Before an Independent Hearings Panel at Waimakariri District Council

under:	the Resource Management Act 1991
in the matter of:	Proposed Private Plan Change Request 31 (PPCR31) to the Waimakariri District Plan

Evidence in Chief – Christopher Paul Bacon
Waimakariri District Council

On behalf of Waimakariri District Council

Evidence on Natural Hazards (Flooding) Relating to Private Plan Change Request RCP031 – 535 Mill Road, Ohoka Plan Change Application

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Dated: 22 June 2023

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INTRODUCTION

0. The purpose of this evidence is to provide to the Commissioners comment on natural hazards (flooding) relating to Private Plan Change RCP031 – Mill Road, Ohoka, located south of the Ohoka township.
1. My full name is Christopher Paul Bacon and I am the Network Planning Team Leader for the Waimakariri District Council. In this position I am involved with planning for infrastructure growth and flood modelling.
2. I am a Chartered Professional Engineer and hold a Batchelor Degree in Civil Engineering. I have over 20 years of experience in civil engineering.
3. I have been requested to provide comments to the Commissioners on natural hazards (flooding) relating to Private Plan Change RCP031, which requests rezoning of approximately 156 hectares of land from rural to a mixture of Residential 3, Residential 4a, Residential 8 and Business.
4. Although this is a Council hearing, I note that in preparing my evidence I have reviewed the code of conduct for expert witnesses contained in part 9 of the Environment Court Practice Note 2023 (the Practice Note). I have complied with it in preparing my evidence. I confirm that the issues addressed in this statement of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.
5. My evidence has predominantly been based on assessing the information presented in the Infrastructure Report (Appendix G to the RCP031 application) prepared by the applicant's consultant, Inovo Projects (**Inovo**).

FLOODING

6. Council flood hazard mapping shows large areas of very low, low and medium flood hazard across the site in the 200- and 500-year flood events. Flooding is from both the upstream localised catchment as well as from within the development site. The site is not at risk of breakout flooding from the Ashley River.
7. The Inovo Infrastructure Report provides a brief flood assessment summary at section 4, whilst the Pattle Delamore Partners (PDP) Flood Effects Report sets out a more detailed analysis based on modelling of the flood effects of the proposed development.
8. Inovo summarises the PDP modelling as demonstrating for the post-development event, flood depths within the plan change site are displaced by the developed areas but constrained to the proposed drainage and road corridors within the plan change site. Flood depths greater than 1m are constrained to the existing natural waterways.
9. Inovo recognise further work during the detailed design stage including more detailed flood modelling of the proposed terrain, stormwater storage and conveyance channels is required, and expected to eliminate predicted increases in flood levels at Bradleys Road / Mill Road intersection and to the south-east of Whites Road. Several submissions raise concerns regarding the effects of the development on flooding on and around their properties, which is another item that needs to be further examined and understood (see paragraph 15 onwards below).
10. PDP found that:

i. The proposed development is consistent with the Environment Canterbury Regional Policy Statement. Floor levels will be located above the 200-year event, no development will take place in areas designated 'high hazard' and there will be no increased risk to life as a result of the development;

ii. The effects on flood flow vary throughout the subdivision. The model predicts that flow over the south-eastern boundary of the subdivision (Whites Road) is increased by 300 L/s (36.1 m^3/s to 36.4 m^3/s). Flow over the north-eastern boundary of the subdivision (Mill Rd) decreases slightly by approximately 40 L/s. Peak flow over Mill Rd is around 8.7 m^3/s. As noted above, the Applicant proposes that further refinement can be done at resource consent stage to balance the flows;

iii. The predicted increase in flood level for existing habitable dwellings outside of the proposed development area is no greater than 45 mm for average flood depth and no more than 39 mm for peak flood elevations. PDP conclude this demonstrates that there is a feasible solution for the development of the land which will ensure the effects of development are less than minor; and,

iv. No change to the high hazard classification with the exception of some locations along the realigned streams.

11. The reason for the increased flood depth at identified properties has not been explored in detail at this stage. The PDP report has modelled the development at a high level, and more detailed modelling will be needed once the development layout is confirmed. The effects of any increase in flood depth must be shown to be less than minor by the Applicant.

12. With regards to freeboard, WDC requirements are 400mm freeboard is to be provided above low hazard flood depth and 500mm above medium hazard flood depth. The freeboard requirements for the site will need to be refined through resource consent stage, as final site levels are to be confirmed. It may be the Applicant will undertake earthworks to raise large areas of ground above the flood hazard depth, in which case the finished floor level will need to meet NZBC requirements only as the earthworks have mitigated the flood hazard present at the property site.

13. Overall the modelling work done by PDP is reasonable, but the results do raise some concerns and anecdotal evidence from submitters should be assessed by the Applicant.

14. Turning to the model results first, the modelling shows some existing dwellings have an increase in flood depth in the 0.5% event of 45mm. The report does not state whether or not this effect is reasonable or less than minor; at this stage it has simply identified the problem. The existing 200-year (0.5%) flood hazard applicable to each of these affected properties needs to be confirmed (i.e. low or medium), as this will dictate the freeboard those properties should retain post-development. For example, if a property is in a medium hazard area, unless the existing FFL of that dwellings is already more than 545mm above the 0.5% event this will not be acceptable, as it needs a freeboard of 500mm above the 0.5% flood level to protect residents and property. The increase in flood depth needs to be further assessed to demonstrate there are no adverse off-site effects, and all effects of the development in the 0.5% AEP event can be fully mitigated. Flood effects on neighbouring properties need to be demonstrated as less than minor.

15. Multiple submissions raise concerns about the impacts of the proposed development on stormwater run-off and flood risk. This is understandable given the community's experience with high groundwater and flooding in the Ohoka area.

16. Submission 230 (D. Myall) sets out in detail their experience with groundwater in the area, which at certain times of year is noted as above the ground at the property (344 Whites Road). This is one of the properties noted to experience an increase in flood depth of 45mm post-development; as noted above, this needs to be further interrogated to demonstrate the effect can be mitigated such that the effects are less than minor.

17. A site-specific flood risk assessment will need to be carried out in more detail at subdivision consent application stage as required by Section 106 of the Resource Management Act, and minimum floor level rules will be set for the area. Ground levels for residential lots will need to be above internal road levels so the roads act as secondary flow paths to safely convey any potential floodwaters. No assessment of overland flow in the 2% AEP event has been undertaken yet. This will need to be done to demonstrate all weather access can be maintained to the RES4A dwellings which are currently modelled as raised islands. This level of detail would be required under any future resource consent application.

SUMMARY

18. From my evidence, I offer the following summarising statements:

    i. The Applicant has appropriately considered the potential increase in flooding within the site, however, has not proposed rules to mitigate against flood risk within the development site (e.g. freeboard requirements; earthworks to raise building platforms).

    ii. The Applicant has appropriately considered the potential increase in offsite flooding and has identified an increase in flooding at several dwellings offsite. The implications of the predicted increase at these dwellings have not been fully addressed. There is a risk there is not a practical mitigation that will be able to be identified at resource consent stage which can be implemented to protect the affected properties.

RECOMMENDATION

19. The applicant should adopt Council's freeboard requirements as required under the RPS, and/or under NZBC as applicable. In low hazard flood areas, Council requires a freeboard of 400mm above the 200-year modelled flood depth, and in medium hazard areas 500mm above 200-year modelled flood depth. If the applicant decides to raise ground levels to enable future property owners to build to NZBC, these raised ground area levels will need to be confirmed and modelled to demonstrate they mitigate flood hazard, and any offsite effects.

20. The offsite flood effects need to be mitigated, and any remaining effects demonstrated to be less than minor to ensure existing dwellings are not adversely impacted by the development. It would be helpful to understand the types of mitigation measures the Applicant could put forward to manage increased flood effects on existing offsite dwellings. Effects to existing offsite dwellings must be demonstrated to be less than minor.