

IN THE MATTER: of the Resource
Management Act 1991
(**RMA**)

AND

IN THE MATTER: Proposed Plan Change 2:
Pukehangi Heights to the
Rotorua District Plan under
Part 5, Sub-Part 5 –
Streamlined Planning
Process and Schedule 1 Part
5 of the RMA

**SUMMARY OF EVIDENCE OF KATHLEEN THIEL-LARDON ON BEHALF OF
BAY OF PLENTY REGIONAL COUNCIL – STORMWATER**

21 September 2020

INTRODUCTION

1. My full name is Kathleen Thiel-Lardon. I am a Senior Environmental Engineer for Bay of Plenty Regional Council (Regional Council). I have the qualifications and experience set out in my Statement of Evidence dated 18 September 2020.

SCOPE OF SUMMARY

2. This statement provides a summary of my Statement of Evidence dated 18 September 2020, in particular my findings on the existing flood risk in the downstream environment, the stormwater effects and proposed mitigation measures for PC2.

EXISTING FLOOD RISK

3. The existing downstream environment shows significant constraints in regards to existing flood risk throughout the urban environment.
4. A number of road crossings are undersized, resulting in ponding and overtopping the embankments including critical infrastructure, such as State Highway 5.
5. The existing flood protection scheme is currently not meeting its level of protection to the floodplain from fluvial (riverine) flooding for the lower Uthina (downstream of SH5).
6. As such, the flood carrying capacity of the lower reaches of the Uthina, the Otamatea, and the Mangakakahi Streams can be described as over-allocated. This means there is no room to accommodate additional runoff and increased peak discharges within the existing environment.
7. Significant fluvial flooding is affecting critical, cultural and social buildings, and a large number of residential, commercial and industrial buildings as well as critical infrastructure when taking a long-term risk management perspective, including climate change and residual risk. Based on the built environment (functional compromised buildings), flood risk is considered high. Some roads are also considered unsafe for vehicles and people to pass.

ASSESSMENT OF STORMWATER EFFECTS OF PC2

8. Hydrological and hydraulic performance of the Utohina Stream, Mangakakahi Stream, Otamatea Stream, and their tributaries and associated catchments within the urban extent is reasonably well understood, based on the modelling investigations that have been carried out.
9. Three models, the Greater Utohina Catchment Model, Catchment 14 (Otamatea) and Catchment 15 (Mangakakahe), were used to test the effects of PC2.
10. The effects on Rotorua Lakes Councils urban catchments 11, 12, 13, 16 and 17, which are part of the Utohina Stream Catchment remains untested.
11. Based on the information available, the testing of post-development on-site mitigation Scenario 15 has identified no detrimental effects on the receiving environment from increased flood depth and velocity.
12. There are some effects of unknown scale from an extended duration that has not been fully considered. A future effects assessment will be required.

PROPOSED MITIGATION MEASURES IN PC2

13. The proposed mitigation options are described in WSP stormwater report as Scenario 15 and Scenario 16. Both options rely on a conceptual representation of dry attenuation basins (ponds and dams) at the same location. Only scenario 15 has been tested through all three models available. Scenario 16 has not been tested in the GUCM, and as such effects on streams and floodplains are not fully understood.
14. The WSP report makes the following recommendations, which I agree with for the stated reasons below:
 - (a) A specific Stormwater Management Plan for the proposed development. – In my opinion, an overarching stormwater management plan is required that demonstrates that the proposed stormwater management is the best practicable option, taking into consideration the existing site features and the constraints of the receiving catchment as a whole.

- (b) Adopting a water sensitive design approach across the whole plan change area. - In my opinion, stormwater management for the PC2 area need to include runoff reduction measures to reduce the impact of an extended duration of flooding.
 - (c) Assessments of the existing overland flow paths, downstream of the plan change area to determine suitability for passage of the over-design event. – In my opinion, the residual risk to the immediate downstream property owners will increase due to the additional runoff being generated by PC2. It needs to be identified that the emergency flows can safely pass within the road corridor and through private property.
15. Flexibility and potential off-site mitigation are envisioned as part of the PC2 mitigation package. While I can agree to flexibility within the development site provided that downstream effects can be managed comprehensively and appropriately, I cannot agree that off-site mitigation should be considered appropriate for PC2 for the following reasons:
- (a) The flood response of this catchment is complex, and the existing flood risk level is high.
 - (b) No detailed assessment of opportunities available throughout the catchment for mitigation of the already existing flood risk and mitigation of already permitted developments within the existing urban environment has been completed to date.
 - (c) Without having done any in-depth assessment, limitations are evident within the Mangakakahi Stream, Otamatea Stream and Lower Uuhina:
 - (i) Otamatea Stream: Following the PC2 development the Otamatea Catchment is almost entirely urban in nature. There is no upstream catchment that can be used for mitigation. During the 1% AEP 2130 event several roads are overtopped, some considered unsafe. Within the urban extent there are only two recreational reserves of sufficient size that have the potential to help reduce

existing flood risk. Robust testing would be required to assess effects on the wider catchment.

- (ii) Mangakakahi Stream: The Mangakakahi Stream has an upstream catchment that has the potential to help reduce existing flood risk. However, finding feasible options for detention dams will be difficult due to upstream steep grades and associated landslide susceptibility. Areas that are gentler in grade tend to accommodate rural buildings in close proximity to overland flow path and streams. There might be some opportunities within the existing urban extent. However, due to the floodplain encroachment below the Mangakakahi Dam there is limited ability to improve capacity. Increased storage within the Mangakakahi Dam and upstream of the dam between Goldie Street and Edmund Road seems feasible. However, robust testing would be required to assess effects on the wider catchment.
- (iii) Lower Utuhina: There is limited opportunity to improve flood protection assets due to the built-up nature and the geotechnical challenges presented by the existence of geothermal vents. Furthermore, modelling of the 1% AEP event current climate identifies that the Mangakakahi Stream is overflowing State Highway 5 due to capacity limitations. Also, any stormwater runoff from local catchments would either need to be pumped or stored behind the stopbanks until water levels recede. There are no obvious feasible opportunities for flood risk reduction in the Lower Utuhina, triggering the need to look catchment-wide.

- 16. In my opinion, the existing flood risk, the constraints and environmental limits within the downstream environment, and the limitation of opportunities within the Mangakakahi Catchment upstream of the urban extent highlights the importance for on-site mitigation.
- 17. The reduction of existing flood risk needs to be based on the robust evaluation of options, costs and benefits over time and across the

community and will be subject to LTP and annual plan constraints for both Councils. As such off-site mitigation and deferral to other future planning processes, such as a district-wide Stormwater Master Planning process, cannot be wholly relied on as a mitigation response due to uncertainties on how and when these can be delivered.

18. Regional Councils stormwater experts have collectively designed specific performance measures and design criteria for the future Stormwater Management Plan to provide sufficient certainty to future designers and to ensure that the intended objectives of the Plan Change can be achieved.
19. Without such controls, any designer will not be able to rely on the specifically designed and tested parameters for this specific catchment and instead rely on more generic standards which might not be appropriate and could misrepresent the effects.

CONCLUSION AND RECOMMENDED CHANGES TO PC2

20. The Utuhina Catchment has a long history of flooding, with both Councils having committed projects to identify options for mitigating existing flood risk.
21. Taking a long-term risk management perspective, including climate change and residual risk identifies that this catchment is considered high risk.
22. Any opportunities that do exist in this catchment to manage flood risk is required to provide for the effects of climate change, the existing urban environment and future infill within the catchment. Options that limit further adaptation in the future should not be locked in.
23. The complexity of the catchments warrants specific performance measures and design criteria to provide sufficient certainty for future designers. I, therefore, support inclusion into PC2 of the suggested amendments made by Mr Nathan Te Pairi.

DATE 21 September 2020

KATHLEEN THIEL-LARDON