

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

AND

IN THE MATTER: of Proposed Plan Change 94 (Washer Road) to the Western Bay of Plenty District Plan under Schedule 1 of the RMA.

STATEMENT OF EVIDENCE OF MARK IVAMY – NATURAL HAZARDS

1 July 2022

EXECUTIVE SUMMARY

1. The Washer Road Plan Change area (Development Area) is susceptible to flooding from intense rainfall.
2. Flooding is the pertinent hazard for risk management in accordance with RPS Policy NH 4B. The proposal is required to achieve a Low level of natural hazard risk, without increasing risk outside the Development Site in accordance with that policy direction.
3. I support the recommendation in Mr Moodie's evidence relating to finished floor levels being set at the 1% AEP 2130 RCP 8.5 flood level plus 300mm freeboard allowance, to achieve a Low hazard risk for building consequences. I also agree new overland flow paths are likely to result in a Low hazard risk for health and safety consequences.
4. Mr Coles does not reflect Mr Moodie's recommendations in any additional provisions. In my opinion further provisions supporting the Structure Plan are required to ensure that the expert recommendations are reflected in the detailed

design of the development, to achieve a Low level of risk for flooding. I support the provisions proposed by Mr Nathan Te Pairi.

INTRODUCTION

Qualifications and experience

5. My full name is Mark Christopher Ivamy. I have 16 years' work experience in natural hazard risk management in New Zealand. I am employed by Bay of Plenty Regional Council Toi Moana (BOPRC) as a Senior Natural Hazards Planner. I have held this role since February 2020. Prior to this role I was employed by BOPRC as a Natural Hazard Advisor from July 2015.
6. A key role of both these positions is supporting the implementation of the Bay of Plenty Regional Policy Statement natural hazards provisions including project management of natural hazards modelling and mapping. I provide support to the Territorial Authorities and resource consent applicants on interpreting and applying the RPS default natural hazard risk assessment methodology (Appendix L). I provide advice on the technical inputs for risk assessments, including the hazard event likelihoods and climate change considerations consistent with the RPS natural hazard and climate change provisions.
7. Prior to being employed by the BOPRC I worked at Tonkin + Taylor Ltd as an Environmental and Engineering Consultant for nine years specialising in coastal hazard management. This role involved providing technical advice to local government agencies and private companies assessing coastal hazard and climate change risk and designing mitigation options.
8. I hold a Master's Degree in Science majoring in geography. I obtained this qualification from the University of Auckland in 2002.
9. I have been a professional member of the New Zealand Coastal Society (an Engineering NZ technical interest group) since 2006 and currently hold the position of Co-Chair. I have also been a member of the Bay of Plenty Natural Hazards Forum since 2015 and currently hold the position of Chair. This is a bi-annual forum that progresses natural hazard management best practice in the Bay of Plenty and includes discussions on modelling/science and mapping, risk assessment and management responses including planning controls.

Background and Scope of evidence

10. I was involved in providing technical feedback on natural hazards to inform the BOPRC submission.
11. This evidence focusses largely on technical matters associated with the application of Bay of Plenty Regional Policy Statement (RPS) Policy NH 4B and its requirement to achieve a Low risk on site for flooding from intense rainfall.
12. In reaching my conclusions I have relied on technical evidence of Mark Townsend and planning evidence of Mr Te Pairi. I have also considered the expert evidence of Mr Moodie and Mr Telford for the Applicant.
13. I have read all the Plan Change 94 documents relevant to my area of expertise.
14. I have read the Expert Witness Code of Conduct set out in the Environment Court's Practice Note 2014 and I agree to comply with it. I confirm that the issues addressed in this statement of evidence are within my area of expertise, except where I state I am relying on the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from my expressed opinion.

NATURAL HAZARD DIRECTION

15. The proposed PC94 Washer Road Development Site is required to achieve a Low level of natural hazard risk, without increasing risk outside the Development Site in accordance with RPS Policy NH 4B.
16. The s.32 report and subsequent Natural Hazard Risk Assessment¹ identified the Washer Road Plan Change area (Development Area) as susceptible to flooding from intense rainfall based on flood modelling and mapping supplied by the Bay

¹ *Natural Hazards Assessment for Western Bay of Plenty District Plan Change 94 – Washer Road Industrial* (Momentum Planning and Design - 30 May 2022)

of Plenty Regional Council. I consider the Natural Hazards Risk Assessment for Washer Road Plan Change 94 is in general accordance with RPS Policy NH 9B and Appendix L of the RPS. I agree that flooding hazard is the pertinent hazard for risk management in accordance with RPS Policy NH 4B.

17. Appendix L of the RPS sets out the expected default natural hazard risk assessment methodology. The Appendix L methodology is based on the ISO 31000:20092 risk management standard and considers the combination of likelihood and consequence to classify a risk level outcome of either Low, Medium or High.
18. Table 20 of Appendix L provides the default natural hazard event likelihoods for assessment. The primary likelihood is considered the appropriate threshold for achieving Low risk for new development proposals. The primary likelihood for flooding is a 1% Annual Exceedance Probability (AEP) event. Table 21 of Appendix L provides a framework to consider three consequence types which are buildings, health and safety and lifeline infrastructure.
19. Achieving Low risk for flooding on the Washer Road Development Site means buildings are not functionally compromised and there is no risk to life in a 1% annual exceedance probability (AEP) event with an allowance for climate change (2130 RCP 8.5).

RESPONSE TO PLANNERS REPORT

20. I have read the Planners Report for Plan Change 94 (topic 6: Natural Hazards) and the Natural Hazards Risk Assessment provided by the applicant. I have also read the further letter correspondence from the applicant to BPORC dated 16 June and the evidence of Peter Moodie and Rob Telford on behalf of the Applicant.
21. Mr Moodie's evidence explains that:
 - a. A minimum finished floor level for buildings shall be set at the 1% AEP 2130 RCP 8.5 flood level plus 300mm freeboard allowance (at paragraph 27). This

² AS/NZS ISO 31000:2009, *Risk management – Principles and guidelines*

reflects the conclusions of the Natural Hazards Risk Assessment. I agree this mitigation will achieve a Low hazard risk for building consequences.

- b. Overland flows from flooding within the Development Site are proposed to be directed over internal roads and are expected to be shallow with low velocities and will be considered a low hazard risk to human life and property. No significant overland flows are understood to cross the site from other offsite sources. (at paragraph 30).
22. Mr Moodie's conclusions regarding the risk associated with the internal roads are not entirely consistent with the comments in the Natural Hazards Risk Assessment. However, I accept Mr Moodie's conclusions and agree that health and safety consequences can be considered a Low hazard risk, based on the nature of the site.
23. Mr Telford's evidence concludes Low hazard risk can be achieved for the Development Site for geotechnical hazards (i.e. liquefaction and slope stability). I accept this assessment of risk and agree with the conclusions.
24. I disagree with the recommendation in the Planner's Report under Topic 6: Natural Hazards that no Structure Plan changes are required as a result of the risk assessment. I disagree with this recommendation for the following reason:
- a. The proposed flood mitigation measures required to achieve a Low level of risk on site for buildings, in accordance with RPS Policy NH 4B, are not accounted for in either Plan Change 94 or the Operative Western Bay of Plenty District Plan (i.e. flood mitigation for buildings at a 1% AEP event including an allowance for climate change to the year 2130).

PROPOSED PROVISIONS

25. The BOPRC Flood Model identifies that ponding exists on the site. It is considered necessary as part of the future design process to define the extent to which new commercial and industrial buildings may reasonably be affected by the 1% AEP flooding event with an allowance for climate change (2130 RCP 8.5). This provides for the reasonable use of land while providing for the appropriate management of flood risk.

26. Mr Coles has suggested minor amendments to the Structure Plan to reflect recommendations from submitters and the Council planner but has not proposed any provisions relating to minimum finished floor levels for buildings. The operative rules for flooding in the WBOP District Plan would not achieve Low risk at the Development Site, in all cases, as required by Policy NH 4B of the RPS. Without additional provisions in the District Plan there is no assurance that the proposal will provide for these levels.
27. I agree with the evidence of Mr Te Pairi that further provisions are required to support the Structure Plan and to ensure the development proposal achieves a Low natural hazard risk on site.
28. In my opinion the provisions should include:
- a. A rule that provides that *Any new Building or Structure in the Washer Road Structure Plan area shall not be Functionally Compromised in a 1% AEP event including a RCP 8.5 climate change projection to 2130, except for buildings or structures that have a gross floor area less than 20m² at ground floor level.*
 - b. A new definition for “functionally comprised” as follows: *When a building cannot continue to be used for its intended use after a flood event based on the extent of likely damage from the effects of ponding and overland flowpaths and impact on normal business functioning.*

CONCLUSION

29. I agree that a Low hazard risk can be achieved for flooding on the Washer Road Development Site, but consider that this outcome needs to be ensured by including provisions in the Structure Plan that require it.



Mark Ivamy

1 July 2022