



WATERSHED

23 September 2019

Queenstown Lakes District Council
10 Gorge Road
Queenstown

Dear Richard Powell,

ORCHARD ROAD DEVELOPMENT

As per your request, we have undertaken hydraulic modelling to assess the ability to supply water to the proposed development of the "Boyd" land (shown in Figure 1 in Orange) with respect to achieving the levels of service required by Queenstown Lakes District Council now and into the future.

The land comprises of Lots 1 to 9, DP 300773 on Orchard Road and Riverbank Road.

Figure 1: Development Area





WATERSHED

DEMAND ASSESSMENT

The demand has been assessed based on information provided by QLDC as tabulated and referenced below.

Table 1: Development Details

Development	No. of Residential Lots / Commercial / Industrial Area	Reference
Boyd Land	400-600	Email 15 May 2019

The key design parameters outlined in Queenstown Lakes District Council Land Development and Subdivision Code of Practice (2015) are as follows:

- Daily consumption of 700 L/p/day
- Number of people per dwelling = 3
- Peak Day Demand (over a 12-month period) = Average Day Demand x PF:
 - (a) PF = 1.5 for populations over 10,000;
 - (b) PF = 2 for populations below 2,000.
- Peak Hourly Demand = Average Hourly Demand (on peak day) x PF (over a 24-hour period):
 - (a) PF = 2 for populations over 10,000;
 - (b) PF = 5 for populations below 2,000.
- Firefighting demands as specified in SNZ PAS 4509
- Commercial / Industrial demands are assessed on a consumption figure of 12m³/Ha/Day

The firefighting classification for residential development will be assessed as FW2 25L/s.

Table 2 shows the demand calculation for the development.

Table 2: Average and Peak Day Demand Calculations

Development Stage	No. of Residential Lots / Area	Population	Average Demand (L/s)	Peak Daily Demand (L/s)
Boyd Land	600	1800	14.58	29.17

Peak Hour Demand

A peak hour factor of 2.1 has been used based on a standard domestic equivalent diurnal profile.

LEVELS OF SERVICE

The levels of service agreed upon with QLDC for the current system performance assessment as part of the model development and calibration project are outlined below:

- The minimum service pressure is 200-300kpa
- The maximum service pressures is 700-800kpa

These levels of service along with the requirements of the Fire Fighting Water Supplies Code of Practice form the basis for the system performance analysis.



WATERSHED

Queenstown Lakes District Council does not prescribe any level of service criteria relating to pipe head loss, generally speaking pipe head loss per unit length for new pipes should ideally be < 2 m/km, or 2- 5 m/km for normal operation.

EXISTING SYSTEM PERFORMANCE

With the commissioning of the new 300mm watermain through the Three Parks subdivision and the new upgrades on Anderson Road the existing network meets the levels of service. It should be noted that the Cardrona Valley Road area is reliant on the single 200mm feed along Golf Course Road which is beginning to experience higher head losses.

APPROVED DEVELOPMENTS

QLDC has received applications for significant land development in the area between Ballantyne Road and Cardrona Valley Road, namely the Bright Sky Gordon's Land, Alpine Estates, and Tussock development areas.

The water supply assessment associated with these developments, identifies the additional demand in the Cardrona Valley Road area increases the head losses through the 200mm watermain on Golf Course Road, reducing pressures.

The proposed reticulation layout for these developments is based around a new section of 500mm watermain through Golf Course Road, which forms part of the proposed future trunk network, being brought forward to coincide with development in this area.

ORCHARD ROAD DEVELOPMENT ASSESSMENT

The initial assessment of the Orchard Road (Boyd) area assumes 400 Lots, of the 600 Lots proposed, would be supplied from Ballantyne Road and the remaining 200 Lots from Cardrona Valley Road. The calculated demand has been applied to the current peak day scenario, which doesn't account for developments which have already been approved.

Based on the previous development assessments, servicing of the 200 Lots from Cardrona Valley Road will require the construction of the proposed trunk infrastructure on Golf Course Road. Without the trunk upgrade minimum pressures with an additional 200 Lots are reduced by 15m in the Cardona Valley Road area, resulting in pressures below 20m in areas west of Cardona Valley Road, and 20-30m on Cardrona Valley Road.

With the additional 400 Lots at the end of Ballantyne Road, minimum pressures are reduced by ~14m, however pressures in this area remain above 30m. The available fire flow at the end of Ballantyne Road is reduced from approximately 91L/s to 63L/s, and the FW4 classification can no longer be achieved at the end of this road. Head loss in the watermain south of Sir Tim Wallis Drive is significantly increased and upgrades would be required.

Given the development can not be serviced based on the current peak day scenario, no further analysis has been undertaken to consider the existing approved developments.



WATERSHED

SUMMARY

The hydraulic model is a representation of the physical water supply system and as noted in the model development and calibration report it has limitation to its accuracy. The demands and peaking factors used to assess the development are based on assumptions and the actual finally water demands may vary.

To service the proposed 600 Lot development on the "Boyd" land (Orchard Road) the proposed "Stage 1" trunk infrastructure on MacPherson Street and Golf Course Road would be required, as well as additional upgrades on Ballantyne Road.

We trust this report meet your requirements. Please contact Charlotte Broadbent on 021766475 charlotte.broadbent@wse.co.nz if you wish to discuss any aspects of this report further.

Regards,

Charlotte Broadbent

Director / Senior Civil Engineer