

Memorandum

To Ulrich Glasner (Queenstown Lakes District Council)

Copy Blair Devlin (Vivian + Espie Ltd)

From Tony Gordon (WSP Opus)

Office Christchurch Environmental Office

Date 8 January 2019

File 6-XQ074.04

Subject Ladies Mile Properties Ltd - Proposed Residential Development – Second Review

Background

In early 2019 a Revision 2 of the 3 Waters Preliminary Assessment for the Lauren Hills development was received from Clark Fortune McDonald & Associates. This was subsequent to a review carried out by WSP Opus in late 2018 in which some gaps were identified in Revision 1 of the Assessment.

Revision 2 adequately responds to many of the matters raised in the earlier memorandum, but there remain some points where either further clarification or elaboration is required. Some changed assessments involve the use of non-Code of Practice figures; whether the use of these is satisfactory is a matter for QLDC to determine.

Wastewater

The calculation of the excess capacity in the existing reticulation assumes a lower dry weather flow per residential unit than the Code of Practice requires. The lower figure is based on flow measurements at the Shotover Wastewater Pump Station in September 2016. The measurement period is limited and doesn't evaluate population present. The flow per residential unit is derived by dividing the flow by the number of occupied dwellings. Using a 'snapshot' of flows over a short period of time with unknown occupancy has the potential to underestimate *peak* dry weather flows.

The calculation of spare capacity again works on pipe-full flow. As pointed out in my initial review, gravity wastewater pipes should be designed to operate part full.

There remains therefore a risk that the existing reticulation could be surcharged by increased flows from the development.

The storage requirements at the pump station are clarified by explaining that the proposed 60 m³ of storage is more than the 39 m³ needed for eight hours storage at Average Dry Weather Flow. 60 m³ would therefore provide 12 hours storage. The Code of Practice doesn't state what QLDC's requirements are.

Stormwater

The calculations of peak flows use revised figures and give rainfall intensities in L/s. This appears to be a typographical error and the unit should be mm/hr.

The calculations of the volumes of runoff still use the Rational Formula coefficient. As pointed out in the initial review, the Rational Formula is a method to derive peak flow, not volume, and runoff volume is likely to exceed the volumes calculated.

The derivation of the pre-development runoff figure of 20 L/s is still not given.

The calculations that allow for soakage need further explanation. There appear to be some units missing. There is no time given for the suggested maximum volume of discharge to ground, and the infiltration for different storms in different events is missing the assumed areas available for infiltration.

Water Supply

In section 7.5 Existing Infrastructure it is stated that the system is connected to the Lake Hayes water supply scheme. As I understand it, the Lake Hayes system is not currently connected. I assume that what is probably being referred to is the Lake Hayes Estate system.

In section 7.6 Concept Design it is stated that:

Given the elevation of the site is lower than the State Highway intersection and 150 kPa is available at that location, it can be deduced that the entire site will have a static pressure of greater than the minimum required 100 kPa can therefore expect to have adequate fire fighting pressures.

The minimum of 100 kPa for firefighting demand is (as quoted in section 7.4 Required Fire Fighting Demand) is not a static pressure. To quote SNZ PAS 4509, section 5 Running (Dynamic) Pressure:

The minimum running pressure in the water main should not be less than 100 kPa while the water main is flowing the required amount of water from the maximum number of fire hydrants.

The conclusion therefore about adequate firefighting pressure appears to be incorrect.

Review Conclusion

It remains unclear that the report's conclusion, that the existing infrastructure can service the proposed development, is correct.

In summary the key points that need to be addressed are:

- There is potential to underestimate the peak dry weather wastewater flows due to the method used
- Gravity wastewater system capacity is assessed using full flow conditions not part-full flow conditions as is best practice
- Excess capacity in the existing wastewater reticulation assumes a lower dry weather flow per residential unit than QLDC's Code of Practice requires
- QLDC to determine whether 12 hours wastewater storage is sufficient
- Stormwater runoff volume is likely to exceed the volumes calculated due to the use of the Rational Formula for the calculations
- The derivation of the pre-development stormwater runoff figure of 20 L/s is still not provided
- Further elaboration is required to determine whether the calculations for stormwater soakage are reasonable
- Confirm that what was meant was a connection to the Lake Hayes Estate water supply system
- Stated 100 kPa firefighting pressure is static not dynamic as required by the Firefighting Water Supplies Code of Practice