HEARING TOPIC

IN THE MATTER	of the Resource Management Act 1991
AND	Proposed Subdivision – 82 Riccarton Road East, Mosgiel – SUB-2016-28 & LUC-2016-169

STATEMENT OF EVIDENCE OF BEN MACKEY FOR OTAGO REGIONAL COUNCIL

Dated 16th August 2016

QUALIFICATIONS AND EXPERIENCE

1. My name is Ben Mackey.

2. I am employed by the Otago Regional Council ("the Council") as a natural hazard analyst, and have been in the role for approximately 15 months. My current role focuses on assessing Otago's natural hazards, such as earthquakes, landslides, coastal change, and flooding.

3. I hold the qualification of PhD in Geology specialising in quantitative geomorphology from the University of Oregon, and bachelor degrees in Science and Law from the University of Canterbury.

4. Prior to working for the Council, I have completed postdoctoral research at the California Institute of Technology and the University of Canterbury, and worked as an engineering geologist in Christchurch.

5. In preparing this evidence I have reviewed:

    a. Documents, reports, and evidence associated to the application, specifically as they relate to natural hazards,

    b. Aerial photos and LiDAR data of the site.

6. I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note. This evidence has been prepared in accordance with it and I agree to comply with it. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE AND OVERVIEW

7. My evidence relates to the potential for land instability on the property, and augment's the Council's original submission. This evidence includes the following:

    a. Annotated LiDAR image of the property

    b. Discussion of the landslide potential

8. Overall, after reading the revised application and additional evidence I consider that potential for slope instability remains in areas beyond those already identified, including near the proposed building platform on new Lot 2

LIDAR IMAGE

9. Figures 1 and 2 (appended) show images of the property at 82 Riccarton Road East. The image is constructed from LiDAR data (aerial laser swath mapping) which enables a detailed 3-D model of the ground surface to be created. The data was acquired in 2004. The view is an oblique view to the southwest of the northern slope of the property.

10. The LiDAR perspective view enables the ground morphology to be seen in detail, and reveals the extent of slope instability on the property, which extends onto adjacent terrain.

LANDSLIDE POTENTIAL

11. Analysis of aerial photos, LiDAR data, and available geotechnical data indicates the proposed building site at (new) Lot 2 is apparently one of the more stable areas in the proposed lot. The middle of the property is bisected by a sizeable landslide slump complex, the toe of which crosses the northern property boundary. Other isolated landslides and areas of hummocky topography are present across the slope.

12. There is some evidence for disturbed terrain directly upslope of the proposed building platform. It is not clear from the available data whether this is some incipient slumping, or if the morphology reflects some other process. Given its upslope location and proximity to the proposed building platform, this feature may evolve into a landslide hazard with the potential to affect structures.

13. Given this feature is likely to be partially within proposed Lot 1, the owner of a potential dwelling on the building platform of Lot 2 may have limited ability to mitigate any slope instability arising in this area, particularly if instability retrogresses further upslope.

14. The extent of slope instability across the northern slope of 82 Riccarton Road East, and extending onto properties to the west, suggests the terrain is very sensitive to landsliding. Changes in topographic loading from earthworks or alteration of the natural

drainage would need to be carefully managed to ensure these activities do not increase the susceptibility to slope instability.

CONCLUSION

15. LiDAR data and analysis of aerial images suggests the northern slope of the property is susceptible to slope instability. There is a topographic feature immediately upslope of the proposed building platform on new Lot 2 which could indicate slope instability in that area.

DATED this 16th day of August 2016.

Ben Mackey

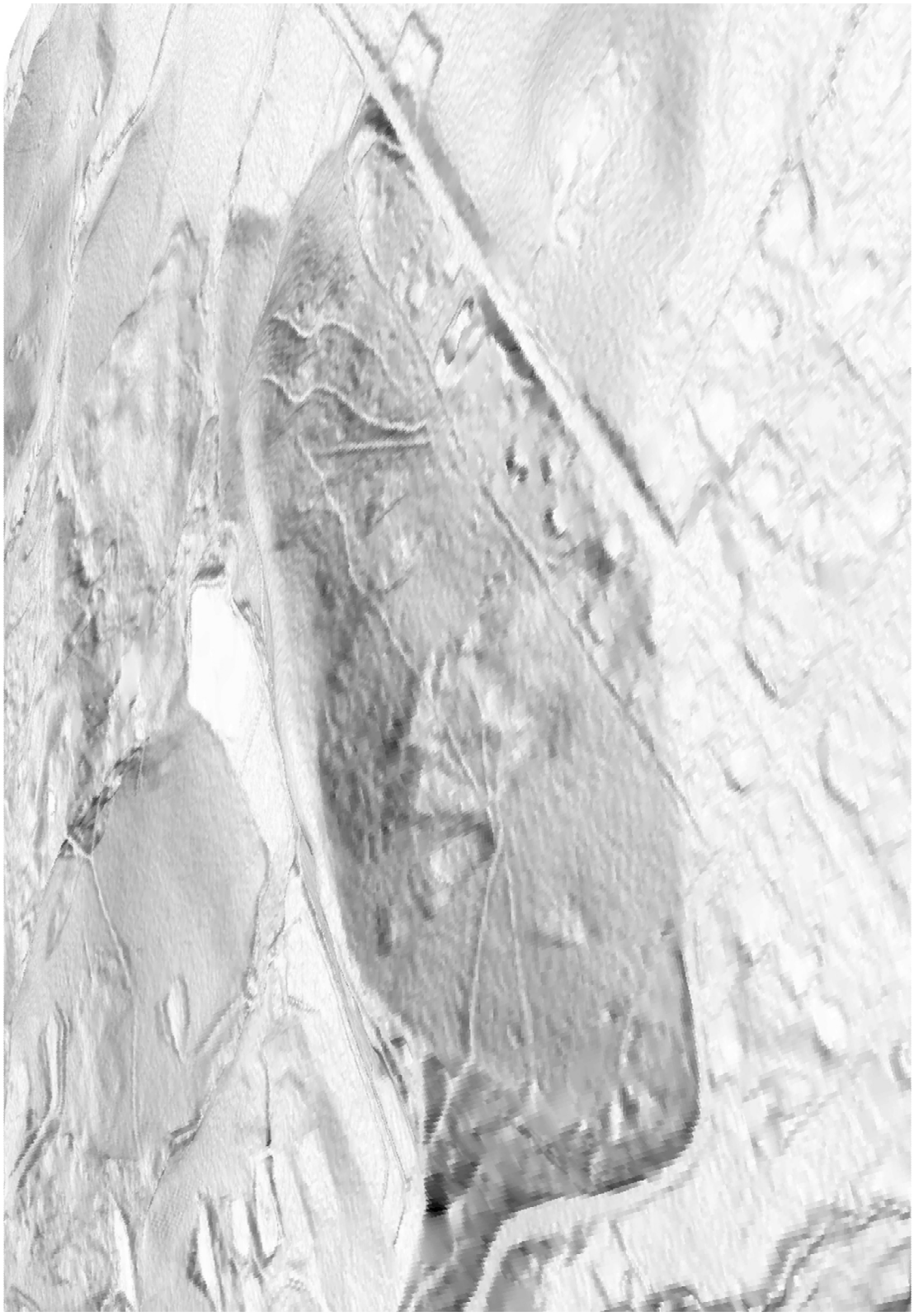

Figure 1. Oblique LiDAR slope-shaded terrain model of 82 Riccarton Road East – view to Southwest. Resolution is 1 m. Note that buildings and vegetation have been removed.

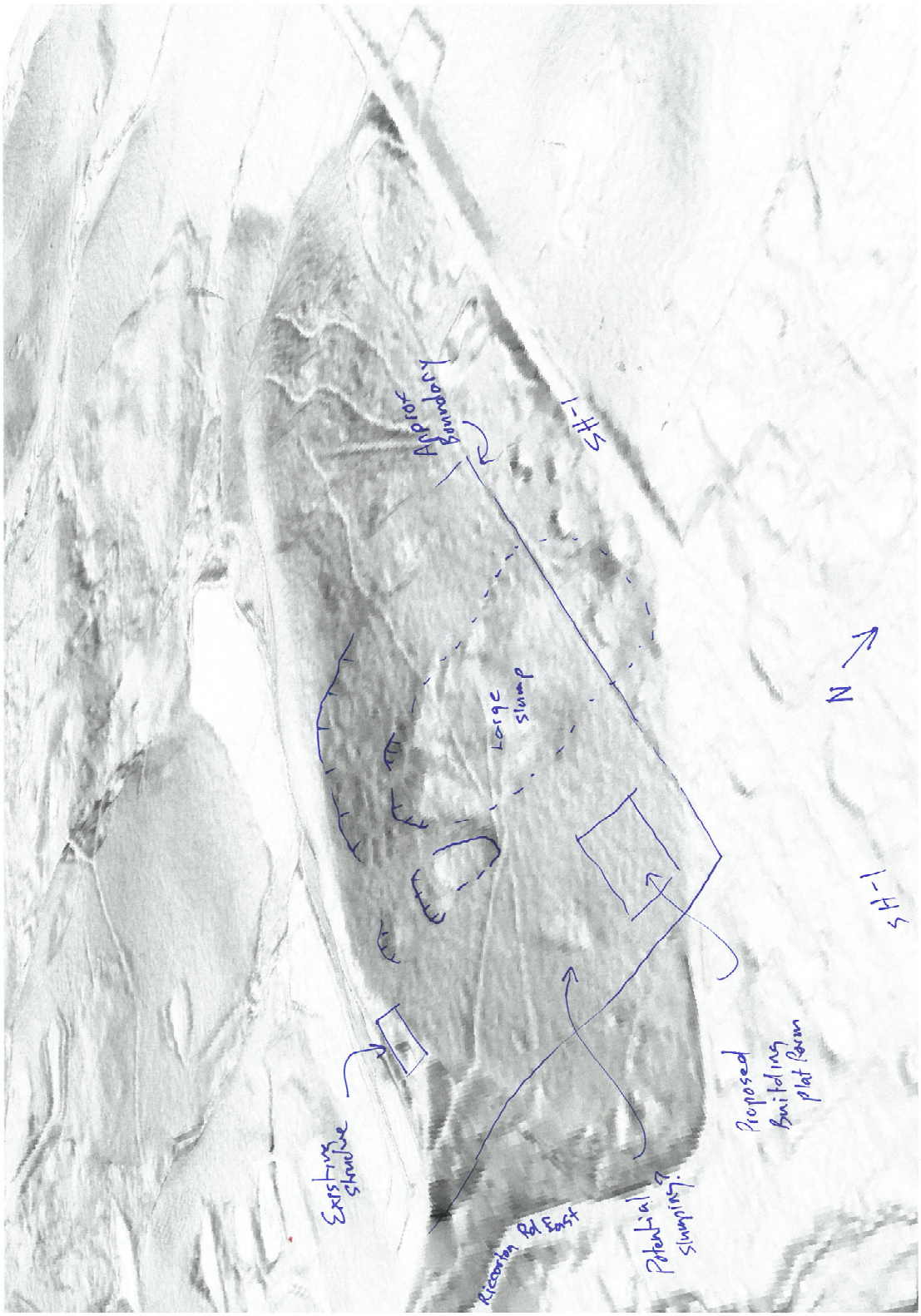

Figure 2. Annotated copy of Figure 1 identifying unstable terrain and proposed building platform.