

**Before the Independent Commissioners appointed by the Waimakariri District Council**

In the matter of            the Resource Management Act 1991 (**the Act**)

And

In the matter of            Proposed Waimakariri District Plan

And

**In the matter of**            the submission by Alistair John Dugald Cameron (#180) seeking the rezoning of land at 2 Auckland Street, Ashley Village.

**Brief of evidence of Elliot Edward Duke on behalf of Alistair Cameron**

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Dated: 5 March 2024

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## **Evidence of Elliot Edward Duke**

### **Introduction**

1. My full name is Elliot Edward Duke. I am a Chartered Geotechnical and Civil Engineer, and Director of Davis Ogilvie & Partners Limited.
2. Davis Ogilvie is a multi-disciplinary consultancy covering structural, civil and geotechnical engineering, land surveying, environmental, resource management and policy planning.
3. I hold a Bachelor of Natural Resource Engineering (Honours) from Canterbury University. I am a Chartered Professional Engineer and a Professional Member of Engineering New Zealand (ENZ). I am an International Professional Engineer recognised on the ENZ Register in New Zealand.
4. I specialise in the civil and geotechnical aspects of projects, including geotechnical investigations, roading and infrastructure design, stormwater, wastewater, and contaminated site management.
5. I have been involved in numerous large-scale land development projects, throughout the South Island. These include the 1500 lot Ravenswood Development in Woodend, the 1200 lot Silverstream development in Kaiapoi, Sovereign Palms, Sovereign Lake and Moorcroft in Kaiapoi. The Cliff Street extension in Redcliffs, Bluewater Resort, Lochinvar Run and The Cairns developments in Tekapo, The Meadows and Appleby Fields in Nelson, and the Waterloo Business Park brownfield development in Hornby.
6. I have overseen Geotechnical Investigations for a variety of clients, including the University of Canterbury, Ministry of Education, Fletchers, Worksafe and numerous local authorities. I am currently on the Christchurch City Council (CCC), New Zealand Claims Resolution Service (NZCRS) and Insurance Tribunals panels to provide expert geotechnical advice.

### **Code of conduct**

7. In preparing my evidence I have reviewed and agree to comply with the Code of Conduct for Expert Witnesses contained in Part 9 of the Environment Court Practice Note 2023. This evidence has been prepared in compliance with the Practice note. I confirm that the issues addressed in this statement of evidence are within my area of expertise, except where relying on the opinion or evidence of other witnesses, which I will specify. I have not omitted to consider any material

facts known to me that might alter or detract from the opinions expressed.

### **Scope of evidence**

8. I have prepared a report on the geotechnical conditions of the site in relation to Mr Cameron's submission.
9. My report has been included as Appendix 7 to the planning evidence of Peter Lloyd Glasson.

### **Summary of evidence**

10. The report at Appendix 7 constitutes my evidence and includes detail of our Geotechnical investigation and recommendations. A summary is provided below.

### **Ground Conditions**

11. The site comprises an approximately semi-rectangular area of 8.0 hectares, and is largely undeveloped grassed farmland, The land is generally flat to undulating, with a gentle overall slope towards the Ashley River.
12. The published geology of the site is identified as "Grey to grey-brown river alluvium of undifferentiated Late Quaternary age (IQa)"
13. Davis Ogilvie conducted geotechnical testing on the site comprising 22 machine-excavated Test Pits (TP) with 26 Dynamic Cone Penetrometer (DCP) testing.
14. Testing revealed a generally uniform soil profile across the site consisting of topsoil underlain by silt (with lesser sand) that generally showed an increase in consistency / density with depth and then gravel. Gravel was relatively shallow at the north end of the site, (1.5 – 2.5 m below EGL) compared to the far south of the site where gravel was measured at 3.0 – 4.6 m below EGL
15. Groundwater was encountered in some of the excavations at between 2.4 – 5.4 m below EGL, with the median depth being 3.7 m below EGL

### **Liquefaction**

16. Observations of the soil and groundwater profile at the site based on test pit excavations suggest that northern areas of the site (are considered consistent with a 'Very Low' Liquefaction Vulnerability Category.
17. Testpits within ~50 m of the southern boundary identified gravel at greater depth overlain by soft and wet silts. Groundwater is present at a shallower depth, and the saturated soils overlying gravel are potentially liquefiable. In the south we consider the area to be consistent with a 'Low' Liquefaction Vulnerability Category i.e., liquefaction damage is unlikely but minor ground damage could occur.

### **Flood Risk**

18. Numerous flood investigations have been undertaken for the Ashley / Rakahuri River floodplain and there is a good understanding of the flood risk.
19. 'Based on currently available information, stopbank breaches which would affect the proposed development are possible, but have a less than 10% chance of occurring during 200 and 500 year ARI flood events'
20. Given the protection provided by the Ashley / Rakahuri River Control Scheme stopbanks the flood hazard risk is considered very low and no specific flood hazard mitigation measures are likely to be required when constructing dwellings on or servicing the property

### **Natural Hazard Summary**

21. The site is suitable for subdivision into residential lots under Section 106 of the RMA. Any risk of liquefaction can be mitigated or managed to an acceptable level.
22. Site-specific geotechnical investigation will be required on each lot to determine the depth to suitable bearing and enable appropriate foundation design at building consent stage
23. Finished floor levels are confirmed during the consenting process by Waimakariri District Council and/or Environment Canterbury;



Date: 5 March 2024  
Elliot Duke