



memorandum

TO Jason Jones FROM Pattle Delamore Partners
RM Group DATE 17 September 2025
RE Ocean Ridge Drive Flood Mitigation Summary

1.0 Introduction

Kaikōura District Council (KDC) have engaged Pattle Delamore Partners Limited (PDP) to assess the flood risk posed by the Kowhai River to the proposed Ocean Ridge Private Plan Change area, southwest of Kaikōura township, adjacent to the Kaikōura Golf Course. The plan change, privately initiated by Cargill Station Limited, proposes to enable subdivision and residential development within the area identified in the application as 'The Farm'.

This memo summarises the findings from PDP's 2025 flood risk and mitigation assessment¹ which incorporates a review of the historic and predicted geomorphological context of the Kowhai River, the simulation of flood flows, and the assessment of effects of proposed flood mitigation works. The assessment supports planning decisions under the District Plan's Urban Flood Assessment Overlay provisions and includes the identification of areas potentially classified as High Flood Hazard.

2.0 Model Summary

A 2D hydraulic model was developed in Tuflow, using 2022 LiDAR. Hydrological inputs were based on scaled 200-year and 500-year ARI flow estimates from Tonkin & Taylor², with a 30% increase applied to account for climate change, in accordance with Policy NH-P1. Model roughness values were sourced from LINZ data and aerial imagery verification.

The model results indicate that baseline flood hazards at the site are minimal and largely confined to existing wetlands and topographic depressions. However, given the geomorphological complexity of the Kowhai River and the site's sensitivity to riverbed aggradation, multiple sensitivity scenarios were assessed to provide an envelope of on-site baseline flood effects. The most conservative of these scenarios (i.e., the scenario that resulted in the largest on-site pre-development flood hazard) was then selected as the design scenario. This incorporated:

- 2 m of riverbed aggradation for the 500-year event;
- The complete removal of the true-left embankment, for the entire duration of the event (240 m long and 70 m wide);

¹ PDP. (2025). Kowhai River Flood Hazard, Ocean Ridge, Kaikōura. Prepared for Kaikōura District Council.

² Tonkin & Taylor Ltd. (2017) Flood frequency analysis for Canterbury Rivers. Prepared for Environment Canterbury. Job Number 31371.001.v2.



- ✧ A 1.5 m increase in sea level at the downstream boundary, coupled with a spring tide, the peak of which coincides with the peak of the flood event;
- ✧ An increase in peak flow of 30 % to account for climate change, and;
- ✧ No river breakout upstream of the development.

To define the High Flood Hazard Area in accordance with the District Plan, areas where depth × velocity ≥ 1 and/or flood depths exceed 1 m in the 500-year conservative design scenario were identified. These criteria informed the delineation of high hazard zones on site, consistent with Policy NH-P1.

It should be noted that the District Plan does not provide guidance on the parameters that should be used to define the 500-year ARI event used to identify the High Flood Hazard Area. The parameters used for the most conservative scenario (the 500-year design scenario as summarised above) are more conservative than the model assumptions used in the 2020 Kaikōura Fans flood modelling investigation completed by Environment Canterbury³.

The proposed design standard for Ocean Ridge responds to the pre-development flood hazard by establishing raised building platforms such that finished floor levels are at least 300 mm above the 500-year ARI flood level under a conservative design scenario.

This mitigation strategy aligns with Policies NH-P9, NH-P10, and NH-P12 by demonstrating:

- ✧ Finished floor levels are more than 300 mm above the 500-year design flood level, mitigating flood risk to people and property (NH-P10 and NH-P12);
- ✧ No significant increase in risk to surrounding properties (NH-P10);
- ✧ No requirement for new or upgraded community-scale mitigation works (NH-P10);
- ✧ Earthworks are unlikely to cause significant off-site displacement of floodwaters and associated hazard relative to the pre-development scenario (NH-P9).

A contour map is attached to this memo outlining the necessary finished floor levels across The Farm area (including the raised platform), which vary spatially in response to flood risk. The contours define minimum finished floor levels based on the 500-year design flood level plus 300 mm freeboard where flooding occurs, or existing ground level where no inundation is predicted. These contours are intended to support the development of permitted activity rules for new sensitive activities, provided they meet the specified minimum floor level requirements.

³ Wild, M. (2020). Kaikōura Fans flood modelling investigation. Environment Canterbury. Report No R20/15, ISBN 978-859387-6.

3.0 Limitations

This memorandum has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Kaikōura District Council, Environment Canterbury, Tonkin and Taylor, Land Information NZ, Fraser Thomas Limited, and Malcom Smith Consulting. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

This memorandum has been prepared by PDP on the specific instructions of Kaikōura District Council for the limited purposes described in the report. PDP accepts no liability if the report is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

© 2025 Pattle Delamore Partners Limited

Prepared by



Steph Patchett

Environmental Engineer

Reviewed and Approved by



Bas Veendrick

Technical Director - Water Resource