BEFORE THE SELWYN DISTRICT COUNCIL

UNDER	the Resource Management Act 1991 (RMA)
IN THE MATTER	of Proposed Private Plan Change 66 to the Operative District Plan: Maddisons Road, Rolleston
BETWEEN	**ROLLESTON INDUSTRIAL DEVELOPMENTS LTD** **Applicant**
AND	**SELWYN DISTRICT COUNCIL**

STATEMENT OF EVIDENCE OF NICHOLAS DAVID ROBERT GRIFFITHS ON BEHALF OF THE CANTERBURY REGIONAL COUNCIL
30 July 2021

INTRODUCTION

1 My full name is Nicholas David Robert Griffiths.

2 I hold a Bachelor of Science with Honours degree in Geography and Geology. I have been employed by the Canterbury Regional Council as a natural hazard scientist since September 2011. This role involves assessing and providing advice on flood hazards, and has included work with Selwyn District Council and DHI Water and Environment Ltd. in the development of rain-on-grid flood modelling for the proposed Selwyn District Plan.

3 I am familiar with the application by Rolleston Industrial Developments Ltd. for Proposed Plan Change 66 (PC66).

4 Although this is not an Environment Court hearing, I confirm that I have read and am familiar with the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2014. I agree to comply with that code. Other than where I state I am relying on the evidence of another person, my evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

SCOPE OF EVIDENCE

5 My evidence relates to flood hazard issues raised in the Canterbury Regional Council's submission on PC66, and the points made on this matter in the evidence presented by Mr Timothy McLeod on behalf of the applicant.

6 I have reviewed the following documents and evidence in preparing my evidence:

(a) The Canterbury Regional Policy Statement 2013 (CRPS)

(b) The Canterbury Regional Council's submission on PC66

(c) The Section 42A Report prepared by Selwyn District Council

(d) Mr McLeod's evidence

SUMMARY OF EVIDENCE

7 LiDAR data inaccuracies will have impacted on flood model results at the PC66 site, but I consider that Mr McLeod has overstated the impact of these inaccuracies.

8 I consider that if the LiDAR inaccuracies did not exist, modelled water depths in the channel that runs through the western part of the property would still meet the

Canterbury Regional Policy Statement definition of ‘high hazard areas’, albeit to a differing degree and spatial extent.

9 It is my opinion that there is nothing in the evidence of Mr McLeod that changes the circumstances as they relate to Environment Canterbury’s original submission concerning the identification of a high hazard area. Any development within the high hazard area should be consistent with Policy 11.3.1 in the CRPS. I agree with the views stated in Paragraphs 84 and 85 of the Section 42A Report prepared by Ms White, that the applicant has not demonstrated that this Policy is given effect to through the proposed application.

FLOOD HAZARD

10 The Canterbury Regional Council’s submission on PC66 references rain-on-grid flood modelling undertaken by DHI Water and Environment Ltd on behalf of Selwyn District Council. The results of this modelling indicate that water depths will exceed 1 m in parts of a channel that runs through the western part of the PC66 property in a 500 year average recurrence interval (ARI) flood event, and therefore meets the Canterbury Regional Policy Statement definition of high hazard areas. In this location, the high hazard definition is met purely because of flood depths, rather than a combination of depth and velocity.

11 As noted in Mr McLeod’s evidence, the 10 x 10 m terrain used in this model was derived from several different LiDAR datasets, with the Rolleston part of the terrain (including the PC66 site) derived from LiDAR data captured in 2016/2017. This dataset was captured when there was a substantial amount of dense crop cover which prevented genuine LiDAR ground returns from being obtained. The data has been poorly classified, with crop surface returns being misclassified as ground returns (rather than vegetation) and therefore being retained in the 1 x 1 m digital elevation model as areas of false high ground.

12 The best way to quantify the impact of the LiDAR inaccuracy on the model results would be to obtain accurate ground level data for the PC66 site, and to use this to correct the model terrain, and re-run the model. In the absence of this information, I have reviewed the model results and LiDAR data, and consider the impact of the LiDAR inaccuracy will be as follows:

12.1 The LIDAR inaccuracies will have negligible impact on modelled flood depths within the upper ~ 150 m of the channel. This is because the invert levels through this part of the channel are higher, or at a similar level to the ‘crop barrier’ levels further downstream.

12.2 The LiDAR inaccuracies are likely to have elevated modelled water depths in the part of the channel from ~ 150 m downstream through to the 'crop barrier' at ~ 300 m downstream. Water depths here may have been elevated by up to 0.6 m, as this is the approximate height of the 'crop barrier' that acts to block the channel in the model terrain. Peak modelled water depths through this part of the channel range from around 1.6 m to 1.9 m and at least some areas would therefore still meet the high hazard area definition in the absence of the LiDAR inaccuracies.

12.3 The LiDAR inaccuracies will have likely resulted in the underestimation of flood depths in the southern part of the channel that runs through the crop affected area. This is because some water that would have otherwise flowed through this part of the channel has ponded behind the crop barrier and been diverted away toward the north-east. High hazard areas through this part of the channel would therefore be no less extensive (but possibly more extensive) than shown in the model results in the absence of the LiDAR inaccuracies.

13 Figure 1 below shows a long section of the stream channel invert derived from the LiDAR data, and corresponding modelled 500 year ARI water level profile. This also includes annotation to highlight the points described above.

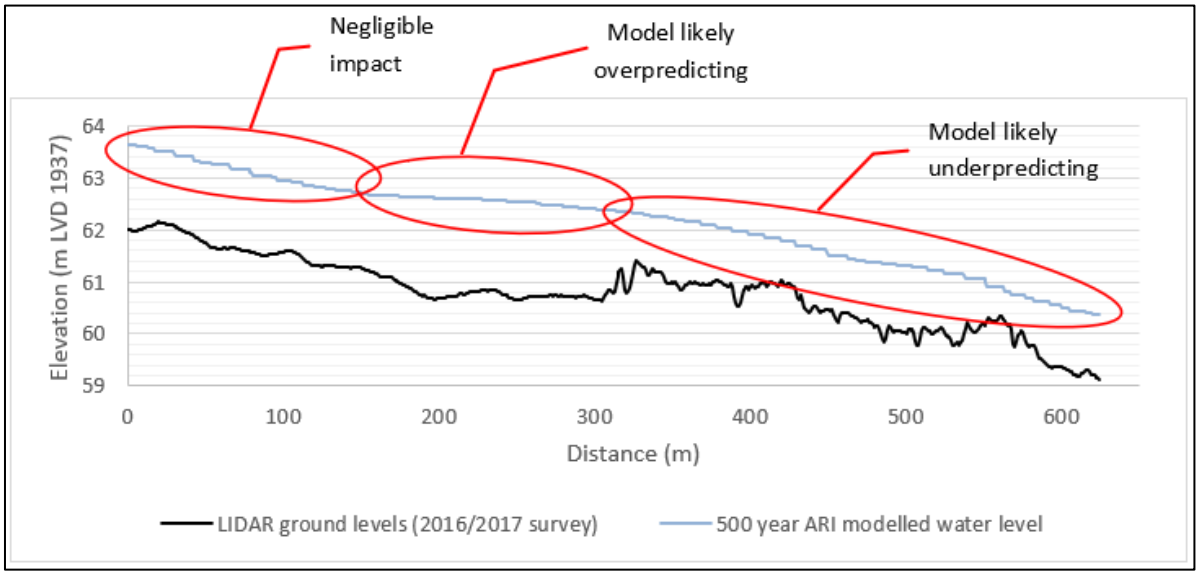

Figure 1. Stream channel long section and modelled 500 year ARI water level profile.

14 Figure 2 below shows the 1 x 1 m LiDAR digital elevation model, overlain with the modelled 500 year ARI hazard values (equal to water depths). The figure also shows the location of the stream channel long section (presented in Figure 1) and distance locations described above.

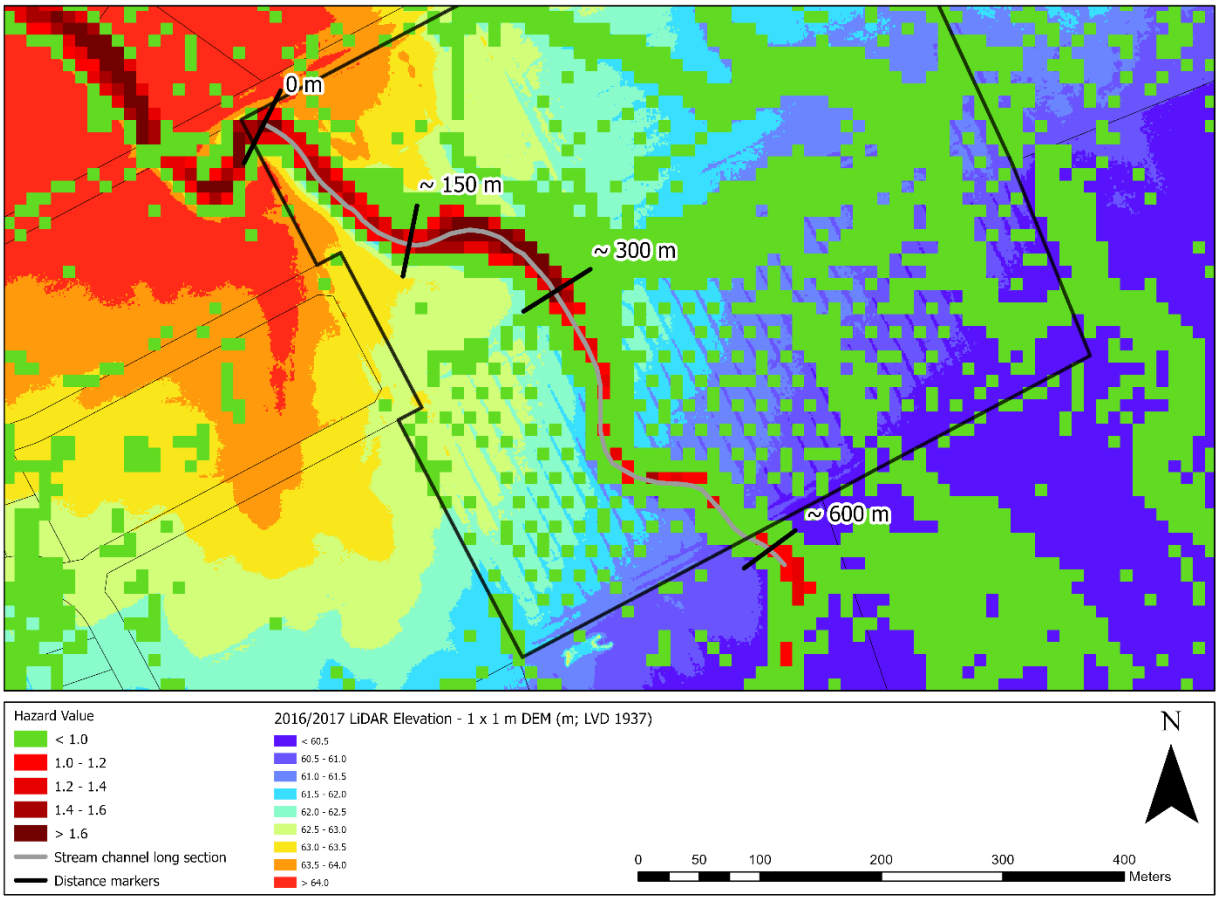

Figure 2. Map showing the LiDAR 1 x 1 m digital elevation model, modelled hazard values, stream channel long section, and distance markers.

CONCLUSION

15 LiDAR inaccuracies carried through to the model terrain are likely to have had an impact on the 500 year ARI model results at the PC66 site. If these inaccuracies did not exist, I consider that the modelling would still show the channel that runs through the western part of the site to meet the Canterbury Regional Policy Statement definition of a high hazard area.

Nicholas David Robert Griffiths

30 July 2021