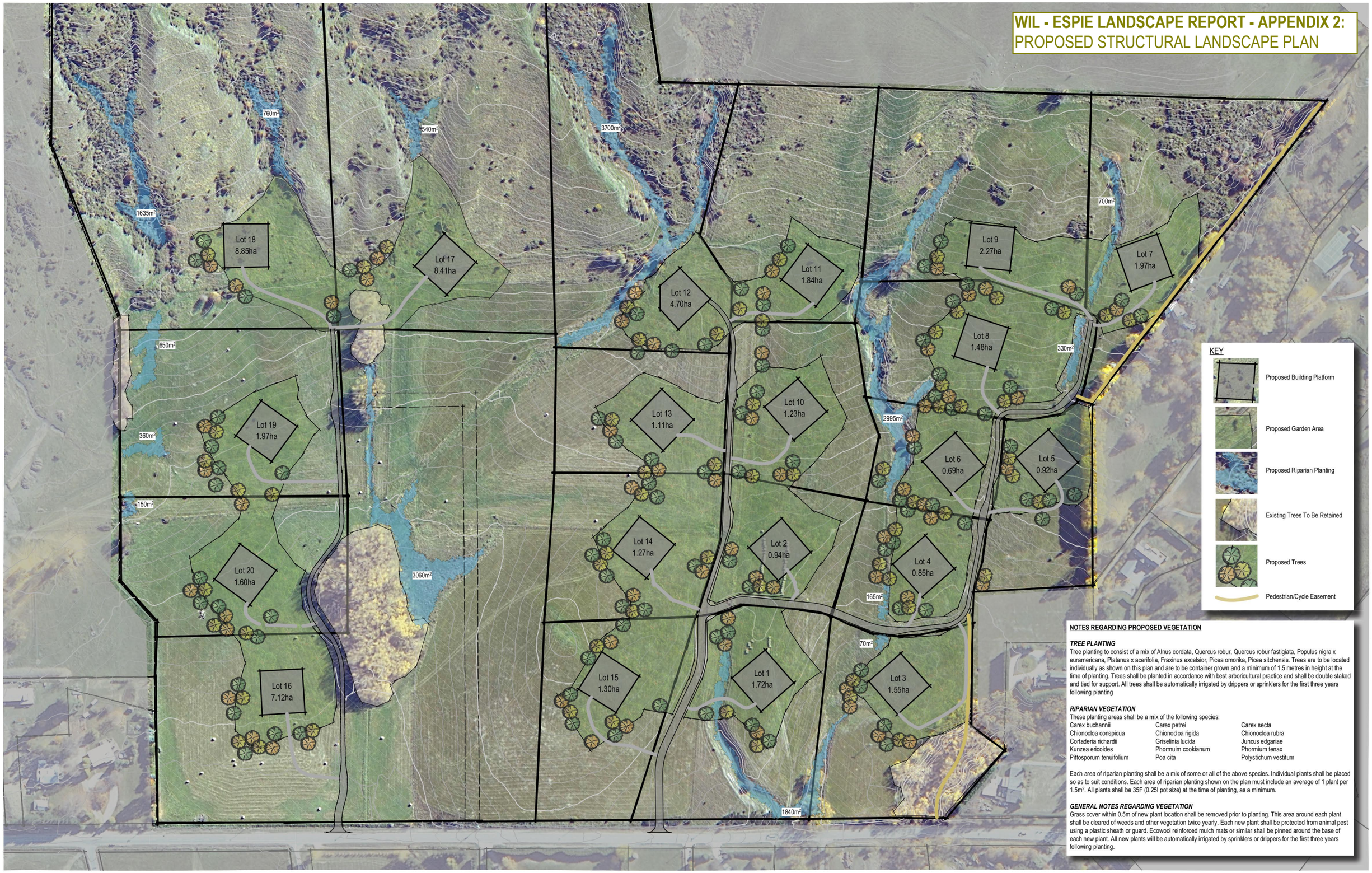
WIL - ESPIE LANDSCAPE REPORT - APPENDIX 2:
PROPOSED STRUCTURAL LANDSCAPE PLAN



NOTES REGARDING PROPOSED VEGETATION

TREE PLANTING

Tree planting to consist of a mix of Alnus cordata, Quercus robur, Quercus robur fastigiata, Populus nigra x euramericana, Platanus x acerifolia, Fraxinus excelsior, Picea omorika, Picea sitchensis. Trees are to be located individually as shown on this plan and are to be container grown and a minimum of 1.5 metres in height at the time of planting. Trees shall be planted in accordance with best arboricultural practice and shall be double staked and tied for support. All trees shall be automatically irrigated by drippers or sprinklers for the first three years following planting

RIPARIAN VEGETATION

These planting areas shall be a mix of the following species:

Carex buchannii	Carex petrei	Carex secta
Chionochloa conspicua	Chionochloa rigida	Chionochloa rubra
Cortaderia richardii	Griselinia lucida	Juncus edgariae
Kunzea ericoides	Phormuim cookianum	Phormium tenax
Pittosporum tenuifolium	Poa cita	Polystichum vestitum

Each area of riparian planting shall be a mix of some or all of the above species. Individual plants shall be placed so as to suit conditions. Each area of riparian planting shown on the plan must include an average of 1 plant per 1.5m². All plants shall be 35F (0.25l pot size) at the time of planting, as a minimum.

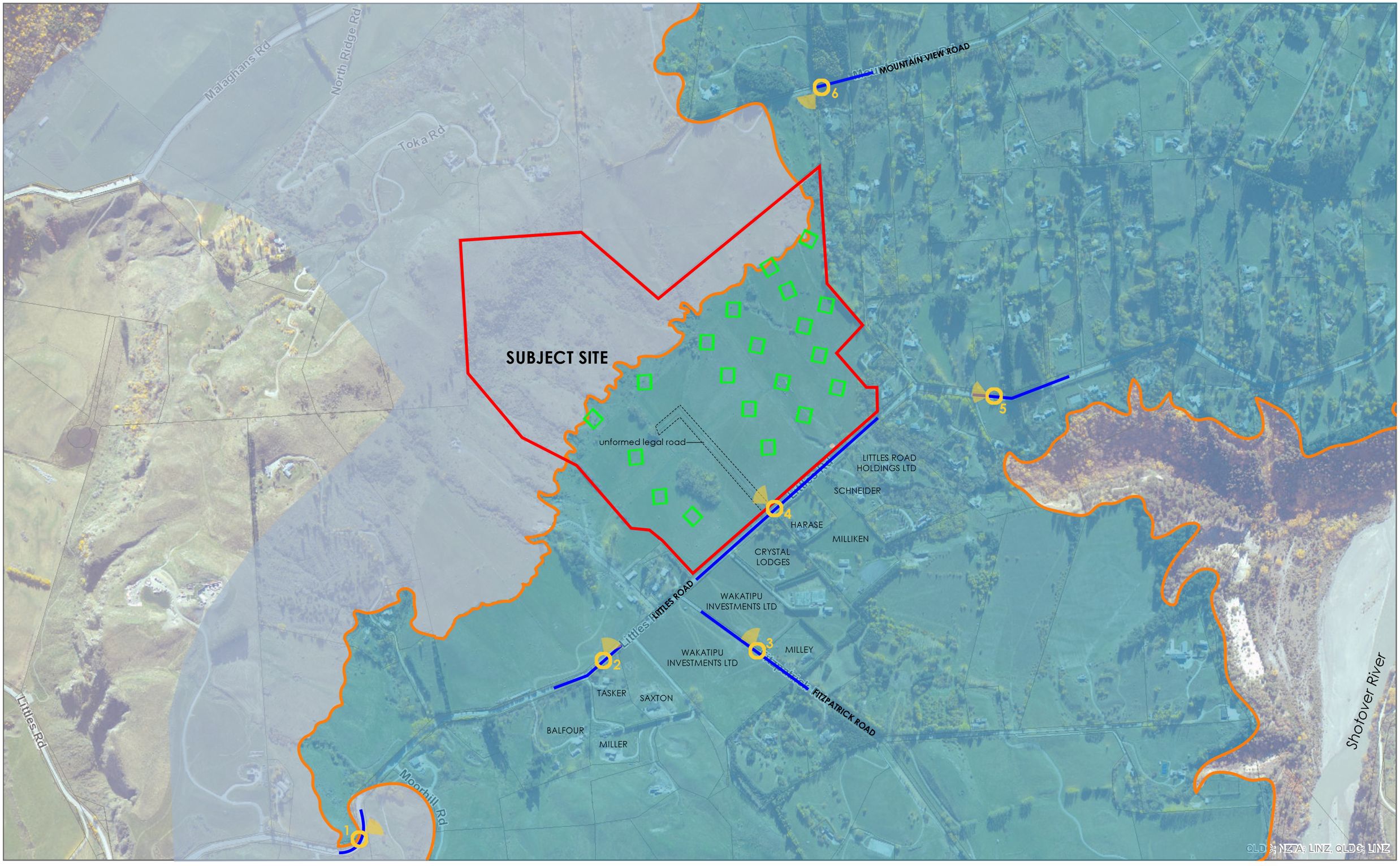
GENERAL NOTES REGARDING VEGETATION

Grass cover within 0.5m of new plant location shall be removed prior to planting. This area around each plant shall be cleared of weeds and other vegetation twice yearly. Each new plant shall be protected from animal pest using a plastic sheath or guard. Ecowool reinforced mulch mats or similar shall be pinned around the base of each new plant. All new plants will be automatically irrigated by sprinklers or drippers for the first three years following planting.

REF: 1426-02 SLP
DATE: 05.06.19
SCALE: 1:2500 @ A3

Structural Landscape Plan
Wakatipu Investment Ltd Subdivision - Littles Road, Queenstown

vivian+espie
resource management and landscape planning
vivian+espie Limited Resource Management and Landscape Planning
PO Box 2514
Physical Address 1/211B Glenda Drive Frankton, Queenstown
Tel +64 3 441 4189 **Fax** +64 3 441 4190 **Web** www.vivianespie.co.nz



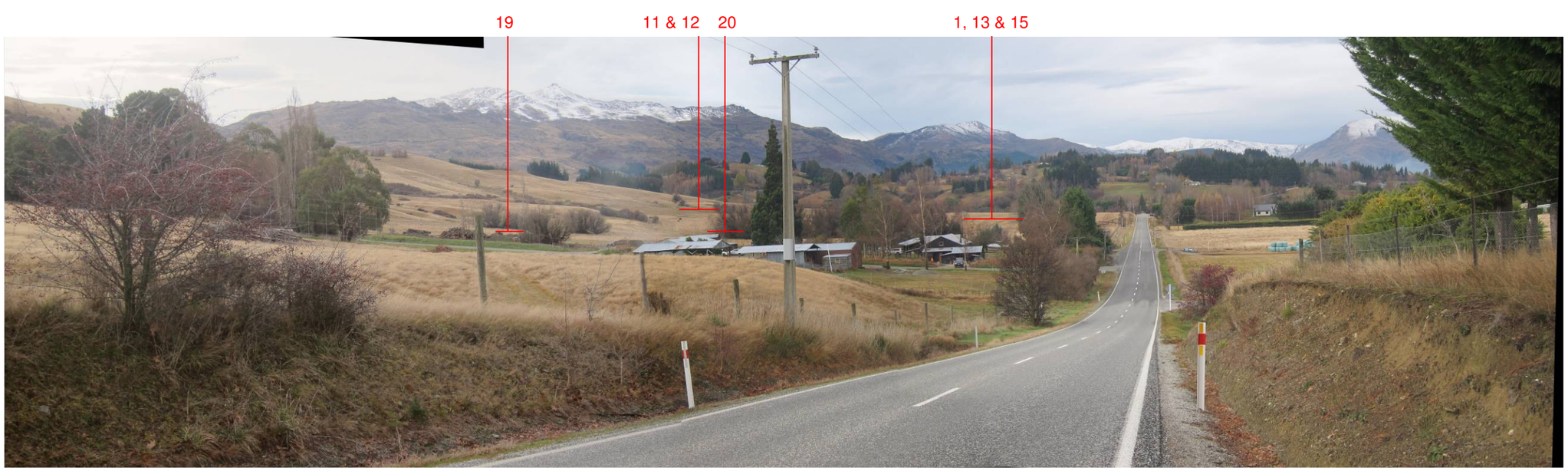
KEY

- site boundary
- extent of intermittent visibility from public roads
- viewpoint location and direction
- proposed building platform locations
- Wakatipu Basin Lifestyle Precinct (WBLP)
- Wakatipu Basin Rural Amenity Zone (WBRAZ)

WIL - ESPIE LANDSCAPE REPORT - APPENDIX 3: VIEWPOINT LOCATION AND CONTEXT MAP

plan scale: 1 - 8,000 @ A3

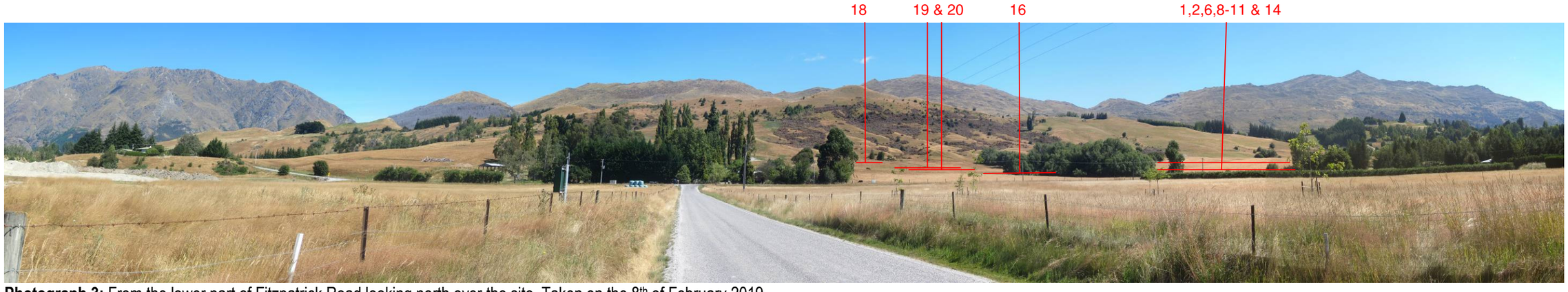
Photograph 1: The first view of the site from Littles Road when travelling east. Taken on the 8th of February 2019.



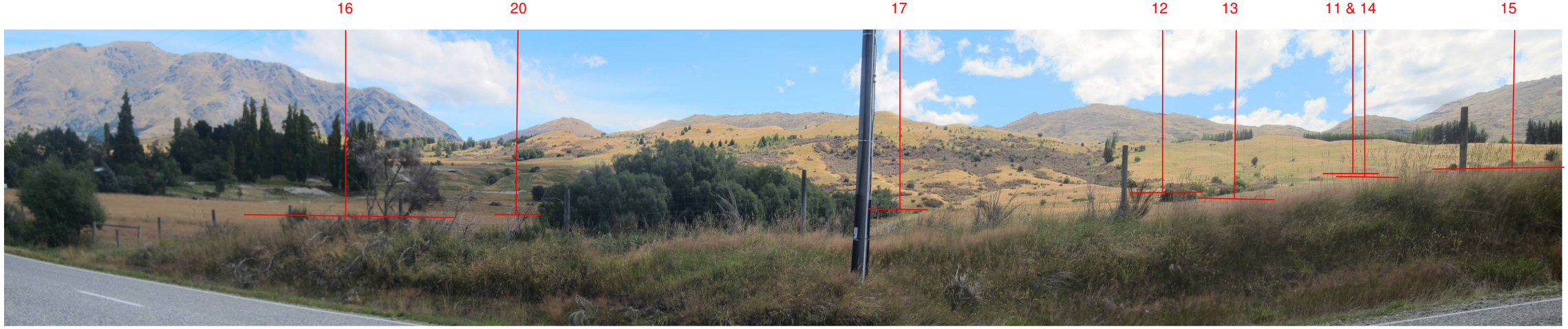
Photograph 2: From the second stretch of Littles Road that allows views to the site, adjacent to the Tasker property. Taken on the 14th of June 2019.

WIL ESPIE LANDSCAPE REPORT - APPENDIX 4: PHOTOGRAPHS

Red labels are an indication of the positions of visible proposed building platforms. All photographs were taken with a fixed focal length of 50mm. Photographs are intended to illustrate points made in my evidence. If this sheet is printed at A3 size, the photographs are not at full size so as to replicate the full-scale field of view as taken in by the human eye.



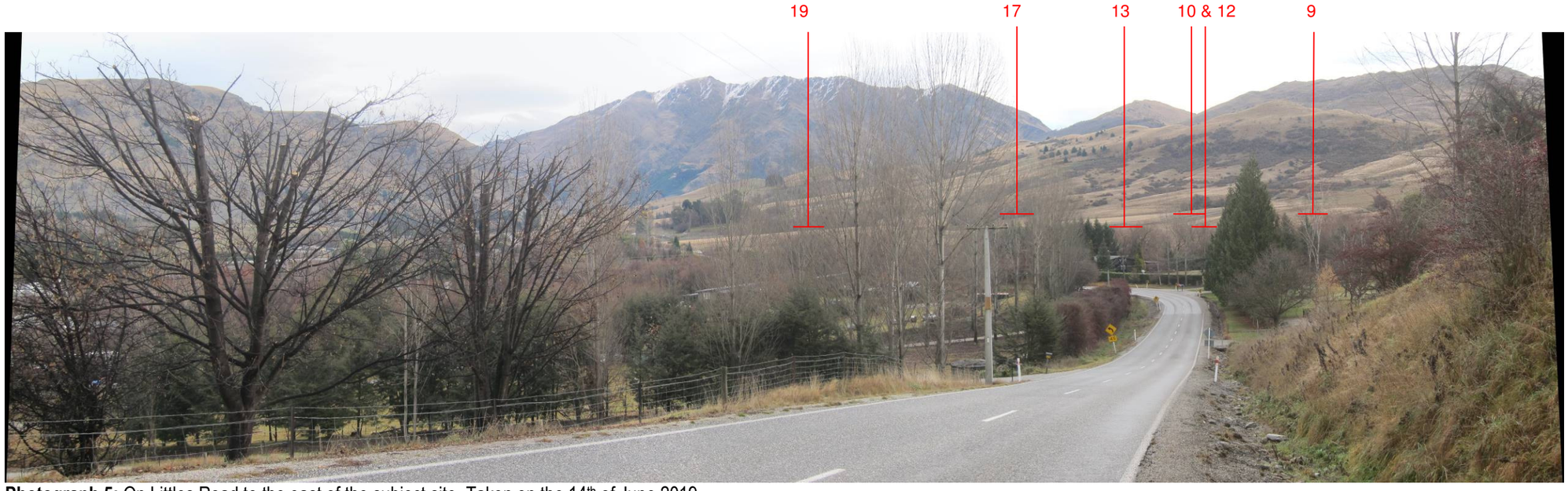
Photograph 3: From the lower part of Fitzpatrick Road looking north over the site. Taken on the 8th of February 2019.



Photograph 4: From immediately adjacent to the site looking north. Taken on the 13th of February 2019.

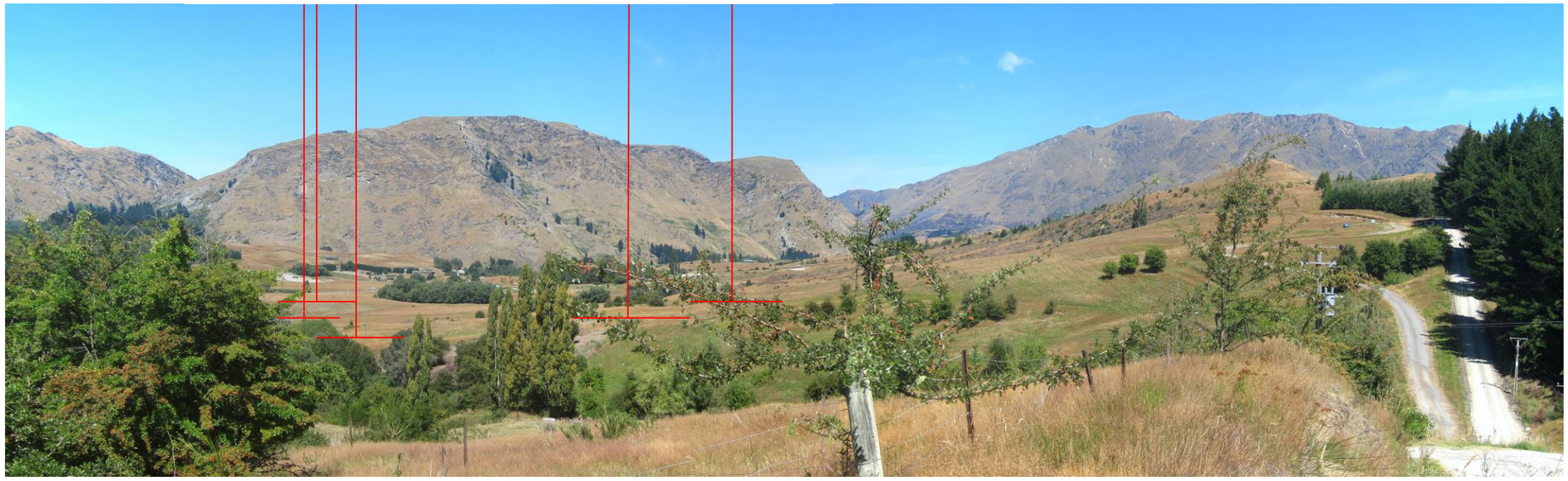
WIL ESPIE LANDSCAPE REPORT - APPENDIX 4: PHOTOGRAPHS

Red labels are an indication of the positions of visible proposed building platforms. All photographs were taken with a fixed focal length of 50mm. Photographs are intended to illustrate points made in my evidence. If this sheet is printed at A3 size, the photographs are not at full size so as to replicate the full-scale field of view as taken in by the human eye.



Photograph 5: On Littles Road to the east of the subject site. Taken on the 14th of June 2019.

2,6,15 and 4 7 9 11 & 12



Photograph 6: From the western extreme of Mountain View Road. Taken on the 8th of February 2019.

WIL ESPIE LANDSCAPE REPORT - APPENDIX 4: PHOTOGRAPHS

Red labels are an indication of the positions of visible proposed building platforms. All photographs were taken with a fixed focal length of 50mm. Photographs are intended to illustrate points made in my evidence. If this sheet is printed at A3 size, the photographs are not at full size so as to replicate the full-scale field of view as taken in by the human eye.

Issue 2
May 23, 2019

Wakatipu Investments Ltd - Dalefield Subdivision

Prepared by: Civilised Ltd

Civilised Ltd

PO Box 1461
Queenstown
Ph 027 223 3036

Wakatipu Investments Ltd - Dalefield Subdivision

Infrastructure Feasibility Report

Report prepared For: Wakatipu Investments Ltd

Report Prepared By: John McCartney
john@civilised.nz

Report Reference: QV021
2019-05-23 Infrastructure Report.docx

Date: 23rd May 2019

Issue	Details	Date
1	Draft for comment	25th March 2019
2	Updated following subdivision layout changes	23rd May 2019

Executive Summary

Wakatipu Investments Ltd propose to create a 20 lot subdivision on their land at Dalefield near Queenstown. Civilised Ltd have assessed the necessary development infrastructure in relation to:

- Access
- Water supply
- Wastewater disposal
- Stormwater runoff
- Earthworks
- Natural Hazards
- Power Supply
- Telecommunications

We confirm that it is feasible to provide the necessary development infrastructure to service the proposed subdivision.

Two altered access from the road network are proposed for the subdivision. These both come from Littles Road and have previously been approved as suitable access points for the underlying subdivision (RM170478). Survey has confirmed that the sight distance available from the proposed accesses off the public roading network are satisfactory given the speed environment and the likely usage of the accesses.

It is proposed to connect the allotments to a new private water supply. This water supply was constructed as part of the underlying subdivision and the water is sourced from the underlying groundwater aquifer under an approved Otago Regional Council consent. The water supply will be reticulated to each of the proposed building platforms. The water demand is able to be accommodated within the existing permitted bore abstraction rate. Firefighting water will be provided by a suitable firefighting reserve maintained in tanks in close proximity to each building platform.

Wastewater is able to be treated and soaked to ground on site by way of individual on site wastewater disposal systems. The suitability of the ground for receiving the wastewater flows has been confirmed following test pitting carried out on site.

Stormwater runoff from impervious areas constructed on the site will also be soaked to ground by use of roadside swales and specifically constructed soakage galleries.

Service providers for power supply and telecommunications reticulation have confirmed that they are able to provide suitable connections to the proposed subdivision.

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Water Supply Information

Appendix D

Site and Soil Assessment

Appendix E

Test Pit Logs and Location Plan

Appendix F

Earthworks Drawings

Appendix G

Typical Site Management Plan

1 Introduction

Wakatipu Investments Limited (WIL) has engaged Civilised Limited (CL) to investigate and report on the feasibility of providing utility services and the necessary development infrastructure for their proposed subdivision development on land in Dalefield near Queenstown.

This report considers the nature of the proposed development, the site conditions affecting the implementation of the necessary development infrastructure and describes the proposed implementation of the following elements;

- Access.
- Water supply and internal reticulation.
- Wastewater collection and disposal.
- Stormwater control.
- Natural Hazards.
- Earthworks.
- Telecommunications.
- Power supply.

The report is to supplement and support the planning submissions made by Vivian + Espie Ltd on behalf of WIL with regard to the application for consent to subdivide.

2 Description of Proposal

WIL proposes to subdivide their existing rural land on Littles Road in Dalefield. The land is currently zoned Rural General under the Queenstown Lakes District Council (QLDC) District Plan and is zoned Wakatipu Basin Lifestyle Precinct under the QLDC Proposed District Plan. A total of 20 new rural allotments are proposed inclusive of dedicated Building Platforms. The allotments range in size from 0.69 ha to 8.85 has.

The new building platforms are to be created on flat to gently sloping ground within each allotment. All of the proposed lots are intended for rural lifestyle development with incorporation of building restriction and landscape covenant areas to preserve as much of the existing rural landscape as possible. A scheme plan showing the indicative layout of the proposed subdivision is contained in Appendix A.

WIL intend to provide and construct accesses to each platform.

The proposed subdivision is likely to be staged.

We note that this assessment of the necessary development infrastructure is limited to consideration of the scale of the subdivision as it is currently proposed.

3 Site Description

The proposed development is located on terrain lying north and above the Shotover River and are located north of Littles Road. The site has frontage to Littles Road.

The site consists of a large gently to moderately sloping paddocks currently used for stock grazing.

Grades in the vicinity of the building platforms on Lots 1 to 20 can be described as flat to gently sloping.

The subject site of the development is contained within one Certificate of Title:

- 857915 (Lot 1 DP 474658) – 82.7880 ha

The elevation of the proposed lots ranges from approximately RL 400 to RL 580m Mean Sea Level (MSL).

Generally, the land within the proposed development area may be described as pasture and includes some trees, brush and ancillary buildings.

During our site visits no evidence of large scale land instability was identified within the boundaries of the proposed rural development.

The land receives approximately 900mm of rainfall per annum and may be subject to drought conditions during the summer months.

It is noted that the subject land is the subject of an underlying subdivision previously approved by QLDC under RM170478. This approved a six lot subdivision and the current proposal is a further subdivision of lots 3 and 4 of that subdivision.

4 Access

4.1 Proposed Accesses

The proposed subdivision will utilise two accesses from Littles Road.

Survey has been used to measure the actual sight distances from the proposed accesses to Littles Road. The required and available sight distance for each access is as follows:

Table 1 – Sight Distances

Location	Usage	Speed Limit	Required Sight Distance	Actual Sight Distance available
Access 1	Residential	80 km/hr	115 metres	> 135m to the east > 300m to the west
Access 2	Residential	80 km/hr	115 metres	> 200m to the east > 115m to the west

The required sight distances have been taken from Table 3 of the QLDC District Plan Rule 14.2.4.2 (iv).

As demonstrated above, the required sight distance is achieved at each proposed access. These access points have previously been approved for residential usage as part of the underlying subdivision (RM170478).

In accordance with the requirements of QLDC, the accesses will need to conform to the requirements of the District Plan. Specifically, the intersections will need to meet the requirements of Diagram 2, Appendix 7 of the QLDC District Plan. A copy of this diagram is included in Appendix B.

The access roads will be sealed to the boundary.

4.2 Proposed Roading

4.2.1 Roading Dimensions and Layout

The proposed roading to the building platforms will be designed and constructed in accordance with the QLDC Land Development and Subdivision Code of Practice (QLDC COP).

The road layout for the development is shown on the plans contained in Appendices A and F of this report.

The roading layout has been governed primarily by the location of existing approved road connections i.e. for Lots 3 and 4 of RM170478 and for the requirements around sight distances (refer section 4.1 above).

Road dimensions have been based on the minimum requirements outlined in Table 3.2 QLDC COP.

The proposed roads have a movement lane width of either 2.5m or 5.5m. The reasons for these width options are as follows:

Road Type A

- The roads correspond to an E1 road in table 3.2 of QLDC COP. This is classed as a lane.
- This features a movement lane of 2.5m width, 0.5 total sealed shoulder width with a water table drain.

- Pedestrians are catered for by the shoulder and berm.
- Cyclists are catered for by sharing the movement lane.
- The road is privately owned within a 6m legal width.

Road Type B

- The roads correspond to an E2 road in table 3.2 of QLDC COP. This is classed as a lane.
- This features a movement lane of 5.5m to 5.7m width, 0.5 total sealed shoulder width with a water table drain.
- Pedestrians are catered for by the shoulder and berm.
- Cyclists are catered for by sharing the movement lane.
- The road is privately owned within a 6m legal width.

A preliminary road design has been undertaken to allow for earthworks calculations to be undertaken. This preliminary road design is included in the drawings in Appendix F and these demonstrate that meeting the requirements of the QLDC COP can be achieved.

4.2.2 Place and Link Functions

Section 3.2.4 QLDC COP states that "the two fundamental roles of a road are to provide a space for interaction between people for a range of purposes and access to land so that movement between places can occur".

The following two sections discuss the proposed design in terms of both 'place context' and 'link context'.

Place Context

Place context is defined for both the specific land use served and the broader area type in which it is located. The land use characteristic is defined according to the description of predominant activities in individual areas.

QLDC COP uses the descriptions "*live, play, shop, work and learn, in addition to activities associated with growing, manufacturing and transporting of goods and products*".

Using Table 3.1 from QLDC COP, we have categorised the development area as:

a. Land use: live and play
b. Area type: rural

The live and play land use is defined as "*homes, home based businesses, and mixed use developments with residential uses, as well as parks and low impact recreation*". The proposed use of the development is for residential homes and is consistent with the live and play land use.

The rural area type is defined as "*Low density, generally no more than 4 units per hectare located outside the urban limits*". Residential housing will be the predominant land use allowing for the fact that there may be a few home based businesses established.

Table 3.1 explains the transport context for the rural area type as private vehicles being the predominant form of transport with low trip volumes throughout the day.

Link Context

Link context is classified by the extent of access and the degree of through movement intended to be served.

For this development the roading most closely aligns with the link context of a Lane being "*a road that provides very high local access and very limited through movement connectivity. Very low vehicle speeds with shared pedestrian and vehicle access predominate*"

4.2.3 Connectivity

Section 3.2.5 of QLDC COP states that well connected networks (roads and other links) are achieved with smaller block sizes and regular connections. As each of the roads anticipated by this development services only one allotment, connectivity factors are not considered further.

4.2.4 Target Operating Speeds

Section 3.3.5 of QLDC COP states that traffic management shall be included in the road design to ensure that the target operating speeds are achieved. Target operating speed can be managed by physical and psychological devices such as narrowed movement lanes, reduced forward visibility, slow points, build outs, lengths, chicanes, planting and landscaping and street furniture and art works. The two key geometric factors that contribute to achieving the target operating speed are carriageway width and forward visibility.

The proposed carriageway widths are consistent with the requirements of QLDC COP in order to provide a suitable vehicular passage as well as making provision for passing manoeuvres.

4.2.5 LID Principles for Stormwater Runoff from Roads

It is proposed to direct all stormwater runoff from roads to the roadside swales which will in turn either discharge into adjacent water courses in order to maintain existing runoff characteristics or soak to ground. Ultimately all stormwater runoff from the roads will be managed across the site so as to balance predevelopment and post-development flows.

Stormwater is discussed further in section 7 of this report. In summary the design is considered to be 'low impact' since all stormwater will be attenuated to predevelopment flows.

4.2.6 Roading Design Parameters

A typical cross sections for the proposed roads is contained in Appendix F of this report.

The road design parameters proposed are as follows:

Table 2 – Access 1 (ch0-ch160), Access 2 (ch0-ch170) and Access 2A (ch0-ch145) – Road Design Parameters

Feature	Design response
Roads	Access 1 (ch0-ch160), Access 2 (ch0-ch170) and Access 2A (ch0-ch145)
Cross Section Reference	E1
Area Context	Rural
Local Attributes	Access to lifestyle or clustered housing
Locality Served	1 to 6 dwelling units
Target Operating Speed	20 km/h
Legal Road Width	6m
Pedestrians	Shared (on shoulder and berm)
Passing, parking, loading and shoulder	Allow for passing up to every 50m, 0.5m sealed shoulder
Cyclists	Shared in movement lane
Movement Lane Width	2.5m
Classification	Lane
Road to be vested in QLDC	No

Table 3 – Access 1 (ch160-end), Access 1A, Access 2 (ch170-end) and Access 2A (ch145-end) – Road Design Parameters

Feature	Design response
Roads	Access 1 (ch160-end), Access 1A, Access 2 (ch170-end) and Access 2A (ch145-end)
Cross Section Reference	E2
Area Context	Rural
Local Attributes	Access to lifestyle or clustered housing
Locality Served	1 to 20 dwelling units
Target Operating Speed	30 km/h
Legal Road Width	9m
Pedestrians	Shared (on shoulder and berm)
Passing, parking, loading and shoulder	Allow for passing in movement lane, 0.5m sealed shoulder
Cyclists	Shared in movement lane
Movement Lane Width	5.5m to 5.7m

Feature	Design response
Classification	Lane
Road to be vested in QLDC	No

5 Water Supply

5.1 Existing System

A potable water supply has been constructed as part of the underlying subdivision (RM170478). This reticulates water from a groundwater bore to header tanks on a neighbouring allotment. This water supply will be extended to the proposed new allotments.

5.2 Water Demand Assessment

Peak water demand would be expected during the summer holiday period when household irrigation requirements are high and seasonal populations are at their peak. The following design figures have been adopted.

Peak potable water consumption Rural Lifestyle Development	= 1,500 litres/day/lot
Irrigation demand	= 1,500 litres/day/lot
Total Water demand for the Development	= 72,000 litres/day

This gives an average flow from the bore of 0.83 litres per second (l/s) based on 24 hour pumping and 1.67 l/s based on 12 hour pumping.

The recently constructed bore on Lot 5 DP 502186 (18 Fitzpatrick Road) is intended to supply the proposed subdivision. The consented bore has rights to take 240,000 litres per day. The water demand figures are well within the scope of this bore.

Included in Appendix C is the results of the water bore construction on Lot 5 DP 502186. This includes a copy of the bore log which also records the pump drawdown test for the bore and water quality testing results carried out for the bore water. Also included is a copy of the ORC Water Permit.

5.3 Reticulation Concept

As discussed above, the water bore on Lot 5 DP 502186 has been reticulated to header tanks on Lot 2 RM170478 and from there it is distributed to the allotments subject to RM170478 and some adjoining allotments.

It is proposed that the proposed allotments will be connected to the rising falling main within Lot 2 RM170478 via a new water main. I note that the water main has already been partially constructed and is currently terminated within the subject land.

Individual allotments will be required to install their own 60,000 litre storage tanks with proprietary pressure boosting as appropriate. At the time of subdivision all allotments will be serviced with a dedicated lot connection to the private supply.

5.4 Water Treatment

The water is sourced from an underground aquifer. The chemical and bacteriological water testing undertaken at the time of the bore being established on Lot 5 DP 502186 indicate a high quality water supply is available. A copy of the laboratory water quality testing results is included in Appendix C.

The water meets the quality requirements of the Drinking Water Standards for New Zealand 2008. However, the level of water hardness may lead to some lime scaling in pipes, fixtures and appliances. This can be treated using a water softening device. It is anticipated that if future lot owners desire it, the water will be softened where it enters individual dwellings. Water softeners are readily available.

5.5 Fire Fighting Water

At the time that a dwelling is established on each residential allotment, new tanks near the proposed dwelling will need to be constructed to serve as a firefighting reserve. These tanks should be a minimum of 30,000 litres of which 20,000 litres is to be maintained at all times as a static firefighting reserve. In addition, vehicular access to the tank is to be maintained at all times and a hardstand area constructed adjacent to the tank to allow a fire appliance to park and pump from the tank. The ongoing requirements for the firefighting water supply should be addressed as a consent notice registered on the title of each residential allotment created.

5.6 Recommendations

The water supply for the development will be provided for by way of connection to the recently constructed water supply constructed as part of the underlying subdivision.

The following consent notices should be registered on the title of the new residential allotments:

1. *At the time a dwelling is erected on the lot, domestic water and firefighting storage is to be provided. A minimum of 20,000 litres shall be maintained at all times as a static firefighting reserve within a 30,000 litre tanks. Alternatively, a 7,000 litre firefighting reserve is to be provided for each dwelling in association with a domestic sprinkler system installed to an approved standard. A firefighting connection in accordance with Appendix B - SNZ PAS 4509:2008 (or superseding standard) is to be located no further than 90 metres, but no closer*

than 6 metres, from any proposed building on the site. Where pressure at the connection point/coupling is less than 100kPa (a suction source - see Appendix B, SNZ PAS 4509:2008 section B2), a 100mm Suction Coupling (Female) complying with NZS 4505, is to be provided. Where pressure at the connection point/coupling is greater than 100kPa (a flooded source - see Appendix B, SNZ PAS 4509:2008 section B3), a 70mm Instantaneous Coupling (Female) complying with NZS 4505, is to be provided. Flooded and suction sources must be capable of providing a flow rate of 25 litres/sec at the connection point/coupling. The reserve capacities and flow rates stipulated above are relevant only for single family dwellings. In the event that the proposed dwellings provide for more than single family occupation then the consent holder should consult with the NZFS as larger capacities and flow rates may be required.

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

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

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

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

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

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

2. *A Water Supply Company, Body Corporate of Lot Owner's Association will be formed to administer the private water supply in accordance with New Zealand Drinking Water Standards.*

3. *Water quality testing has identified water hardness within the supply system that may lead to lime scaling in pipes and appliances. It is recommended future owners consider the installation of a water softening device.*

6 Wastewater Disposal

6.1 General

No community or Council scheme is available for connection in close proximity to the subject site. It is not sustainable to remove waste from site therefore individual on site wastewater disposal (OSWWD) must be examined.

It can be shown that the development may be advanced on the basis of on-site wastewater disposal systems to each proposed lot. The feasibility of such systems is discussed below.

6.2 Site and Soil Assessment

A site and soil assessment has been undertaken and the report for this is included in Appendix D of this report. This assessment has been based on the guidelines of AS/NZS 1547:2012. The site and soil assessment was carried out by undertaking a site visit with a detailed walkover inspection along with excavation of a series of test pits across the subject site. A copy of the test pit logs and test pit location plan are included in Appendix E.

6.3 Conclusions

Based on our investigations to date the soils on the site have sufficient capacity to facilitate the disposal of effluent to land via sub-soil soakage methods, however the presence of sensitive receivers (being groundwater, surface water bodies and water bores) requires that the effluent receive some form of treatment prior to discharge.

We confirm that based on our assessment of the likely loadings, on-site wastewater treatment and disposal systems may be designed to provide the necessary level of treatment such that the risk of causing significant adverse environmental effects is minimised.

For this particular development, given the size of the lots to be created and the large amount of land area available, it is expected that the on-site sewage and disposal systems could be for either individual sewage management or communal management.

We confirm that a tank system, in conjunction with primary and secondary treatment elements, may be designed, implemented and maintained to ensure a "means of treating and disposing of sewage

which is consistent with maintaining public health and avoids or mitigates adverse effects on the environment", therefore satisfying council policy.

6.4 Recommendations

Given the size of the proposed rural lots we believe it is appropriate and feasible to consider individual lot systems for this development.

Individual lot systems that would provide sufficient renovation to effluent from on-site wastewater disposal for this development prior to discharge to land are summarised as follows;

6.4.1 Individual Lot Systems

The individual lot system would comprise a multi chamber septic tank or similar filtered type tank to each lot combined with a secondary treatment element. Sewage from the treatment system would be pump or siphon dosed at a controlled daily rate to a disposal field of shallow depth. This system could be designed to provide sufficient treatment/renovation of effluent prior to discharge to land. Provision should be made at site planning stage for a minimum disposal field area of 50 m² and a reserve field area of 50 m².

To maintain high effluent quality such systems would require the following;

- Specific design by a suitably qualified professional engineer.
- A requirement that each lot must include systems that achieve the levels of treatment determined by the specific design.
- Regular maintenance in accordance with the recommendations of the system designer and a commitment by the owner of each system to undertake this maintenance.
- Intermittent effluent quality checks to ensure compliance with the system designers specification.
- Siting of disposal fields greater than 50m from any surface watercourse or water bore.
- Consideration of potential runoff ponding on the lower parts of allotments following prolonged heavy rainfall when siting disposal fields on these allotments.
- Future disposal fields on the lower allotments to consider using discharge control trenches to limit accession of nutrients to groundwater.

7 Stormwater Disposal

The intended access arrangements and the development of dwellings and associated buildings on the proposed building platforms on the site will alter the existing stormwater run-off patterns from the site catchment.

The proposed stormwater infrastructure on the site will comprise two primary elements as follows:

1) Roadside drainage swales to receive and dispose of the runoff from the proposed accesses for the building platforms on Lots 1 to 20.

2) Future soak pits to be constructed to drain runoff from buildings developed on the site.

The roadside swales will be used to convey stormwater flows either to the lower parts of the site and to provide soakage to allow runoff to drain to ground. Subject to detailed design, roadside drainage swales may include specifically constructed soak pits or may direct flows to flow attenuation features.

The future dwellings and any associated buildings will primarily reticulate roof runoff to water supply tanks. However, there will be various impermeable parts of the site that will need to direct runoff to specifically constructed soakage galleries to dispose of runoff. These areas will include paved areas and overflow provisions from water tanks to allow for rainwater runoff from rooves when the water storage tanks are full.

Subject to specific design in conjunction with the dwelling or associated building designs, the drainage of impermeable paved areas and rainwater tank overflow features will be able to be drained to ground by the use of an appropriately design stormwater soak pit. Test pits that were excavated on site as part of the site and soil assessment for wastewater disposal confirm that ground conditions are suitable for stormwater disposal by soakage to ground.

8 Earthworks

Earthworks proposed for the site consists of the roads to gain access to the building platforms. No earthworks within the platforms themselves are proposed as part of this proposal.

The access roads will consist of swales to assist pavement drainage and culverting to maintain existing runoff paths. Subject to detailed design, the road pavement will likely consist of a 100mm deep AP40 basecourse layer over a 200mm deep AP65 sub-base layer. The topsoil rom the road corridors will be stripped to stockpile and re-spread on batters alongside the roads following road construction. Earthworks will also be required to undercut any soft silts under the topsoil layer where necessary and allow for the construction and installation of underground services and structures.

We have undertaken detailed earthworks modelling of the cut and fill and this is presented graphically in the CL drawings QV021-F-200 to 250 contained within Appendix F.

The access to Lots 2 and 12 have been applied for under a separate consent and the earthworks for these accesses are not included in Table 4 below.

The total earthworks figures for the development as assessed are summarised below:

Table 4 – Proposed Earthworks

Description	Cut Volume	Fill Volume	Total Volume	Maximum Cut Height	Maximum Fill Height	Extent of Earthworks
Accesses 1 Roading	890m³	5m³	895m³	0.60m	0.15m	2,940m²
Access 2A Roading	1,100m³	15m³	1,115m³	1.15m	0.48m	3,375m²
Building Platform accesses	3,159m³	47m³	3,206m³			10,530m²

All earthworks shall be carried out in accordance with detailed contract specifications and a Site Management Plan (SMP). The SMP will be prepared by the contractor and approved by the engineer prior to the commencement of site works. A typical SMP is included in Appendix G.

9 Natural Hazards

We have reviewed the published natural hazard data including the QLDC hazard maps. There are no potential hazards that are noted for the site.

During our walkovers of the site, no significant natural hazards have been identified. The potential for ponding on the lower allotments during prolonged and heavy rainfall is considered minor and is mitigated by the location of the building platforms being away from the lowest parts of these sites and the standard building code requirements for floor height above surrounding ground. The presence of steep sided gullies on the slopes are not considered hazardous to any appropriately designed and constructed houses on the designated building platforms.

10 Power Supply & Telecommunications

10.1 Power Reticulation

Aurora Energy Limited has been contacted regarding the proposed subdivision development. Their response confirming their ability to make an electricity supply available for this development is awaited. A copy of correspondence from Aurora will be provided when received.

10.2 Telecommunications Reticulation

Chorus have been contacted regarding the proposed subdivision development. Their response confirming their ability to make telecommunications connections available for this development is awaited. A copy of correspondence from Chorus will be provided when received.

11 Limitations

This report has been written for the particular brief to Civilised Ltd from their client and no responsibility is accepted for the use of the report for any other purpose, or in any other context or by any third party without prior review and agreement.

In addition, this report contains information and recommendations based on information obtained from a variety of methods and sources including inspection, sampling or testing at specific times and locations with limited site coverage and by third parties as outlined in this report. This report does not purport to completely describe all site characteristics and properties and it must be appreciated that the actual conditions encountered throughout the site may vary, particularly where ground conditions and continuity have been inferred between test locations. If conditions at the site are subsequently found to differ significantly from those described and/or anticipated in this report, Civilised Ltd must be notified to advise and provide further interpretation.

Appendix A

Proposed Subdivision Drawing

SCHEDULE OF LOT AREAS WHEN SPLIT BETWEEN TWO ZONES

LOT	LAND WITHIN LIFESTYLE PRECINCT	LAND WITHIN AMENITY ZONE
7	9769m²	9960m²
9	8274m²	1.45ha
11	9732m²	8751m²
12	1.30ha	3.4ha
17	1.60ha	6.812ha
18	1.29ha	7056ha

NORTH

Lot 18 8.85ha
Lot 17 8.41ha
Lot 12 4.70ha
Lot 11 1.84ha
Lot 9 2.27ha
Lot 7 1.97ha
Lot 8 1.48ha
Lot 19 1.97ha
Lot 13 1.11ha
Lot 10 1.23ha
Lot 6 0.69ha
Lot 14 1.27ha
Lot 2 0.94ha
Lot 4 0.85ha
Lot 5 0.92ha
Lot 20 1.60ha
Lot 16 7.12ha
Lot 15 1.30ha
Lot 1 1.72ha
Lot 3 1.55ha

NOTE:
Plan is subject to resource consent and survey approval therefore boundary positions and areas may be subject to change

Boundary between Wakatipu Basin Amenity Zone and Lifestyle Precinct

DRAFT 10.12.18

Shotover Design Limited trading as
Clark Fortune McDonald & Associates
Licensed Cadastral Surveyors - Land Development - Planning Consultants
309 Lower Shotover Road, P.O.Box 553 Queenstown
Tel. (03)441-6044, Fax (03)442-1066, Email admin@cfma.co.nz
21 Reece Crescent, P.O.Box 550, Wanaka
Tel. (03)443-4448, Fax (03)443-4445, Email admin@cfma.co.nz
Level 1, Bracken Court, 480 Moray Place, P.O. Box 5960
Tel. (03)470-1582, Fax (03)470-1583, Email admin@cfma.co.nz

Rev.	Date	Revision Details	By
A	Feb 19	Amend platform and boundary locations	ED
B	March 19	Amend platform locations	ED
C	April19	Amend driveway location for lot 17	ED

LOTS 1 - 20 BEING A PROPOSED SUBDIVISION OF LOT 10 LT 518523

Client: WAKATIPU INVESTMENTS LTD

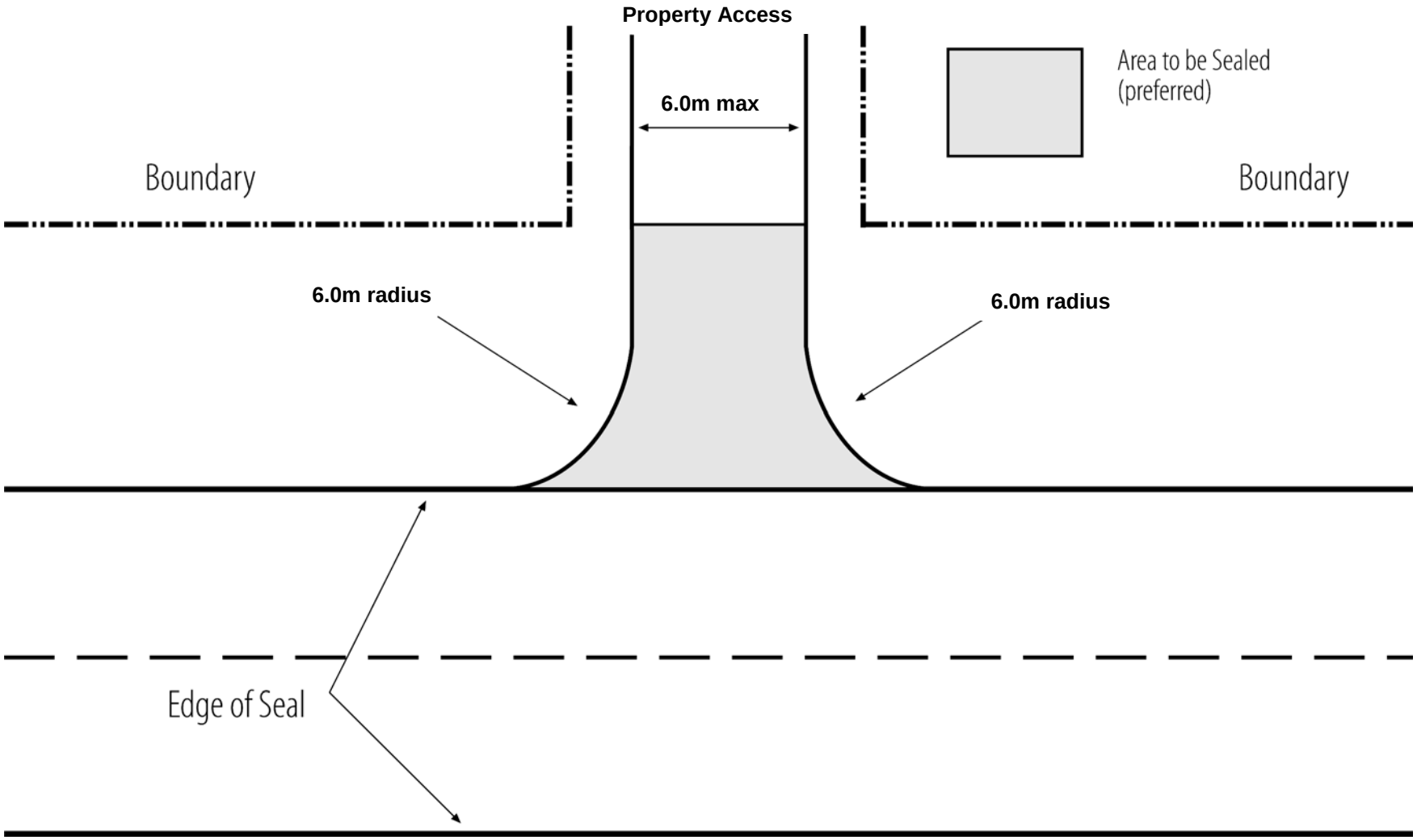
Notes:
All dimensions shown are in meters unless shown otherwise.
Any person using Clark Fortune McDonald drawings and other data accepts the risk of:
- Using the drawings and other data in electronic form without requesting and checking them for accuracy against the original hard copy versions.
- Ensuring the information is the most recent issue.

Surveyed	Signed	Date	Job No.		Drawing No.
---		---	12628		13
Drawn	Signed	Date	Scale		
ED		10.12.18	1:2000 @ A1 1:4000 @ A3		
Designed	Signed	Date	Datum & Level		Rev.
			MT NIC 2000		C

Appendix B

Access Diagram

Diagram 2. Private Access



Appendix C

Water Supply Information

Otago Regional Council

Our Reference: A1027211 Consent No. RM17.190.01

WATER PERMIT

Pursuant to Section 104B of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Wakatipu Investments Limited

Address: Triumph Capital Limited Shed 19a Princes Wharf, 137 Quay Street, Auckland

To take and use groundwater from an unknown aquifer
For the purpose of communal supply

For a term expiring 1 August 2047

Location of Point of Abstraction: Alexandra, approximately 185 metres south east of the intersection of Fitzpatrick Road and Littles Road

Legal Description of land at point of abstraction: Lot 1 DP 26630

Legal Description of land (s) where water is to be used: Lot 1 DP 26630, Lot 2 DP 300351 Lot 301 DP 503594, Lot 1 DP 300014 and Lot 3 DP 21680 and other land as advised in writing to the Consent Authority

Map Reference at point of abstraction: NZTM 2000 E1262472 N5010257

Conditions

Specific

1. If this consent is not given effect to within a period of two years from the date of commencement of this consent, this consent shall lapse under section 125 of the Resource Management Act 1991.
2. (a) The rate of abstraction shall not exceed 6 litres per second;
   (b) 240 cubic metres per day;
   (c) 7,440 cubic metres per month;
   (d) 58,400 cubic metres per year

Performance Monitoring

3. (a) The consent holder shall install a water meter to record the water take, at the point of take, within an error accuracy range of +/- 5% over the meter's nominal flow range, and telemetry compatible datalogger with at least 24 months data storage to record the rate and volume of take, and the date and time this water was taken.

(b) The datalogger shall record the date, time and flow in litres per second.

(c) The water meter shall be installed according to the manufacturer's specifications and instructions. There shall be enough space in the pipe to allow for verification of the accuracy of the meter under condition (f).

(d) The consent holder shall ensure the full operation of the water meter and datalogger at all times during the exercise of this consent. All malfunctions of the water meter and/or datalogger during the exercise of this consent shall be reported to the Consent Authority within 5 working days of observation and appropriate repairs shall be performed within 5 working days. Once the malfunction has been remedied, a Water Measuring Device Verification Form completed with photographic evidence must be submitted to the Consent Authority within 5 working days of the completion of repairs

(e) The installation of the water meter shall be completed to full and accurate operation prior to the exercise of the consent. The consent holder shall forward a copy of the installation certificate to the Consent Authority within one month of installing the water meter and datalogger.

(f) (i) If a mechanical insert water meter is installed it shall be verified for accuracy each and every year from the first exercise of this consent.
(ii) Any electromagnetic or ultrasonic flow meter shall be verified for accuracy every five years from the first exercise of this consent.
(iii) Each verification shall be undertaken by a Consent Authority approved operator and a Water Measuring Device Verification Form shall be completed and supplied to the Consent Authority within 5 working days of the verification being performed, and at any time upon request.

(g) The consent holder shall provide records from the datalogger to the Consent Authority by 31 July each year and at any other time on request. Data shall be available electronically giving date, time and flow rates in no more than 15 minute increments, via a datalogger approved by the Consent Authority.

General

4. The consent holder shall take all practicable steps to ensure that:
(a) there is no leakage from pipes and structures;
(b) the use of water is confined to targeted areas, as shown in appendix 1 and other land as advised in writing to the Consent Authority
(c) there is no run off of irrigation water in irrigated areas either on site or off site.

5. Copies of the results of any water quality analyses performed on the groundwater shall be forwarded to the Consent Authority within two weeks of the analysis being undertaken.

6. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the consent holder of its intention to review the conditions of this consent within 3 months of each anniversary of the commencement of this consent for the purpose of:

   (a) adjusting the consented rate or volume of water under condition 2, should monitoring under condition 3 or future changes in water use indicate that the consented rate or volume is not able to be fully utilised; or

   (b) determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or

   (c) ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and the Otago Regional Policy Statement; or;

   (d) adjusting or altering the method of water take data recording and transmission.

Notes to Consent Holder

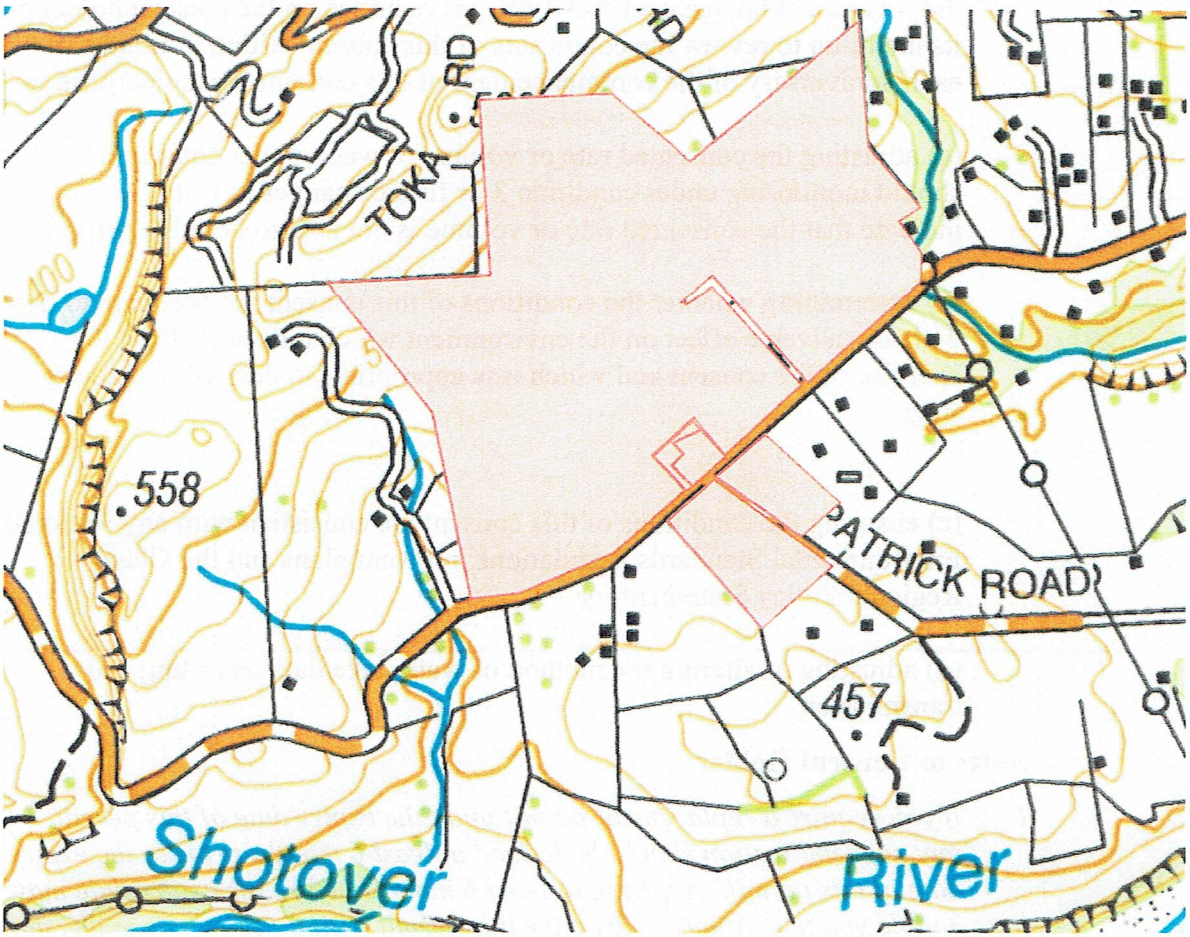
1. *If you require a replacement permit upon the expiry date of this permit, any new application should be lodged at least 6 months prior to the expiry date of this permit. Applying at least 6 months before the expiry date may enable you to continue to exercise this permit until a decision is made, and any appeals are resolved, on the replacement application.*
2. *The water meter, datalogger and telemetry unit should be safely accessible by the Consent Authority and its contractors at all times.*

Issued at Dunedin this 22nd day of August 2017

Christopher P. Shaw
Manager Consents

Otago Regional Council

Appendix 1. Map showing location of where water is to be used.

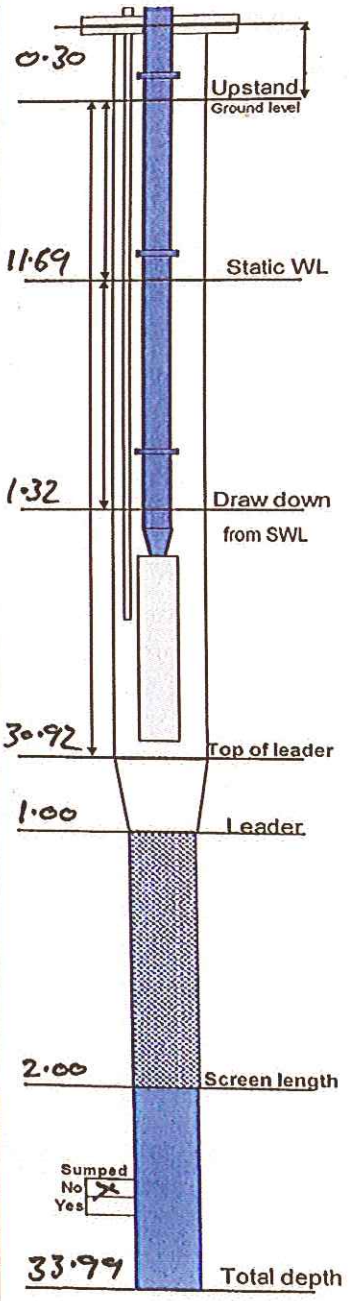


mcneill DRILLING ■ DISTRIBUTION ■ PUMPING SINCE 1918

Client Name:	urban collective	Home No.	
	Hole 2	Cell No.	
Address	1 Hikes Rd	Consent No.	
	queenstown		
Grid Reference	E- 1262472	N- 5010257	
Driller	N Simmons		
Machine/Rig:	DR24	Fleet No. 232	
Drill Method:	Diesel rotary		
Bore diameter mm	150 mm		
Start date:	10-5-17	Finish Date: 11-5-17	
Development Hours:	2.5	Development Method: air surge	
Screen Slot:	2.5 mm	ID 128 mm	OD 138 mm
PVC slotted	Top m	Bottom m	
Total casing used:	32.32 m m	Total Depth: 33.99 m	
Sump length:	N/A m	Sump Diameter: mm	
Test Pumping	Air lifted	Pumped ✓	Rate: 6.25 LPS
Test Pump period	5 Hrs	Pump intake: 20 m	
Bacterial Water test	Yes ✓	No	
Chemical Water test	Yes ✓	No	
Casing top sealed	Yes ✓	No	
Impervious seal at ground	Yes	No ✓	
Over Drilled	Yes ✓	No	0.5 m

Comments:

0 - 0.7 Soil
0.7 - 3.9 Small Sandy Gravel
3.9 - 9.9 Silt
9.9 - 20.9 Very Sandy Silty Gravel
20.9 - 23.9 Sandy very Silty Gravel
23.9 - 27.3 Sand
27.3 - 34.00 Sandy Gravel
34.00 - 34.5 Schist rock



Version: 1, Created 16 October 2014

Citilab
Analysis Consultants

LABORATORY ANALYSIS REPORT

#69268

Tuesday, 30 May 2017

McNeill Drilling - INGL
(Cnr SH 1 & Clapham Road)
PO Box 542
INVERCARGILL 9840

ATTENTION: Invercargill, Brad

Your Order #:- P66618 .

Job Start: 12/05/17 11:48:09

LAB. REF.	Sample Taken:	Sample Description / Test start:	Test complete:	ANALYSIS	RESULT	comments: Analytical Method	Detection Limits
14374	11/05/17 15:00	.... (Citilab to include explanatory notes with report). Email report to admin@mcneillnz.com					
		Urban Collective ~ Bore Water #2					
		21/05/17 11:54:46	22/05/17 13:23:08	Acidity Requires CO2	<5 g/m³ as CaCO3	APHA 2310, B	5 g/m³ as CaCO3
		12/05/17 15:28:43	16/05/17 15:26:41	Alkalinity to pH 4.5	110 g/m³ as CaCO3	APHA 2320, B	1 g/m³ as CaCO3
		12/05/17 15:28:44	16/05/17 15:26:42	Alkalinity to pH 8.3	<1 g/m³ as CaCO3	APHA 2320, B	1 g/m³ as CaCO3
		22/05/17 14:43:35	22/05/17 16:27:11	Bromide (IC)	<0.1 g/m³	APHA4110, B	0.03 g/m³
		22/05/17 14:43:36	22/05/17 16:27:13	Chloride (IC)	2.7 g/m³	APHA4110, B	0.05 g/m³
		21/05/17 11:54:50	22/05/17 13:20:28	Colour (Hazen) *	<2.5 Hazen	Lovibond Comparator	2.5° Hazen
		12/05/17 15:28:34	16/05/17 14:35:42	Conductivity @ 25°C	25 mS/m	APHA 2510, B	0.03 mS/m
		22/05/17 14:43:34	22/05/17 16:27:09	Fluoride (IC)	<0.1 g/m³	APHA4110, B	0.03 g/m³
		21/05/17 11:54:52	29/05/17 15:59:01	Total Hardness By Calculation	122 g/m³ as CaCO3	APHA 2340, C	1 g/m³ as CaCO3
		12/05/17 15:28:28	16/05/17 10:54:53	pH	7.64 @ 20°C	APHA 4500 - H+, B	0.02 pH unit
		22/05/17 14:43:33	22/05/17 16:27:07	Phosphate (IC) *	<0.2 g/m³	APHA4110, B	0.4 g/m³
		22/05/17 14:44:44	22/05/17 16:27:16	Phosphate-P (IC) *	<0.1 g/m³	APHA4110, B	0.2 g/m³
		22/05/17 14:43:38	22/05/17 16:20:00	Sulphate (IC)	12 g/m³	APHA4110, B	0.03 g/m³
		16/05/17 09:04:47	16/05/17 11:11:06	Turbidity - class 1	1.9 NTU	APHA 2130, B	0.05 NTU
>> Referral: Hill Laboratories, Hamilton.		21/05/17 11:55:05	29/05/17 15:58:15	Arsenic-Total *	0.0029 g/m³	APHA 3125, B	0.001 g/m³
>> Referral: Hill Laboratories, Hamilton.		21/05/17 11:55:07	29/05/17 15:58:28	Calcium-Total (ICP) *	44 g/m³	APHA 3125, B	0.001 g/m³
>> Referral: Hill Laboratories, Hamilton.		21/05/17 11:55:09	29/05/17 15:58:21	Iron-Total (ICP) *	0.131 g/m³	APHA 3125, B	0.005 g/m³
>> Referral: Hill Laboratories, Hamilton.		21/05/17 11:55:12	29/05/17 15:58:33	Magnesium-Total (ICP) *	2.8 g/m³	APHA 3125, B	0.002 g/m³
>> Referral: Hill Laboratories, Hamilton.		21/05/17 11:55:16	29/05/17 15:58:40	Manganese-Total (ICP) *	0.0067 g/m³	APHA 3125, B	0.0003 g/m³
		22/05/17 14:43:32	22/05/17 16:19:54	Nitrate (IC)	5.8 g/m³	APHA4110, B	0.03 g/m³
		22/05/17 14:44:42	22/05/17 14:44:50	Nitrate-N (IC)	1.31 g/m³	APHA4110, B	0.01 g/m³
		12/05/17 12:09:25	17/05/17 10:28:11	E. coli (Quanti-Tray)	<1.0 MPN/100 mL	APHA 9223 B	1.0 MPN/100 mL

Citilab
Analysis Consultants

Analyst's Comments:

These samples were collected by yourselves and analysed as received at the laboratory.

The detection limits given are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Units: In accordance with modern practice the previous 'mg/L' is now expressed as the equivalent 'g/m³'.

IANZ
ACCREDITED LABORATORY

Citilab is accredited by International Accreditation New Zealand (IANZ). The tests reported here have been performed in accordance with its terms of accreditation - with exception of any marked *, which are not within Citilab's scope.

Frank Ho

Dr. Frank Ho
Lab Services Manager

LWGibbons

Liana Wheeler-Gibbons
Microbiology Technician (KTP)

10 Tahuna Rd, PO Box 781, Dunedin 9054
Telephone (03) 455 7938, Fax (03) 455 7940
Email: mail@citilab.co.nz
Website: www.citilab.co.nz

Citilab

Analysis Consultancy Site

Sample -14374 Urban Collective – Bore water Batch 69268

Determinants	Results (mg/L or specified)	MAV[1] or GV[2]	Target range	Comments
Acidity	<5	-	Low	Ok
Alkalinity	110	-	Low	Ok
Bromide	<0.1	-	Low	Ok
Chloride	2.7	250	<250	Ok
Colour	<2.5	-	<5.0	Ok
Conductivity	25	-	<40, low	Ok
Fluoride	<0.1	-	Low	Ok
Total hardness	122	200	50-80	Hard*
pH	7.64	7.0 to 8.5	7.0 to 8.0	Ok
Phosphate	~~<2.4~~ <0.2	250	Low	Ok
Sulphate	12	250	<125	Ok
Total arsenic	0.0029	0.01	0.005	Ok
Turbidity	1.9	5	2.5	Ok
Total calcium	44	-	40	High*
Total iron	0.131	0.2	<0.2	Ok
Total magnesium	2.8	-	10	Ok
Total manganese	0.0067	0.4	<0.04 for appearance	Ok
E.coli	<1	<1.0	<1.0	Ok
Nitrate	5.8	50	<25	Ok

[1]MAV means Maximum Acceptable Values quoted from Drinking Water Standards for New Zealand 2008. [2]GV means Guideline Values from the same source above.
mg/L equals to g/m³ and is often referred to as ppm (parts per million). < means less than.

Overall comment: The water sample was deemed to be **SUITABLE for drinking purpose with respect to the tested parameters according** to the 2008 guidelines of The New Zealand Drinking Water Standards (NZDWS). The high total calcium had rendered the water hard. This water hardness will cause detergent deficiency and scaling problems. It is therefore recommended that an appropriate water softener be installed to solve the hardness problem.

Frank Ho

Dr. Frank Ho
Laboratory Services Manager

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Telephone (03) 455 7938, Fax (03) 455 7940
Email: mail@citilab.co.nz
Website: www.citilab.co.nz

Citilab
Analysts Consultants

Civilised Limited

P O Box 1461
Queenstown 9348

ATTENTION: **John McCartney**

LABORATORY ANALYSIS REPORT

#71820

Thursday, 29 March 2018

Job Start: 22/03/18 08:15:54

LAB. REF.	Sample Taken:	Sample Description / Test start:	Test complete:	ANALYSIS	RESULT	comments: Analytical Method	Detection Limits
24208	21/03/18 15:05	~ WIL Bore					.... Temp = 8.0°C
		22/03/18 08:20:19	27/03/18 12:27:03	T-Coli (Quanti-Tray)	<1.0 MPN/100 mL	APHA 9223 B	1.0 MPN/100 mL
		22/03/18 08:20:21	27/03/18 12:27:04	E. coli (Quanti-Tray)	<1.0 MPN/100 mL	APHA 9223 B	1.0 MPN/100 mL

Analyst's Comments:
These samples were collected by yourselves and analysed as received at the laboratory.
The detection limits given are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

IANZ ACCREDITED LABORATORY

Citilab is accredited by International Accreditation New Zealand (IANZ). The tests reported here have been performed in accordance with its terms of accreditation - with exception of any marked *, which are not within Citilab's scope.

Dr. Frank Ho
Lab Services Manager

Naomi Pelet
Microbiology Technician (KTP)

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Telephone (03) 455 7938, Fax (03) 455 7940
Email: mail@citilab.co.nz
Website: www.citilab.co.nz

Citilab
Analysts Consultants

Civilised Limited

P O Box 1461
Queenstown 9348

ATTENTION: **John McCartney**

LABORATORY ANALYSIS REPORT

#73392

Saturday, 27 October 2018

Job Start: 25/10/18 08:39:48

LAB. REF.	Sample Taken:	Sample Description / Test start:	Test complete:	ANALYSIS	RESULT	comments: Analytical Method	Detection Limits
30339	24/10/18 15:39	~ well/bore				.... Temperature blank 7.5°C	
		25/10/18 11:01:50	27/10/18 10:57:48	**T-Coli (Quanti-Tray)**	**9.7** MPN/100 mL	APHA 9223 B	1.0 MPN/100 mL
		25/10/18 11:01:51	27/10/18 10:57:49	**E. coli (Quanti-Tray)**	**<1.0** MPN/100 mL	APHA 9223 B	1.0 MPN/100 mL

Analyst's Comments:
These samples were collected by yourselves and analysed as received at the laboratory.
The detection limits given are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

IANZ ACCREDITED LABORATORY

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Debra Fairley-Aldridge
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Appendix D

Site and Soil Assessment

Onsite Wastewater Disposal Site & Soils Assessment

Use for Subdivision or Land Use Resource Consent

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

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

Site Description

Property Owner: Wakatipu Investments Ltd

Location Address: Littles Road

Queenstown

Legal Description (eg Lot3 DP1234) : Lot 1 DP474658

List any existing consents related to waste disposal on the site: Nil

General description of development / source of waste water: Proposed 24 lot subdivision, creating six new building platforms for domestic dwellings.

The number and size of the lots being created: 24 Lots ranging from 0.85 ha to 5.12 ha

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

Land use: Grazing/farming

Topography: Varies from flat to steeply sloping

Slope angle: 0 to 1:1

Aspect: Generally south to southeast

Vegetation cover: Grass/pasture

Areas of potential ponding: The flat paddocks may have some ponding during prolonged heavy rain.

Ephemeral streams: Yes, see site plan

Drainage patterns and overland paths: Sheet flow leading to gullys with permanent and ephemeral streams, eventually draining to the Shotover River.

Flood potential (show with return period on site plan): Nil

Distance to nearest water body: There are water bodies within the site

Water bores with 50m (reference ORC Maps): Nil

Other Site Features: All existing water bores shown on site plan

Slope stability assessment details – summarise any areas unsuitable for waste water irrigation. (Attach report if applicable): No slope stability issues noted on site, effluent disposal should not occur on the upper steeper slopes or near/in the incised gullys.

(Highest potential) Depth to ground water:

Summer > 5m

Winter > 5m

Information Source Assessed given the test pit information

What is the potential for waste water to short circuit through permeable soils to surface and / or ground water?
With appropriate design and disposal field siting, potential for short circuiting will be minimal.

Soil Investigation (Appendix C)

Field investigation date: 21st March 2017

Number of test pit bores (C3.5.4): 10 test pits

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

If fill material was encountered during the soil investigation state how this will impact on the waste water system:
No fill encountered in any test pit

Average depth of topsoil: 200mm

Indicative permeability (Appendix G) : > 1 m/day

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

Soil Category *(Table 5.1)*	Soil Texture *(Appendix E)*	Drainage	Tick One
1	Gravel and sands	Rapid	
2	Sandy loams	Free	
3	Loams	Good	✓
4	Clay loams	Moderate	
5	Light clays	Moderate to slow	
6	Medium to heavy clays	Slow	

Reasons for placing in stated category:
Sites are underlain by either free draining alluvial gravels and sands or by glacial till.

Loading rate, DLR (Table L1): 30 mm/day

Explanation for proposed loading rate: The conservative loading rate for secondary treated effluent for category 3 soils is 30mm/day respectively.

Recommendations from site and soils assessment

Specify any design constraints
Specify any areas unsuitable for location of the disposal field
Specify any unsuitable treatment and/or disposal systems
Propose suitable mitigation to enable successful effluent treatment

1) Due to the variability of the ground conditions underlying the site, it is recommended that future disposal beds/fields be subject to specific test pitting to confirm suitable discharge rates.

2) In order to avoid potential areas of ponding during heavy and prolonged rainfall events, disposal fields on lower allotments should avoid the lowest parts of each allotment.

3) Disposal fields need to be sited carefully in relation to gullys, permanent water courses and the ephemeral water courses crossing the site.

4) Secondary treatment is recommended due to the presence of water bores in the area.

Attachments Checklist

- [X] Copy of existing consents — Nil relevant consents
- [✓] Soil investigation addendum
- [✓] To scale site plan, the following must be included on the plan:
  - Buildings
  - Boundaries
  - Retaining Walls
  - Embankments
  - Water bodies
  - Flood potential
  - Other septic tanks / treatment systems
  - Water bores
  - Existing and proposed trees and shrubs
  - Direction of ground water flow
  - North arrow

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

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

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

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

Tel: 03 442 5681

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

Company: Civilised Limited

Email: john@mccartneys.nz

Phone number: 027 2233036

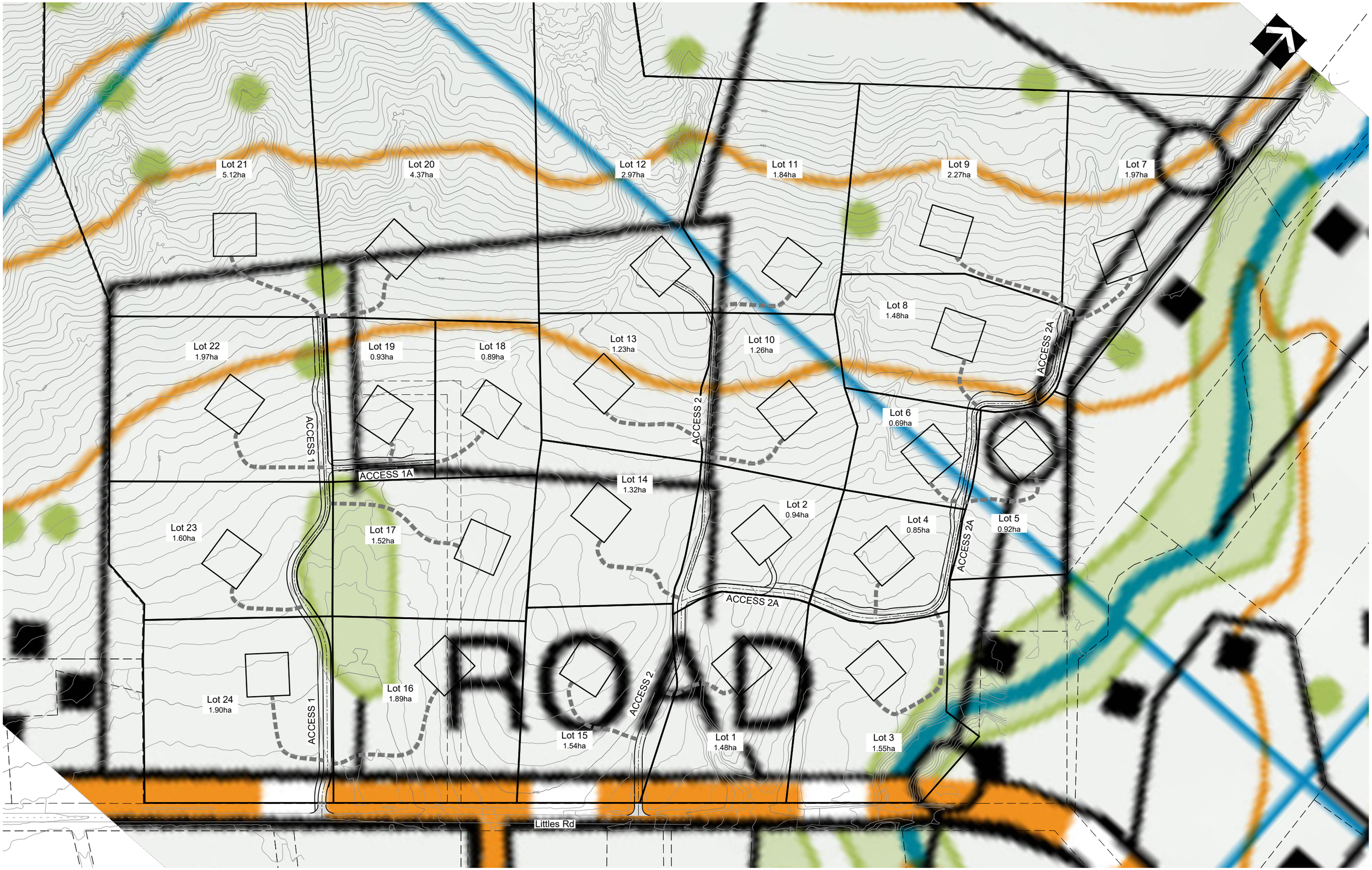
Name: John McCartney

Signature: 

Date: 26th March 2019

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

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



REV	DATE	DESCRIPTION	APPROVED
A	25/03/19	Initial Issue	JFM

CONSULTANT

Civilised Ltd

CIVILISED LTD
PO BOX 1461
QUEENSTOWN 9348

T: 027 223 3036
E: john@mccartneys.nz

JFM	25/03/2019
DESIGN	DATE
JFM	25/03/2019
DRAWN	DATE
JFM	25/03/2019
CHECKED	DATE

CLIENT

WAKATIPU INVESTMENTS LTD

PROJECT/LOCATION

PROPOSED SUBDIVISION
LITTLES ROAD - QUEENSTOWN

CONTRACT NUMBER: -

SCALE (AT A3): 1:2500

TITLE

ON SITE WASTEWATER DISPOSAL
OVERALL TOPOGRAPHICAL MAP

DRAWING NUMBER: QV021-F-520

REVISION: A

Appendix E

Test Pit Logs and Location Plan

REV	DATE	DESCRIPTION	APPROVED
A	25/03/19	Initial Issue	JFM

CONSULTANT

Civilised Ltd

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PO BOX 1461
QUEENSTOWN 9348

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JFM	25/03/2019
DESIGN	DATE
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DRAWN	DATE
JFM	25/03/2019
CHECKED	DATE

CLIENT

WAKATIPU INVESTMENTS LTD

PROJECT/LOCATION

PROPOSED SUBDIVISION
LITTLES ROAD - QUEENSTOWN

CONTRACT NUMBER: -

SCALE (AT A3): 1:2500

TITLE

ON SITE WASTEWATER DISPOSAL
TEST PIT LOCATION PLAN

DRAWING NUMBER: QV021-F-510

REVISION: A

Test Pit Log

Civilised Ltd

Project:	Proposed 24 Lot Subdivision	Project Number:	QV021
Site Location:	Littles Road, Queenstown	Client:	Wakatipu Investments Ltd
Tets Pit Number:	Test pit #1 - Fine, sunny, no wind.		Sheet 1 of 10

Depth (m)	Water Level	Graphic Log	Moisture	Soil Rock Description	Geological Unit	Depth
				TOPSOIL - turf, dark brown, dry	Topsoil	
0.5				Sandy SILT, LOESS - Light brown, moist	Loess	0.5
1.0						1.0
1.5						1.5
2.0				Silty, sandy GRAVEL - sub-rounded, light brown, AP20, schist based - Glacial Till	Glacial Till	2.0
2.5				2.2m bottom of pit, no water ingress. 		2.5
3.0						3.0
3.5						

Date Excavated:	21/03/2019 11:20am	Equipment:	Hitachi 13.5 tonne excavator
Logged By:	JFM	Contractor:	Solidbuilt Homes Ltd

Test Pit Log

Civilised Ltd

Project:	Proposed 24 Lot Subdivision	Project Number:	QV021
Site Location:	Littles Road, Queenstown	Client:	Wakatipu Investments Ltd
Tets Pit Number:	Test pit #2 - Fine, sunny, no wind.		Sheet 2 of 10

Depth (m)	Water Level	Graphic Log	Moisture	Soil Rock Description	Geological Unit	Depth
				TOPSOIL - turf, dark brown, dry	Topsoil	
				Sandy SILT, LOESS - Light brown, dry	Loess	
0.5				Sandy GRAVEL, rounded, light brown, AP20, dry	Gravel	0.5
1.0				Silty, sandy GRAVEL - sub-rounded, light brown, AP20, schist based - Glacial Till	Glacial Till	1.0
1.5						1.5
				SAND - gray, moist, clean	Sand	
2.0				1.8m bottom of pit, no water ingress.		2.0
2.5						2.5
3.0						
3.5						3.0

Date Excavated:	21/03/2019 11:37am	Equipment:	Hitachi 13.5 tonne excavator
Logged By:	JFM	Contractor:	Solidbuilt Homes Ltd

Test Pit Log

Civilised Ltd

Project:	Proposed 24 Lot Subdivision	Project Number:	QV021
Site Location:	Littles Road, Queenstown	Client:	Wakatipu Investments Ltd
Tets Pit Number:	Test pit #3 - Fine, sunny, no wind.		Sheet 3 of 10

Depth (m)	Water Level	Graphic Log	Moisture	Soil Rock Description	Geological Unit	Depth
				TOPSOIL - turf, dark brown, dry	Topsoil	
				Sandy SILT, LOESS - Light brown, dry	Loess	
0.5				Silty, sandy GRAVEL - sub-rounded, light brown, AP20, schist based - Glacial Till	Glacial Till	0.5
1.0						1.0
				Schist BEDROCK - easily rippable at interface, more solid with depth	Bedrock	
1.5						1.5
2.0				1.5m bottom of pit, no water ingress.		2.0
2.5						2.5
3.0						3.0
3.5						

Date Excavated:	21/03/2019 11:48am	Equipment:	Hitachi 13.5 tonne excavator
Logged By:	JFM	Contractor:	Solidbuilt Homes Ltd

Test Pit Log

Civilised Ltd

Project:	Proposed 24 Lot Subdivision	Project Number:	QV021
Site Location:	Littles Road, Queenstown	Client:	Wakatipu Investments Ltd
Tets Pit Number:	Test pit #4 - Fine, sunny, no wind.		Sheet 4 of 10

Depth (m)	Water Level	Graphic Log	Moisture	Soil Rock Description	Geological Unit	Depth
				TOPSOIL - turf, dark brown, dry	Topsoil	
0.5				Sandy SILT, LOESS - Light brown, dry	Loess	0.5
1.0						1.0
1.5				Silty, sandy GRAVEL - sub-rounded, light brown, AP20, schist based - Glacial Till	Glacial Till	1.5
2.0						2.0
2.5				Schist BEDROCK - easily rippable at interface, more solid with depth	Bedrock	2.5
3.0				2.4m bottom of pit, no water ingress. 		3.0
3.5						

Date Excavated:	21/03/2019 11:56am	Equipment:	Hitachi 13.5 tonne excavator
Logged By:	JFM	Contractor:	Solidbuilt Homes Ltd

Test Pit Log

Civilised Ltd

Project:	Proposed 24 Lot Subdivision	Project Number:	QV021
Site Location:	Littles Road, Queenstown	Client:	Wakatipu Investments Ltd
Tets Pit Number:	Test pit #5 - Fine, sunny, no wind.		Sheet 5 of 10

Depth (m)	Water Level	Graphic Log	Moisture	Soil Rock Description	Geological Unit	Depth
				TOPSOIL - turf, dark brown, dry	Topsoil	
0.5				Sandy SILT, LOESS - Light brown, dry	Loess	0.5
1.0				Sandy GRAVEL, some silt, cleaner with depth, light brown/gray, subrounded	Gravel	1.0
1.5						1.5
2.0						2.0
2.5				2.4m bottom of pit, no water ingress. 		2.5
3.0						3.0
3.5						

Date Excavated:	21/03/2019 12:02pm	Equipment:	Hitachi 13.5 tonne excavator
Logged By:	JFM	Contractor:	Solidbuilt Homes Ltd

Test Pit Log

Civilised Ltd

Project:	Proposed 24 Lot Subdivision	Project Number:	QV021
Site Location:	Littles Road, Queenstown	Client:	Wakatipu Investments Ltd
Tets Pit Number:	Test pit #6 - Fine, sunny, no wind.		Sheet 6 of 10

Depth (m)	Water Level	Graphic Log	Moisture	Soil Rock Description	Geological Unit	Depth
				TOPSOIL - turf, dark brown, dry	Topsoil	
				Sandy SILT, LOESS - Light brown, dry	Loess	
0.5						0.5
				Silty, sandy GRAVEL - sub-rounded, light brown, AP20, schist based - Glacial Till	Glacial Till	
1.0						1.0
1.5						1.5
				Schist BEDROCK - solid	Bedrock	
2.0				1.9m bottom of pit, no water ingress.		2.0
2.5						2.5
3.0						
3.5						3.0

Date Excavated:	21/03/2019 12:13pm	Equipment:	Hitachi 13.5 tonne excavator
Logged By:	JFM	Contractor:	Solidbuilt Homes Ltd

Test Pit Log

Civilised Ltd

Project:	Proposed 24 Lot Subdivision	Project Number:	QV021
Site Location:	Littles Road, Queenstown	Client:	Wakatipu Investments Ltd
Tets Pit Number:	Test pit #7 - Fine, sunny, no wind.		Sheet 7 of 10

Depth (m)	Water Level	Graphic Log	Moisture	Soil Rock Description	Geological Unit	Depth
				TOPSOIL - turf, dark brown, dry	Topsoil	
				Sandy GRAVEL, some silt, cleaner with depth, light brown/gray, rounded	Gravel	
0.5						0.5
1.0						1.0
1.5						1.5
2.0						2.0
2.5						2.5
				2.5m bottom of pit, no water ingress.		
3.0						3.0
3.5						

Date Excavated:	21/03/2019 12:29pm	Equipment:	Hitachi 13.5 tonne excavator
Logged By:	JFM	Contractor:	Solidbuilt Homes Ltd

Test Pit Log

Civilised Ltd

Project:	Proposed 24 Lot Subdivision	Project Number:	QV021
Site Location:	Littles Road, Queenstown	Client:	Wakatipu Investments Ltd
Tets Pit Number:	Test pit #8 - Fine, sunny, no wind.		Sheet 8 of 10

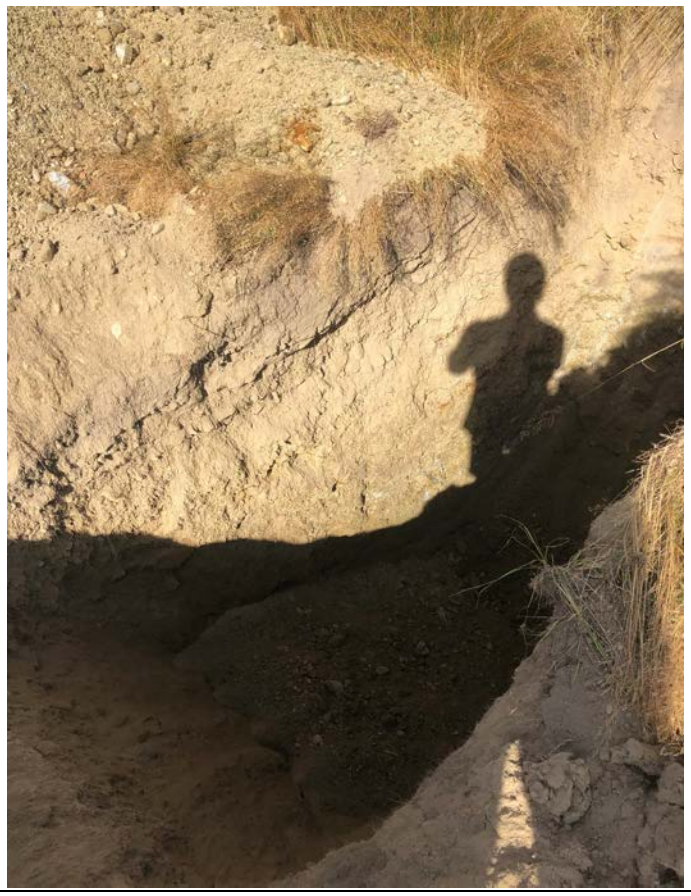
Depth (m)	Water Level	Graphic Log	Moisture	Soil Rock Description	Geological Unit	Depth
				TOPSOIL - turf, dark brown, moist	Topsoil	
				SILT layers - soft, damp, wetter with depth, organic	Silt	
0.5						0.5
1.0						1.0
1.5						1.5
				Sandy, silty GRAVEL, light brown/gray, subrounded, saturated, groundwater flows.	Gravel	
2.0						2.0
2.5						2.5
3.0						3.0
3.5				3.6m bottom of pit, water ingress at >1.6m depth.		

Date Excavated:	21/03/2019 12:23pm	Equipment:	Hitachi 13.5 tonne excavator
Logged By:	JFM	Contractor:	Solidbuilt Homes Ltd

Test Pit Log

Civilised Ltd

Project:	Proposed 24 Lot Subdivision	Project Number:	QV021
Site Location:	Littles Road, Queenstown	Client:	Wakatipu Investments Ltd
Tets Pit Number:	Test pit #9 - Fine, sunny, no wind.		Sheet 9 of 10

Depth (m)	Water Level	Graphic Log	Moisture	Soil Rock Description	Geological Unit	Depth
				TOPSOIL - turf, dark brown, dry	Topsoil	
0.5				Sandy GRAVEL, some silt, cleaner with depth, light brown/gray, rounded, dry. 	Gravel	0.5
1.0						1.0
1.5						1.5
2.0						2.0
2.5				2.4m bottom of pit, no water ingress.		2.5
3.0						
3.5						3.0

Date Excavated:	21/03/2019 12:39pm	Equipment:	Hitachi 13.5 tonne excavator
Logged By:	JFM	Contractor:	Solidbuilt Homes Ltd

Test Pit Log

Civilised Ltd

Project:	Proposed 24 Lot Subdivision	Project Number:	QV021
Site Location:	Littles Road, Queenstown	Client:	Wakatipu Investments Ltd
Tets Pit Number:	Test pit #10 - Fine, sunny, no wind.		Sheet 10 of 10

Depth (m)	Water Level	Graphic Log	Moisture	Soil Rock Description	Geological Unit	Depth
				TOPSOIL - turf, dark brown, dry	Topsoil	
0.5				Sandy SILT, LOESS - Light brown, moist	Loess	0.5
1.0						1.0
1.5				Sandy GRAVEL, some silt, cleaner with depth, light brown/gray, subrounded, wet	Gravel	1.5
2.0						2.0
2.5				2.3m bottom of pit, water ingress at 1.8m depth. 		2.5
3.0						
3.5						3.0

Date Excavated:	21/03/2019 12:46pm	Equipment:	Hitachi 13.5 tonne excavator
Logged By:	JFM	Contractor:	Solidbuilt Homes Ltd