

Under the Resource Management Act 1991

And

In the matter of Proposed Plan Change 2 to the Rotorua District Plan

SUMMARY OF EVIDENCE OF MARK STUART PENNINGTON

Dated 21 September 2020

TOMPKINS WAKE

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INTRODUCTION

- 1 My name is Mark Stuart Pennington. I am a Senior Water Resources Engineer and Technical Director with Tonkin & Taylor Ltd. I have the qualifications and experience set out in paragraphs 2 to 8 of my Statement of Evidence dated 14 September 2020.
- 2 My Statement of Evidence addressed the following:
 - Effects assessment: stormwater and flooding
 - Mitigation of stormwater/flood effects that result from development
 - The site and the proposed development
 - RLC Stormwater masterplan
 - Conclusion.

EFFECTS ASSESSMENT: STORMWATER AND FLOODING

- 3 With the primary interest in flood assessments being peak flood level attained, there are numerous and complex ways by which this can be determined.
- 4 To date, design event analyses relevant to Plan Change 2 have been based on simulation of a design rainfall event (not a recorded event) of the required probability of occurrence. Comparisons in stormwater and flood performance in response to this design rainfall event were then made between the “pre-“ and “post-“ land development scenarios.
- 5 Analysis of gauged data has shown that the probability/likelihood of inundation to a certain level is linked to the probability/likelihood of the rainfall event, but that these are not necessarily equal at all locations. That is, simulation of a design 100-year ARI rainfall event does not always result in a 100-year ARI peak flood discharge at every location in the catchment, nor does it always result in a 100-year ARI peak flood level being attained at every location in the catchment.

MITIGATION OF STORMWATER/FLOOD EFFECTS THAT RESULT FROM DEVELOPMENT

- 6 Technical understanding of flood mechanisms is in continuous development, and advances are regularly made that improve understanding. Similarly, the actual performance of various flood mitigation elements that have been previously constructed has been observed over time, and sometimes preferences change based on these observations. That is, an approach deemed “acceptable” or even “best practice” today might be looked upon less favourably in the future.
- 7 It is my opinion that allowance for such advancements should be made in this proposed Plan Change.
- 8 A recently published paper has revealed some unintended outcomes from commonly applied approaches to stormwater and flood management. In particular, consideration was given to the mitigation measure performance in response to recorded rainfall sequences (as opposed to design rainfall events), and the results indicated that the degree of mitigation sought was not always delivered.

THE SITE AND THE PROPOSED PUKEHANGI HEIGHTS DEVELOPMENT AREA

- 9 In recognition of the stormwater analyses that have been undertaken being applied to a plan change, and that subsequent, more detailed, analyses will follow through the development process, it is appropriate to adopt a conservative approach in sizing of various elements.
- 10 In my opinion, the analyses undertaken demonstrate that stormwater and flood mitigation of effects that relate to proposed future development of this area can be applied on site. That is, there is at least one solution that exists to these issues, and this solution does not rely on externally applied measures. This solution is not necessarily the only approach that can be adopted to achieve the desired outcomes.

ROTORUA LAKES COUNCIL STORMWATER MASTERPLAN

- 11 RLC has commissioned development of a “stormwater masterplan” to bring together and build on prior flood studies. The objective of the stormwater masterplan is to

identify integrated flood management solutions to facilitate future urban growth while also addressing existing floodable areas where possible.

- 12 It is possible that, through the masterplanning work being undertaken, alternatives to the on-site mitigation measures proposed for this Plan Change are shown to be suitable.
- 13 Phase 1 of the masterplan is due for delivery by mid-October 2020.