Proposed Zoning at Brackens Ridge, Arrowtown South

Urban Design Assessment



Prepared for Mt Soho Trust by:

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urban design ltd

November

2026

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Cover image: Aerial from QLDC GIS website

1 Introduction

1.1 RA Skidmore Urban Design Ltd. has been requested by J. Carter Planning Ltd., on behalf of Mt Soho Trust, to provide urban design advice in relation to a proposal to rezone land at Brackens Ridge (the "Site"), a site located adjacent to the southern edge of the Arrowtown township. A special zone, the Arrowtown South Special Zone currently applies to the Site. The zone enables 17 rural lifestyle lots, with a minimum lots size of 1,500m² and an average of at least 4,000m². It is proposed to rezone the land Lower Density Suburban Residential.

1.2 The purpose of this report is to inform and support Mt Soho Trust's submission on the private plan change request by Arrowsouth Properties Limited to rezone land immediately to the north of the Site from the current Arrowtown South Special Zone to Suburban Residential Zone (the "PPC"). I have reviewed the PPC documents. I note that the Landscape Assessment report by Rough Milne Mitchell Landscape Architects (24th February 2026) includes a graphic supplement with some helpful maps and images referred to in this report (the "RMM graphic supplement").

1.3 In 2009 I was engaged by Mt Soho Trust to provide urban design advice in relation to a proposed Plan Change to rezone an area, including the subject land (the "Site"), for residential use. At that time, I prepared the 'Arrowtown Southern Extension – Urban Design Assessment' (September 2009). The Plan Change request progressed through the Environment Court with the final outcome being the current zoning.

1.4 I have visited the site and surrounding environs on numerous occasions, the most recent being the 26th January 2026.

1.5 The following report is structured in three sections. In the first, I provide an overview of key findings from my 2009 report. I then set out key features in the surrounding environment that have changed since that assessment was carried out. Finally, I draw conclusions about the appropriateness of the land to accommodate a residential expansion of the Arrowtown settlement as proposed.

2 2009 Urban Design Assessment

2.1 My 2009 Urban Design Assessment (the "UDA") was guided by a number of statutory and non-statutory documents that were relevant at that time, including:

- The Queenstown-Lakes District Partially Operative District Plan (2007);
- The Growth Management Strategy for the Queenstown Lakes District (2007);

- The NZ Urban Design Protocol;
- The Draft Queenstown Lakes District Urban Design Strategy (April 2009); and
- The Arrowtown Design Guidelines (2006).

2.2 Section 3 of the report set out an analysis of the urban structure of Arrowtown. The analysis identified: the historic origins of the settlement to service the gold mining activity in the area; the relationship of the settlement to its dramatic natural setting and the way this provides containment to the settlement; and the way the settlement has grown and evolved over time.

2.3 A summary of the analysis identified the key structuring elements of Arrowtown as being:

- Containment and visual connection to natural landforms, particularly Arrow River and the ranges to the north and east;
- Golf course open spaces containing settlement to the south;
- Heart of the settlement is the commercial centre focussed on Buckingham Street;
- Main entry points to the settlement are from Malaghans Road (west), Arrowtown-Lake Hayes Road (southwest), and Centennial Avenue (southeast);
- The ‘old town’ residential neighbourhoods have a built pattern that strongly reflects the identified ‘Arrowtown character’;
- The roading pattern of the ‘new town’ departs from the connected grid network found in the ‘old town’; and
- Social infrastructure is concentrated in the commercial centre and ‘old town’ with the exception of the Primary School, located on Centennial Avenue.

2.4 Section 4 of the report provided a description of the Site and its surrounding context. Key features of the Site included: the undulating topography and location of the McDonnell escarpment and its relationship to a watercourse at its base; large mature trees located around existing dwellings to the south of the Site; heritage buildings including the Muter Farm homestead (Category 3 protection, Item 126) and the associated stone stable.

2.5 This section also described the pattern of surrounding land use and development, including: the residential neighbourhood to the north; the Arrowtown Golf Course to the

east and south; and a small cluster of established rural residential sites to the north of the Golf Course.

2.6 From a consideration of the existing urban structure and settlement pattern of Arrowtown, and the characteristics of the subject site, my assessment found that the area provides a logical extension to the settlement. Key reasons included:

- The adjoining golf courses provide a logical open space boundary to the settlement;
- McDonnell Road and Centennial Avenue create clear boundaries and accessways into the site and the established town;
- Development already extends along the terrace and McDonnell Road escarpment;
- Appropriate development of the land has the potential to enhance the arrival experience when entering Arrowtown from the south via Centennial Avenue;
- The undulating nature of the land provides the potential for the creation of a high amenity living environment; and
- The opportunity exists to enhance the visual quality and amenity of the stream that runs through the area.

2.7 I concluded that the proposed plan change area would provide a suitable southern 'book-end' to the settlement of Arrowtown, creating a clear urban edge that is defined by adjoining open spaces and main street axes. I noted that the detailed provisions of the zone would be important in determining how that growth is accommodated in a manner that respects the visual amenity of the area and the character values that contribute to Arrowtown's distinct sense of place.

2.8 Section 5 of the report identified key character elements of Arrowtown, particularly in relation to: street configuration and character; vegetation; and the pattern of built development.

2.9 From the analysis set out in the preceding sections, Section 6 of the report identified a number of urban design principles for the Plan Change with recommendations about District Plan methods to achieve those principles. The urban design principles were:

- Create a distinctive entrance to Arrowtown that contributes to the collective character of the settlement;
- Respect topography;
- Capitalise on views to the surrounding landscape;

- Enhance natural watercourse as a structuring element and amenity feature;
- Create a high amenity public realm that reflects the character of Arrowtown;
- Provide good connectivity;
- Create a strong vegetative framework; and
- Enable building intensity, scale, and form that provides good residential amenity and responds to key character features of Arrowtown.

2.10 The conclusion section of my report highlighted that Arrowtown is a small settlement that sits within a spectacular mountain setting. From its inception as a gold mining settlement, the town has evolved to meet the changing needs and preferences of its residents. Arrowtown is a distinctive place. In particular, the older core of the town exhibits a range of features that creates a distinctive character that is highly valued by both residents and visitors.

2.11 I concluded that, in terms of urban structure, the proposal to provide for limited expansion of the settlement to the south is appropriate. I considered the proposed Plan Change area to be well defined and contained by the surrounding open space features of the golf course. The area is well connected to the core of the settlement by Centennial Drive and McDonnell Road; and I noted the opportunity to improve the arrival experience when entering Arrowtown via Centennial Drive.

2.12 I also noted the opportunity to promote a sustainable pattern of development by:

- Providing a defined urban boundary;
- Optimising urban resources;
- Reinforcing the scale and character of development in the existing settlement;
- Achieving cohesive, integrated urban areas; and
- Mitigating the adverse effects of development.

3 Changes to the Context for Considering Proposal

3.1 In considering the potential southern expansion of Arrowtown, the Environment Court determined that the Urban Growth Boundary (“the UGB”) should move south, but only for a short distance along McDonnell Road. That area has now been developed in accordance with the zoning (Stage 1 of the Arrowsouth Properties land). The Court determined that the remainder of the Arrowtown South area should provide a rural

lifestyle density. The operative District Plan applies the Arrowtown South Special Zone to the southern portion of the Arrowsouth land and to the Site with an accompanying structure plan that limits the total number of dwellings on the Site to 17.

3.2 I remain of the opinion that, along with the southern portion of the Arrowsouth land, the Site is well located to accommodate residential expansion of Arrowtown. Since 2009 and the Environment Court's determination, there have been a number of changes to the planning context and the surrounding physical environment that I consider lend further support to accommodating an increased density of residential activity on the Site.

3.3 A summary of key factors affecting my assessment is set out below.

Changes to the District Plan

3.4 Through the District Plan review, there has been a number of changes to the zoning pattern in the area. This includes:

1) The Arrowtown Golf Course is now zoned Community Purpose;

2) An area to the south of the Residential Arrowtown Historic zone has been zoned Medium Density Residential;

3) Land off Jopp St has been included within the UGB and zoned Low Density Suburban Residential; and

4) Land on the western side of McDonnell Road comprises a mix of zones including Wakatipu Basin Rural Amenity Zone (with a minimum lot size of 80 hectares); Wakatipu Basin Lifestyle Precinct; and the Hills Resort Zone.

3.5 The Hills Resort Zone extends over an extensive area between McDonnell Road and Arrowtown-Lake Hayes Road. The purpose of the zone is described as enabling high quality on-site visitor activities and resort facilities in a golf course setting and with a predominance of open space. The zone provides for golf courses, a sculpture park, walkways and cycleway, visitor industry activities, residential activities, and a small-scale commercial centre. A range of forms of visitor accommodation are anticipated in the zone, including boutique hotels/lodges with associated visitor amenities (including cafés and restaurants and facilities for health and wellness) and units that are primarily available for short-term visitor stays.

Consents and resulting Development in Area

3.6 Tewa Banks, a master planned neighbourhood, has recently been developed (still under construction), off Jopp Street at the south-eastern end of Arrowtown. This southern extension is contained by the golf course to the west and south. The

neighbourhood has been delivered by the Queenstown Lakes Community Housing Trust. The masterplan provides for 68 new homes ranging in size from one to four bedrooms in a number of typologies (see **Figure 1** below).



Figure 1: Recent development at Tewa Banks

3.7 Since my original assessment, the Arrowtown Lifestyle Village has also established (on land zoned Rural Amenity). It is a retirement village located on the western side of McDonnell Road, opposite the golf course and to the south of the Site. The village has

been comprehensively designed and contains a residents' lodge and a collection of recently constructed, closely spaced, single-level villas (see **Figure 2** below). I understand that further villas are also planned.



Figure 2: Dwellings within Arrowtown Lifestyle Village

3.8 Within the Arrowtown South Special zone, the area of land zoned Low Density Residential adjacent to McDonnell Road has been developed in accordance with the zone provisions (Stage 1 of Arrowsouth Properties development) (see **Figure 3** below).

3.9 The stone stables associated with the Muter Farm homestead have been restored and adapted to accommodate a function centre that is now operating (see **Figure 4** below).

3.10 There has also been some residential expansion at the north-western margin of Arrowtown, off Manse Road, that is now well established.



Figure 3: Arrowsouth Stage 1 development



Figure 4: Function Centre in restored stables

Wakatipu Basin Land Use Planning Study

3.11 The Wakatipu Basin Land Use Planning Study (March 2017) (the "Basin Study") was commissioned by QLDC to respond to a number of queries by the Hearings Panel for the PDP. The assessment sought to identify the environmental characteristics and amenity values of the areas that should be maintained and enhanced, identify areas able to absorb development without adversely affecting the identified values, and identify those areas that are unable to absorb such development. Finally, it sought to determine whether there is any capacity for further development in the Wakatipu Basin floor and, if there is, where it should be located and what form it should take.

3.12 The report provides a comprehensive analysis of the character and amenity values of the Basin and the differences in different locations, with a strong emphasis on landscape values. The report mapped a series of Landscape Character Units ("LCU") across the Basin. The Site is located in LCU 24. The analysis found that this LCU had a high absorption capability and recommended the creation of a South Arrowtown Precinct. The recommendations for the Arrowtown Precinct noted that this may achieve a density of development at the same level as the PDP's Low or Medium Density Residential Zones (1:450m² and/or 1:250m²) and that the Precinct would require the integration of a clearly defensible urban edge, and assume an 'urban parkland' development character.

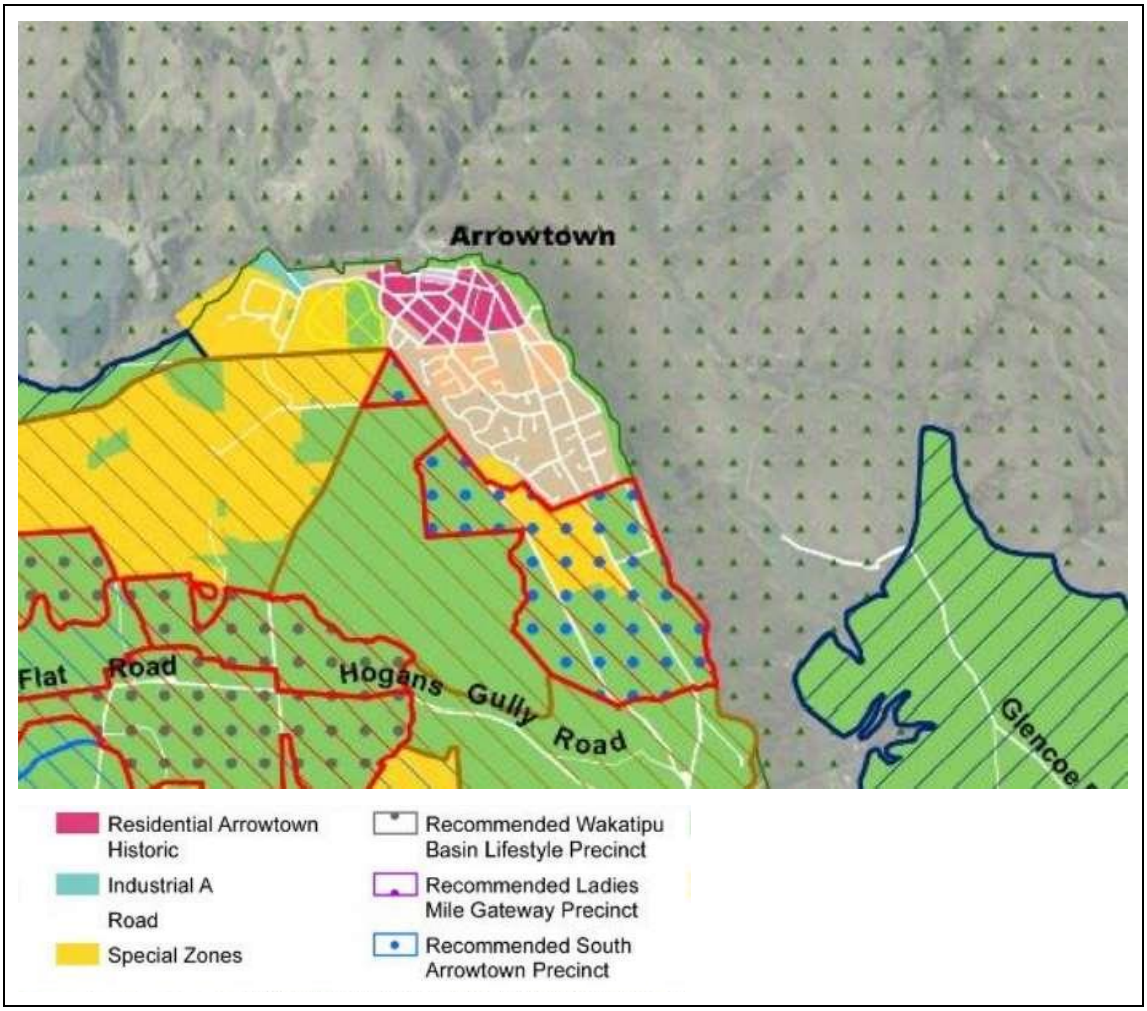


Figure 5: Excerpt from Figure 1 of the Basin Study

New Legislation – National Policy Statement on Urban Development

3.13 The National Policy Statement on Urban Development (NPS-UD) was released in July 2020. The NPS-UD seeks to ensure New Zealand's towns and cities are well-functioning urban environments that meet the changing needs of our diverse communities. It seeks to remove overly restrictive barriers to development to allow growth 'up' and 'out' in locations that have good access to existing services, public transport networks, and infrastructure.

3.14 Objective 4 of the NPS notes that "New Zealand's urban environments, including their amenity values, develop and change over time in response to the diverse and changing needs of people, communities and future generations."

Residential Demand – Growth in Area

3.15 In 2022 an Economics Assessment was prepared by Formative to inform a development proposal for the Site. The report found that the Queenstown Lakes District has experienced rapid population growth over the past 20 years. The assessment found that demand projections calculated by QLDC in 2018 underestimated the demand that has occurred. The report noted that while QLDC's updated Housing Capacity Assessment identified a housing shortage in Arrowtown, it still relied on demand projections that are lower than consented growth. The report considered that the shortage of dwelling supply in Arrowtown is likely to be significantly larger than is reported in the Council's latest housing assessment.

4 Urban Design Assessment – Appropriateness of Residential Expansion

4.1 It is proposed to extend the Suburban Residential Zone (as set out in the PDP) across the Site and include a structure plan to enable a suitable site-specific development response.

Efficiency of Settlement Growth

4.2 I consider the Site is well located to accommodate an expansion of residential use as proposed. In my opinion, the current zone provisions that enable development of the land to create a low-density, rural 'lifestyle' residential environment represents an inefficient use of the land resource. If developed in accordance with the zone provisions, the subdivision pattern would place constraints on creating a future suitable urban structure, if and when urban expansion of the settlement is deemed appropriate. In particular, the opportunity to achieve good street and pedestrian connectivity may be lost. Fragmented land tenure would also limit the potential to achieve a co-ordinated development response on the land.

Access to Local Employment, Services and Amenities

4.3 Arrowtown is a well-established settlement that contains a broad range of employment, services, and amenities. Many of these are concentrated in the town centre, while the wider settlement contains a full range of community amenities, including library, churches, school, and recreational opportunities and facilities. In particular, the

Arrowtown Primary School is located a short distance (around 350m from the northern end of the Site along Centennial Avenue) from the Site.

4.4 This access to a range of employment, services, and amenities has transport implications, with the opportunity for many daily trips to be made locally; and opportunities for walking and cycling local trips reducing potential traffic generation.

Residential Amenity

4.5 Easy access to a range of established employment, services, and amenities will contribute to the amenity of the neighbourhood for residents. Unlike many 'greenfield' residential development areas where these amenities can take a considerable time to establish, the Site is well located as an extension of a fully established urban environment, to take advantages of the amenity this provides. New residents can form ties with an established community network.

4.6 If zoned for residential use, the opportunity would exist to establish a public realm that provides good connectivity though the Site, both vehicular and active mode, including providing a connection between McDonnell Road and Centennial Avenue. This would improve connectivity for the wider Arrowtown settlement.

4.7 Responding to the characteristics and natural features of the land, it is recommended that the escarpment and wetland area at its base is kept free from development and is ecologically restored. The restored ponds at the base of the escarpment would provide a distinctive natural amenity for dwellings at their margins and the wider neighbourhood.

4.8 The considerably varied topography of the land provides the opportunity for house sites with differing aspects, outlook, and character.

4.9 The opportunity also exists through the subdivision process to respond to the historic heritage item on the site, the Muter Farm homestead (Category 3 protection, Item 126) and the associated restored stone stables, and integrate these features as part of the neighbourhood. With the establishment of a function venue at the stables, these elements of built heritage will provide a neighbourhood focus and contribute positively to the neighbourhood character.

4.10 Overall, I consider the Site will provide good amenity for residents and will contribute to the expansion of Arrowtown in a manner that provides a well-functioning urban environment.

Urban Boundary

4.11 As set out in Section 3 above, there have been a number of significant changes to the planning framework and physical environment since the Environment Court's

determinations in 2013 regarding the location of the urban growth boundary and the suitability of the Site to accommodate urban growth.

4.12 The more recent Basin Study was carried out with consideration of these relevant matters and identified the Site as being within an area that is suitable to accommodate urban growth. It recommended the creation of an Arrowtown Precinct, suggesting that it may be suitable to achieve a density of development at the same level as the PDP's Low or Medium Density Residential Zones (1:450m² and/or 1:250m²). From an urban design perspective, I agree with that recommendation.

4.13 The Basin Study recommended a fine-grained consideration of a range of matters to be progressed through a structure planning process. It identified the need to define a clearly defensible urban edge and assumed an 'urban parkland' type development character.

4.14 As noted above[1], in my opinion, if development were to proceed in accordance with the current Arrowtown South zone provisions, it would frustrate the ability to achieve the outcomes recommended in the Basin Study. The fragmentation of land would diminish the ability to take a comprehensive approach to development of the Site and may preclude the ability to achieve an appropriate urban structure.

4.15 In my assessment in 2009, I found that McDonnell Road and the Arrowtown Golf Course provided an edge that could define a defensible urban boundary. Since then, the context for considering an appropriate boundary to the settlement has changed with:

1) The establishment of the Arrowtown Lifestyle Village to the west of McDonnell Road;

2) Land off Jopp Street being developed for medium density residential use;

3) Creation of the Hills Resort Zone to the west of McDonnell Road, with a range of activities enabled; and

4) Zoning of the Arrowtown Golf course as Community Purpose.

4.16 In the context of this broader land-use pattern and the recommendations in the Basin Study, the Site would not form an edge to the Arrowtown settlement. In my opinion, development of this land would not restrict the ability to define a wider defensible urban edge as recommended in the Basin Study.

[1] Para. 4.2

Maintaining Arrowtown Character

4.17 As I identified in my 2009 assessment, Arrowtown has a distinctive character. Key features that contribute to the special character of the urban environment include: the settlement's relationship to its wider natural setting; the configuration and character of streets; vegetation; and the pattern of built development.

4.18 As defined in the Arrowtown Design Guidelines, expression of an historic character is concentrated on the Town Centre and the residential area immediately surrounding this (see **Figure 6** below). This is reflected in the zone structure that identifies the Arrowtown Town Centre Zone and Arrowtown Residential Historic Management Zone, and the application of special character provisions.

4.19 The more recent residential neighbourhoods, including the residential area that extends to the northern boundary of the Site, provide some contrast to that historic character; and the built environment reflects more contemporary residential neighbourhoods.

4.20 An area of land to the south of the Arrowtown Residential Historic Management Zone is now zoned Medium Density Residential, enabling a greater density of residential activity that may result in increased change in character within the established area of Arrowtown.

4.21 The proposed rezoning primarily relies on the subdivision design to ensure a neighbourhood character and amenity that reflects its Arrowtown context is created. This will be achieved through the urban structure defined by the layout of streets and accessways and the lot layout that responds to the underlying topography, the provision of open spaces, and the distribution of a range of lot sizes. The design of streets and open spaces will also contribute to the amenity and character of the neighbourhood.

4.22 The Suburban Residential zone also includes a specific objective (7.2.4) that seeks to ensure that residential development in Arrowtown is compatible with Arrowtown's existing character. Supporting Policy 7.2.4.1 identifies key considerations for development that requires a resource consent. The standards for the zone also include a lower height for Arrowtown (6.5m as a permitted activity and up to 8m as a restricted discretionary activity, with one of the matters of discretion being consistency with Arrowtown's existing character, as described in the Arrowtown Design Guidelines 2016).

4.23 In addition to the general guidance set out in the Queenstown Lakes District Council Residential Zone Design Guide (2021), Section 4 of the Arrowtown Design guide sets out guidance for the 'new town' residential areas of the settlement. The guidance relates to: building construction and forms (Section 4.8); creating spaciousness and simplicity (Section 4.9); the streetscape (Section 4.10); and street lights and exterior lighting (Section 4.11). Detailed guidance that relates to both the historic residential area and the new town residential areas relates to: pedestrian networks (Section 4.12);

views and vistas (Section 4.13); parking, driveways and garages (Section 4.14); churches and church grounds (Section 4.15); planting (Sections 4.16 – 4.20); boundary treatments, paving surfaces, and utilities, signs and structures (Sections 4.21 – 4.23); reserves and parkways and private boundaries with these (Sections 4.24 and 4.25); and building design and construction (Section 4.26 – 4.29).

4.24 Centennial Avenue and, to a lesser extent, McDonnell Road provide the southern arrival points to the Arrowtown settlement. The guidance set out in the Arrowtown Design Guide provides detail to encourage individual site development to interface with the street corridor in a manner that reinforces the settlement's distinctive character. However, for Permitted activities these outcomes would not be required. Given the importance of the street frontages in defining the arrival to Arrowtown, I recommend that a site-specific provision is included that requires the Centennial Avenue and McDonnell Road boundary of properties interfacing with these streets to be defined in a manner that is consistent with Section 4.21 of the Arrowtown Design Guide.

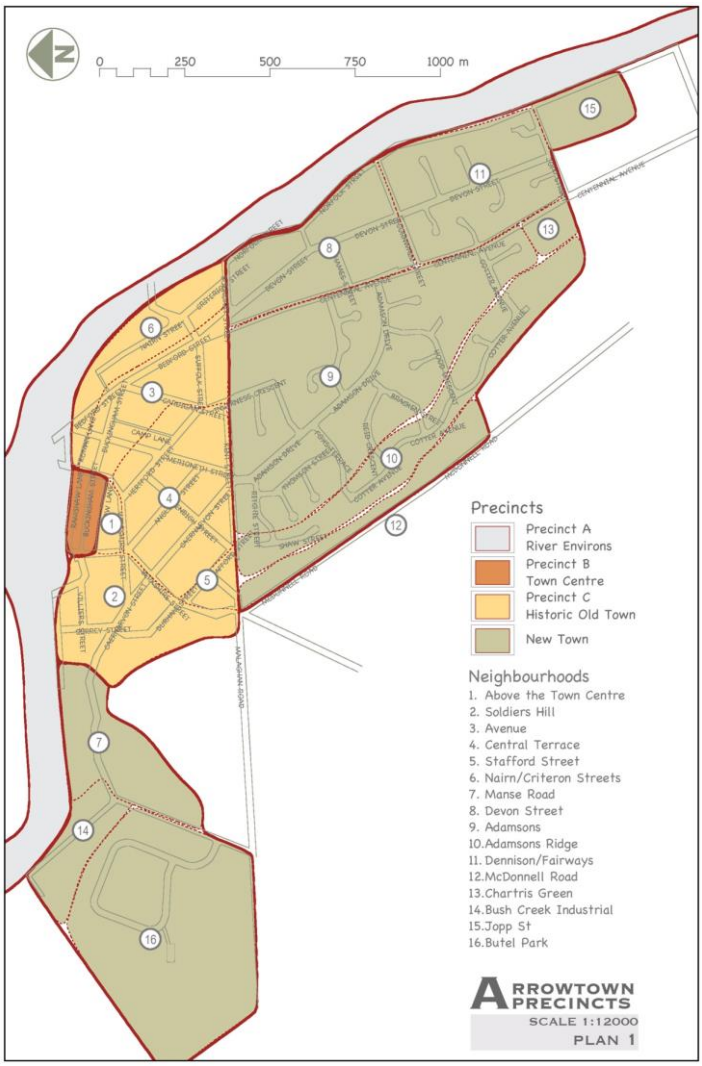


Figure 6: Precinct Plan from Arrowtown Guidelines, p.1-2

5 Conclusions

5.1 Arrowtown is a settlement with a long and rich history that has evolved and grown over time to respond to its changing functions and the needs of its community.

5.2 In 2009 I carried out an urban design assessment that determined that urban growth could be accommodated to the south of the existing urban area, including the Site, in a manner that respects the existing settlement pattern and contributes positively to its evolution.

5.3 Since my earlier assessment, there have been a number of significant changes to both the physical environment surrounding the Site and the relevant planning framework. Having considered this context, it is my opinion that the role of the Site and its suitability to accommodate residential expansion of the settlement is reinforced.

5.4 In my opinion, it is appropriate to apply the Suburban Residential zone to the Site, excluding the escarpment and adjacent wetland area from development. In my opinion, rezoning the land represents an efficient use of a limited land resource in a location that is well serviced by established employment, community services, and amenities.

5.5 In my opinion, the zone provides a suitable framework to enable an appropriate neighbourhood to establish on the Site, responding to both the Site's characteristics and the established character of Arrowtown. In my opinion, the subdivision provisions set out in Chapter 27 of the Proposed District Plan and the suite of provisions relating to the Suburban Residential zone are suitable to enable an appropriate expansion of the existing settlement. Given the importance of the Centennial Avenue and, to a lesser extent, McDonnell Road frontages in defining the arrival experience to Arrowtown, I have recommended an additional site-specific standard be included for properties that interface with these streets.



Rebecca Skidmore
Urban Designer/Landscape Architect
November 2026

ECOLOGICAL ASSESSMENT OF WETLANDS ON MONK FARM, ARROWTOWN, OTAGO



providing outstanding ecological services to sustain and improve our environments

Wildlands

R6405

ECOLOGICAL ASSESSMENT OF WETLANDS ON MONK FARM, ARROWTOWN



Constructed wetland fenced to exclude stock (foreground) with willows in part of a natural wetland in the background.

Contract Report No. 6405

June 2022

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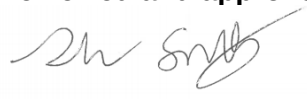
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Reviewed and approved for release by:



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1. INTRODUCTION

Roger Monk owns land at Arrowtown that is currently zoned 'Arrowtown Special Zone' which enables the owner to develop into 17 rural residential lots. Currently an alternative proposal entails preparing a fast track application (via the Covid Fast Track Act) that would allow a great density of residential development. As part of that application advice is required regarding a water course which runs through the site. Specifically, an understanding is needed as to whether it comprises a natural wetland, and therefore what rules may be triggered in the National Environmental Standards – Freshwater Management (NES-FM).

2. METHODS

A site visit to the Monk Farm site (Figure 1) was undertaken on 27 May 2022. The weather was fine and frosty, with frost initially making it more difficult to identify plant species. The property was traversed with a particular focus on wetlands. Notes were made on the species composition of wetlands and on the factors responsible for wetland formation. Wetlands were classified according to the 'natural wetland' definitions in the National Policy Statement for Freshwater Management (NPS-FM). Plant species observed in the wetlands were recorded (Appendix 1).

3. ECOLOGICAL CONTEXT

3.1 Site description, history and current land use

The Monk Farm site spans a gully immediately south of the Arrowtown urban area. The gully slopes gently up to McDonnell Road in the west, and has a steep scarp on its eastern side, to terraces that extend to Centennial Ave to the east. The gully has a relatively flat floor, and there is evidence that a drainage channel was excavated in the northern part of the gully floor. A small tributary stream enters the gully from the east. Below the Monk Farm property the stream becomes confined to an incised channel.

A personal communication from the landholder (Appendix 2) notes that the site was historically grazed by both sheep and cattle on both sides of a stream that meandered down the gully. Sheep occasionally became stuck, indicating wetland areas were present. Willow trees were present along the most of the stream; those along the southern part were cleared. The creek was dammed at the southern boundary to enable formation of a wetland.

The site was being grazed by cattle at the time of the field survey, and there is evidence of cattle trampling effects in all damp areas of the site. Stock are excluded from wetland vegetation between a central causeway and the southern causeway by a one-wire electric fence.


Legend
Property boundary
Cotter Ave
Alexander Pl
Jopp St
McDonnell Rd
Centennial Ave
Location Map
1108
929
Bush Creek
Arrowtown
Wharehuanui
506
Arrow Junction
Lake Hayes
750
Data Acknowledgment
Map contains data sourced from LINZ
Crown Copyright Reserved
Report: 6405
Client: -
Ref: 04 0660
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File: Figure_Location.mxd
Figure 1. Location of the Monk Farm site
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Wildlands
www.wildlands.co.nz, 0508 WILDNZ
© 2022
Scale: 1:5,000
Date: 13/06/2022
Cartographer: FM
Format: A4

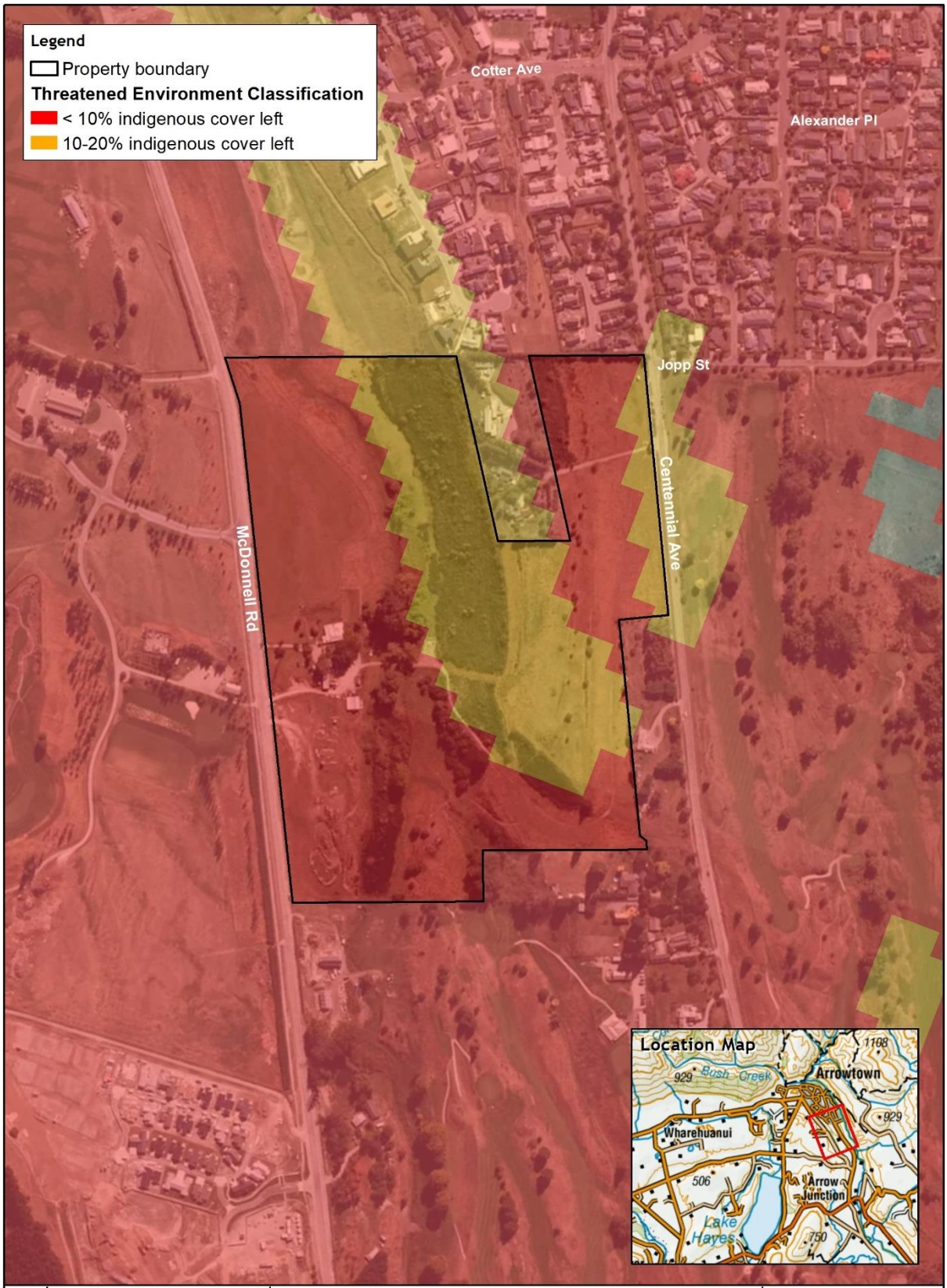


Figure 2. Threatened Environment Classification for the Monk Farm site

3.2 Threatened Environment Classification

The Monk Farm site is covered by land environments that retain less than 20% of their original indigenous cover (Cieraad *et al.* 2015). The land is mostly covered by land environments that retain less than 10% of their original cover, with the scarp and adjacent areas comprising land environments with 10-20% of their original cover remaining (Figure 2). These land environments are a priority for ecological restoration.

3.3 Ecological districts

The Monk Farm site is located in the Shotover Ecological District, with takes in the catchments of the Arrow River and lower Shotover River. It has a relatively dry climate, affected by the rain shadow of the Main Divide. Annual rainfall ranges from 650-160 mm per year, with prevailing north-west winds (McEwen 1987). On terraces, fans, moraines, and low hills, the soils comprise shallow to moderately deep droughty soils with loess over alluvium, till and/or schist (McEwen 1987).

3.4 Potential natural vegetation

The site has been mapped as mountain beech forest in potential natural vegetation mapping for Otago Region (Wildland Consultants 2020). This mapping is not at sufficiently fine scale to identify and map small wetlands. In Otago, mountain beech forest is typically the dominant forest type in drier rain shadow areas east of the Main Divide.

4. STATUTORY CONTEXT

4.1 Wetland definition

The Resource Management Act (1991) (RMA) defines a wetland as:

> *Wetland includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions*

Section 3.21 of the NPS-FM defines a natural wetland as:

A wetland (as defined in the Act) that is not:

> (a) a wetland constructed by artificial means (unless it was constructed to offset impacts on, or restore, an existing or former natural wetland); or
>
> (b) a geothermal wetland; or
>
> (c) any area of improved pasture that, at the commencement date, is dominated by (that is more than 50% of) exotic pasture species and is subject to temporary rain-derived water pooling

4.2 Wetland policies

One policy in the NPS-FM is relevant:

Policy 6: *There is no further loss of extent of natural inland wetlands, their values are protected, and their restoration is promoted.*

4.3 Wetland regulations

Two regulations in the NES-FM are relevant to the proposed subdivision.

Regulation 52

(1) Earthworks outside, but within a 100-metre setback from, a natural wetland is a **non-complying activity** if it—
   (a) results, or is likely to result, in the complete or partial drainage of all or part of a natural wetland; and
   (b) does not have another status under any of Regulations 38 to 51.

(2) The taking, use, damming, diversion, or discharge of water outside, but within a 100-metre setback from, a natural wetland is a **non-complying activity** if it—
   (a) results, or is likely to result, in the complete or partial drainage of all or part of a natural wetland; and
   (b) does not have another status under any of Regulations 38 to 51.

Earthworks within a 100-metre setback from a natural wetland can occur, but must not result in the complete or partial drainage of the natural wetland. Earthworks also must not dam or divert the natural wetland.

Regulation 54

The following activities are **non-complying** if they do not have another status under this subpart:

(a) vegetation clearance within, or within a 10-metre setback from, a natural wetland:
(b) earthworks within, or within a 10-metre setback from, a natural wetland:
(c) the taking, use, damming, diversion, or discharge of water within, or within a 100-metre setback from, a natural wetland.

Any vegetation clearance, earthworks, or discharge of water within 10 metres of a wetland has non-complying status.

5. WETLAND ASSESSMENTS

5.1 Overview

Three kinds of wetland are present on the Monk Farm site. A constructed wetland is present at the southern end of the gully, formed behind a raised causeway across the gully. Upstream of this is a natural wetland, partly vegetated in willows. A very small natural wetland is present in the stream tributary that flows in from the east. Other wetlands that meet the 'improved pasture' exemption in the natural wetland definition are also present. These areas are described in more detail below.

5.2 Constructed wetland

The constructed wetland is formed by a causeway approximately built up approximately 1 metre from the gully floor and was deliberately created with the intention of flooding the upstream area to form a wetland (Appendix 2). A culvert discharges water through the causeway into the incised stream below. This wetland meets natural wetland exemption (a), being a wetland created by artificial means.

This wetland includes small islands, and the islands and open water margins are densely vegetated in pūkio (*Carex secta*) sedges (Plate 1) with occasional soft rush (*Juncus effusus*), creeping buttercup (*Ranunculus repens*), and broad dock (*Rumex obtusifolius*). Blackberry (*Rubus fruticosus*) is occasionally present. One island has tall willow or poplar trees. It is possible that some of the pūkio sedges in this wetland were planted; alternatively, they may have naturally colonised the constructed wetland from upstream habitats.



Plate 1: The lower part of the constructed wetland.

5.3 Natural wetlands

Upstream of the central causeway, a natural wetland is present, and was assessed in frosty conditions. This wetland may have been partly induced by pugging from stock, but very likely had a natural origin on gently-sloping land in the upper gully (Plate 2). The past excavation of a drain down the centre of the gully suggests that wetland vegetation was historically present. The lower part of the wetland is covered by crack willow (*Salix fragilis*) with scattered pūkio and blackberry beneath, while the upper part has local groves of pūkio, scattered soft rush, and abundant jointed rush (*Juncus articulatus*). Other species include Yorkshire fog (*Holcus lanatus*), water forget me not (*Myosotis laxa*), white clover (*Trifolium repens*), *Epilobium brunnescens*, water cress (*Nasturtium microphyllum*) and what appeared to be *Carex sinclairii* on the wetland margins. Occasional crack willow regeneration is also present. This wetland is not dominated by improved pasture or subject to temporary rain-derived ponding and therefore is defined as a natural wetland.

A smaller natural wetland is present in the eastern tributary stream. The wider wetland was mostly formed by pugging from cattle, and supported improved pasture species, but in one part of the wetland, dense rushes of soft rush, hard rush (*Juncus edgariae*), water forget me not, jointed rush, floating sweet grass (*Glyceria fluitans*), creeping buttercup, white clover, and Yorkshire fog are present (Plate 3). In this area the cover of improved pasture species is relatively low so the improved pasture exemption does not apply. The wetland area to the south is dominated by improved pasture, was grazed in September 2020, and may also be subject to temporary ponding of water.

5.4 Wetlands exempted as ‘improved pasture’

Wetlands exempted from the ‘natural wetland’ definition include the wetland pictured in the rear of Plate 3, the scattered rushes and sedges in pasture on the eastern side of the gully (Plate 4), and a wetland created by stock pugging in the bed of the eastern tributary stream (Plate 5) just before it meets the gully floor.



Plate 2: Natural wetland vegetation at the northern end of the gully. Jointed rush was the dominant species between the taller rushes.



Plate 3: Natural wetland (foreground) with dense rushes, while in the background within the red rectangle the wetland is dominated by improved pasture.



Plate 4: Grazed margins on the eastern side of the gully support scattered rautahi (*Carex coriacea*) but a predominance of improved pasture.



Plate 5: A wetland formed by cattle pugging where the eastern tributary meets the gully floor. The vegetation is dominated by improved pasture species.



Figure 3. Status of wetlands on the Monk Farm site

6. CONCLUSIONS

Three kinds of wetland are present on Monk Farm, comprising natural wetlands, a constructed wetland, and non-natural wetlands dominated by improved pasture and subject to temporary rain-derived ponding (not mapped). Earthworks within 100 metres of the natural wetlands will need to ensure they do not cause drainage, damming, or diversion of these wetlands to avoid non-complying status. The small natural wetland in the eastern tributary could potentially be developed as the effects of clearance of this wetland would be relatively minor. In addition, there would be scope to increase natural wetland extent on the eastern side of the larger natural wetland, to ensure consistency with NPS-FM requirements for no further loss of wetland extent. An aquatic offset could be implemented to ensure a net gain in natural wetland extent and of natural wetland values.

ACKNOWLEDGMENTS

Jenny Carter (of Carter Planning Ltd) is thanked for provision of guidance around the site.

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McEwen M. 1987: Ecological regions and districts of New Zealand. Booklet to accompany Sheet 4. *New Zealand Biological Resource Centre Publication No. 5*. Department of Conservation, Wellington.

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VASCULAR PLANT SPECIES RECORDED IN WETLAND VEGETATION AT THE SITE

Species	Common Name	Plant Type
Carex coriacea	Rautahi	Sedge
Carex secta	Pūkio	Sedge
*Cirsium arvense**	Californian thistle	Dicot herb
*Cirsium vulgare**	Scotch thistle	Dicot herb
*Digitalis purpurea**	Foxglove	Dicot herb
Epilobium brunnescens	Willow herb	Dicot herb
*Glyceria fluitans**	Floating sweetgrass	Grass
*Holcus lanatus**	Yorkshire fog	Grass
*Juncus articulatus**	Jointed rush	Rush
*Juncus effusus**	Soft rush	Rush
*Juncus tenuis**	Slender rush	Rush
*Myosotis laxa**	Water forget-me-not	Dicot herb
*Nasturtium microphyllum**	Watercress	Dicot herb
*Ranunculus repens**	Creeping buttercup	Dicot herb
*Rumex obtusifolius**	Broad-leaved dock	Dicot herb
*Salix ×fragilis**	Crack willow	Tree
*Solanum dulcamara**	Bittersweet	Vine
*Trifolium repens**	White clover	Dicot herb

PERSONAL COMMUNICATION RELATING TO HISTORIC LAND USE

From: Roger Monk <rogmonk@gmail.com> **Sent:** Tuesday, 24 May 2022 9:11 pm **To:** Jenny Carter <jenny@carterplanning.nz> **Subject:** Unamed creek on McDonnell road .

Hi Jenny,

In the 1960's the stream meandered from the northern boundary of the house block to its southern boundary adjacent to No2 tee of the Arrowtown Golf Course. Sheep and cattle grazed the entire length of the stream on both sides though there was the odd place sheep became stuck and had to be rescued. The stream was entirely encased in mature willow trees from above the house to the southern end of the golf course.

In the late 1980's I removed the majority of the willow trees from my southern boundary as far north as the woolshed. This was followed by the damming of the creek at my southern boundary and the installation of a sluice gate to the culvert pipe to enable the flooding of the area forming a wetland as far upstream as far as the woolshed and is as it stands today. The necessary damming and discharge permits were sought from the appropriate authority.

Regards,

Roger



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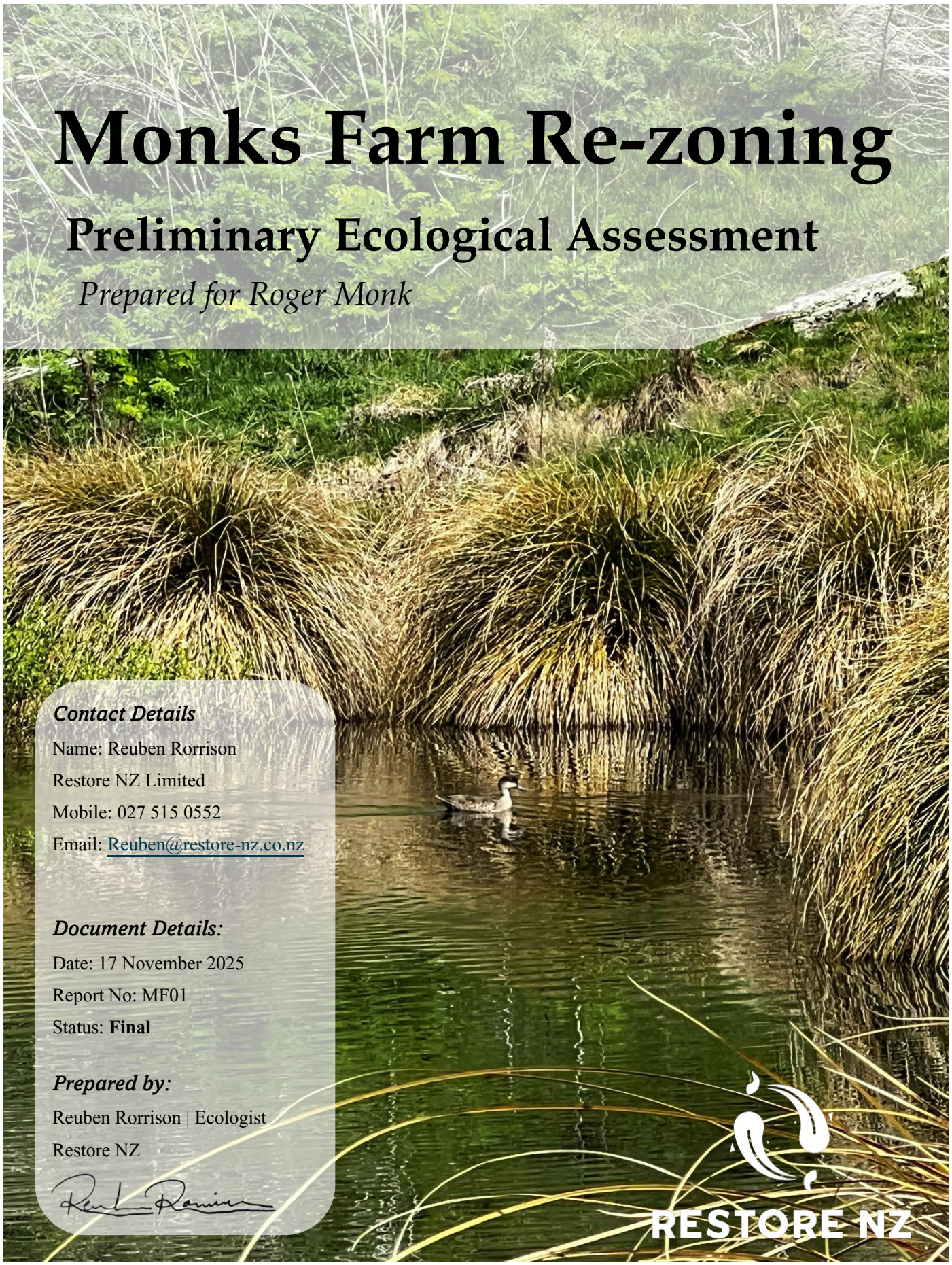
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Monks Farm Re-zoning

Preliminary Ecological Assessment

Prepared for Roger Monk



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1 Introduction

This report provides a high-level ecological overview of the Monks Farm property at the southern end of Arrowtown (Figure 1). It has been prepared to inform a proposed plan change seeking to rezone the property from the *Arrowtown South Special Zone* to *Low Density Residential Zone*.

The assessment builds on previous ecological work by Dawn Palmer (2009) and Kelvin Lloyd, Wildlands (2022) and provides an updated high-level summary of current ecological condition, potential constraints, and opportunities for enhancement.

Field verification and GIS mapping were undertaken by Restore NZ (Reuben Rorrison) to combine and expand on the existing information regarding the habitats and ecotones present on-site.

The scope of this report is intentionally broad-scale and strategic. It is intended to:

- Provide an overview of the key ecological features within the site, drawing on existing assessments and recent observations.
- Confirm that these features will remain protected and managed under the existing national, regional, and district planning frameworks regardless of the proposed zoning change.
- Outline how ecological values can be recognised and enhanced through future subdivision design, and
- Identify, in broad terms, areas that appear most suitable for development from an ecological perspective.



Figure 1: Site location.

2 Methodology

2.1 Desktop Review

A desktop review was undertaken to inform site history, geomorphic context, and previously reported ecological values. This included review of the following spatial datasets and resources:

- Manaaki Whenua / Landcare Research Ecosystem and Land Cover Mapping, including:
  - Potential Natural Vegetation,
  - Current Vegetation Land Cover Database (LCDB) Version 6,
  - Mapped Wetlands (MWLR. 2025).
- Historical Aerial Imagery via Retrolens (1950s - 1980s) to assess past land use and vegetation cover.
- Google Earth Pro time-series imagery (1980s - 2020s) to examine recent changes in land use, vegetation, and surface hydrology.
- Client supplied information and reports, including:
  - An Ecological Assessment of Wetland on Monk Farm. Prepared in 2022 by Kelvin Lloyd from Wildlands Consultants, and
  - An Ecological Assessment and Recommendations report, prepared by Dawn Palmer in 2009 as part of the original plan change to *Arrowtown South Special Zone*.

2.2 GIS analysis

Habitats and ecotones described in existing reports and observed on site were mapped using GIS software, combined with publicly available datasets found on LINZ Dataservice.

2.3 Site Visit

A field inspection was undertaken by Restore NZ on the 26 October 2025 to verify the presence and condition of key ecological features (wetlands, stream corridor, escarpment vegetation). Observations were qualitative only, noting dominant vegetation composition, hydrological indicators, and general site condition under the prevailing seasonal conditions.

All tracks walked during the site visit were GPS recorded to ensure full coverage and inform spatial accuracy of test locations.

2.4 Assessment Approach

Ecological features are described by broadly following the principles of the EIANZ (2018) Ecological Impact Assessment Guidelines, with consideration of the key criteria of representativeness, diversity and pattern, rarity and distinctiveness, and ecological context. However, quantitative field survey, plot data collection, or formal value scoring was not undertaken.

Instead, ecological condition and context have been evaluated qualitatively, based on professional judgement, site observations, and available background information. This provides an overview of the relative importance and restoration potential of ecological features without assigning formal EIANZ value ratings.

In addition to site-specific attributes, the assessment also considers the role of on-site ecological features as linkages to wider habitat networks and potential downstream effects on hydrology and connected ecosystems.

This report describes existing ecological features and provides context for future assessment. A formal determination of ecological significance under section 6(c) of the RMA or the NPS-IB has not been undertaken at this stage.

2.5 Limitations

This assessment provides a high-level overview to inform the proposed plan change. It does not constitute a detailed ecological survey, effects assessment, or ecological management plan.

- Detailed wetland delineation has not been undertaken by the author. Wetland and stream boundaries are based on existing reports and aerial imagery and are considered indicative for broader planning considerations only.
- The assessment is based on a single site visit and the prevailing seasonal and weather conditions at that time, which was following the second wettest September on record (since 1968; Otago daily times, 2025).
- The report draws on third-party information (including Wildlands 2022 and Dawn Palmer 2009). Restore NZ has not independently verified all external data and accepts no responsibility for any inaccuracies or omissions in those sources.
- The assessment assumes that detailed ecological survey and management planning will be undertaken at the subdivision and design stages of any future development. Ecological values will require further quantification at the impact assessment stage, involving more robust and detailed survey methodology.
- This report is intended solely for use in support of the current plan-change process. Restore NZ does not condone the use or reliance on this document for any other purpose.

3 Description of the Existing Environment

3.1 Ecological District & Wider History

The site lies within the Otago Ecological Region and Shotover Ecological District, an area of steeply dissected landforms within the Arrow and lower Shotover catchments. The geology is dominated by schist with pockets of alluvial and glacial deposits, forming shallow, stony, and often drought-prone soils. The continental climate brings hot, dry summers and cold winters under the rain-shadow of the Southern Alps.

Historically, the district supported beech forests on sheltered slopes and a mosaic of tussock grassland and shrubland across the drier faces. Most of this has been modified by grazing, with exotic pasture and woody weeds now dominant, though remnants of native shrubland and tussock communities persist on less disturbed slopes and gullies.

Pre-European Māori visited the Arrowtown area for seasonal hunting/gathering, and travel along pounamu routes. Large areas of forest and scrub were deliberately burnt to open pathways and encourage the growth of edible plants such as bracken. The first Europeans to settle in the Wakatipu Basin were pastoralists who established large sheep runs in the early 1860s. A few years later, the discovery of alluvial gold in the Arrow River (1862) sparked the Arrowtown gold rush, drawing thousands of prospectors from around the world. As gold yields declined, many of the miners took up for pastoral farming, with cereal cropping and grazing becoming dominant across the terraces and valley floors.

Farming intensified, and exotic grasses replaced indigenous cover. In the late 19th century, much of Otago suffered a severe rabbit plague. Rabbits stripped hillsides bare, forced many farms into bankruptcy, and led to the return of exhausted and unsellable land to the Crown. The government formed Rabbit Boards, which enacted widespread poisoning and fumigation, and later the introduction of myxomatosis and calicivirus.

3.2 Present Day Habitats

The property is owned by Roger Monk, a long-time Arrowtown local. It is approximately 18 hectares in size and operates as a small-scale farm with a few stock to manage pasture growth. Roger has witnessed the transformation of Arrowtown as urban development has expanded into the surrounding rural areas.

The property mostly sits within land classified as < 10 percent indigenous vegetation cover remaining (MWLR, 2012). These areas represent heavily modified parts of the landscape, where little indigenous biodiversity persists outside of small remnant patches. The escarpment face is mapped as an 10-20 percent indigenous cover remaining, indicating a landscape where indigenous habitats are still highly reduced and sparsely distributed. This classification is broad scale an, it does not accurately capture small features such as wetlands or other localised areas of indigenous vegetation.

The local topography is undulated, with an upper terrace along the northern boundary, a steep escarpment descending to a valley floor through which a small stream flows. The flatter valley floor supports slow surface drainage, leading to areas of natural wetland formation. An artificial dam at the southern end of the property inundates part of the valley floor. This feature now provides open-water habitat and supports indigenous wetland flora and fauna. The present-day habitats are described in detail in Sections 3.2.1 - 3.2.6 and illustrated in Figure 2 below.

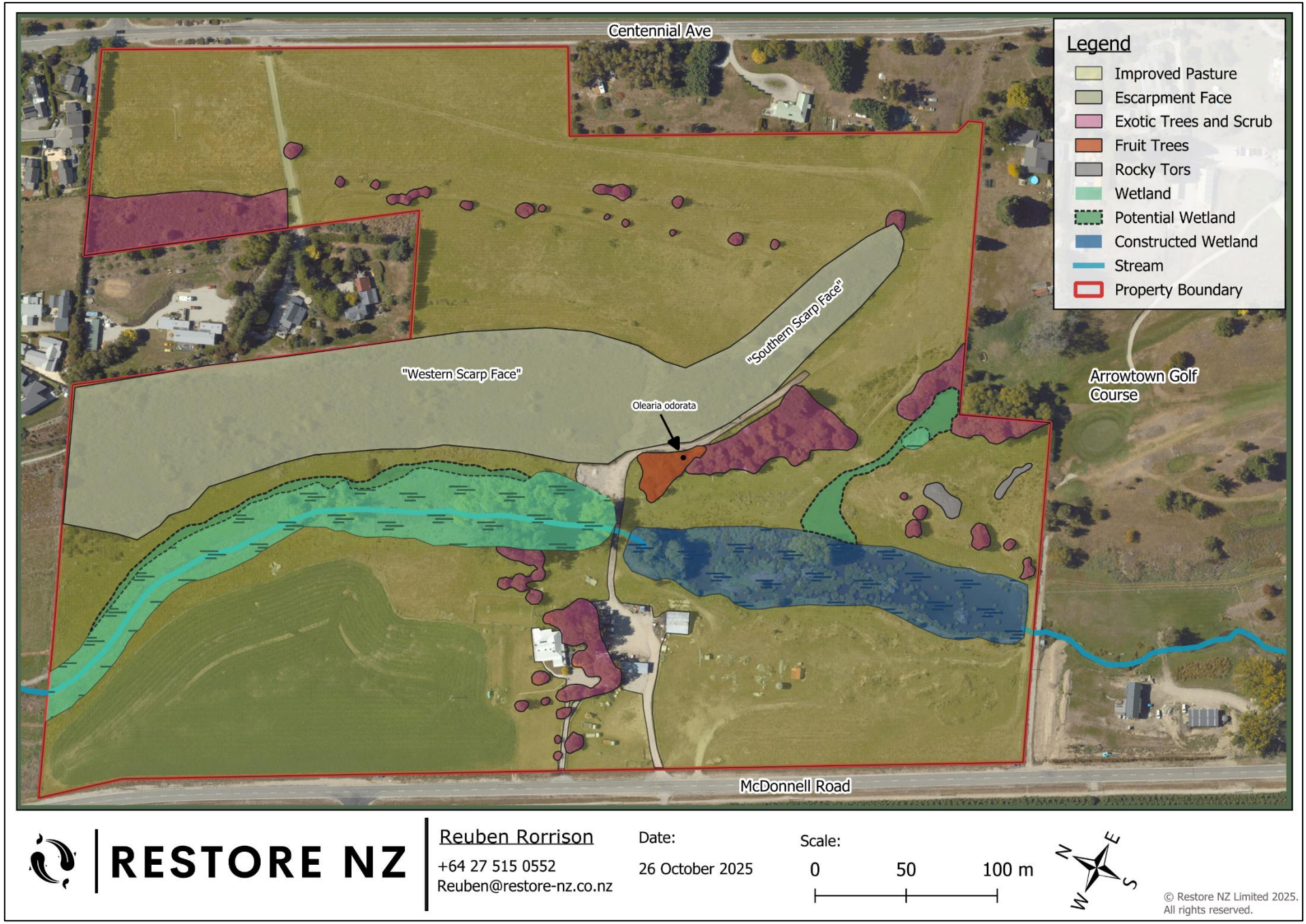


Figure 2: Present day habitats and primary ecotones present on-site.

3.2.1 Wetlands

3.2.1.1. Natural Inland Wetlands

Natural wetlands on the property occur within the lower northern portion of the gully and in a smaller hollow toward the southern end of the site. The main natural wetland occupies the gully floor where a small stream flows north to south through ephemerally/seasonally saturated pasture. These areas correspond with the natural wetlands identified and mapped by Wildlands, on which the boundaries in Figure 2 have been derived.

Hydrology in the larger wetland is influenced by both the surface runoff from the escarpment and the stream, with ponding and slow drainage resulting in persistent saturation. The stream loses its defined channel and spreads across the valley floor, forming a diffuse wetland system. Boundaries are therefore likely to fluctuate seasonally and between years depending on rainfall and stock pugging. Its lower portion is covered by crack willow (*Salix fragilis*) with scattered pūkio (*Carex secta*) and blackberry (*Rubus fruticosus*) beneath, while the upper portion contains local groves of pūkio, scattered soft rush (*Juncus effusus*), and abundant jointed rush (*Juncus articulatus*). Other associated species include Yorkshire fog (*Holcus lanatus*), water forget-me-not (*Myosotis laxa*), white clover (*Trifolium repens*), *Epilobium brunnescens*, watercress (*Nasturtium microphyllum*), and what appears to be *Carex sinclairii* along the margins (Lloyd, 2022; Figure 3). The vegetation is degraded and pugged by cattle but retains a clear hydrophytic character consistent with a natural wetland under the NPS-FM definition.

A smaller natural wetland occurs in the southern portion of the site, situated at a slightly higher elevation than the artificial wetland; converging where it seeps through a pasture dominated drainage channel (Figure 4). The hydrology of this wetland appears to be primarily reliant on rainwater runoff and seeps from the hillside above. The wider surrounding area has been heavily trampled and supports a dominance of improved pasture species (hence was excluded as natural wetland in Lloyd 2022), but within the upper end of the drainage line a dense cover of soft rush, Edgar's rush (*Juncus edgariae*), jointed rush, floating sweet grass (*Glyceria fluitans*), creeping buttercup (*Ranunculus repens*), white clover, Yorkshire fog, and water forget-me-not (*Myosotis laxa*) is present.

Both wetlands represent remnants of the original valley-floor drainage network, although their hydrology has been altered by heavy grazing and pugging. The intense grazing has reduced the continuity of habitat present, and while multiple species of indigenous wetland bird were observed in the artificial wetland, the natural wetlands represent much lower quality habitat. Wetlands are a nationally recognised priority for conservation, and these wetlands still contain a indigenous component (albeit in very low and scattered abundance).

Their highly degraded condition, remaining underlying hydrology and remnant indigenous species make them highly suitable for restoration. Images of the natural wetlands present on-site can be seen below in Figures 3 & 4.



Figure 3: Two photographs of the larger natural wetland taken while standing on the escarpment, one facing south/downstream (left) and one facing north-west/upstream (right).



Figure 4: Two photographs of the smaller natural wetland and surrounding wet pasture.

3.2.1.2. Potential Wetlands

In addition to the two natural inland wetlands described above, areas in the valley floor exhibit wetland characteristics but are likely to be excluded from the NPS-FM definition of "natural wetland" due to dominance by improved pasture species and ongoing stock grazing at the time of assessment (Lloyd, 2022). These areas have been identified as potential wetlands in Figure 2.

The first of these occurs around the smaller natural wetland, where wetland vegetation transitions into grazed pasture. The hydrology that accumulates in this area flows downslope through a constructed drainage channel toward the artificial wetland at the valley floor (Figure 5). Although currently dominated by exotic pasture grasses, this feature clearly retains wetland hydrology and could readily be re-established and enhanced into indigenous dominant wetland habitat.

The margins of the larger gully wetland also contain a broad transitional zone between the natural wetland core and the surrounding improved pasture, as identified in Lloyd 2022. While the transitional area would likely be excluded under the improved pasture exemption of the NPS-FM when grazed, it nonetheless exhibits hydrology and scattered wetland vegetation, suggesting that wetland extent has been historically larger. A detailed delineation following the MfE (2022) Wetland Delineation Protocols would likely refine the area mapped as natural wetland in Lloyd 2022 into a smaller/sporadically distributed core, embedded within a wider pasture-dominated transition zone (Figure 5).

These potential wetlands are ecologically important for two reasons. First, the pasture exclusion only applies while the current and future land use remains pastoral grazing; if the site is developed for residential purposes, these areas would no longer qualify for exclusion and may meet the definition of natural inland wetland under the NPS-FM. Second, the existing hydrology and partial wetland vegetation make these zones highly suitable for restoration and enhancement, offering an opportunity to expand wetland extent and improve ecological function within the gully system.



Figure 5: Photographs of the potential wetlands: where water drains from the smaller natural wetland (left) and the transitional margins of the larger natural wetland (right).

3.2.1.3. Artificial Wetlands

An artificial wetland occupies the southern end of the gully and was intentionally constructed by the landowner in the late 1980s through the formation of a low dam and causeway across the valley floor (Lloyd, 2022; Palmer, 2009). The structure raised the local water table and permanently flooded the upstream gully to create an open-water and sedgeland system (Figure 6). Water now flows into the ponded area from the natural wetlands upstream and discharges through a culvert, returning to a natural stream channel.

The feature meets the NPS-FM exclusion for wetlands constructed by artificial means and therefore is not classified as a natural inland wetland. Nevertheless, it retains natural wetland hydrology and provides valuable aquatic and riparian habitat within the wider gully system.

The wetland contains several small islands and shallow margins that are densely vegetated in pūkio (*Carex secta*), with soft rush, creeping buttercup, broad-leaved dock (*Rumex obtusifolius*), and occasional blackberry. There are a few mature willows that the landowner has retained for aesthetic purposes. The vegetation appears to have established naturally from upstream sources, although some deliberate planting may also have occurred.

During the site visit, the wetland supported a high diversity of avifauna relative to its small size, including pūkeko (*Porphyrio melanotus*), paradise shelduck (*Tadorna variegata*), mallard (*Anas platyrhynchos*), New Zealand scaup (*Aythya novaeseelandiae*), Eurasian coot (*Fulica atra*), and grey teal (*Anas gracilis*). A tūī (*Prosthemadera novaeseelandiae*) was observed feeding above the wetland, and a sacred kingfisher (*Todiramphus sanctus*) was present on the pond margin. These observations indicate that the wetland provides valuable feeding and potentially breeding habitat for a range of indigenous and introduced waterbirds.

Although artificial in origin, the ponded wetland represents an ecologically functional component of the property's hydrological network, supporting higher habitat quality and biodiversity than surrounding grazed and degraded wetland habitats. Its established hydrology, structural diversity, and avifaunal use make it highly suitable for further enhancement and integration within any future restoration or development design.



Figure 6: The artificial wetland pictured facing south-east (left) and facing west from the escarpment (right).

3.2.2 Streams

A small stream flows through the gully, extending across the length of the property from north to south. Within the site it is largely indistinct, as most of its course is contained within the natural and artificial wetlands where surface flow spreads across the valley floor and loses a defined channel. Short stretches of more defined channel occur at the north and south of the property.

No freshwater fish were recorded during electrofishing surveys undertaken by DOC in 2004, approximately 300 metres downstream of the site, and no other fish surveys have been conducted within the property itself. Surveys in the wider catchment indicate the presence of exotic trout (*Salmo trutta & Oncorhynchus mykiss*) and salmon (*Oncorhynchus spp*.), as well as a limited number of observations of indigenous fish such as kōaro (*Galaxias brevipinnis*), common bully (*Gobiomorphus cotidianus*), and longfin eel (*Anguilla dieffenbachii*). The dam structure forming the artificial wetland likely presents a barrier to upstream fish passage, limiting colonisation of the site.

Such barriers are common across New Zealand and are relics of a time when less consideration for indigenous fish migratory behaviour was given and approvals were easier to obtain. Within Otago specifically, these barriers are not always inherently negative and, under certain circumstances, can provide positive outcomes for indigenous freshwater fish.

3.2.3 Escarpment Face

The steep western and southern escarpment faces form the boundary of the gully system, rising to the upper terrace of the property. The area corresponds with what Palmer (2009) described in her Arrowtown South ecological assessment. Her observations indicated that the slope was dominated by exotic woody weeds, particularly broom (*Cytisus scoparius*) and hawthorn (*Crataegus monogyna*), with scattered sycamore (*Acer pseudoplatanus*), Douglas fir (*Pseudotsuga menziesii*), larch (*Larix decidua*), and rowan (*Sorbus aucuparia*). Small remnant patches of indigenous vegetation were noted, including hard tussock (*Festuca novae-zelandiae*), blue tussock (*Poa colensoi*), and a single *Olearia odorata* growing beneath the exotic canopy. The face is mapped as *Gorse and/or Broom* in the Land Cover Database (Version 6, 2025).

Site observations undertaken for this assessment largely confirm the previous description. Much of the area previously described as the escarpment faces have since been mechanically cleared by excavator, with evidence of splintered woody debris remaining across the slope (Figure 7). Aerial imagery indicates that prior to clearance the slope was almost entirely dominated by a single species, thought to be broom which is supported by the existing reports and remaining patches.

Several larger trees are still standing, including mature hawthorn, Douglas fir, and rowan, likely spared due to their larger size. A single *Olearia odorata* (likely the one noted in Palmer, 2009) remains present, located just below the existing farm track on the southern escarpment amongst a small group of fruit trees (Figure 2). Sparse tussock grasses are still present on the upper slope.

The recently cleared surfaces are now dominated by exotic grasses, purple foxglove (*Digitalis purpurea*), hemlock (*Conium maculatum*), and woolly mullein (*Verbascum thapsus*). The resulting vegetation is highly

modified, but the removal of woody weeds presents an opportunity for indigenous replanting during slope stabilisation.

Common exotic bird species were frequently observed using the scrub and scattered trees on the escarpment for perching and foraging, behaviour that also provides suitable hunting opportunities for New Zealand falcon (*Falco novaeseelandiae*). Species recorded included starling (*Sturnus vulgaris*), redpoll (*Acanthis flammea*), house sparrow (*Passer domesticus*), dunnock/hedge sparrow (*Prunella modularis*), blackbird (*Turdus merula*), song thrush (*T. philomelos*), goldfinch (*Carduelis carduelis*), and abundant Californian quail (*Callipepla californica*). A grey warbler (*Gerygone igata*) was the only indigenous bird detected on the escarpment during the visit although other common indigenous species are likely to use the area on occasion.



Figure 7: The recently cleared southern escarpment face with a stand of scrub remaining in the background (left) and the remaining scrub up-close, dominated by broom with hawthorn and rowan in the background (right).

3.2.4 Rock Tors

Exposed schist tors occur in a limited number of locations on the property (Figure 2). These features are very small in size and occur as isolated outcrops within heavily grazed pasture, reducing their connectivity to surrounding habitats and limiting opportunities for colonisation by indigenous fauna. The schist is largely smooth and unfractured, with very few deep fissures or cavities - features that are typically essential for supporting rock-dwelling lizard species in Otago.

Despite this degradation and isolation, signs of lizard activity were recorded during the site visit, including faecal pellets within one of the few existing crevices and two McCann's skinks (*Oligosoma maccanni*) observed basking on the rock surface. Given their abundance in the Ecological District, and their ability to disperse through grassland, it is reasonable to assume that the droppings also belonged to McCann's skink. The small amount of suitable crevice habitat, lack of connections to populations occurring in the wider landscape, and likely high predation pressure from introduced pests, means that rock-dwelling gecko species are considered unlikely to still be present.

Although currently of limited ecological value, the tors remain an interesting geological and visual feature and could be enhanced through restoration. See Figure 8 below for images of the remaining rocky tors on-site.



Figure 8: Photographs of the two rocky tors mapped in Figure 2, the photograph on the left showing the crack in which droppings were observed.

3.2.5 Exotic Trees and Scrub

Exotic vegetation occurs throughout the property. Species include willow sp. along the gully margins, a large Douglas fir on the upper plateau and smaller ones throughout the property, and a range of amenity and shade trees around the dwelling and within paddocks. A small orchard-like cluster of fruit trees is present on the lower southern escarpment, encapsulating the single *Olearia odorata* (Figure 2). These trees contribute little overall ecological value but would provide some seasonal food and perching opportunities for birds.

3.2.6 Improved Pasture

The majority of the property comprises improved pasture, consistent with its long history of agricultural use. Palmer (2009) recorded the vegetation as being dominated by browntop (*Agrostis capillaris*), with a mix of other common pasture grasses and herbs including Yorkshire fog, cocksfoot (*Dactylis glomerata*), yarrow (*Achillea millefolium*), clovers (*Trifolium* spp.), and curled dock (*Rumex crispus*). Field observations confirm that this pattern remains largely unchanged, with rank grassland and grazed paddocks covering most of the site outside the wetland and escarpment areas.

The pasture is low in indigenous diversity and representativeness. Its primary relevance is in forming the matrix habitat surrounding the more distinct ecological features described above.

3.2.7 Mammalian Pests

Mammalian pests are common across the propertyt. Rabbits (*Oryctolagus cuniculus*) are particularly abundant, with several active warrens observed on the steep escarpment faces and extensive evidence of grazing. Given the surrounding farmland and proximity to residential areas, it is reasonable to assume the presence of a wider suite of introduced mammals, including stoats (*Mustela erminea*), ferrets (*M. furo*), weasels (*M. nivalis*), hedgehogs (*Erinaceus europaeus*), rats (*Rattus* spp.), house mice (*Mus musculus*), domestic and feral cats (*Felis catus*), and possums (*Trichosurus vulpecula*).

These species collectively contribute to predation pressure on lizards, birds, and invertebrates, and grazing impacts on regenerating vegetation.

4 Discussion

Based on the existing assessments and on-site observations, the gully and associated streams, wetland and hydrology form the ecological core of the site. It provides the underlying water regime that sustains wetland conditions and connects habitats between the north-western and south-eastern ends of the property.

More indigenous bird species were observed using the artificial wetland than any other habitat on-site, and this feature also supports the highest density and abundance of indigenous vegetation. Despite no formal fauna survey occurring, it is highly likely that future surveys will find this is the most utilised habitat on the property. It is connected via the stream to areas of natural inland wetland that, although degraded, are highly suitable for restoration and likely to achieve measurable gains in ecological value through indigenous enhancement planting. National-level protection of natural inland wetlands (see Section 5) makes these areas unsuitable for development, reinforcing their suitability for future enhancement and incorporation within subdivision design.

The degraded wetlands and site topography together offer an opportunity to promote sustainable stormwater management through the use of wetland planting, swales, and soakage systems to manage runoff while improving habitat quality. With careful water-quality management, these features could increase wetland extent, connectivity, and indigenous species diversity on the property.

In contrast, the grazed exotic pasture and recently cleared, previously exotic-dominated escarpment face are unlikely to represent key ecological features of the property. These areas present opportunities for enhancement planting where unsuitable for development (such as the escarpment face) and indicate locations where future development is less likely to generate substantial adverse ecological effects.

Replanting the escarpment with indigenous tussock grassland or kānuka dominant shrubland would provide a cost-effective means of stabilising slopes while allowing wetland enhancement to be prioritised as wetlands are considered a national priority for conservation. This approach would still improve the overall ecological representativeness of the escarpment, using a low-maintenance indigenous species mix appropriate for the ecological district.

Should the site progress to subdivision following rezoning, detailed wetland delineation, ecological impact assessment (including flora and fauna surveys), and preparation of an ecological management plan would most appropriately be undertaken at the subdivision consent stage.

5 Planning Context and Legislative Alignment

The current Arrowtown South Special Zone includes specific indigenous-revegetation requirements for the escarpment that were primarily imposed to address landscape and amenity outcomes rather than ecological ones:

"The McDonnell escarpment extends parallel to the road and is the key defining landscape feature on the southern and western edges of Arrowtown… The protection and enhancement of the southern part of the escarpment will enable both existing houses that are above the escarpment and future houses within the zone to be visually integrated with this feature."

From an ecological perspective, the escarpment appears to support very little indigenous biodiversity and is unlikely a key ecological feature of the property.

In contrast, the wetlands represent a key area of ecological value on-site. Activities that may affect these wetlands or the connected gully system fall under the National Environmental Standards for Freshwater Management 2020 (NES-F), which controls vegetation clearance, earthworks, drainage, and discharges within and near natural inland wetlands. The Otago Regional Council Regional Water Plan and the Queenstown Lakes Proposed District Plan further manage potential effects at the regional and district level. Together, these frameworks provide for the assessment and management of any potential effects on wetland extent, values or hydrology.

The National Policy Statement for Indigenous Biodiversity 2023 and Section 6(c) of the Resource Management Act 1991 also ensure that significant indigenous vegetation and habitats of indigenous fauna are recognised and provided for. Most indigenous fauna (including all indigenous lizard species) remain protected under the Wildlife Act 1953, which will continue to apply through all future stages of development. This means that even the artificial pond can be attributed protection under the existing national-level legal framework due to its potential to provide significant habitat for indigenous fauna.

Overall, the existing national and regional legislation provides the regulatory framework within which ecological values, wetlands being of particular relevance, would be managed irrespective of land-use zoning.

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GEOSOLVE



GEOTECHNICAL



WATER RESOURCES



PAVEMENTS

Geotechnical Report for Private Plan Change

175 McDonnell Road and 132 Centennial Avenue

Arrowtown

Report prepared for:

Roger Monk

Report prepared by:

GeoSolve Limited

Distribution:

Roger Monk

J Carter Planning Limited

GeoSolve Limited (File)

February 2026

GeoSolve Ref: 250625

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GEOTECHNICAL WATER RESOURCES PAVEMENTS

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1 Introduction

1.1 General

This report presents the results of a geotechnical assessment undertaken by GeoSolve Limited (GeoSolve) to provide comment on the anticipated geohazards, geotechnical considerations and high-level recommendations for the subject site in support of a private plan change application.

This assessment has been completed for Roger Monk in accordance with GeoSolve proposal reference 250625 dated 17th September 2025.

1.2 Development

We understand the proposed development comprises submission of a private plan change to re-zone the properties. The re-zone will mostly comprise lower density residential, with a visitor accommodation and commercial zone in the south western corner of 175 McDonnell Road, as per the supplied Aurum Survey plans appended.

Figure 1.1 below shows the location of the subject site , which comprises 175 McDonnell Road and 132 Centennial Avenue.



Figure 1.1. Site location (Source QLDC Webmaps).

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2 Site Description

2.1 General

The subject property includes three parcels of land, legally described as Part Section 104 Block VII Shotover SD, Lot 1 DP 25880, Section 1 SO 24781 and Lot 2 DP 25880 (132 Centennial Avenue), and is located at the southern end of the Arrowtown township, as shown in Figure 1.2 above.

The property is bounded by McDonnell Road to the west, Centennial Avenue to the east, residential developments to the north and the Arrowtown Golf Course and residential lots to the south.

The site has an existing residential and commercial building accessed off McDonnell Road, as well as a hardstand area and various sheds. A residential building is located at 132 Centennial Avenue. The balance areas are undeveloped and currently being used as farmland. Vegetation typically comprises mostly pasture with shrubs and trees in sloping areas.

2.2 Topography and Surface Drainage

Site contours are provided on Figure 1 Appendix A.

Site topography comprises a centrally located elevated ridgeline that extends south from the Advance Terrace area of Arrowtown. The ridge separates the western half of the site from the eastern half. The crest of the ridgeline is approximately 25-35 m above the lowest lying areas to the west. The western side of the ridgeline is steeper with a relatively consistent slope of 25-30°, the eastern slope is shallower and is typically 15-20°.

The western portion of the site is the lowest-lying area with a creek running north-west to south-east. The creek is dammed by an earth bund on the southern boundary resulting in a pond on the upstream side. Localised areas of marshy ground are present around the creek and pond.

Gently sloping terraces are present along the western boundary of the site between the creek and McDonnell Road, and where the dwellings and hardstand areas are located.

Various soil bunds have been constructed associated with the developed areas including minor cut to fill. A terraced stone retaining wall is located below the commercial building.

Photograph 2.1 below shows a general view of the north western area.

The eastern portion of the site comprises a gradually shallowing slope that falls approximately eastwards to Centennial Avenue. Gradients by the road are gentle and there are no established overland flow paths. Photograph 2.2 below shows a general view of the eastern area.

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Photo 2.1 – Looking north-west across the north-western portion of the subject site from the central ridgeline. The creek and marshy ground can be seem close to the tow of the slope.



Photo 2.2 – Looking north-east across the north-eastern portion of the subject site, with Centennial Avenue in along the eastern margin.

3 Subsurface Conditions

3.1 General

Site specific intrusive investigations have not been undertaken for this assessment. A review of the site geology and subsurface conditions has been undertaken using published information, nearby investigation data and surface exposures mapped during the site inspection.

3.1 Regional Geology

The site is located in the Wakatipu basin, a feature formed predominantly by glacial advances. Published references indicate the last glacial event occurred in the region between 10,000 and 20,000 years ago. Glaciations have left deposits of glacial till, glacial outwash and lake sediment over ice–scoured bedrock. Post glacial times have been dominated by the erosion of the bedrock and glacial sediment, with deposition of alluvial deposits by local watercourses and lacustrine sediment during periods of high lake levels.

No known active fault traces are present at the site or in the immediate vicinity. A significant seismic risk exists in this region from rupture of the Alpine Fault, located 80 km northwest from Queenstown along the West Coast of the South Island. There is a high probability that an earthquake with an expected magnitude of over M_W 8 will occur along the Alpine Fault in the next 50 years.

3.2 Regional Geological Mapping

Regional mapping[1] indicates the site geology to be 'schist rock' with a westerly orientated foliation. Soil cover is not shown. No active faults are indicted on or nearby the site.

3.3 Nearby Investigation Information

Site specific intrusive investigations have been completed around the margins of the site which enable a summary of the ground conditions at the site and immediate area to be inferred.

GeoSolve have reviewed the geotechnical report for the neighbouring property immediately to the north west, and the key points from this report are summarised below:

- Test pits, Scala penetrometers, Cone Penetration Tests (CPT), and soakage tests were undertaken.
- Identified materials comprised uncontrolled fill, loess, alluvial deposits overlying schist bedrock.
- Groundwater was observed at 0.9-2.9 m bgl.

[1] The institute of Geological and Nuclear Sciences Limited, 1:250,000 Geological Map 18, Wakatipu, 2000.

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The ground conditions identified immediately to the north west are expected to continue south into the subject site and be present along the alignment of the creek and immediate areas.

Investigations along the elevated area of the Advance Terrace ridgeline immediately north of the site have been undertaken by Geosolve in recent years, including test pits and DPH testing to depths of 12 m. The investigation data shows the ridgeline comprises granular glacial deposits which are typically medium dense to dense, with rock at depth.

Geosolve have completed investigations for residential developments immediately beyond the southern boundary and the ground conditions in this area comprise shallow (0.5 to 5 m) schist rock, overlain by alluvial deposits of silt sand and gravel.

The results of the investigations outlined above are consistent with internal geological exposures observed during site mapping.

3.4 Summary of the Site Geology.

Central Ridge

The central ridge, see Area A on Figure 3.1 below, is expected to comprise granular, medium dense to dense glacial deposits, e.g. glacial outwash with rock and groundwater at depth. Lower parts of the slope may have a veneer of colluvium and or slope wash.

Western Area (west of the central ridge)

Ground conditions west if the central ridge are expected to comprise shallow (< 1 m) surface deposits of topsoil and loess overlying alluvial deposits of silt, sand and gravel. Localised uncontrolled fill is also present around the buildings and yard areas, and pockets of peat may be present on the margins of the Creek. Depth to bedrock will be variable however is likely to be present at depths of less than 10 m in most locations, and could be near the surface immediately adjacent to McDonnell Road. Groundwater is expected to be to be shallow adjacent to the creek and is likely to be < 4 m over most of this area. This area is shown as Area B on Figure 3.1 below.

Eastern Area (east of the central ridge)

Ground conditions east of the central ridge are expected to comprise shallow (< 1 m) surface soils of topsoil and loess overlying alluvial and outwash deposits of sand and gravel. Local exposures of rock are present in southern areas of Arrowtown and the adjacent golf course, and depth to rock is estimated to be variable, and generally between 1 to 10m. Local areas of perched groundwater may be present on the underlying rock. This area is shown as Area C on Figure 3.1 below.

Southern Area

An area to the south, east of the dam, is characterised by surface exposures of rock with sediment deposition comprising silt, sand and gravel in the low lying areas. This area is shown as Area D on Figure 3.1 below



Figure 3.1. Areas A, B, C and D as described in Section 3.4 above.

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4 Preliminary Geohazards Assessment

4.1 General

A site walkover was undertaken on 29 October 2025 to map the geological and geomorphological features across the site and assist with geotechnical hazard review for the site.

4.2 Seismic

A severe seismic risk is present in the region, as discussed in Section 3.1, and appropriate allowance should be made for seismic loading during detailed design and geotechnical assessment at Resource and building Consent Stages.

4.3 Liquefaction

With respect to liquefaction susceptibility a preliminary assessment has been undertaken by review of existing hazard mapping, site observations and nearby detailed assessments.

Regional mapping undertaken in 2019 by GNS science available on the Queenstown Lakes District Council (QLDC) hazard mapping shows most of the site to be Domain A with the exception of an area in the north western corner of the site which is classified as Domain B1. GNS describes the 2 categories as follows:

- Domain A: The ground is predominantly underlain by rock or firm sediments. There is little or no likelihood of damaging liquefaction occurring. In MBIE (2017) terms, liquefaction is unlikely.
- Domain B1: The ground is predominantly underlain by poorly consolidated river or stream sediments with a shallow groundwater table. There is considered to be a low to moderate likelihood of liquefaction susceptible materials being present in some parts. There is geotechnical evidence for the presence of liquefaction-susceptible materials at least in some locations at the surface. In MBIE terms, liquefaction damage is possible.

Figure 4.1 below provides an excerpt from the QLDC hazard mapping showing the GNS liquefaction susceptibility mapping.

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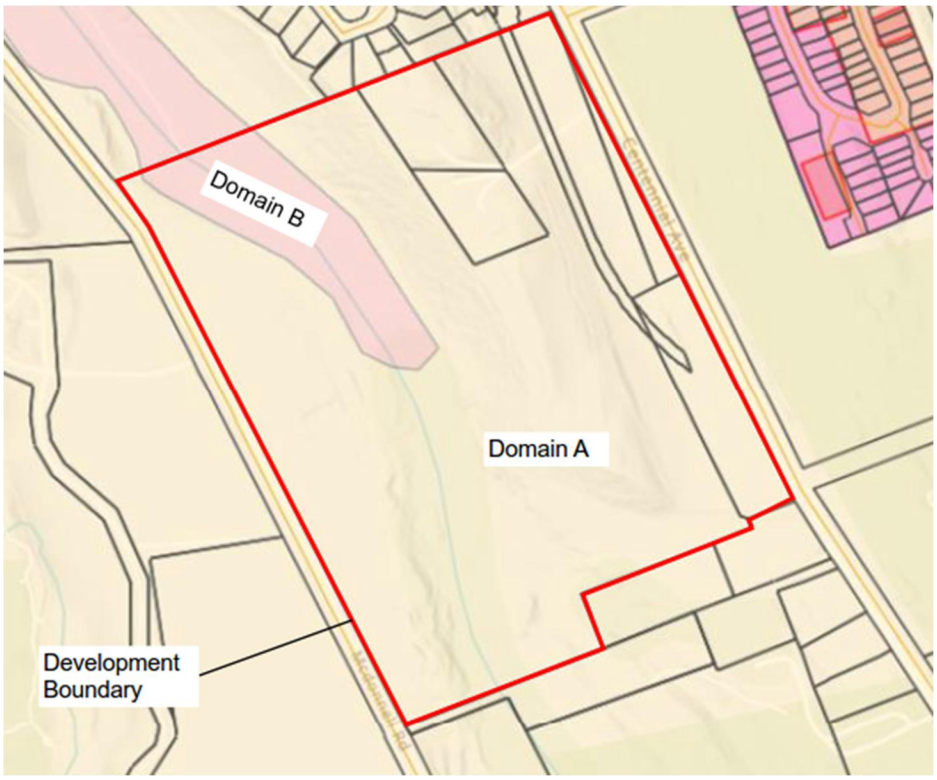


Figure 4.1. QLDC Hazard Mapping, GNS 2019 Liquefaction Vulnerability.

Site observations and a review of nearby geotechnical assessment reporting generally confirms the GNS regional mapping shown in Figure 4.1. Geosolve expect the area shown as Domain B1 on Figure 4.1 will extend further south than that mapped by GNS in 2019.

The ground model and liquefaction hazard identified by specific investigation immediately to the north west is expected to extend south into the subject site and follow the creek. A moderate to high liquefaction risk is therefore expected in western areas of the site and a lateral spreading risk may also be present around the creek margins.

The highest risk zones will be associated with the low-lying wetland and pond areas where the groundwater table will be at or near surface, and adjacent areas. The risk of liquefaction is expected to reduce with distance from the creek. as the depth to the groundwater increases, as shown on Photograph 4.1 below.

The liquefaction vulnerability in eastern areas of the site is expected to be low and Domain A, as identified by GNS, is considered appropriate.

Due to the identified liquefaction risk, specific site investigation and liquefaction analyses will be required at the subdivision planning and design stages to determine the liquefaction mitigation required for Resource Consent.

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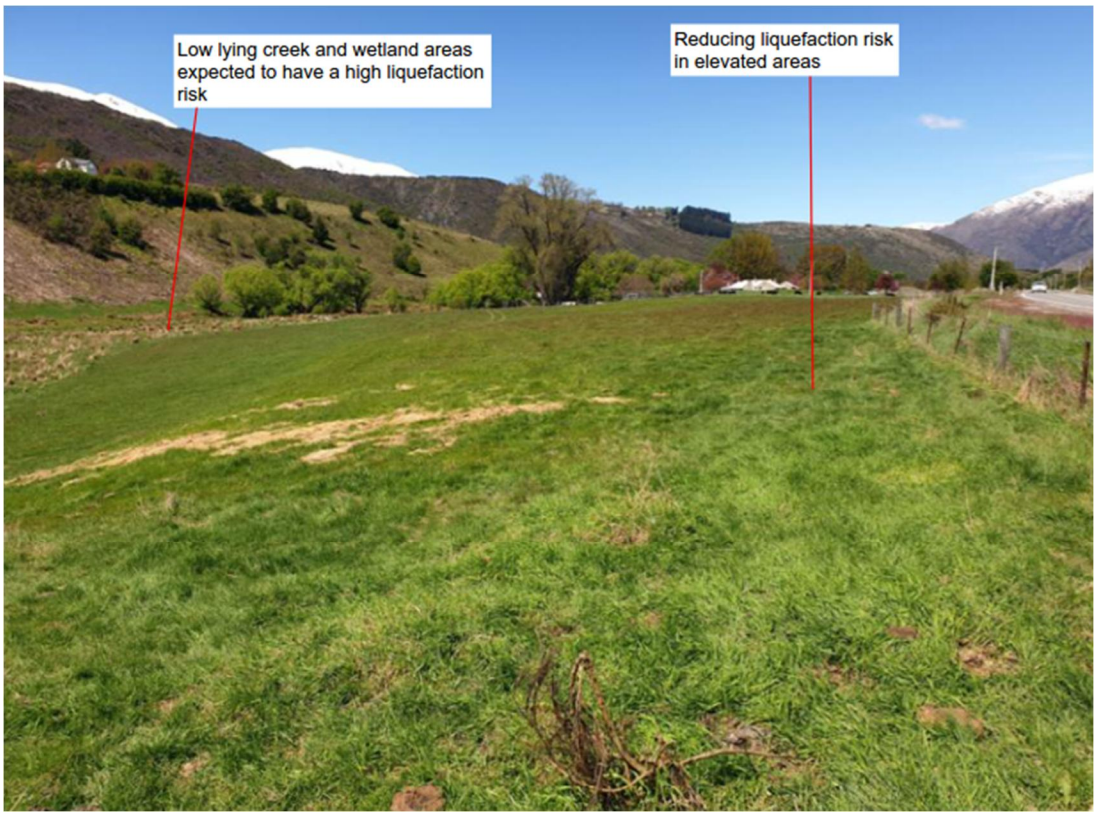


Figure 4.2 – Looking south-east across the low-lying wetland and adjacent elevated are adjacent to McDonnell Road.

4.4 Slope Instability

4.4.1 Deep-Seated Instability

There was no Geomorphological evidence of deep seated slope instability observed during the site inspection, and no mapped instability is present on QLDC hazard mapping.

4.4.2 Shallow instability

Surficial soil creep, shallow slumping and sheet erosion were observed in the areas identified on the geomorphology map, Figure 1, Appendix A, and are shown on the photographs provided in Figure 4.3 below. These areas are inferred to be on slopes affected by a combination of steep ground generally steeper than 3H: 1V (horizontal to vertical), perched groundwater or areas affected by surface runoff (exacerbated by vegetation removal). These areas typically isolated to relatively small and well-defined features. Common engineering mitigation measures are available to address this type of instability.

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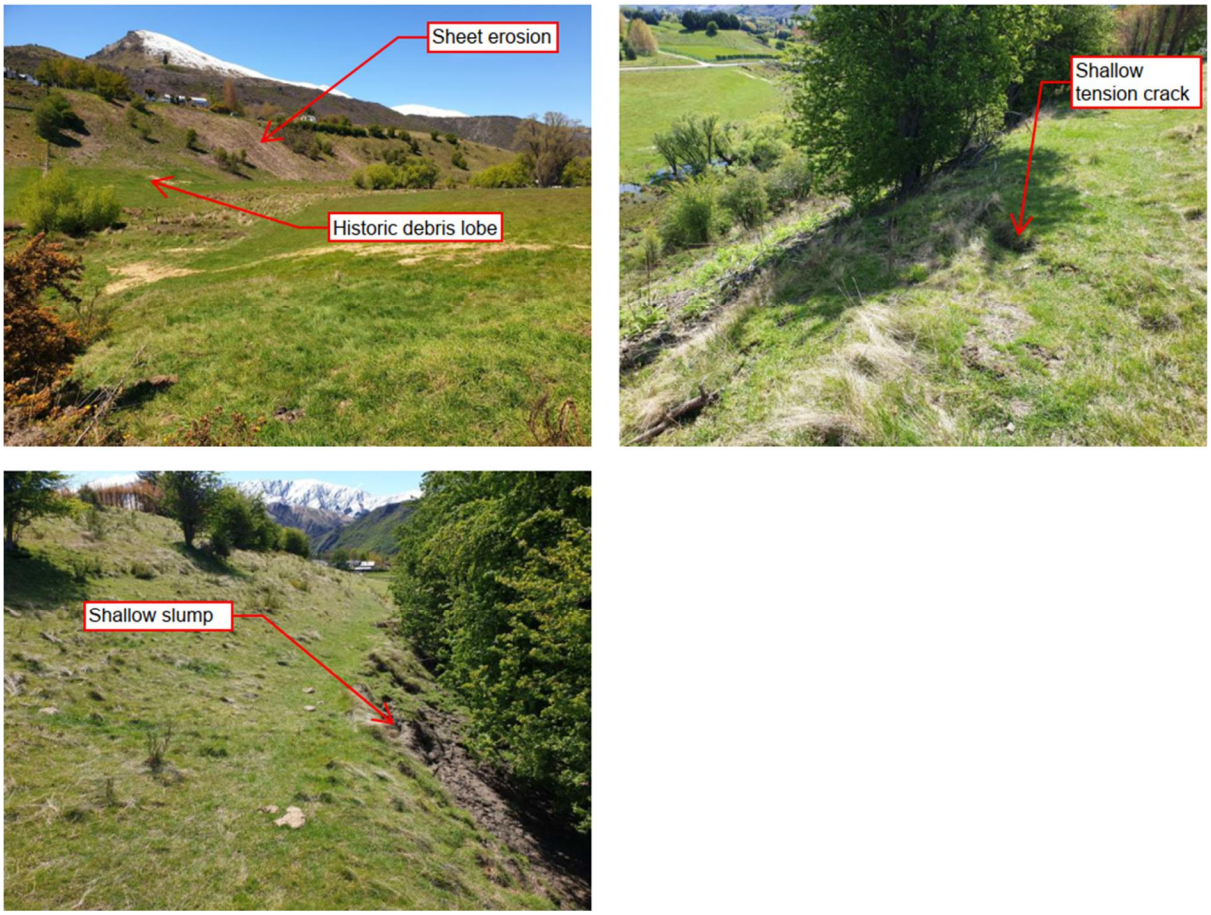


Figure 4.3 – Examples of shallow instability (Left to right), looking back at the west-facing ridgeline slope, tension crack at crest of ridgeline, slumping on east-facing ridgeline slope.

4.4.3 Slope Performance with respect to Residential Development

The west facing slopes of the central ridgeline provide a relatively consistent slope of 35° and the geology is expected to comprise glacial outwash deposits of sand and gravel. Based on the site observations and expected geology this slope is assessed as stable in its current condition under static (non-seismic) conditions. From experience with similar slope configurations Geosolve consider instability of this slope during a moderate to large seismic event is considered possible, and/or factors of safety may not satisfy recommended engineering guidance for residential development. See Section 5.4 and 6 below for further recommendations.

The eastern side of the ridge comprises a shallower slope of 15-20° and no significant slope stability risk is likely to be present in this area that will preclude development.

4.5 Rock Fall

No rock fall source areas that could affect the site have been identified.

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4.6 Flooding and Overland Flow

The potential for ponding water in low lying western areas around the creek has been identified and should be considered at resource consent and subdivision design stages as part of the overall subdivision stormwater management.

Final earthwork and building floor levels around the creek will need to provide sufficient free board above modelled flow and ponding levels.

4.7 Natural Hazard Risk

Natural hazard risk at the property will principally be liquefaction around the margins of the creek and shallow landslips associated with steeply sloping areas.

As noted in Section 3.2 of the National Policy Statement for Natural Hazards 2025 a risk based assessment needs to consider mitigation measures and residual risk, as shown below:

> (2) When assessing natural hazard risk, decision-makers must consider:
>
> (a) existing and proposed mitigation measures; and
>
> (b) residual risk that arises when design thresholds of any existing and proposed mitigation measures are exceeded.

At this stage of the project mitigation measures are not yet known and, if required, will depend on the detailed geotechnical assessment and recommendations to be provided at the resource consent and engineering stages. Typical mitigation options are likely to comprise:

- Avoidance/building set-back from identified hazard areas.
- Ground stabilisation, e.g. in-ground walls, geogrid reinforced fill.
- Specific foundation design, e.g. TC2 or TC3 foundations in line with MBIE recommendations.
- Minimum floor level requirements.

Geosolve expect the consequences from the identified natural hazards can be reduced to minor or negligible if appropriate engineering assessment and mitigation is undertaken. A comprehensive risk assessment which considers mitigation measures can then be provided as part of a resource consent report.

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5 Preliminary Engineering Considerations

5.1 General

Residential development for the subject site is considered feasible from a Geotechnical perspective. The geotechnical issues associated with future subdivision design and construction, and residential development by individual lot owners, will generally be similar to existing developments in the surrounding area for a significant portion of the site.

Geotechnical risks are however present in some areas of the site and detailed investigation and assessment will be required as part of any subdivision consent application and detailed engineering design process.

Preliminary engineering considerations are provided below.

5.2 Earthworks

Cut and fill earthworks are expected to be readily achieved across the site however specific assessment will be required where excavations or filling near slopes or over settlement-prone ground (e.g., the low-lying wetland areas) are proposed.

Deep excavations across the property will need to consider groundwater, which will be shallow in some areas. Shallow investigations around the margins of the creek are also expected to intercept groundwater. Dewatering or other groundwater related construction methodology may be required for excavations around the creek.

Shallow uncontrolled fill is present in many areas, particularly in the western half around the building and yard. Uncontrolled fill will need to be removed from beneath future lots, roading and engineered fill footprints. Re-use as engineered fill may be feasible based on engineering review.

Site-won material will be variable in composition. Soils with a high silt content are likely to be encountered and site won materials may therefore be challenging to re-use as engineered fill.

The subsurface soils will be relatively easy to excavate by conventional methods; however, schist bedrock rock is expected to be at shallow depths as identified on the hazard map. Subsurface investigations will be required to confirm depths to schist in other areas.

5.3 Foundations

The site is subject to subsurface investigation at the Resource Consent stage to confirm recommendations with respect to foundation design. Foundation design can also be further addressed as part of Geotechnical Completion reporting. Foundation design requirements will vary across the site and preliminary review is provided below.

Eastern Areas

Geosolve expect that ultimate bearing capacities with respect to typical shallow residential foundations bearing on natural soils will be in the 200-300 kPa range. A range of standard

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foundation options frequently used in the Lakes District will be available, such as waffle rafts, timber pile, strip and pad footings. Local undercutting of weaker soils and replacement with engineering fill, and deepening foundation bearing depth, can be utilised to improve foundation performance.

Western Areas

A risk of liquefaction, lateral spreading and low bearing soils has been identified around the creek and pond and adjacent areas. Specific foundation design is expected to be required to address the identified issues. Ground improvement or remediation at the subdivision design stage, e.g. area wide stabilisation, can be considered to reduce engineering requirements for future development.

It is anticipated that MBIE TC1 to TC3 foundations will be required to address liquefaction. If high risk zones are intended to be developed then specific engineering investigation and is recommended to confirm feasibility and engineering options.

5.4 Hazards

Liquefaction

The potential for liquefaction and associated lateral spreading has been identified at the site, particularly around the creek and pond, and adjacent low lying areas. Detailed assessment will be required to determine if mitigation is appropriate and any associated engineering considerations. Appropriate options may include:

- Avoidance/building set-back from identified hazard areas.
- Ground stabilisation, e.g. in-ground walls, geogrid reinforced fill.
- Specific foundation design, e.g. TC2 or TC3 foundations in line with MBIE recommendations.

Slope Stability

As discussed in Section 4.4.3 above any proposed subdivision or building development in close proximity to the western slopes of the central ridge will require specific engineering assessment with respect to slope stability. A slope stability assessment, including site investigations, will be required to confirm lot boundaries, any offsets from the toe, specific engineering design requirements for future buildings, and/or if remedial works are required.

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6 Summary and Further Work

Residential development for the subject site is considered feasible from a Geotechnical perspective. Geotechnical considerations have been identified for the development area and will require detailed assessment for resource consent.

To assist with final subdivision layout, earthworks design, resource consent and subdivision engineering, Geosolve recommend the following geotechnical investigation and assessment works be undertaken:

- A test pit investigation should be undertaken across the site sufficient to confirm the geological stratigraphy in the upper 2-3 m.
- Deep cone penetrometer (CPT) investigations should be undertaken, particularly in western areas, to enable a detailed liquefaction and lateral spreading analysis to be undertaken.
- Slope stability analysis should be completed for the slopes on the western side of the central ridge, as discussed in Section 5.4.
- Flooding and overland flow should be assessed, as discussed in Section 4.6.
- Geotechnical review of the proposed subdivision layout and associated earthworks .

Geosolve consider the requirements provided in the QLDC Land Development and Subdivision Code of Practice 2025 are appropriate to control the risk of development with respect to geotechnical considerations and natural hazards at the site.

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7 Applicability

This report has been prepared for the sole use of our client, Roger Monk, with respect to the particular brief and on the terms and conditions agreed with our client. It may not be used or relied on (in whole or part) by anyone else, or for any other purpose or in any other contexts, without our prior review and written agreement.

No subsurface investigation has been undertaken. This report has been prepared on the basis that subsurface investigation will be undertaken for future consenting.

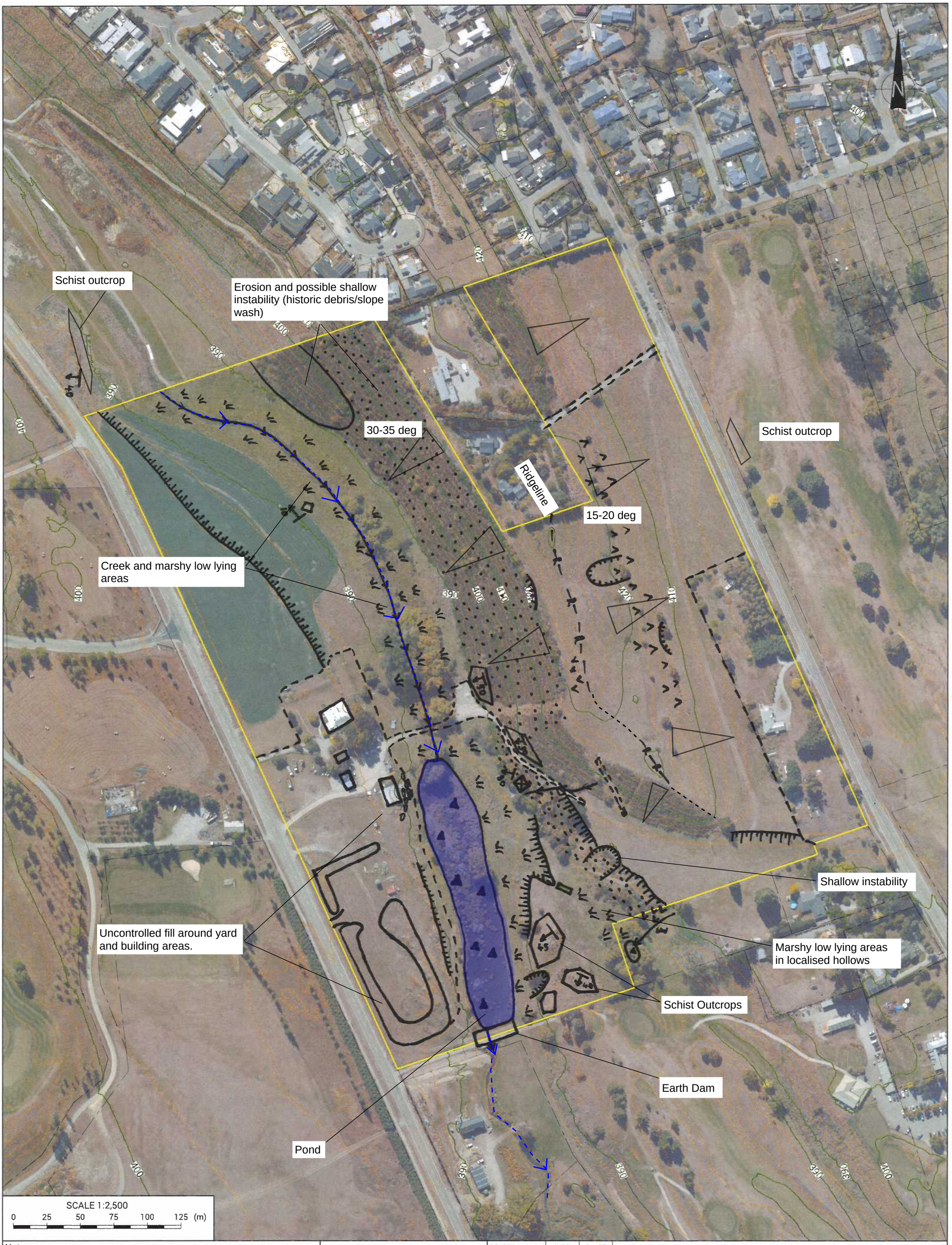
Report prepared by:	Reviewed for GeoSolve Limited by:
	
.....	.....
Henry Nagel Engineering Geologist	Paul Faulkner Principal Engineering Geologist

Appendices: Appendix A – Site Plan - Figure 1

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Appendix A: Site Plan

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Notes:
1. These drawings have been prepared for the benefit of Roger Monk with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

Legend:
Lidar Contours
2m Minor Interval, 10m Major Interval
(Source: QLDC, Otago - Queenstown LiDAR 1m DEM 2021)

GEOSOLVE
Level 1, 70 Macandrew Road, South Dunedin
www.geosolve.co.nz

DRAWN	WCG	Oct.25
CHECKED	PGF	Feb.26
APPROVED		
CAD File	250625.dwg	
Scale (at A3)	1:2500	
Project No.	250625	

Roger Monk
175 McDonnell Road, Arrowtown
Geotechnical Report for Plan Change
Geomorphology Plan

Figure No. Appendix A, Figure 1
Revision 0



GEOSOLVE

Aukaha
KIA KAHA, AU KAHA

Roger Monk
C/- Jenny Carter
JCarter Planning Limited
Via email: jenny@carterplanning.nz

18 February 2026

Tēnā koe Jenny

Brackens Ridge Private Plan Change Proposal

I write on behalf of Aukaha (1997) Ltd ("Aukaha"), who represents Kāi Tahu ki Otago papatipu rūnaka (kā rūnaka). Thank you for the opportunity to provide an initial response to the proposed plan change for the Brackens Ridge site at McDonnell Road, Arrowtown.

This response is based on the information provided to date, which I have summarised for kā rūnaka. This includes the proposed zone plan dated 23 September 2025, the Preliminary Ecological Assessment (Restore 2025), the Ecological Assessment of Wetlands (Wildlands 2022), the Ecological Assessment Report (Dawn Palmer 2009), the Spatial Plan Call for Sites planning memo (2023) and other information you have communicated regarding the proposed development approach for this site.

I note that Kāi Tahu ki Otago Ltd (as Aukaha was formerly known) provided preliminary comments on 20 August 2009 to a proposed subdivision/private plan change proposal (PC39). This (and any subsequent) response supersedes that feedback, although it is worth noting that the issues raised in that letter do provide high-level guidance on likely key issues relating to any future subdivision works.

I understand that further technical reports are still to be delivered, which may further inform the proposed management approach for this property. I look forward to the chance to review and provide feedback as these become available and the planning and development intent for the property becomes more refined.

General Comment

Kā rūnaka have no concerns in principle with the proposed plan change for the 17.9 ha Monk Farm property at McDonnell Road. This appears to be a logical extension of the Arrowtown urban area, with further urban expansion in this area likely limited by the presence of golf courses and retirement village to the south, east and west. If well-managed, residential zoning appears to be a more efficient use of the land than the rural living provided for by the Arrowtown South Zone in the Operative District Plan (ODP).

This overall position is expressed in the context of overarching and very strong concerns that kā rūnaka hold in relation to the conveyance, treatment and disposal of wastewater in Queenstown Lakes, particularly in the Whakatipu Basin. It is noted that the Brackens Ridge development is proposed to be reticulated as to drinking and wastewater. Setting aside Queenstown's on-going wastewater issues, this would be considered the right approach for this development. However, it is worth noting that kā rūnaka are advocating to Queenstown Lakes District Council for a broader strategic and more holistic approach toward wastewater treatment and disposal in the Whakatipu Basin.

Kāi Tahu Values

When considering urban development in Queenstown Lakes, kā rūnaka draw attention to the Kāi Tahu values framework expressed in the Queenstown Lakes Spatial Plan 2021. This values framework was developed to provide a Kāi Tahu perspective on appropriate approaches to urban development.

While all values may hold some relevance, the most relevant values are likely to be:

- *Whanaukataka and manaakitaka* – encouraging development that is community and family-focused, as well as emphasising a sense of welcome and hospitality to visitors and residents alike

- *Mauri and tikaka* – centring the duty of care to safeguard and, where possible, enhance te taiao (the natural environment), particularly wai māori (freshwater) and any mahika kai species

- *Haere whakamua* – looking to the future with the wellbeing of following generations at the forefront

These values can be woven into thinking in relation to matters such as design of public and communal spaces; providing for alternate transport modes and localised services where possible; connectedness beyond the property

boundaries; and the management and treatment of natural waterways, wetlands and stormwater.

Site-Specific Values

In addition to these wider Kāi Tahu values, a high-level scan has identified the following potential values specific to the site:

Wai māori/wāhi tūpuna

The site is not in a mapped wāhi tūpuna in the Proposed District Plan (PDP). At its closest point it sits roughly 200m from Haehaenui (Arrow River) wāhi tūpuna (#28) which has listed values that include ara tawhito, mahika kai and nohoaka. These values relate to historic and contemporary associations with the Haehaenui catchment as a travel route, place of seasonal settlement and area for gathering food and other resources.

While not in the mapped wāhi tūpuna, the site contains a tributary of Haehaenui/Arrow River, which may be colloquially referred to as McDonnell Creek. In line with ki uta ki tai approach to resource management, Kāi Tahu view the creek as part of the wider catchment that feeds Haehaenui, the Kawarau and eventually the Mata-au/Clutha. Opportunities to enhance the mauri/well-being of the creek and associated wetland complexes (including natural inland, artificial or potential wetlands) would be supported by kā rūnaka.

Blue Green Network

The creek is mapped in the draft QLDC Blue Green Network Plan and is identified for proposed ecological improvement along riparian margins. Ecologist assessments to date suggest that ecological investment within the property would be best directed to the wetlands and creek. This is in line with the Kāi Tahu perspective on blue-green networks, which is to prioritise wai Māori (freshwater) first and build from there. The management of stormwater and how it interacts with the creek/wetlands and associated indigenous species will be an integral part of this.

It is noted that the zone plan does not yet make the same provision for public walkways/cycleways and open space that the ODP plan provisions do. As a high-level zone plan this is understandable, however, kā rūnaka are interested to see how this provision may be incorporated in more advanced plans moving forward, particularly as it relates to access to and along the wetlands and creek.

Thank you for the opportunity to be involved in this plan change proposal and I look forward to working with you, on behalf of Kāi Tahu papatipu rūnaka, as the proposal progresses. Please note that this initial response is made without prejudice to any possible involvement of kā rūnaka in any future notified plan change proceedings.

Nāku noa, nā



Michael Bathgate
Senior Planner
Aukaha (1997) Limited

Cc: Margaret Ferguson, Kaikawe Mahere a Rohe, **Te Ao Mārama Inc.**

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PROPOSED PRIVATE PLAN CHANGE 2 – ARROWTOWN SOUTH

SUBMISSION BY MOUNT SOHO TRUST LTD

COMMENT ON LANDSCAPE ISSUES

Ben Espie

vivian+espie

13 November 2026

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1 I have read the submission regarding Proposed Private Plan Change 2 (**PPPC2**) that has been made by Mount Soho Trust Ltd (**Mount Soho**), and I have been asked to comment on the relief sought by Mount Soho in relation to landscape issues.

2 As is set out in the Mount Soho submission, as part of the Proposed District Plan (**PDP**) process, the QLDC commissioned the Wakatipu Basin Land Use Planning Study (**WBLUPS**) to give guidance regarding a suitable zoning regime for the Wakatipu Basin, based on a study of the landscape character and visual amenity of the basin. The WBLUPS concluded that the South Arrowtown Landscape Character Unit (which includes all of the ASSZ, incorporating the PPPC2 and Mount Soho sites) has a high capability to absorb additional development and recommended urban scale development for this area, subject to suitable design.

3 Without covering the detail of the WBLUPS's analysis, I agree with its conclusions regarding the relevant area; urban development can be accommodated over the area, subject to appropriate design. I also agree with the Mount Soho submission that, confining new zoning to the PPPC2 site alone misses an opportunity to re-address the Arrowtown South Special Zone (**ASSZ**) as a whole, as is recommended by the WBLUPS.

4 The Mount Soho submission seeks that the entire ASSZ is rezoned comprehensively, so that the predominant zone over the area becomes Suburban Residential. In association with this, the submission seeks that the Urban Growth Boundary (**UGB**) is configured so as to encompass all of the area of the current ASSZ. PPPC2 draws the UGB at the straight cadastral property boundary at the southern end of the PPPC2 site, leaving the remainder of the current ASSZ outside of the UGB.

5 While I have not undertaken a detailed assessment of the landscape and visual effects of the Mount Soho relief to date, I consider that the Mount Soho relief generally represents an

appropriate outcome for the Mount Soho site and the broader area of the current ASSZ. Given the existence of the ASSZ and the findings of the WBLUPS that the South Arrowtown Landscape Character Unit is able to absorb (appropriately deigned) urban development, I consider that the Mount Soho submission's proposed UGB configuration is more logical than that which is proposed by PPPC2.

6 At a high level, I consider that key aspects of an appropriate treatment of the site will be:

- Open space and improved natural character over the watercourse/wetland part of the site and the prominent escarpment;
- Providing public access alignments through the site so as to appropriately connect with the alignments through the current PPPC2 site and with other public places;
- Reduced density over the elevated ridge area of the site so as to represent a feathering out of the existing line of residential land use that extends along this ridge from the north;
- Providing appropriate and attractive frontages to both Centennial Avenue and McDonnell Road including suitable setbacks, vegetative treatments and limited road access points;

7 The above points need not necessarily be resolved at the time of zoning. The Mount Soho submission suggests using a Structure Plan and / or bespoke PDP provisions to address these points, which I consider to be appropriate.

8 Regarding issues of landscape and visual effects, I am supportive of the Mount Soho Relief overall.

Ben Espie

vivian+espie

13 November 2026