

BEFORE THE QUEENSTOWN LAKES DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER Plan Change 50 (Queenstown Town Centre Zone
Extension) to the Queenstown Lakes District Plan

STATEMENT OF EVIDENCE OF MR NIGEL RICHARD LLOYD

1 EXECUTIVE SUMMARY

- 1.1 I conducted a preliminary geotechnical assessment of the Lakeview and Brecon St zones for the Queenstown Lakes District Council. I found the site is generally suitable for future development with liquefaction risk and alluvial fan hazard risk being very low.
- 1.2 Any large scale future development within this area will require specific evaluation of the site and ground conditions tailored to the location and type of development and structures that are proposed at the time of planning and design. These requirements, and the specific elements to be evaluated are standard for any significant development within the Wakatipu Basin.
- 1.3 Items that I expect to require consideration when planning and designing future developments in the area include evaluation of stormwater and groundwater runoff, strength testing of soils and potential variability, depth to rock, stability of excavations, rock mass defects and the steep slopes along the northern fringe of the area.

2 INTRODUCTION

- 2.1 My name is Nigel Richard Lloyd. I am a Civil and Environmental Engineer. I have 13 years of Civil and Environmental Engineering experience in various Engineering roles including 8 years as a Senior Engineer with my current employer, Hadley Consultants Ltd in Queenstown. I have a Bachelor of Engineering (Civil) with Honors. I have been a member of the Institute of Professional Engineers of New Zealand (IPENZ) since 2002.
- 2.2 I have undertaken numerous preliminary and detailed site investigations and assessments throughout New Zealand in my professional career assessing a range of factors including geotechnical conditions and natural hazards. This includes a number of sites in Queenstown and around the Wakatipu Basin over the last 10 years that I have been based in Queenstown.

2.3 I became involved in the current matter in November 2013. I completed a Preliminary Geotechnical Assessment on the Lakeview Holiday Park site in December 2013, a Preliminary Geotechnical Assessment of the Plan Change zone in July 2014, and a Preliminary Geotechnical Assessment on the 34 Brecon Street site as an addendum to the July report in August 2014. These assessments have included review of more detailed site investigations undertaken previously in various portions of the site by others for a variety of clients and purposes.

2.4 I have read the Code of Conduct for Expert Witnesses outlined in the Environment Court's Consolidated Practice Note and have complied with it in preparing this evidence. I also agree to follow the Code when presenting evidence to the Council. I confirm that the issues addressed in this brief of evidence are within my area of expertise and that I have not omitted to consider material facts known to me that might alter or detract from my opinions.

3 SCOPE OF EVIDENCE

3.1 My evidence will review my findings from an initial desktop review and preliminary geotechnical assessment of the section of land owned by QLDC within the Queenstown Town Centre: Lakeview Subzone Plan Change Area and the privately owned 34 Brecon Street site.

4 THE PLAN CHANGE

4.1 The plan change has been described in detail by Mr Speedy of the Queenstown Lakes District Council. Very generally, it provides for more intensive uses of the plan change area, particularly in terms of the scale of the built environment. My evidence considers whether the area is geotechnically suitable for such a change.

5 THE SITE

- 5.1 I have assessed a portion of the plan change area that I will refer to as the “site” and this includes: the Council owned portion of the Lakeview sub-zone located to the north of Thompson, Man and Isle Streets between Glasgow Street to the west and Cemetery Road to the northeast on the lower, south-western flank of Bob’s Peak and the privately owned 34 Brecon Street site bounded by Brecon Street to the east, Cemetery Road to the south and west and the Queenstown Cemetery to the north.
- 5.2 The majority of the Council owned portion consists of a generally flat to gently sloping terrace of low relief, but also includes an elevated spur towards the western boundary and steep hill slopes along the northern boundary. The main terrace portion of the site ranges from approximately RL340 metres in the east to RL355 metres above mean sea level.
- 5.3 A minor gully extends into the western corner of the Council owned portion of the site from the steep adjacent slopes which may result in surface water flows, although these appear to be small and ephemeral in nature. Some areas of minor groundwater seepage have been identified in the toe of the steeper north slopes in several areas. Minor groundwater is expected to be present beneath the site in some locations.

6 KEY FINDINGS

- 6.1 Based on site visits, observations of surface features, review of previous reports for the Lakeview site, my interpretation of the geology and results from previous subsurface investigation works I make the following conclusions:
- 6.2 The area is overlain with generally competent alluvial material and glacial till over schist bedrock, all being suitable for building development.
- 6.3 I consider the liquefaction risk within the area to be very low due to the predominantly coarse grained soils and limited quantities of near surface permanent groundwater

expected to be present across the site. In my view, this should not need to be a consideration in future design unless ground conditions are found to vary.

- 6.4 A potential alluvial fan hazard is identified in the QLDC hazard maps and this is noted as being less recently active. An alluvial fan is an area that has been subject to inundation by stream flow and deposition of materials transported by the water. I consider the risk posed by the alluvial fan hazard to be very low, so that I do not anticipate any land use constraints provided upslope runoff is adequately allowed for during detailed design. The exception is a small area of debris cone relating to the steeper slopes to the north which encroaches on to the northern fringe of the zone area. However this area is limited in extent and is located within proposed reserve area in the Lakeview sub-zone Structure Plan.
- 6.5 The depth to bedrock is relatively shallow across large portions of the zone area. This may impact development costs. Similarly, the dip angle of the bedrock may necessitate rock bolting if required excavation depths become significant or jointing is exposed which requires stabilisation.
- 6.6 I recommend that any large scale future development within this area will require specific evaluation of the site tailored to the location and type of development and structures proposed and design of the site works. This work will likely include the following.
- (a) Referencing of previous subsurface investigation work against proposed building location in order to avoid duplication and additional investigations as required.
 - (b) Specific strength testing of soils by targeted subsurface investigations and testing in regions where significant structures and foundations are proposed. This investigation information would be used to inform foundation design.
- 6.7 I note that a number of other factors will need to be considered as part of normal development within this area. These include;

- (a) Control of stormwater and groundwater including from the upslope catchment and considering the possibility of reduced vegetation cover.
- (b) Optimising building location to account for the variable depth to rock and the risk of rock mass defects.
- (c) The possibility of variability in the strength and excavation stability of the overburden materials (alluvial materials, beach deposits and glacial till).
- (d) Any undercutting in close proximity to the steep slopes to the north.

6.8 All of the above are typical considerations for development within the Wakatipu Basin and their impact will be a function of the nature and extent of the proposed development.

7 CONCLUSION

7.1 For the reasons outlined in my evidence it is my view that there are no geotechnical constraints or reasons why development of the sort facilitated by the plan change could not proceed subject to appropriate targeted investigations and detailed design at the time specifics of the future development are known.

DATED the 10th day of November 2014

A handwritten signature in blue ink, appearing to read 'N. Lloyd', is written over a light blue circular stamp.

Nigel Lloyd

Senior Civil and Environmental Engineer