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Submission Against Private Plan Change RPC 031: Floodwater and Stormwater

By Roger Foy of 505 Mill Rd, Ohoka.

I am a chartered professional engineer with more than 40 years of experience, including Christchurch infrastructure rebuild following the 2010/11 earthquakes. I have lived in the Ohoka area for ten years.

I am a resident within the block of properties which are bounded by Mill and Whites Rd and which adjoin the proposed development.

I appreciate this opportunity to express my view on the effects of the proposed subdivision and have selected the management of flood and stormwater flows because I consider these to have the greatest potential to be problematic for the community and WDC, should the development be approved.

I consider that the proposal makes very optimistic claims about the management of stormwater and associated floodwater on the site, with no downstream effects on the community for the following reasons:

- Floodwater: Mr Throssell contends that floodwaters can be conveyed through the site with no additional contribution of floodwater volumes from the site in times of heavy rain, simply by separating areas of development from the four waterways that currently run through the site. It is my opinion that due the nature of the development where at least 50% of the site will be changed from farmland to a developed subdivision, with roads, driveways, footpaths and building roofs, that a proportion of the runoff, especially at times of heavy rainfall, will find its way into those waterways. Surface flows from rainfall can theoretically be contained within storage swales or bunds for later release, however the model presented assumes that these swales will always be empty and therefore have design capacity at the time of the rainfall. This is unlikely recognising the volume of rainfall the area experiences during winter, where standing water is present in low lying areas for weeks. The retention area at the Whites Rd reserve is evidence of this. Surface water takes a long time to drain away. Mr Throssell's evidence does not address where the swales or bunds would overflow to once they became full, and how water would be released. There is also no suggestion of backup capacity for the site to cope with extreme or repeated rainfall events. The heavy rain event of 23 July (documented in Mr Throssell's summary of evidence) clearly demonstrated that the Whites Road and Ohoka stream drainage system has no additional capacity to accept any further inflows during times of heavy rain, with both local overflows and downstream, at the Eastern end of Mill Rd, being closed for a day due to flooding. Surface flows from the

adjacent Sherrif farm (the proposed development site) affected all of the properties in the residential block adjoining the proposed development site. The lawns and gardens at my property were underwater, and fortunately our more modern house was sufficiently elevated for the floors to remain dry. It was not a pleasant experience to see floodwaters approaching the house and garage. While the developer makes a well intentioned statement in terms of preventing additional surface water from the subdivision from entering the existing watercourses, the developer does not (and cannot) warrant that flood flows from the development site will not increase in the future with the combined effects of the development and the likely increase in rainfall events. Furthermore, if the subdivision were to be approved and constructed, the residents in the subdivision would be protected due to the requirement for a 500mm elevation of floor levels, however the adjoining community is likely to experience higher surface water levels, causing damage and distress for property owners outside the subdivision and downstream for properties which adjoin the Ohoka stream; ie we are the ones that have a greater risk of flooding passed to us because of the development. The evidence presented does not give confidence that there will not be more frequent or more significant events such as occurred on 23 July. This assertion is backed by details such as Mr Throssell discussing in his evidence that the site stormwater system will be sized for a 1 in 50 year rainfall event (which he accepts has occurred twice in less than one year (in July 2022 and July 2023) and then Mr O'Neill in his evidence (para 24) states: "Primary stormwater runoff from the residential development areas (i.e. flows from up to a 20% AEP/5-yr ARI, not a one in 50 year event) within the site will be collected along roads via swales. This flow will be conveyed to be discharged into either raingardens or bioscapes for treatment" These devices are intended for cleaning stormwater flows and provide minimal additional buffer storage, especially during periods of wet weather. Ohoka has just experienced a 1 in 50 year rainfall event and yet the evidence presented appears be inconsistent with the requirement to fully contain a 1 in 50 year rainfall event on the site. In my view, the developer should present a concept that clearly demonstrates not just sufficient, but excess capacity to cope with high rainfall events and to give the community confidence that there would be no flow on effects, and even potential mitigation to lessen the current risk to the community. The evidence presented on behalf of the developer does not do this.

- Construction Period: I consider that during the construction period of the subdivision the risk to community is greater due to temporary retention structures being installed and the incomplete nature of drainage paths and water retaining swales. The evidence presented is

silent on effects during the construction period, yet I consider this presents an even greater risk to the community.

- Stormwater Management: Mr O'Neill describes how stormwater will be contained in swales, or bunded stormwater areas, during rain events, providing stormwater retention for later release. He introduces the concept of the bunds being built along contour lines, logical because of the fall or gradient across the site from Bradleys to Whites Rd. Mr O'Neill fails to further explain how (i) how the stormwater bunds will be configured to ensure there is sufficient surge capacity during winter periods when the local groundwater levels are known to be very high (as noted, potentially between 120 and 160 mm below ground level) (ii) how water discharge rates would be managed to ensure no downstream overloading of roadside drains or the Ohoka Stream, (iii) how the road and hard surface drainage would be configured to ensure all the surface water was directed to the bunds, noting that there are streets running at right angles to the contour lines. These roads and foot paths are natural flow paths which will channel water towards Whites Road, (iv) how water will be conyeyed laterally South across the subdivision, to move it away from the North end there the flood model indicates surface flows are greatest and because of the proposed commercial area, parking area and access streets there is less space for retention swales. For this surface water to be moved southward to areas where there is more space available for swales, across 3 – 4 existing waterways or floodways suggests there will need and complexity of pumping water to the Southern part of the subdivision at times of heavy rain. I consider the claim that all stormwater can be contained on site until such time that it can be discharged without overloading the existing local drainage network is optimistic and would add operational and maintenance complexity if installed. I note that Mr O'Brien proposes that such technical details would be further developed during a resource consent process, however because of the significant risk overflows from the site present to both the local community and WDC and the difficulty in changing the drainage layout if found after construction not to work as claimed, the details should have been addressed more carefully within the submission.

Conclusion: The information provided by the applicant about how it would manage flood and stormwater flows does not demonstrate or give confidence that there would be no detrimental effects or costs incurred by the community or WDC external to the development, because of additional surface water flows from the substantially altered site. The Ohoka area will be affected by future rainfall levels which are almost certain to exceed the 1 in 50 year level and so present a significant and very real uncertainty for the community arising from the proposed development. A

related issue is that while the subdivision is under construction, is the lack of information about how surface water and high rainfall events would be controlled to not only prevent excess flows, but also sediment flows from the site.

The proposal does not present sufficiently developed concepts or make commitments to give confidence to the community that we will not suffer any detrimental effects from surface water flows from the subdivision into the surrounding Ohoka area and therefore should be declined.

Roger Foy,

5 August 2023