



122 Morven Ferry Road, Arrow Junction, Queenstown

ENGINEERING INFRASTRUCTURE REPORT

Prepared For:

Gibbons Development

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MCKENZIE & CO.

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Location: 122 Morven Ferry Road, Arrow Junction, Queenstown

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1.0 Introduction

1.1 The Application

McKenzie and Co Consultants Ltd (MCCL) have been engaged by Gibbons Developments Ltd (the Applicant) to carry out an Engineering Infrastructure and Servicing Assessment for the proposed development at 122 Morven Ferry Road, hereafter referred to as 'the site.'

This report addresses the operational servicing of Ridgeburn, including potable water, wastewater treatment and disposal, stormwater networks, and infrastructure funding and management. Construction-phase environmental controls are addressed separately in the EMP and CMP.

1.2 Objective

This report aims to identify the various necessary infrastructure provisions to adequately service the future development proposal to the satisfaction of the Queenstown Lake District Council (QLDC) and Otago Regional Council (ORC).

QLDC Land Development and Subdivision Code of Practice 2025.

The report provides information in support of the Resource Consent application and is based on publicly available information.

This Report provides comments about the existing and future infrastructure relevant to the site. It identifies any potential issues that may need to be addressed during the further stages of investigation, design, and planning of the redevelopment, specifically:

- Bulk earthworks associated with creating and forming building platforms, roading, shared and private accessways, and parking.
- Environmental Management (i.e., Erosion & Sediment Controls) associated with the earthworks and construction operations.
- Stormwater management and disposal.
- Wastewater collection and disposal.
- Potable water supply including fire-fighting water supply.
- Utilities (e.g., power, communications, and gas if applicable).

This report should be read in conjunction with the consent application's Engineering drawings, calculations, and other supporting documents referred to in this report.

2.0 Site Information

2.1 Site Locality

The property lies in the rural setting of Arrow Junction in the Wakatipu Basin near Queenstown. It includes the prominent Morven Hill.

The land area is approximately 212.76 ha across seven freehold titles. Refer to Table 1. The land is currently used for pastoral/rural activity. There is an existing homestead 210 m² floor area.

The property features historic stone walls and architecture, open farmland rising up to ridgelines. From elevated ridges the land offers extensive views over surrounding mountain ranges and across the Wakatipu Basin. Positioned close to major trails, river systems and recreation areas.



Figure 1: Site Location (Source: Google Earth)

Table 1 – Site Summary

EXISTING SITE SUMMARY INFORMATION	
Site Address	122 Morven Ferry Road, Arrow Junction, Queenstown
Legal Description	- Lot 2 DP 601937 (RT: 1174254) – 24.7256 ha - Lot 3 DP 529201 (RT: 857180) – 2.0584 ha - Lot 5 DP 300661 and Sections 21, 23, 24, 64, 71 in Blocks VIII & IX Shotover SD (RT: 946021) – 82.6923 ha - Section 22 Block IX Shotover SD (RT: OT406/118) – 23.0823 ha - Section 23 Block IX Shotover SD (RT: OT7D/1456) – 26.5069 ha

EXISTING SITE SUMMARY INFORMATION

- Section 1-2 SO 478164, Section 25 Block IX Shotover SD, Lots 3-4 DP 300661 (RT: 946040) – 45.1025 ha
- Section 1 SO 420327 (RT: 492534) – 8.5980 ha

2.2 Existing Site Features and Infrastructure

An existing homestead building, stone walls, a woolshed and other farm-buildings/sheds are located on the site.

The land contour predominantly consists of undulating rural farmland, with a portion of the site located on the steep slopes of Morven Hill. It has direct access to recreational networks. There are communications towers located on top of Morven Hill.

An open water race traverses through the site, which is operated by the Arrow Irrigation Company Ltd. This water races services downstream properties for irrigation purposes.

Several natural wetlands and ephemeral streams are located within the site. These are detailed in the ecologist's report and are also shown on Drawing 4048-0-4300 series, in **Appendix A**. The natural wetlands will be protected during the works, and the existing hydrology will be maintained as far as practicable.

Some constructed ponds are also present. These will be removed as part of the earthworks process.

Existing trees, fences, tracks, drainage and redundant buildings and farm equipment will all be removed or relocated where they do not support the development proposal.

There is an existing bore on site that provides potable water to the existing dwelling to be removed.

No reticulated sewer, stormwater or water for the broader area.

Transmission Tower

Based on information from Transpower, a high-voltage transmission line corridor traverses a portion of the southern part of the site, including at least one transmission tower. While the corridor is indicated on publicly available maps, the exact location and boundaries of the easement should be formally surveyed by a licensed surveyor in consultation with Transpower. Accurate identification of the corridor is essential to ensure compliance with National Grid regulations, maintain required safety clearances, and inform subdivision layout and lot design. This survey will provide certainty for building setbacks, infrastructure placement, and overall subdivision planning. Refer to Figure 2



Figure 2: Transmission Tower/Pylon Location (Source: Transpower Website)

3.0 Hazards

Natural Hazards

Based on the Otago Regional Council's Natural Hazards Exposure Analysis Map, the site has a low level of exposure to the identified natural hazards. These include river and lake flooding, active alluvial fan activity, landslides, rockfall, tsunami, storm surge, liquefaction, active faults, and Waitaki coastal erosion. This indicates that, according to current regional hazard mapping, the site is not located within areas considered to have elevated susceptibility to these natural hazard events.

However, it is noted that while the mapped hazard exposure is low, site-specific investigations may still be required during detailed design to confirm ground conditions, slope stability, and potential localized risks not captured at the regional scale.

Flood Risk Assessment

A review of the Queenstown Lakes District Council (QLDC) Flood Maps indicates that the 122 Morven Ferry Road site is not identified as being at risk of flooding. These maps are prepared using historical flood data, hydrological modeling, and topographical information to identify areas susceptible to river or surface water flooding.

While the QLDC Flood Map provides a high-level assessment, it is recommended that site-specific stormwater and drainage assessments be conducted during detailed design. This ensures that local low-lying areas, natural drainage paths, or future changes in climate or upstream development are adequately considered in the subdivision layout.

A stormwater mitigation report by McKenzie and Co details the preliminary flood modelling results for the development site. The report details how the storm events will be managed through the sites proposed channel and stormwater devices to ensure the proposed dwellings and receiving environments are adequately protected during storm events up to and including the 100 year event.

Wildfire Risk and Mitigation Measures

The Ridgeburn development is located within a rural landscape setting where seasonal dry conditions, particularly during summer, can increase the likelihood of wildfire ignition and spread. Wildfire risk for the site is influenced by both on-site ignition sources associated with future residential activity, and off-site ignition sources associated with surrounding rural land uses.

The existing land use includes rural agricultural activities and cropping, which can contribute to increased seasonal fuel loads and presents a potential ignition risk through the use of heavy machinery. These surrounding rural activities are considered a primary contributor to wildfire ignition risk in the local context.

The proposed development incorporates a range of landscape, infrastructure, and ongoing management measures intended to reduce ignition likelihood, limit available fuel loads, and improve containment potential should a wildfire occur.

Ignition Sources and Site Context

The development will introduce additional human activity within the site, which may increase potential ignition sources compared with the existing rural baseline. However, during periods of elevated wildfire risk, district-wide fire bans are typically implemented, which further mitigates ignition potential associated with activities such as outdoor burning.

Off-site ignition sources remain relevant due to the surrounding rural environment, where agricultural operations (including machinery use) and seasonal cropping can increase both ignition likelihood and available combustible fuel. The design of the development therefore places emphasis on buffer treatments and containment measures at the interface between the developed area and surrounding rural land.

Vegetation Fuel Load and Landscape Design

The proposed landscape design includes extensive areas of irrigated planting, reserves, and green space. The planting palette is understood to consist predominantly of low to moderate

flammability species, based on species listed in the Fire and Emergency New Zealand plant flammability directory. This planting approach is expected to present a lower wildfire hazard than unmanaged rural vegetation and seasonal cropping, particularly during summer dry conditions.

In addition, existing higher-risk vegetation on site, including established pine trees, will be removed as part of the development works. This will reduce existing fuel loads and lower the potential for rapid fire spread through the site.

Grassed areas within the reserves will be maintained through mowing or grazing, which will reduce the potential for dry grass fuel accumulation during summer periods.

Ongoing reserve maintenance measures may also be implemented to further reduce wildfire fuel sources, including:

- removal of lower branches from trees up to approximately 2 metres above ground level, and
- routine removal of dry or dead vegetation material.

These maintenance practices would assist in limiting ladder fuels and reducing the potential for fire spread into tree canopies.

Irrigation and Moisture Retention

A spray irrigation system is proposed throughout landscaped areas, including Morven Hill and key boundary planting zones. This irrigation strategy will assist in maintaining soil moisture and vegetation health, reducing vegetation dryness during peak summer conditions. The irrigated landscape areas will therefore provide improved resistance to ignition and may assist in slowing the spread of fire through reserve and amenity planting areas.

Buffers, Separation, and Containment Features

A key mitigation strategy embedded within the landscape design is the provision of buffers between built development and surrounding rural land. In most locations, the site boundary treatment includes a combination of planting buffers and physical separation features such as stormwater channels, roading corridors, or open space. These features collectively provide areas of low-flammability planting, wet zones, or non-vegetated separation that can assist in containing wildfire spread and reducing exposure of buildings to radiant heat and direct flame contact.

In addition, the Kawarau River forms a significant physical separation corridor along the southern edge of the wider landscape context, which provides a natural fire break to wildfire spread from the south.

Where appropriate, ignition risk on Morven Hill may also be managed through operational controls such as restricting public access during periods of high fire danger, if required. This would provide an additional mechanism to reduce ignition sources during peak risk periods.

Emergency Access and Firefighting Water Supply

The development roading layout has been designed to support emergency response access and will be constructed in accordance with relevant Firefighting Code of Practice requirements. The internal road network provides continuous vehicle circulation routes, supporting firefighting access and evacuation capability where required.

A robust firefighting water supply system is proposed, including on-site water reservoirs to ensure a reliable volume of water is available within the development. The proposed water reticulation network will include fire hydrants spaced to achieve compliant coverage across the developed area, supporting firefighting operations throughout the site. Refer to the McKenzie and Co engineering drawings, 6000 series for details on the proposed water and firefighting reticulation layout.

Summary

Overall, the Ridgeburn development incorporates a combination of low to moderate flammability planting, irrigated reserve and boundary landscaping, ongoing vegetation maintenance provisions, managed grass fuel areas, and physical buffer features such as roads and stormwater corridors. These measures, together with compliant emergency access and a dedicated firefighting water supply network (including on-site storage and hydrant provision), will reduce the likelihood of wildfire ignition within the development, limit available fuel loads relative to the existing rural baseline, and improve containment and emergency response capability in the event of a wildfire.

Hazardous Activities and Industries List (HAIL) Data

Within the 122 Morven Ferry Road site, a portion of the land is identified as an unverified HAIL (Hazardous Activities and Industries List) site. HAIL is a national register of sites that may have experienced hazardous activities, such as fuel storage, chemical use, timber treatment, or industrial processes, which could result in contamination of soil or groundwater.

The term “unverified” indicates that no formal site investigation has been undertaken, and therefore the presence, type, and extent of any contamination are currently unknown. As such, the site may pose potential environmental, health, and safety risks if disturbed during subdivision or construction activities.

In accordance with the Resource Management Act 1991 and relevant QLDC planning requirements, any subdivision or development proposals for this parcel would require site investigation and, if necessary, remediation prior to land-use changes. Depending on the findings, mitigation measures could include soil testing, excavation, capping, or restrictions on certain land uses.

A Detailed Site investigation report by Spring Line has identified areas within the site that require a remedial action plan to set out the methodology and protocols for works within

these areas. The report concludes that these isolated areas can be managed appropriately and recommends that further investigation and the remedial action plan is prepared and approved prior to earthworks commencement. The recommendations within this report will be implemented on site prior to earthworks commencement.

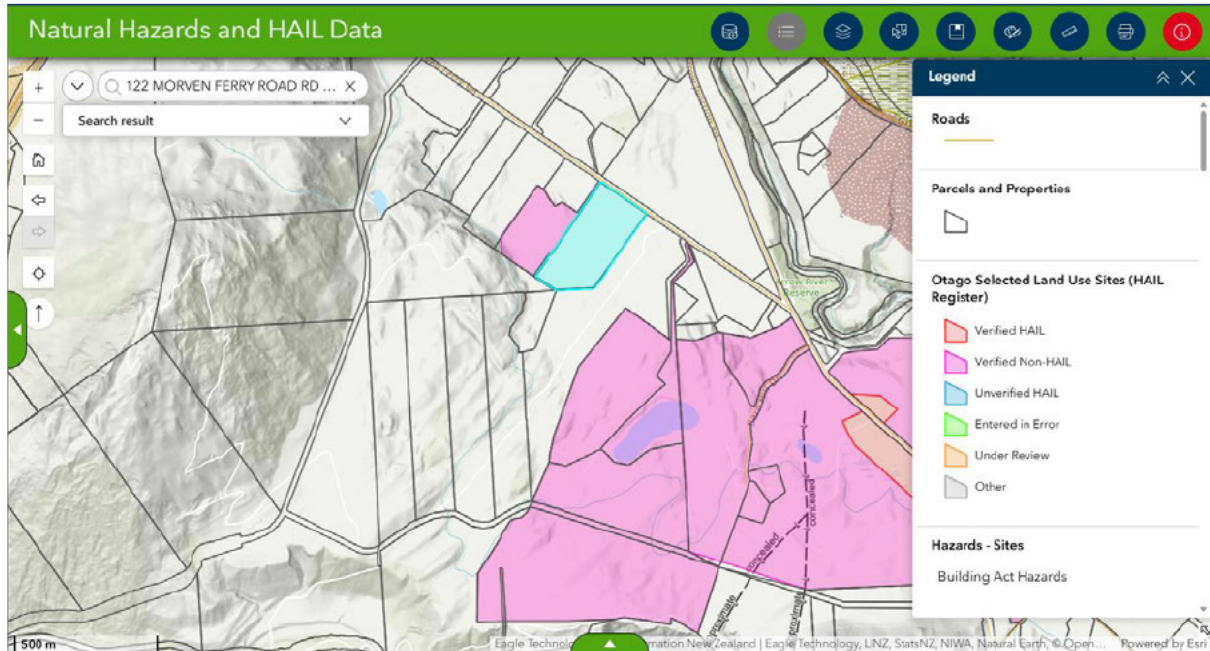


Figure 2: Unverified HAIL (Source: QLDC GIS - Map Navigator)

4.0 The Development Proposal Summary

The developer is seeking to subdivide the property into approximately 1,210 residential dwellings plus a commercial precinct.

Within the 1,210 dwellings, there is a component of higher-density / more affordable homes — for example about 180 homes targeted at one-bedroom through three-bedroom units. The commercial area would include seven commercial buildings comprising uses such as a community centre, supermarket, business centre, daycare facility.

The proposal also includes significant landscaping and ecological works, for example about 60 ha of native vegetation planting around the ridgeline (Morven Hill) and along the Kawarau River border; about 150,000 native plantings.

5.0 Roading and Site Access

5.1 Existing Access

Morven Ferry Road is described as a gravel rural road. The carriageway width narrows to approximately 3.7–4.0 m adjacent to the site.

5.2 Future Access

Morven Ferry Road will be upgraded to accommodate the expected traffic from the development and provide a safe and efficient connection for all users. The upgrade includes a 5.6 m carriageway, a 1 m shoulder, a shared pedestrian and cycle path, and a swale for stormwater management, resulting in a total road corridor width of 20.12 m. This configuration ensures sufficient space for vehicle movement, active transport, and safe drainage, while maintaining a pedestrian- and cyclist-friendly environment.

Within the development, the internal private roading network has been designed to provide hierarchical access and functionality, consistent with urban design and traffic engineering standards:

- **Collector Road (23 m width):** Designed to carry the majority of internal traffic efficiently, connecting local roads to Morven Ferry Road and other key access points. Its width allows for multiple lanes, on-street parking, pedestrian and cycle facilities, and landscaping.
- **Local Roads (ranging from 14.4 m to 19.3 m width):** These roads provide access to individual lots and are designed to balance traffic flow with residential amenity. The width allows for vehicular traffic, parking, footpaths, and landscaping, ensuring a safe and convenient environment for residents.
- **Laneways (minimum 8 m to 9.6 m width):** These are smaller roads primarily serving rear access to lots or secondary traffic, providing service access and reducing traffic on local roads.
- **Jointly Owned Access Lots (JOALs):** These private access ways service multiple lots within the development, providing safe and convenient access while reducing the need for additional public road infrastructure.

Overall, the road hierarchy and widths have been designed to support the development's anticipated traffic volumes, provide safe access for pedestrians and cyclists, and facilitate stormwater management, while integrating with the existing road network.

6.0 Site Clearance

Site clearance will occur as part of the subdivision. In areas required for the construction of new accessways serving the proposed development. These areas will be prepared for construction through the removal of obstacles, debris, and other unwanted materials. Preparation activities may include vegetation clearance, demolition of existing structures,

excavation and grading, removal of debris, utility disconnections, relocations or realignments, and soil testing and treatment.

7.0 Earthworks

Refer to the Environmental Management Plan, and the Construction Management Plan for details regarding Earthworks activities.

8.0 Stormwater Disposal

8.1 Existing Stormwater Features

There is no public stormwater infrastructure network near the site.

8.2 Proposed Stormwater Disposal

All stormwater management practices will be designed and implemented in accordance with QLDC COP and ORC Guidelines.

The specific detailed design of the private onsite stormwater management systems will be undertaken at the Building Consent stage by individual lot owners, in accordance with the approved subdivision conditions and consent notices.

8.2.1 Primary System

Stormwater runoff generated from rainfall events up to the 5% Annual Exceedance Probability (AEP) or 1-in-20-year event will be conveyed through a network of roadside swales, which provide both conveyance and preliminary treatment by promoting infiltration and sediment deposition.

Collected runoff will then discharge into a combination of a pipe network and vegetated swales before entering the wetland detention pond, which serves as the primary treatment and attenuation facility for the site. The pond is designed to detain and treat stormwater, allowing for the settlement of suspended solids and the removal of contaminants through wetland vegetation processes.

A spillway has been incorporated between the pond and the downstream conveyance swale to safely manage overflows during extreme storm events that exceed the primary design capacity.

The swale and pipe network have been designed to accommodate the 5% AEP peak flow rate, including allowances for climate change-adjusted rainfall intensities in accordance with current design standards.

For larger, less frequent storm events exceeding the 5% AEP (e.g., the 1% AEP or 1-in-100-year event), flows will be safely contained within the road corridors and conveyance swales, directing excess runoff to the wetland detention pond without causing adverse flooding or erosion impacts. Both the conveyance swale and the wetland detention pond have been designed to manage and convey flows associated with the 1% AEP event, ensuring system resilience and protection of downstream environments during major storm events. Refer to Drawing 4048-0-4000 series for the stormwater management methodology and layout, in **Appendix A**.

Pipe sizes will be designed using 12d Model, which integrates hydrology and hydraulics to ensure an efficient network. Design flows for each catchment will be calculated using Manning's equation for partially full pipes and Darcy–Weisbach/Colebrook–White for full pipes. Refer to preliminary Drawings 4048-0-4400 series, in **Appendix A** noting that pipe sizing will be confirmed in the detail design stage.

A new 1950mm diameter stormwater line is proposed to run from the site down Morven Ferry Road, and outlet into the Arrow river. This pipe has been up-sized to accommodate large stormwater flows and to direct flows into a safe location away from neighbouring properties. The outlet of this pipe will incorporate a velocity reduction such as a stilling manhole or other device to be designed during the detail design phase, which will reduce velocity and prevent erosion scour at the discharge point.

While the 1950mm diameter stormwater line can not convey all 1% AEP storm flows, it will significantly reduce the smaller flows from the site. It's expected that the large pipeline will be able to contain all events up to the 2 year. Preliminary calculations have identified that approximately 40% of the 10-year event will be able to managed within the piped network, with no allowance for blockage. The final pipe capacity and design will be confirmed in the detail design stage.

8.2.1 Operational Stormwater Infrastructure

The proposed stormwater system has been designed as an integrated primary and secondary network comprising interception works, conveyance infrastructure, attenuation basins, treatment devices, and controlled discharge structures. The operational intent of the system is to maintain or reduce peak discharge rates relative to pre-development conditions at all critical downstream interfaces, while also providing appropriate water quality treatment prior to discharge to sensitive receiving environments.

8.2.1 System Overview

The operational stormwater network consists of:

- Roadside swales providing initial conveyance and treatment
- A piped minor system designed for the 5% AEP (1-in-20-year) event
- A series of attenuation basins (Ponds 1–7) providing peak flow control
- An intercepting 1950 mm diameter stormwater main along Morven Ferry Road
- Defined secondary overland flow paths for events exceeding minor system capacity
- Energy dissipation structures at all controlled discharge points

The detailed hydraulic and hydrological performance of these components is assessed in the McKenzie and Co Stormwater Mitigation Report, including HEC-HMS and TUFLOW 2D HPC hydraulic modelling of pre- and post-development scenarios.

8.2.2 Operational Performance – Minor Events ($\leq$ 5% AEP)

For rainfall events up to the 5% AEP, runoff from developed areas will be collected via swales and piped infrastructure and conveyed to attenuation basins. These basins temporarily store stormwater and release it at controlled rates through engineered outlet structures.

The minor system has been designed to convey peak flows without surcharge of pipes or uncontrolled overland flooding. Climate change allowances have been incorporated into rainfall intensities consistent with current design standards.

8.2.3 Operational Performance – Major Events (1% AEP)

For major storm events up to the 1% AEP (100-year) event, the system operates in a combined piped and surface flow mode.

Key operational mechanisms include:

- Upstream diversion of Morven Ferry Road inflows via the 1950 mm intercepting main
- Temporary storage within attenuation basins to limit discharge to pre-development rates
- Controlled overflow structures directing excess flows along designated overland pathways
- Spillways located to replicate historic discharge points and prevent uncontrolled redirection of floodwaters

The Stormwater Mitigation Report confirms that peak discharge to 138 Morven Ferry Road is reduced relative to pre-development conditions for critical storm events

The secondary system ensures that during events exceeding minor design capacity, floodwaters remain within defined corridors such as roads and swales, and do not impact habitable floor levels.

8.2.4 Water Quality Treatment Operation

Operational treatment is provided through a treatment train approach comprising:

- Vegetated swales
- Raingardens and bioretention systems
- Constructed wetlands and detention basins
- Gross pollutant traps where required

These devices are sized in accordance with GD01 methodology and are designed to remove sediment, hydrocarbons, and associated contaminants prior to discharge. The first 20 mm of runoff is detained and released in a controlled manner to maintain stream hydrology and protect wetland environments, as detailed in the Stormwater Mitigation Report. Refer to section 8.2.2 for a more detailed overview on water quality treatment.

8.2.5 Discharge Control and Energy Dissipation

All major discharge points incorporate energy dissipation measures to prevent scour and erosion. The primary outlet to the Arrow River includes a stilling basin or equivalent device to reduce outlet velocity and manage concentrated pipe flows.

Combined discharge rates to the Arrow River are designed to match pre-development outflows, ensuring no increase in downstream flood risk.

8.2.6 Ownership, Operation and Maintenance

The stormwater infrastructure within the site will be owned and operated by the private infrastructure company established for the development. This entity will be responsible for:

- Routine inspection and maintenance of swales, pipes, and basins
- Sediment removal from treatment devices
- Vegetation management within wetlands and basins
- Inspection and maintenance of outlet control and energy dissipation structures
- Monitoring system performance during major rainfall events

Maintenance schedules will be developed at detailed design stage to ensure long-term hydraulic performance and treatment efficiency.

The stormwater infrastructure outside of the site will be vested to, owned and operated by Queenstown Lakes District Council. The Council will be responsible for:

- 1950 mm Stormwater main on the north side of Morven Ferry Road
- 1350 mm Stormwater main on the south side of Morven Ferry Road
- Associated structures to these lines; Manholes, Wingwalls, Scruffy Domes, Outlet Structures

The publicly vested infrastructure will be subject to detail design and QLDC approval via an Engineering Plan Approval Process. The sizes, lengths, alignments and associated structural details described above are indicative and may be revised to satisfy Council requirements during detailed design.

8.2.7 Residual Risk and System Resilience

The stormwater network has been designed in accordance with a risk-based approach consistent with the National Policy Statement for Natural Hazards. Residual risk associated with events exceeding the 1% AEP design threshold, or potential blockage scenarios, is managed through:

- Defined exceedance pathways
- Spillway redundancy
- Distributed attenuation storage
- Separation of habitable floor levels from predicted flood extents

8.2.2 Stormwater Quality

The proposed stormwater management system is designed to improve the quality of runoff prior to discharge to the receiving environment. Stormwater generated from impervious and disturbed surfaces will be conveyed through swales and a wetland detention pond, which provide treatment through a combination of sedimentation, filtration, and biological uptake.

The swales promote initial removal of coarse sediments and debris, while the wetland detention pond allows for further settling of fine particles and the uptake of nutrients such as nitrogen and phosphorus by aquatic vegetation. These processes collectively reduce the concentrations of suspended solids, heavy metals, and hydrocarbons commonly associated with construction and urban runoff.

The treatment system ensures that discharged stormwater meets Queenstown Lakes District Council (QLDC) and Otago Regional Council (ORC) water quality objectives, minimising adverse effects on downstream waterways and supporting the overall protection of aquatic and receiving environments.

Roof Runoff

The future roof area will be made of inert materials, and will be properly maintained, along with the gutters and downspouts, to safely discharge into the environment without the need for treatment.

8.2.3 Secondary System

The secondary stormwater system provides safe conveyance of runoff that exceeds the capacity of the primary (minor) system, such as during extreme rainfall events greater than the 5% Annual Exceedance Probability (AEP). It is designed to prevent flooding of habitable buildings and minimise damage to property and infrastructure by providing overland flow paths for excess stormwater.

Flows from major events will be directed along road corridors, berms, and conveyance swales, which are designed to safely contain and convey runoff towards the wetland detention pond and designated discharge points. The secondary system has been assessed for the 1% AEP (100-year) event, ensuring that floodwaters remain within controlled flow paths and do not adversely affect downstream properties or the receiving environment.

Freeboard

Residential lots and commercial buildings FFL have been designed to provide the required freeboard.

8.3 Flood Hazards

Flood hazards on the site have been assessed in relation to both minor and major storm events. The stormwater management system, including conveyance swales, pipe networks, and the wetland detention pond, is designed to safely convey runoff from events up to the 5% AEP, while flows from larger events (up to the 1% AEP) are safely managed within road corridors, overland flow paths, and conveyance swales.

This design approach mitigates the risk of flooding to buildings, infrastructure, and public areas, and ensures that any overflows are directed along controlled paths to the wetland detention pond. By providing both primary and secondary flow paths, the system mitigates potential flood hazards and protects downstream environments from erosion and uncontrolled discharges.

These hazards have been assessed in a separate report. Refer to MCCL Stormwater Servicing Report.

9.0 Wastewater

9.1 Existing Wastewater Infrastructure

There is no public wastewater infrastructure network available to serve the proposed subdivision.

9.2 Proposed Wastewater Disposal

As there is no existing public wastewater infrastructure network available to service the proposed subdivision, an onsite low-pressure wastewater system (LPS) has been designed to meet the development's needs.

The proposed LPS is intended to provide a reliable, low-maintenance, and environmentally responsible solution for wastewater collection and conveyance from both the residential and commercial lots within the subdivision.

A design flow rate of 250 litres per person per day (250 L/p/d) has been adopted for the residential area, consistent with the Queenstown Lakes District Council (QLDC) Code of Practice (COP). Watercare COP guidelines have been used for the commercial area. Detailed demand calculations supporting this design flow are included in **Appendix C**, and the low-pressure pipe sizing calculations prepared by EcoFlow are also appended for reference. Refer to **Table 4**.

Table 4 – Design Parameters

PARAMETERS	DESIGN ASSUMPTIONS –	DESIGN ASSUMPTIONS – OPTION 2
Residential:		
Design Occupancy	3 people / dwelling	QLDC COP
Design Flow	250 L/person/day	QLDC COP
Peaking Factor (Dilution/Infiltration)	1.2	QLDC COP
Peaking Factor (Dry Weather Diurnal)	2.5	QLDC COP
Commercial:		
Dry Retail Flow Allowance	1person/50m ² /65L/day	Watercare COP
Office Buildings	1person/15m ² /65L/day	Watercare COP

PARAMETERS	DESIGN ASSUMPTIONS –	DESIGN ASSUMPTIONS – OPTION 2
Wet Retail (Food & Beverage Retail)	15L/day/m ²	Watercare COP

Under the proposed system, each property will be equipped with its own pressure sewer grinder pump unit and boundary kit. Wastewater generated onsite will be collected and macerated by the grinder pump before being discharged via a small-diameter pressure sewer main. The system is designed such that each pump unit will discharge directly into the main low-pressure sewer network, which conveys flows to the wastewater treatment plant (WWTP) for final treatment and disposal.

This design approach provides several key benefits:

- Scalability and flexibility – each lot operates independently, allowing staged development and straightforward future expansion.
- Reduced excavation and installation costs – small-diameter pressure mains require less trenching and are more adaptable to undulating terrain.
- Reliability and resilience – individual grinder pump units ensure consistent performance even in areas where gravity systems are impractical.
- Environmental protection – all wastewater is contained within a sealed pressurised system, minimising the risk of leakage or infiltration.

The same low-pressure system design will also be applied to the commercial component of the development, ensuring consistent operation and maintenance requirements across the entire site.

Each commercial unit — including the gym, offices, daycare, supermarket (retail, storage, and office components), worker accommodation, retail tenancies, bar, farmhouse, shearing shed, and gatehouse — will be equipped with its own pump chamber system. Each chamber will incorporate 24-hour emergency storage capacity, allowing continued operation during power outages or system maintenance. Wastewater from these chambers will be conveyed via the low-pressure grinder pump network to the onsite WWTP for treatment and subsequent disposal to the land irrigation field.

Onsite Treatment System

A WWTP (Wastewater Treatment Plant) will be installed onsite, using a Sequencing Batch Reactor (SBR) system to treat all domestic wastewater from the development. The SBR

process treats sewage in controlled batches through aeration, biological digestion, and settling within the same tank, producing high-quality effluent suitable for land irrigation or controlled discharge. Compact and efficient, the SBR system allows full onsite treatment without reliance on council sewer networks and can be scaled to match development stages while meeting environmental and regulatory standards.

Refer to Drawing 4048-0-5000 series for the network layout and location of the WWTP, in Appendix A.

Wastewater Disposal

The treated effluent from the WWTP will be discharged to the land disposal field via a subsurface drip irrigation system. Wastewater from each dwelling will be conveyed to the plant through a grinder pump low-pressure sewer network, which macerates solids before pumping. Sludge generated within the SBR process will be periodically removed by a licensed contractor and disposed of offsite at an approved wastewater treatment facility.

10.0 Water Supply

10.1 Existing Water Supply Infrastructure

There is no public water infrastructure network near the site.

10.2 Proposed Water Supply

The proposed development's water supply will be sourced primarily from an onsite groundwater bore take, providing high-quality, reliable water for residential, commercial, and community uses. All sources will feed into a central storage and treatment facility with filtration, disinfection, and pressurised reticulation to service the entire site. This dual-source approach ensures a resilient, compliant, and sustainable water supply for the development.

The proposed development will include a central water treatment plant supplying potable water, supported by balancing and buffering tanks to manage peak flows and provide emergency reserves. A duty-assist/standby pumping configuration will ensure reliable distribution throughout the site, while a dedicated fire pump will maintain water availability for firefighting purposes. This combination of treatment, storage, and pumping infrastructure provides a resilient, compliant, and efficient water supply system for the residential, commercial, and community components of the development.

The layout of the water reticulation network, including the location of all major water devices, pumps, and balancing tanks infrastructure, is detailed in Drawing 4048-0-6000 series, included in Appendix A.

Water demand for the development has been calculated using 755 L/day per dwelling with a peaking factor of 2 in resulting in a peak daily demand of 1,510 L per dwelling. Water requirements for the commercial precinct have been determined using Watercare's Code of Practice, accounting for the specific usage of offices, gym, daycare, supermarket, bars, and other facilities. These estimates have informed the design of the treatment plant, storage, pumping systems, and reticulation network to ensure a reliable and resilient water supply for all residential, commercial, and community areas.

The total water demand for the proposed development, including 1,210 residential dwellings and the commercial precinct, has been used as the basis for hydraulic analysis. These demands — calculated using 755 L/day per dwelling with a peaking factor of 2 for residential lots and Watercare COP values for commercial areas — were incorporated into a hydraulic model of the network. The modelling was carried out using EPANET software for water distribution system analysis.

The water demand calculations for the proposed development have been based on the design flow allowances outlined in **Table 5**. These allowances specify the per-dwelling daily demand, peaking factors, and commercial usage rates applied to each type of facility within the development. **Table 5** provides the detailed parameters used to calculate total and peak water demand, which in turn informed the sizing of the treatment plant, storage and balancing tanks, pumps, and reticulation network. By referencing these standardized design flows, the hydraulic analysis ensures that the water supply system is adequately sized, reliable, and compliant with regulatory requirements.

It's noted that the water design volume of 755L per dwelling is below the 1,000L per dwelling advice from the QLDC engineering department. A reduced figure has been adopted for the design based on the following parameters;

- All residential lots will be metered, and as such any leaks or high demand will be quickly identified.
- All water use fittings will be WELS approved water efficient fittings. This will include Laundry, Kitchen, Bathrooms, Showers, etc
- No Irrigation will be permitted from the community water supply
- The adopted figure of 250L/ person/day is inline with other principalities around the country and exceeds design guidance from national guidelines such as TP58.
- The water supply will be controlled by a private infrastructure company who will employ management practice to monitor, maintain, enforce and guarantee that water demand does not exceed 750L per dwelling per day. It will also be proposed to have a consent notice applied to the titles ensuring that owners are notified of their obligations in perpetuity

Table 5 – Design Parameters

PARAMETERS	DESIGN ASSUMPTIONS –	DESIGN ASSUMPTIONS – OPTION 2
Residential:		
Design Flow	250 L/person/day	Engineering Judgement
Peaking Factor	2	QLDC COP
Commercial:		
Gym/Communal Hall	100L/p/day	Watercare COP
Office Buildings	65L/15m2/p/day	Watercare COP
Daycare (Children)	45L/child/day	Watercare COP
Daycare (Staff)	50L/employee/day	Watercare COP
Supermarket (Retail/Fresh Space)	15L/m2/day	Watercare COP
Supermarket (Storage)	50L/p/day	Watercare COP
Supermarket (Office)	65L/15m2/p/day	Watercare COP
Supermarket (Retail/Fresh Space)	15L/m2/day	Watercare COP
Worker/Visitor Accommodation	200L/room/day	Watercare COP
Retail	65L/50m2/p/day	Watercare COP
Bar/Pizzeria	15L/m2/day	Watercare COP

11.0 Utilities

11.1 Existing Utilities

Preliminary investigations indicate that electricity and telecommunications services are available in the vicinity of the site along Morven Ferry Road.

Overhead and underground power lines run adjacent to the site. These lines can be extended into the development to provide supply for residential, commercial, and community facilities. A reticulated electrical network will be designed onsite to ensure reliable distribution and capacity for future growth, including street lighting and high-demand commercial connections.

Fibre optic and copper telephone lines are present along the road frontage. Connections can be established to each lot and commercial unit via underground ducts or overhead lines, providing high-speed internet, telephone, and data services. The network will be designed to

meet current and anticipated future demand for residential, commercial, and emergency services.

The existing telecommunications infrastructure on Morven Hill will remain operational. No works are proposed to remove or alter this infrastructure. Access is currently provided via a track located within the south of the development site.

A proposed water treatment plant and reservoirs will be constructed near the development's access point to Morven Hill. The design of the water treatment plant maintains and improves maintenance access to the telecommunications infrastructure. The proposed works will not adversely affect the infrastructure or restrict access to it.

Located to the south of the site is Transpower's National Grid network, including associated pylons and high-voltage transmission lines. The proposed development does not seek to alter this network and will comply with all relevant Transpower setback requirements. The National Grid Yard setback from the District Plan has been applied and is shown on the engineering drawings.

Engagement with Transpower has commenced and will continue throughout the development programme. All proposed dwellings are well set back from the National Grid infrastructure. The closest proposed works in this area are the wastewater treatment plant and water bore locations, which can be designed to accommodate the required setback distances, once Transpower confirm the setback distance required.

Temporary works may be required near the infrastructure during construction, and a Close Approach Permit will be obtained from Transpower where necessary. Existing Transpower maintenance access will remain unchanged.

11.2 Proposed Utilities

Power and telephone services will be required for the new lot via underground connections.

We anticipate that suitable connections for both power and telecommunications (i.e., underground) can be made to service the future dwellings. However, this will be subject to detailed design and installation by each independent utility provider.

Early consultation has been sought with Aurora Energy, Chorus and Tuatahi First Fiber who confirm that the site can be services for both power and telecommunication services. Refer to Appendix E.

Overall, electricity and telecommunications are readily available nearby, and the development will extend these services onsite through reticulated distribution networks, ensuring reliable and compliant provision for all users.

11.3 Arrow Irrigation Scheme

The site is traversed by an existing open irrigation channel that forms part of the Arrow Irrigation Scheme. Consultation has been undertaken with Arrow Irrigation, who have provided guidance on how the scheme should be accommodated and maintained through the proposed development.

Arrow Irrigation has advised that, where practicable, the existing open channel should be piped to address health and safety considerations. They have also confirmed that the piped alignment should be realigned where appropriate to minimise the extent of pipework required.

A 4.0 m wide easement is proposed over the piped alignment to enable Arrow Irrigation to access and maintain the infrastructure.

Consultation remains ongoing, and relevant correspondence is included in the appendices.

12.0 Consultation and agreements with Queenstown-lakes District council.

12.1 Consultation

McKenzie and Co Consultants Ltd has undertaken consultation with officers of the Queenstown Lakes District Council (QLDC) during the development of the proposal. Several meetings were held with Council officers to discuss the overall scale of the development, the proposed staging, and the approach to infrastructure servicing, including roading, stormwater, wastewater, water supply, and other utilities.

Through these discussions, Council officers did not raise any specific concerns with the proposed development or the overall infrastructure strategy. The consultation process assisted in clarifying Council expectations and informing the development of the engineering design and supporting assessments.

It is acknowledged that, due to the scale and complexity of the proposal, Council may not have had the opportunity to fully assess all aspects of the development at the time of consultation. Accordingly, it was agreed that, wherever practicable, the proposed works will be designed and constructed to align with QLDC's Land Development and Subdivision Code of Practice and other relevant Council standards, noting that the majority of the proposed infrastructure will be privately owned and operated.

Ongoing engagement with QLDC is anticipated as the project progresses through detailed design, consenting, and construction, to ensure that Council requirements are appropriately addressed and that the development is delivered in a manner consistent with good engineering practice.

13.0 Infrastructure Funding

13.1 Infrastructure Funding

All public and private infrastructure required to service the proposed development will be provided at the Applicant's cost. No financial contribution, funding, or subsidy is sought from Queenstown Lakes District Council (QLDC) for the delivery of the proposed infrastructure works.

This includes, but is not limited to, the upgrading of Morven Ferry Road to accommodate the development, the provision of internal roading, and all associated stormwater, wastewater, water supply, and utility infrastructure. The development will be serviced by private water supply and wastewater treatment systems, with no reliance on existing or future Council reticulated services. Solid waste and recycling services will also be privately provided through contracted rubbish collection services.

A private infrastructure company will be established to own, operate, and maintain the development's infrastructure assets. This entity will be responsible for the ongoing operation, maintenance, renewal, and future upgrading of the infrastructure systems. Funding for these activities will be recovered through levies, user charges, and fees collected from residents, commercial occupants, or property owners within the development.

This funding model is intended to ensure that the infrastructure remains financially sustainable over the long term and that the costs associated with the development are borne by those who directly benefit from the infrastructure, rather than the wider community.

It is acknowledged that, should QLDC in the future request changes to the infrastructure arrangements — including potential upgrading, vesting, or modification of any infrastructure components — the funding and ownership arrangements may be revisited. Any such changes would be subject to further agreement between the Applicant and QLDC and addressed through the appropriate statutory and contractual processes.

14.0 Conclusion

McKenzie and Co Consultants Ltd have undertaken the relevant assessments and confirm that, with the implementation of the engineering infrastructure recommended in this report,

the proposed development can proceed with minimal environmental effects and negligible impacts on neighbouring properties and environment.

The proposed stormwater, wastewater, and water supply systems are appropriately designed and are sufficient to service the development.

All stormwater from buildings and impervious surfaces will be collected, conveyed, and managed in accordance with the methods outlined above. The stormwater system is to be installed prior to the construction of any buildings and will be confirmed at the building consent stage.

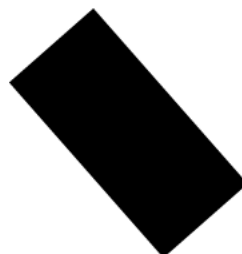
Stormwater mitigation measures have been incorporated into the stormwater design to ensure that effective mitigation is in place, enabling the site to maintain pre-development discharge rates despite the increase in impervious area.

All future buildings must be designed and positioned to accommodate the full suite of required services, including:

- (a) stormwater collection, treatment, and disposal;
- (b) wastewater collection, treatment, and disposal;
- (c) water supply;
- (d) electricity supply; and
- (e) telecommunications.

In conclusion, the assessments undertaken demonstrate that the proposed development can be fully and appropriately serviced by the infrastructure outlined in this report.

Appendix A – Engineering Drawings (Bound Separately)



Appendix B – Stormwater Calculations

(Refer to Mckenzie and Co Stormwater Mitigation Report)

Appendix C – Wastewater Calculations

WASTEWATER DEMAND CALCULATIONS																			
PROJECT NAME:		Ridgeburn		 MCKENZIE & CO.								REVISION:		CREATED BY:		CHECK BY:		DATE:	
PROJECT NUMBER:		4048										E		SL		SL		18/12/2025	
												F		SL		SL		22/12/2025	
Type of Wastewater system		Low Pressure Sewer										G		SL		SL		23/01/2026	
				H		SL		SL		23/02/2026									
LANDUSE AREA		Gross Floor Area (m2)	Net Floor Area (m2)	No. Personnel		Table 6.1.b - Other facility design occupancy allowances & Table 6.1.c – Wet and dry commercial assumed design allowances, Watercare COP		Average Dry Weather Flow (L/p/d)	Occupancy per residence	No. Lots/Dwellings	Population	Average Dry Weather Flow - ADWF (m3/d)	Dilution/Infiltratio Peak Factor (QLDC pressure sewer system design standards 6.4)	Wet Weather Flow WWF (m3/d)	Dry weather diurnal Peaking factor (QLDC COP, 5.3.5.1)	Peak Wet Weather Flow - PWWF (l/s)			
Residential																			
QLDC Land Dev CoP 5.3.5.1								250	3	1,210	3,630	908	1.2	1,089	2.5	26.26			
Commercial		GFA																	
Gym / Community Hall		450	2120	50	People	100	L/p/d					5	1.2	6	2.5	0.14			
Office		2650		100	Children	65	L/15m2/p/d					9	1.2	11.02	2.5	0.27			
Daycare		750				45	L/p/d				5	1.2	5.4	2.5	0.13				
						50	L/p/d				0.65	1.2	0.78	2.5	0.02				
Supermarket		2500	2000	13	Staff	15	L/m2/d					30	1.2	36	2.5	0.87			
		850	240	5	Staff	50	L/p/d					0.25	1.2	0.3	2.5	0.01			
		300		202	Studio rooms staff	65	L/15m2/p/d					1.04	1.2	1.248	2.5	0.03			
Worker / Visitor Accomodation						180	L/room/day				36.36	1.2	43.632	2.5	1.05				
						50	L/p/d				0.5	2.2	1.1	3.5	0.02				
Retail		450	360	10		65	L/50m2/p/d					0.47	1.2	0.5616	2.5	0.01			
Bar / Pizzeria (Shearing Shed)		300	240			15	L/m2/d					3.6	1.2	4.32	2.5	0.10			
Other																			
Farm House Play Area (Neighbourhood A)		170	4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use			900	L					0.9	1.2	1.1	2.5	0.03			
Hay Barn Bike Facilities (Neighbourhood J)		224	4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use			900	L					0.9	1.2	1.1	2.5	0.03			
Community Park Changing Rooms (Neighbourhood D)		70	4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use			2000	L					2	1.2	2.4	2.5	0.06			
Water and Wastewater Treatment Plant				1	Staff	50	L/p/d					0.05	1.2	0.1	2.5	0.00			
Total												1,003		1,204		29.0			

Appendix D – Water Supply Calculations

WATER DEMAND CALCULATIONS



PROJECT NAME:	Ridgeburn	REVISION:	CREATED BY:	CHECK BY:	DATE:
PROJECT NUMBER:	4048	F	SL	SL	23/01/2026
		G	SL	SL	17/02/2026
		H	SL	SL	23/02/2026
		D	SL	SL	18/12/2025
		E	SL	SL	22/12/2025

LANDUSE AREA		Gross Floor Area (m2)	Net Floor Area (m2)	No. Personnel		Table 6.1.b - Other facility design occupancy allowances & Table 6.1.c – Wet and dry commercial assumed design allowances, Watercare COP	Daily Consumption (L/dwelling/day)	No. Lots/Dwellings	Daily Demand (m3/d)	Peak Factor	Peak Daily Demand (m3/d)
Residential											
Meterd water Supply, WELS fitting, Water Reduction Fittings, No irrigation. TP58 Values, Managed by Water supply company							750	1,210	908	2	1,815
Commercial		GFA									
Gym / Community Hall		450		50	People	100 L/p/d			5	2.0	10.0
Office		2650	2120			65 L/15m2/p/d			9	2.0	18.4
Daycare		750		100	Children	45 L/p/d			5	2.0	9.0
				13	Staff	50 L/p/d			0.65	2.0	1.3
Supermarket	Retail/fresh space	2500	2000			15 L/m2/d			30	2.0	60.0
	Storage	850		5	Staff	50 L/p/d			0.25	2.0	
	Office	300	240			65 L/15m2/p/d			1	2.0	2.1
Worker / Visitor Accomodation				202	Studio rooms	180 L/room/day			36	2.0	72.7
				10	Staff	50 L/p/d			1	3.0	1.5
Retail		450	360			65 L/50m2/p/d			0.47	2.0	0.9
Bar / Pizzeria (Shearing Shed)		300	240			15 L/m2/d			4	2.0	7.2
Other											
Farm House Play Area (Neighbourhood A)	No personnel, just 2 WCs and a drinking tap/sink, 170m2 GFA	170	4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use			900 L			0.9	2.0	1.8
Hay Barn Bike Facilities (Neighbourhood J)	2 WCS and a drinking tap/sink, 224m2 GFA	224	4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use			900 L			0.9	2.0	1.8
Community Park Changing Rooms (Neighbourhood D)	5 WCS and a drinking tap/sink, 70m2 GFA	70	4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use			2000 L			2	2.0	4.0
Water and Wastewater Treatment Plant	Occasional user - not permament			1	Staff	50 L/p/d			0.05	2.0	0.1
Total									1,003		2,006

Appendix E

AURORA ENERGY LIMITED

PO Box 5140, Dunedin 9058

PH 0800 22 00 05

WEB www.auroraenergy.co.nz



14/04/2025

REF: 125943

Rob Stewart

McKenzie & Co. Consultants

[REDACTED] t@McKenzieand [REDACTED]

Dear Rob,

ELECTRICITY SUPPLY AVAILABILITY FOR A PROPOSED NEW DEVELOPMENT - NEW LARGE COMPLEX

122 MORVEN FERRY ROAD, ARROW JUNCTION 9371 LOT 2 DP 601937 .

Thank you for your inquiry outlining the above proposed development.

Subject to technical, legal and commercial requirements, Aurora Energy can make a Point of Supply¹ (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.

Yours sincerely

A handwritten signature in black ink, appearing to read "Niel Frear".

Niel Frear

CUSTOMER INITIATED WORKS MANAGER

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

From: Margaret Singh [REDACTED]
Sent: Tuesday, 15 April 2025 4:19 pm
To: Sam Hiha
Cc: James Kitchen
Subject: RE: CONFIDENTIAL: Proposed Doonholme Development

Hi Sam,

Our network planner and scoper for the Queenstown region have come back to me today. Chorus will be able to extend their network to provide connection availability. However, please note that this undertaking would of course be subject to Chorus understanding the final total property connections that we would be providing, roll-out of property releases/dates and what investment may or may not be required from yourselves and Chorus to deliver the infrastructure to and throughout the site in as seamless and practical way as possible.

The cost can only be finalised at the time that you are ready to proceed.

Thanks, and let me know should you require further information.

Kind Regards,

Margaret Singh | Group Account Manager

CHORUS | T | M +6421560418

From: Sam Hiha [REDACTED]
Sent: Friday, 11 April 2025 11:36 am
To: Margaret Singh [REDACTED]
Cc: James Kitchen [REDACTED]
Subject: RE: CONFIDENTIAL: Proposed Doonholme Development

You don't often get email from sam.hiha@mckenzieandco.co.nz. [Learn why this is important](#)

Amazing, thank you Margaret

Sam Hiha
Intermediate Civil Engineer
+64 21 340 702



DEVELOPING GREAT PLACES AND PEOPLE

Level 6, 41 Shortland Street Auckland 1010
PO Box 259309, Botany 2163





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From: Margaret Singh [REDACTED]
Sent: Friday, 11 April 2025 11:35 am
To: Sam Hiha [REDACTED]
Cc: James Kitchen [REDACTED]
Subject: RE: CONFIDENTIAL: Proposed Doonholme Development

Hi Sam,

Rest assured; Information is always kept confidential.
I am consulting with the area planner and scoper for this project and will be in touch early next week with capacity confirmation and letter.

Thanks, and regards,

Margaret Singh | Group Account Manager

CHORUS ITM [REDACTED]

From: Sam Hiha [REDACTED]
Sent: Friday, 11 April 2025 11:29 am
To: Margaret Singh [REDACTED]
[REDACTED]
Subject: CONFIDENTIAL: Proposed Doonholme Development

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Kia ora Margaret,

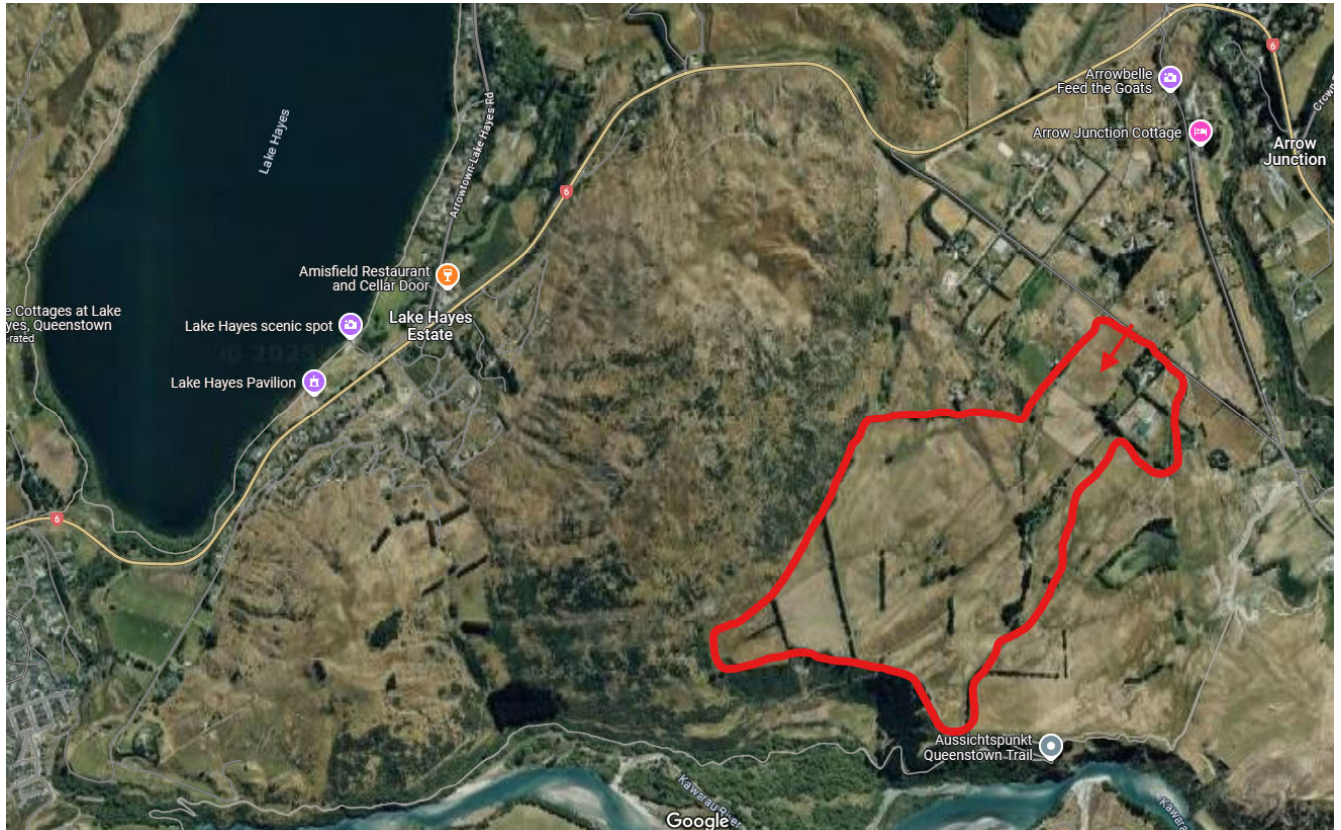
Could you please treat the following details in full confidentiality due to commercial sensitivity.

We are designing a proposed development in the Queenstown area east of Lake Hayes and are enquiring about the potential for Fibre connection to the area.

The site location is as per the screenshot below, with access to the development off of Morven Ferry Road. The proposed development will be approximately 1200 residential lots, 4ha commercial area, and Water and Wastewater treatment plants.

Can you please provide a letter confirming that there is the ability to provide services to this development, or potential upgrades required to provide this?

I look forward to hearing from you.



Thanks,

Sam Hiha

Intermediate Civil Engineer

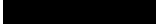
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11/04/2025

CONDITIONAL ACCEPTANCE BY TUATAHI FIRST FIBRE LIMITED AS TELECOMMUNICATIONS OPERATOR

Development: Doonholme Development
Location: Morven Ferry Road, Arrow Junction

1. Tuatahi First Fibre Limited (TFF) confirms that a TFF telecommunications connection will be made available for each lot in the development, **providing the developer was to sign a TFF Installation Agreement**. Upon approval of this agreement, TFF will undertake to become the telecommunications operator of the telecommunications reticulation in the proposed development (the "**Subdivision**"), to provide network connections to the lots, in the Subdivision (the "**Reticulation**").
2. The Reticulation will be installed in accordance with:
 - (a) the requirements and standards set by the Queenstown Lakes District Council and advised to TFF via the Council's website; and
 - (b) the requirements of the Telecommunications Act 2001 and all other applicable laws, regulations and codes (as amended).
3. The Reticulation will be installed by our preferred provider to TFF's satisfaction.
4. TFF will be the owner, operator and maintainer of the Reticulation.
5. One or more retail service providers will be available to supply telecommunications services over the completed Reticulation when service is available, provided that TFF shall not be responsible if the retail service provider's offer to supply such telecommunications services or the number of such providers varies from time to time.

SIGNED for and on behalf of **TUATAHI FIRST FIBRE LIMITED** by:Signature: *J Campbell*Name: Jonathan Campbell
Business Development Manager

Scott Lamason

From: Chris Hansen [REDACTED]
Sent: Monday, 1 December 2025 8:07 am
To: Scott Lamason; [REDACTED]
Cc: Nigel Black
Subject: RE: [#4048-0] Arrow Irrigation + Ridgeburn
Attachments: 20251127080613299.pdf

Hi Scott,

Some comments below.

Regards,

Chris Hansen

From: Scott Lamason [REDACTED]
Sent: Tuesday, 25 November 2025 4:02 pm
To: Chris Hansen [REDACTED]
Cc: Nigel Black <[REDACTED]>
[REDACTED]

Hi Chris, Tony and Nigel,

Thanks for your advice and assistance over the irrigation channel last week.

Can you please confirm the flow rate of water coming into the channel through our site? We need to add this into our flood mapping software.

We discussed piping the irrigation channel through our site, as I understand it, you wish to reduce liability and risks of having the channel near more population. **The residential activity and the open race are not compatible.**

Were you anticipating that we would pipe the entire channel through our site, or can we pipe sections that are more problematic/risky? Preferably all the race. **From the concept drawing, it doesn't look like there are many locations where there is not a risk of either reverse sensitivity or hazard?**

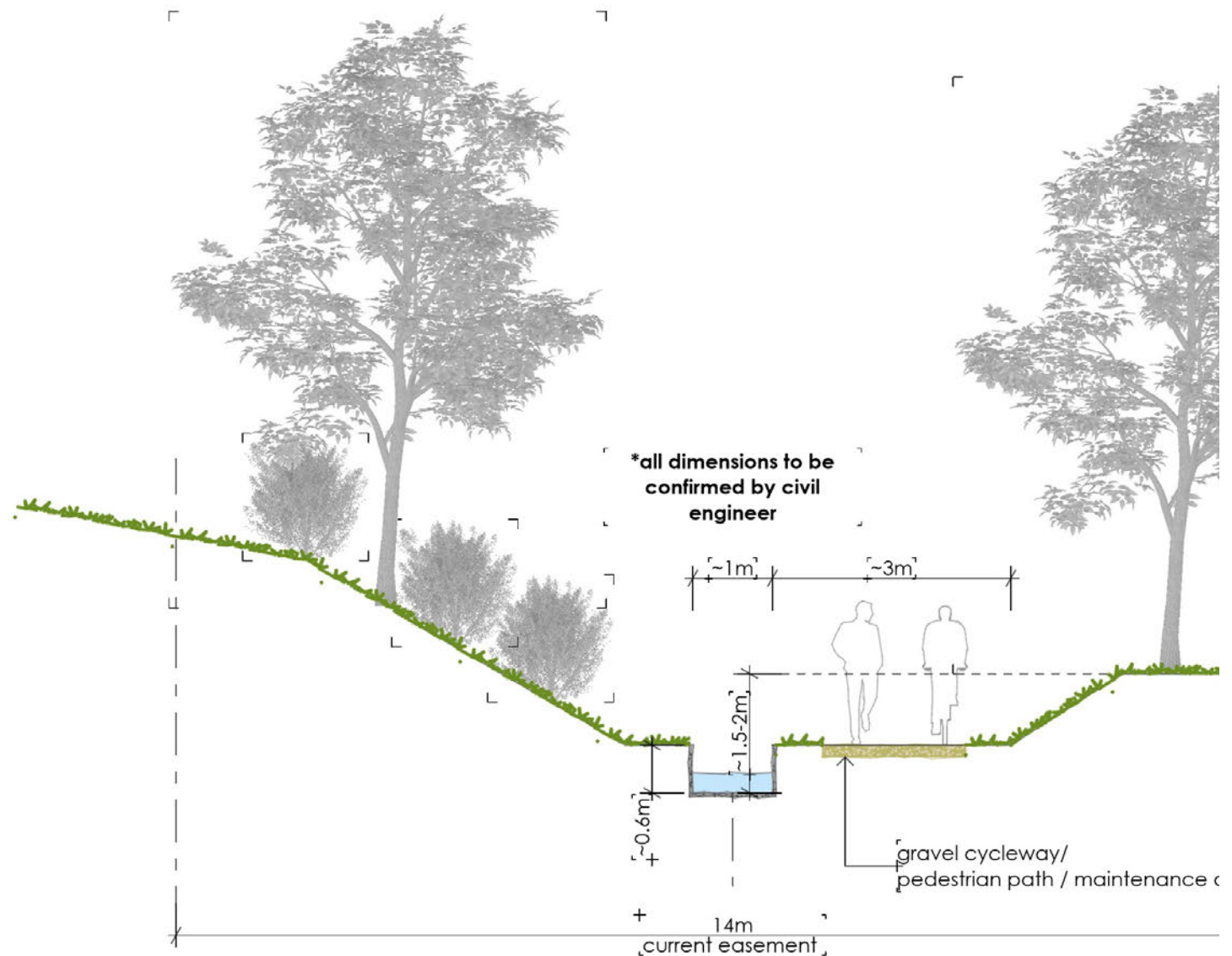
The architect is really interested in keeping some of the irrigation channel, and potentially widening the area around it, to create a feature that speaks to the history of the land – is this something we can work with you on? **If the race was no longer an Arrow Irrigation asset, then it would be at your discretion how it is used.**

I think we would be able to landscape the surrounding areas to prevent spillover into property, provide access for maintenance, shape any flood waters away from property etc. (backed up by calculations, engineering reporting, detailed plans etc) **That may be possible, but it would not be an AIC asset.**

If you think we can work to some agreement on this, could we have another catch up to discuss what you need to see to be able to reduce or remove your risks? (or is this a no go?)

See attached scribbles as perhaps an idea. The line marked pink could be an inverted syphon. AIC have several in their network this would reduce the amount of open race by circa 700m – coloured green. That part of the race can be fed out of the property quota but would no longer be AIC network and you have the flexibility to use how you see fit. The removal of the race in that location may allow more freedom for the subdivision design. There is bound to be other options but trying to look at ways of minimizing disruption to both parties.

Thanks,



Scott Lamason BEngTech (Civil)
Design Lead

021 221 0412

Level 6, 41 Shortland Street, Auckland 1010
PO Box 259309, Botany 2163
09 320 5707

MCKENZIE & CO.

mckenzieandco.co.nz

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From: Chris Hansen [REDACTED]

Sent: Friday, November 21, 2025 3:51 PM

To: Scott Lamason [REDACTED]

Cc: Nigel Black <[REDACTED]>

Hi Scott,

Some comments below.

Regards,

Chris Hansen

From: Scott Lamason [REDACTED]

Sent: Friday, 21 November 2025 3:13 pm

To: Chris Hansen [REDACTED]

Subject: [#4048-0] Arrow Irrigation + Ridgeburn

Hi Chirs and Tony,

Thank you for your time today, it was great to hear about your irrigation scheme.

Couple of quick follow up questions that came to me after the meeting,

Would you have any estimate for how much water will enter our site from the scheme? Attached is plans to show the Command Area of the scheme (I note they are a little out of date). 800l/s can be taken out of the Arrow River up the Arrow Gorge. The flow is then split just to the west of Arrowtown. It distributes water roughly in catchments each side of Lake Hayes. The network has two main by-wash locations, one being the Frankton Arm and the other being the Kawarau River just down stream of Ridgeburn. It might therefore be a reasonable assumption to say that half the flow could be directed through Ridgeburn site out to the by-wash. Nigel might have some more empirical data, but this might be OK to begin with.

Could you also please confirm the quota allocated to our block? I'll ask Tony to confirm current quota, recall it might be circa 20ha. For clarity, the quota is split into 1 hectare portions. Each hectare is 900mm depth of water (9 million litres) over the irrigation season being 272 days from 1st Sep. through 31st May. Or 0.383l/s/ha. 180,000m³ per season for 20ha.

I think you mentioned that you don't irrigate during winter, is that because of lack of demand or supply?
Do you want more water?

It is due to the climate being too cold for vegetation growth. No purpose for running the scheme, nothing grows, its frozen a good part of the time.

Extra water is always helpful; however, it would need to be provided at the top of the scheme to service our customers. The race network is gravity fed from the Arrow River Gorge. Water sourced at or near Ridgeburn is near the end of one of the branches of the scheme (Junction Race), so almost all customers are upstream so would need pumped a considerable distance. We don't expect it would be cost effective to do so.

The volume constraint is really based on the time of year that the water is needed, which is peak times, Jan & Feb. Moving forward, storage is being promoted to the shareholders as a better solution and using the water we already have more efficiently.

Thanks,

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