster finish, schist, weatherboards finished with a natural stain or painted weatherboards. These finishes and all finishes of other external elements such as spouting, joinery, down pipes etc. shall be of a dark grey, brown or green recessive colour with a light reflectance value of between 7% and 20%.
- g) Roof top structures e.g. satellite dishes (excluding flues) shall not extend beyond the building platform height controls. Solar panels are to be ground based or located so as not to be

visible from beyond the site. Rooftop structures e.g. satellite dishes will be finished in recessive dark grey, brown or green colours with a light reflectance value of between 7% and 20% and with a matte finish.

- h) All exterior lighting shall be restricted to the curtilage area as shown on the approved landscape plan, Structural Landscape Plan, J. Robertson – Cardrona Valley Road, Wanaka, Ref 0919-SLP4 dated 19/02/2016 (**Curtilage Area**) and shall be down lighting only. Lighting shall not exceed 1m above ground level, except where attached to a building where it shall not exceed 3m above ground level. There shall be no light spill beyond the Curtilage Area. Lighting shall not be used to highlight buildings, structures or feature landscape elements such as trees that are visible beyond the site.
- i) Entrance gateways off public roads or public land shall be of a standard farm gate design of timber or steel construction in keeping with rural context and no higher than 1.5m.
- j) All fencing, including fencing around Curtilage Area shall be standard post and wire (including rabbit proof fencing), deer fencing or timber post and rail in keeping with traditional farm fencing.
- k) There shall be no linear planting along the Curtilage Area boundary to avoid highlighting the Curtilage Area within the broader landscape.
- l) Access drives up to the domestic Curtilage Area shall be a gravel of a local grey coloured stone such as schist and exclude concrete kerb and channels to maintain rural character.
- m) All domestic landscaping and structures including but not limited to clotheslines, outdoor seating areas, external lighting, swimming pools, tennis courts, pergolas, and amenity gardens and lawns shall be confined to the Curtilage Area as shown on the certified landscape planting plan.
- n) Planting within the Curtilage Area shown on the certified landscape planting plan with a mature height of over 4m will be of species typical of the rural pastoral landscape such as poplar, oak (green), non-wilding pines, or indigenous species and shall exclude the problematic weed species such as birch or sycamore and brightly coloured ornamental species such as red oaks, golden elms, or ornamental maples and other similar species.
- o) Polycarbonate or similar skylight panels installed on the roof of buildings within the approved building platform shall be 100% transparent or of dark tint such as to avoid opaque or pale colouring roofing panels that may cause a contrasting banding effect that would highlight built form in the broader landscape.
- p) Eaves on all buildings above all glazed areas shall extend no less than 800mm beyond glazing on all eastern, northern or western facing sides of the building to reduce the effect of glare highlighting the building from distant viewpoints.
- q) At the time a dwelling is erected on the lot, the owner for the time being shall engage a suitably qualified professional as defined in Section 1.7 of Queenstown Lakes District Council's Land Development and Subdivision Code of Practice to design a stormwater disposal system that is to provide stormwater disposal from all impervious areas within the site. The proposed stormwater system shall be subject to the review of the Principal Resource Management Engineer at Council prior to implementation and shall be installed prior to occupation of the dwelling.

- r) At the time a dwelling is erected on the lot, the owner for the time being shall engage a suitably experienced person as defined in sections 3.3 & 3.4 of AS/NZS 1547:2012 to design an onsite effluent disposal system in compliance with AS/NZS 1547:2012. The design shall take into account the site and soils investigation report and recommendations by Petherick Consultancy Ltd, dated 22/04/2015. The proposed wastewater system shall be subject to Council for prior to implementation and shall be installed prior to occupation of the dwelling.
- s) At the time a dwelling is erected on Lot 1, domestic water and firefighting storage is to be provided. A minimum of 20,000 litres shall be maintained at all times as a static firefighting reserve within a 30,000 litre tank. Alternatively, a 7,000 litre firefighting reserve is to be provided for each dwelling in association with a domestic sprinkler system installed to an approved standard. A firefighting connection in accordance with Appendix B - SNZ PAS 4509:2008 (or superseding standard) is to be located no further than 90 metres, but no closer than 6 metres, from any proposed building on the site. Where pressure at the connection point/coupling is less than 100kPa (a suction source - see Appendix B, SNZ PAS 4509:2008 section B2), a 100mm Suction Coupling (Female) complying with NZS 4505, is to be provided. Where pressure at the connection point/coupling is greater than 100kPa (a flooded source - see Appendix B, SNZ PAS 4509:2008 section B3), a 70mm Instantaneous Coupling (Female) complying with NZS 4505, is to be provided. Flooded and suction sources must be capable of providing a flow rate of 25 litres/sec at the connection point/coupling. The reserve capacities and flow rates stipulated above are relevant only for single family dwellings. In the event that the proposed dwellings provide for more than single family occupation then the consent holder should consult with Fire and Emergency New Zealand (FENZ) as larger capacities and flow rates may be required.

The FENZ connection point/coupling must be located so that it is not compromised in the event of a fire.

The connection point/coupling shall have a hardstand area adjacent to it (within 5m) that is suitable for parking a fire service appliance. The hardstand area shall be located in the centre of a clear working space with a minimum width of 4.5 metres. Pavements or roadways providing access to the hardstand area must have a minimum formed width as required by Council's standards for rural roads (as per NZS 4404:2004 with amendments adopted by Council in 2005). The roadway shall be trafficable in all weathers and be capable of withstanding an axle load of 8.2 tonnes or have a load bearing capacity of no less than the public roadway serving the property, whichever is the lower. Access shall be maintained at all times to the hardstand area.

Underground tanks or tanks that are partially buried (provided the top of the tank is no more than 1 metre above ground) may be accessed by an opening in the top of the tank whereby couplings are not required. A hardstand area adjacent to the tank is required in order to allow a fire service appliance to park on it and access to the hardstand area must be provided as above.

The FENZ connection point/coupling/fire hydrant/tank must be located so that it is clearly visible and/or provided with appropriate signage to enable connection of a fire appliance.

Firefighting water supply may be provided by means other than the above if the written approval of the FENZ Central North Otago Area Manager is obtained for the proposed method.

The firefighting water supply tank and/or the sprinkler system shall be installed prior to the occupation of the building.

Advice Note: FENZ considers that often the best method to achieve compliance with SNZ PAS 4509:2008 is through the installation of a home sprinkler system in accordance with Fire Systems for Houses SNZ 4517:2010, in each new dwelling. Given that the proposed dwelling is approximately 8km from the nearest FENZ Fire Station the response times of the New Zealand Volunteer Fire Service in an emergency situation may be constrained. It is strongly encouraged that a home sprinkler system be installed in the new dwelling.

- t) A minimum of 0.5 hectares of wilding conifers within the site shall be removed and replaced with pasture per annum and all wilding conifers shall be eradicated from the property within 7 years of the date of issue of the 224 certificate. Cleared areas and other areas of the site shall be managed to prevent the re-establishment of wilding conifers. Any wilding conifer seedlings that re-establish must be removed immediately.
- u) All planting as shown on the approved landscape plan, Structural Landscape Plan, J. Robertson – Cardrona Valley Road, Wanaka, Ref 0919-SLP4 dated 19/02/2016 shall be maintained to ensure healthy and natural growth, and to sustain a closed canopy once established. Planting shall be maintained in its natural state and form and shall not be trimmed or modified in any manner. If any tree or plant shall die it shall be replaced as per the plan within 12 months.
- v) All mitigation earth mounds shall be retained as per the certified as-built earth plans (Asbuilt Ground Profiles, Jeremy Robertson, The Larches, Cardrona Valley Road, Job No W4300 Drawing No 002 Sheets 200-204 dated 10/09/2018) and shall not be altered or modified in any manner that reduces the visual mitigation of the mounding as approved by Council.
- w) Water quality testing completed for the RM150552 subdivision water supply show compliance with the *Drinking-water Standards for New Zealand 2005 (Revised 2008)*, indicating that the water is safe to drink. However, iron and turbidity levels exceed the guideline value (GV). This does not indicate a health risk, but may require some form of treatment to remedy to avoid issues such as brown staining of laundry and basins. Please refer to the Eurofins ELS Ltd Analytical Report (Report Number: 19/2311, Issue: 1, dated 23/01/2019) for full details (available on the underlying RM150552 subdivision consent file for the property held by Queenstown Lakes District Council).

Dated this

8<sup>th</sup>

day of

April

2019

**SIGNED** for and on behalf  
Of the **QUEENSTOWN LAKES**  
**DISTRICT COUNCIL** under delegated  
Authority by its Acting Team Leader,  
Subdivision, Development Contributions, & Property  
Keri Anne Garrett

  
\_\_\_\_\_

# View Instrument Details



**Instrument No** 11472919.4  
**Status** Registered  
**Date & Time Lodged** 20 June 2019 11:17  
**Lodged By** Moore, Evan Richard  
**Instrument Type** Easement Instrument



| Affected Records of Title | Land District |
|---------------------------|---------------|
| 876977                    | Otago         |

**Annexure Schedule:** Contains 4 Pages.

## Grantor Certifications

I certify that I have the authority to act for the Grantor and that the party has the legal capacity to authorise me to lodge this instrument ☒

I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument ☒

I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply ☒

I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period ☒

I certify that the Mortgagee under Mortgage 10119593.5 has consented to this transaction and I hold that consent ☒

## Signature

Signed by Evan Richard Moore as Grantor Representative on 27/05/2019 09:50 AM

## Grantee Certifications

I certify that I have the authority to act for the Grantee and that the party has the legal capacity to authorise me to lodge this instrument ☒

I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument ☒

I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply ☒

I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period ☒

## Signature

Signed by Bridget Irving as Grantee Representative on 24/05/2019 05:02 PM

\*\*\* End of Report \*\*\*

**Form 22**

**Easement instrument to grant easement or *profit à prendre***  
(Section 109 Land Transfer Act 2017)

**Grantor**

JEREMY JAMES ROBERTSON and POLSON HIGGS NOMINEES (2014) LIMITED

**Grantee**

AURORA ENERGY LIMITED

**Grant of Easement or *Profit à prendre***

**The Grantor** being the registered owner of the burdened land set out in Schedule A **grants to the Grantee** (and, if so stated, in gross) the easement(s) or *profit(s) à prendre* set out in Schedule A, with the rights and powers or provisions set out in the Annexure Schedule(s)

**Schedule A**

*Continue in additional Annexure Schedule, if required*

| Purpose of Easement, or <i>profit</i> | Shown (plan reference)  | Burdened Land (Record of Title)   | Benefited Land (Record of Title) or in gross |
|---------------------------------------|-------------------------|-----------------------------------|----------------------------------------------|
| Right to Convey Electricity           | E as shown on DP 533538 | Lot 1 DP 533538 held in RT 876977 | In gross                                     |

**Easements or profits à prendre rights and powers (including terms, covenants and conditions)**

*Delete phrases in [ ] and insert memorandum number as required; continue in additional Annexure Schedule, if required*

Unless otherwise provided below, the rights and powers implied in specified classes of easement are those prescribed by the Land Transfer Regulations 2018 and/or Schedule 5 of the Property Law Act 2007

The implied rights and powers are hereby **[varied]** **[negatived]** **[added to]** or **[substituted]** by:

~~[Memorandum number \_\_\_\_\_, registered under section 209 of the Land Transfer Act 2017]~~

[the provisions set out in Annexure Schedule 2]

**Annexure Schedule 2****CONTINUATION OF "EASEMENTS OR PROFITS À PRENDRE RIGHTS AND POWERS (INCLUDING TERMS, COVENANTS AND CONDITIONS)"**

The Grantee shall have as easements in gross forever in favour of the Grantee the following rights:-

- (a) To convey electricity under and through the soil of that part of the land in Record of Title 876977 marked E on Deposited Plan 533538 (hereinafter referred to as "the electricity cable easement");

(the said Record of Title 876977 is hereinafter referred to as "the burdened land").

**TERMS, CONDITIONS, COVENANTS OR RESTRICTIONS IN RESPECT OF THE RIGHT TO CONVEY ELECTRICITY****A. ELECTRICITY CABLE EASEMENT****The Grantee shall have the right**

- (a) To lead and convey electricity, electric impulses, and ancillary telecommunications without interruption or impediment (except during any periods of necessary renewal or repair) by means of conduits, cables, pipes and ancillary equipment laid or to be laid under the surface of and through the soil of the electricity cable easement.
- (b) To lay, place, inspect, repair, maintain, renew, upgrade and replace on and under the electricity cable easement such conduits, cables, pipes and ancillary equipment as may be necessary to convey such electricity, electric impulses, and ancillary telecommunications by means of the said conduits, cables, pipes and ancillary equipment.
- (c) For the Grantee its servants, agents, workmen and contractors to enter and remain on such part or parts of the burdened land as may be necessary to secure access to the electricity cable easement and the said conduits, cables, pipes and ancillary equipment and on such parts of the burdened land as may be necessary for the purpose of laying, placing, inspecting, repairing, maintaining, renewing, upgrading and replacing the said conduits, cables, pipes and ancillary equipment together with full power and authority for the Grantee its surveyors, engineers, workmen, agents and servants with or without vehicles implements machinery and equipment from time to time and at all times to enter and remain on the said part or parts of the burdened land as may be necessary for the purpose of exercising and enjoying all or any of the rights privileges and easements granted in this instrument.

**1. The Grantor covenants with the Grantee**

- (a) Not to place any building or other structure or plant any tree or shrub or alter the natural level of the land on the electricity cable easement without the prior written consent of the Grantee.

- (b) To take all reasonable steps to ensure that their tenants, agents and workmen do not do any wilful or negligent act or thing whereby the said conduits, cables, pipes and ancillary equipment and the said electricity cables shall be damaged or destroyed. If it is established that the damage was caused by the negligent or wilful act of the Grantor or their tenants, agents or workmen then the Grantor shall be responsible for the repair and/or replacement required. Any work so required shall be carried out by a Contractor selected by the Grantee.
- (c) Not at any time permit or suffer any act or thing whereby the rights, powers, liberties, licences and easements hereby granted to the Grantee may be interfered with or affected.

**2. The Grantee covenants with the Grantor that upon the exercising of any of its rights the Grantee shall**

- (a) Cause as little damage as possible to the burdened land and the occupiers of the burdened land;
- (b) Restore the burdened land as near as reasonably possible to its previous condition;
- (c) Make good at the Grantee's expense any damage done by the actions of the Grantee to the buildings, erections and fences of the Grantor.
- (d) Not except while work is being carried on upon the burdened land leave on that part of the burdened land not covered by the electricity easements any rubbish or debris or obstruction.

# View Instrument Details



**Instrument No** 11472919.3  
**Status** Registered  
**Date & Time Lodged** 20 June 2019 11:17  
**Lodged By** Moore, Evan Richard  
**Instrument Type** Easement Instrument



| Affected Records of Title | Land District |
|---------------------------|---------------|
| 876977                    | Otago         |
| 876978                    | Otago         |

**Annexure Schedule:** Contains 4 Pages.

## Grantor Certifications

- I certify that I have the authority to act for the Grantor and that the party has the legal capacity to authorise me to lodge this instrument ☒
- I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument ☒
- I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply ☒
- I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period ☒
- I certify that the Mortgagee under Mortgage 10119593.5 has consented to this transaction and I hold that consent ☒

## Signature

Signed by Evan Richard Moore as Grantor Representative on 24/05/2019 12:16 PM

## Grantee Certifications

- I certify that I have the authority to act for the Grantee and that the party has the legal capacity to authorise me to lodge this instrument ☒
- I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument ☒
- I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply ☒
- I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period ☒

## Signature

Signed by Evan Richard Moore as Grantee Representative on 24/05/2019 12:16 PM

\*\*\* End of Report \*\*\*

**Form 22****Easement instrument to grant easement or *profit à prendre***

(Section 109 Land Transfer Act 2017)

**Grantor****JEREMY JAMES ROBERTSON AND POLSON HIGGS NOMINEES (2014) LIMITED****Grantee****JEREMY JAMES ROBERTSON AND POLSON HIGGS NOMINEES (2014) LIMITED****Grant of Easement or *Profit à prendre***

**The Grantor** being the registered owner of the burdened land set out in Schedule A **grants to the Grantee** (and, if so stated, in gross) the easement(s) or *profit(s) à prendre* set out in Schedule A, with the rights and powers or provisions set out in the Annexure Schedule(s)

**Schedule A**

| Purpose of Easement, or <i>profit</i>                        | Shown (plan reference) | Burdened Land (Record of Title) | Benefited Land (Record of Title) or in gross |
|--------------------------------------------------------------|------------------------|---------------------------------|----------------------------------------------|
| RIGHT OF WAY                                                 | A & B on DP 533538     | Lot 1 DP 533538<br>RT: 876977   | Lot 2 DP 533538<br>RT: 876978                |
| RIGHT TO CONVEY WATER                                        | B & D on DP 533538     | Lot 1 DP 533538<br>RT: 876977   | Lot 2 DP 533538<br>RT: 876978                |
| RIGHT TO CONVEY ELECTRICITY AND TELECOMMUNICATIONS           | F & C on DP 533538     | Lot 1 DP 533538<br>RT: 876977   | Lot 2 DP 533538<br>RT: 876978                |
| RIGHT TO OPERATE AND MAINTAIN PUMP AND RIGHT TO CONVEY WATER | C on DP 533538         | Lot 1 DP 533538<br>RT: 876977   | Lot 2 DP 533538<br>RT: 876978                |

**Easements or *profits à prendre* rights and powers (including terms, covenants and conditions)**

Unless otherwise provided below, the rights and powers implied in specified classes of easement are those prescribed by the Land Transfer Regulations 2018 and/or Schedule 5 of the Property Law Act 2007

The implied rights and powers are hereby **added to** by the provisions set out in Annexure Schedule.

**Form L****Annexure Schedule**

Page of Pages

*Insert instrument type***EASEMENT INSTRUMENT**

The implied rights and powers which are prescribed by Schedule 5 of the Land Transfer Regulations 2018 are hereby added to as follows:

The right to convey water shall include:

- (a) The right of the registered proprietor for the benefited land to install, operate and maintain a pump and pumphouse in area marked "C" on DP 533538; and
- (b) The right of the registered proprietor for the benefited land to pump water from the bore located in area marked "C" on DP 533538; and
- (c) Any right to pump, take and convey water shall always be subject to the priority of:
  - i. the registered proprietor of the burdened land to have water for household supply;
  - ii. the registered proprietor of the benefited land to have water for stock; and
  - iii. the terms of any consents granted by the regional or local authorities and any water scheme to which either the benefited land or the burdened land is subject to;
- (d) If the bore is found to have an excess supply of water after the uses above, then the grantor and grantee may agree to use such excess supply for other purposes such as irrigation; and
- (e) Prior to the registered proprietor of the benefitted land pumping any water that registered proprietor will install water and electricity meters at such pump for the purposes of apportioning any charges for the water and electricity flowing through the pump; and
- (f) Costs in relation to the use and supply of water shall be met by the grantor and grantee in proportion with its use, except:
  - i. Where there is a significant increase in the costs occasioned by any deliberate or negligent act of one or some only of the grantor or grantee, the cost shall be borne wholly by that grantor or grantee.

- ii. Where there is a significant increase in the costs that is partially attributable to an act or omission by that grantor or grantee, that party must pay the portion of the costs that is attributable to that act or omission.
- (g) Where the cost of water or electricity flowing through the pump is invoiced to one party by a supplier (the "receiving party"), then the other party shall indemnify the receiving party for that party's share of costs for water and/or electricity as apportioned by the water/electrical meters described in (e) above, and the following will apply:
- i. Within a reasonable time of receipt of such invoice from a supplier, the receiving party will read the water and electricity meters and acting reasonably will calculate and apportion the costs in connection with usage.
  - ii. On receipt of the calculation and apportioned cost from the receiving party, the other party shall promptly pay their portion of costs to the receiving party.
  - iii. The receiving party will not be obliged to make payment to the supplier until it has received payment from the other party.
  - iv. Any costs in connection with a delay in reading the meter or making any payment shall be borne by the party causing such delay.
  - v. For clarity, all rights and powers implied in all classes of easement as listed in the Land Transfer Regulations 2018, Schedule 5 at sections 10, 11, 12, 13 and 14 shall apply to these additional rights as set out in this annexure schedule, except that where there is any conflict between this annexure schedule and Land Transfer Regulation 2018, this annexure schedule will prevail.