

Before an Independent Hearings Panel
Appointed by Waimakariri District Council

under: the Resource Management Act 1991

in the matter of: Submissions and further submissions on the Proposed
Waimakariri District Plan

and: Hearing Stream 12D: Ōhoka rezoning request

and: **Carter Group Property Limited**
(Submitter 237)

and: **Rolleston Industrial Developments Limited**
(Submitter 160)

Summary of evidence of Ben Throssell

Dated: 4 July 2024

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SUMMARY OF EVIDENCE OF BEN THROSSELL

- 1 My full name is Benjamin Graham Throssell.
- 2 I prepared the following statements in support of the Submitters' rezoning request:
 - 2.1 Statement of evidence dated 5 March 2024; and
 - 2.2 Supplementary statement of evidence dated 18 June 2024.
- 3 While I was excused by the Panel from attending Hearing Stream 12D, I have been asked to prepare this summary of evidence for the Panel in light of Mr Bacon's presentation at the hearing.
- 4 I understand conferencing on the issue of flooding is likely to be directed by the Panel.
- 5 My evidence in chief covers the effects of the development on the 200-year flood event and set-up of the 2D hydraulic model. My supplementary evidence covers the effects of development on the 50-year flood event and effects downstream of the model extent.
- 6 Mr Bacon, agrees that our hydraulic modelling demonstrates that the effects on flooding, for the 200-year event, can be mitigated to an acceptable level. Some concerns regarding durations and flooding patterns were raised by Mr Roxburgh regarding the off-site effects for the 50-year event. These were also discussed by Mr Bacon at the hearing.
- 7 The issues of off-site effects for the 50-year event are addressed in detail in my supplementary evidence, and I consider that the effects can be mitigated to an appropriate level. I note Mr Roxburgh states in paragraph 4 of his evidence summary that he was instructed not to respond to my supplementary evidence, so I am unsure of exactly what his remaining concerns are.
- 8 I have also addressed effects on areas downstream of the model extent, (for example, Kaiapoi) in my supplementary evidence. In essence, flood effects decrease as distance from the site increases. I note that Mr Keenan in paragraph 13 of his evidence makes a generalised comment on effects, stating that "*adverse effects diminish with the increasing distance downstream from the site.*"
- 9 I note Mr Roxburgh in his summary statement states:

"While efforts have been made to demonstrate that the 50-year average recurrence interval (ARI) flow will be no greater in the post development scenario, it is unclear whether the downstream and surrounding environment can adequately convey the full 50-year ARI flow, without some properties being negatively impacted. "

- 10 In the absence of a response to my supplementary evidence, which addresses the 50-year ARI issue raised, I am unsure of exactly what his remaining concerns are.
- 11 I note that the 50-year event is considered a secondary event (rather than a primary event¹) and therefore some out of bank flows and activation of secondary flow paths are expected. In my opinion, it is unusual to expect that the 50-year flow can be conveyed without properties being negatively impacted. Regardless, I would expect a low hazard environment (such as Ōhoka south of Mill Road) to have comparatively more available capacity to convey flows without negative impacts on properties compared to a medium or high hazard environment.
- 12 Mr Roxburgh considers that the immediate downstream and surrounding environment is known to have a susceptibility to flooding. I think it is important to qualify this statement and highlight the differences between the various categories of flooding, often defined as flood hazard. Flood hazard is a measure of consequences, for an event to be classified as high hazard, the consequences of the event must be significant. High hazard flood events are likely to cause significant damage to infrastructure or result in loss of life. Recent examples of high hazard flood events are Cyclone Gabrielle and the Auckland Anniversary event. Low hazard events may include some nuisance flooding of property but will have minimal damage to infrastructure and no loss of life.
- 13 The Waimakariri District Council uses a 200-year flood event with climate change considerations to classify flood hazard. For context, NIWA classified Cyclone Gabrielle as roughly a 200-year flood event for the Esk Valley² (without climate change adjustments). This indicates that the flood event under consideration has a similar probability of occurring as Cyclone Gabrielle. However, the consequences of a 200-year flood differ significantly between Ōhoka and the Esk Valley. The flood hazard map (Attachment 5 of my evidence in chief) shows two distinct flood zones separated by Mill Road:
- 13.1 **South of Mill Road (Low Hazard):** This area, encompassing the site and downstream areas, is primarily categorised as low hazard (H1). This signifies minimal flood risk for people and buildings. Only one residential building near Mill Road falls outside this classification; and,
- 13.2 **North of Mill Road (Medium Hazard):** This area includes most of urbanised Ōhoka. Here, the hazard classification ranges from H2 (unsafe for small vehicles) to H4 (unsafe for people and vehicles). Multiple residences are located within

¹ A primary event (for example the 5-year or 10-year events) is expected to be conveyed within the stormwater network and should not (although it often does) have negative impacts on properties.

² <https://www.hbrc.govt.nz/assets/Document-Library/Reports/External-Reports/NIWA-letterreport-230224.pdf>

these higher hazard zones. However, Attachment 3 of my supplementary evidence demonstrates no noticeable impact on this area during a 50-year flood event. Similarly, Attachment 7 of my evidence in chief shows minimal flood level increases (less than 20 mm) for the 200-year event.

- 14 In conclusion, any potential flood impacts on Ōhoka would be concentrated to the less populated area south of Mill Road. This area is classified as low hazard. Even if an event similar to Cyclone Gabrielle was to occur over the Waimakariri District, I would expect only minor flooding issues in this location (south of Mill Road). Compared to other parts of the Waimakariri District, I conclude Ōhoka is less vulnerable to large flood events.
- 15 I consider our analyses of the 50-year and 200-year events give confidence that the effects on flooding of the proposed development can be mitigated to an appropriate level. I note further assessments will be required at the resource consent stage once the final subdivision plan has been determined, as is typical for any development.
- 16 I understand the Oxford Ōhoka Community Board's presentation expressed concern that my assessment (as well as the Council's flood model) is a desktop review only and does not reflect what actually happens on the ground. I address model validation in paragraphs 32 to 38 of my evidence in chief. I conclude that the WDC model (and therefore, the PDP model also) is likely conservative. This means the model is more likely to over-estimate flood levels rather than under-estimate them. I note Mr Bacon agrees with this statement.

Dated: 4 July 2024

Ben Throssell