+IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application to Kapiti Coast District Council for non-complying resource consent for a proposed 53 lot subdivision (including earthworks and infrastructure) at Otaihanga, Kapiti Coast.

STATEMENT OF EVIDENCE OF CRAIG MARTELL ON BEHALF OF THE APPLICANT

1. INTRODUCTION

Qualifications

1.1 My full name is Craig Murray Martell. My qualifications are [Bachelor of Science (Hons) from Victoria University (1994) and Master of Science (Hydrology) from Victoria University (1996)].

Experience

1.2 I am the Managing Director of Awa Environmental, an environmental consulting firm with a focus on hydraulic modelling of rivers and stormwater networks. I have 25 plus years' professional experience in hydraulic modelling, flood plain management and stormwater management. Prior to operating my own independent consultancy, I was amongst other roles, the practice leader for flood risk management at Jacobs NZ. I have worked extensively through New Zealand on river and urban stormwater projects and have been modelling stormwater systems since 1994.

1.3 In particular, for the majority of this time, I have had a strong working involvement in stormwater quality and quantity in Kapiti Coast District. This has included being the lead stormwater advisor to the Council, developing hydraulic models and associated flood hazard management plans from 1998 to present, designing and constructing numerous

projects, providing asset management advice, climate change advice, low impact design standards, attending numerous public and private plan changes as an expert witness, and community consultation with much of the above. I have also worked extensively with developers in the District including substantial plan changes including leading the development of the Ngarara Zone and leading the 3 waters AEE for Waikanae North.

Background

1.4 I have been involved in the following aspects of the proposal, flood hazard assessment of effects modelling and reporting, options assessment for the sizing and design of stormwater mitigation devices. Specifically, this has involved:

(a) I have provided ongoing design advice to the project team on the options/requirements for stormwater mitigation of the development. I identified how low impact design solutions should be implemented, utilising the soakage potential of the dunes, across the site to achieve hydraulic neutrality as described in the Kapiti Coast District Council Subdivision and Development Principles and Requirements 2012 document.

(b) I have overseen the construction of the existing flood hazard model of the site using MIKEFLOOD software.

(c) I have attended meetings with Greater Wellington Regional Council (GWRC) and assisted the Applicant gain regional resource consents for the development.

(d) I was the primary reviewer of the Otaihanga Road Subdivision (including bulk earthworks and infrastructure) Flood Hazard Assessment of Effects report, as to the effects of the application, which supported the Application for resource consent to both GWRC and KCDC.

(e) Participated in meetings.

- 13/05/2021 - Site visit & workshop – Phernne Tancock, Richard Mansell, Nick Taylor, Dave Compton Moen, Chris Hansen and Nick Goldwater

- 20/07/2021 - GWRC meeting – Stu Farrant (GWRC Consultant), Genevieve Walker (GWRC Resource Advisor), Anna McLellan (GWRC Resource Advisor), Chris Hansen (Planner)

- 25/02/2021 - GWRC meeting – Ryan McAlister (Kaitohutohu/Resource Advisor, Environmental Regulation)

- 15/11/2021 – KCDC meeting - John Saxton (Senior Water & Wastewater Engineer), Rita O'Brien (Stormwater & Coastal Engineer), Sushil Timsina (Development Engineer), Sakirin Sapeas (Senior Business Advisor for Development Agreement, Amanda Cottrell (Executive Secretary), Richard Mansell (Applicant), Phernne Tancock (Barrister), Chris Hansen (Planner), Nick Taylor (Survey/Land Development)

(f) Assisted the Applicant to respond to Further information Requests from both Regional and District Council's.

1.5 I confirm that I have read the briefs of Dave Compton-Moen (landscape), Nick Taylor (infrastructure/earthworks), Nick Goldwater (ecology) and Cam Wylie (geotechnical) to which I will cross-refer as required. However, my evidence will focus on my area of expertise hydraulic modelling and stormwater management.

2. CODE OF CONDUCT

2.1 Although not necessary in respect of council hearings, I can confirm I have read the Expert Witness Code of Conduct set out in the Environment Court's Practice Note 2014. I have complied with the Code of Conduct in preparing this evidence and I agree to comply with it while giving oral evidence before the hearing committee. Except where I state that I am relying on the evidence of another person, this written evidence is 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 in this evidence.

3. EXECUTIVE SUMMARY

3.1 The site is being developed at a low density of development, in particular this is the case for the northern rural-residential portion of the site, with average Lot sizes of 2-3000m^2.

3.2 Due to the low density of the development and it's peri-urban nature low impact solutions for stormwater, (where water is retained and stored for slow release into the stormwater network, or soaks into the existing ground), is the most appropriate.

3.3 The landowner approved this approach and made land available for low impact solutions.

3.4 Soakage rates were tested and are moderate to high, as typical in Kapiti sands.

3.5 The hydrological impacts of developing the site can be mitigated using low impact devices including swales, soak pits and a constructed wetland which utilise the soakage potential of the dunes and maintain a distributed hydrological profile that, as close as possible, mimics the existing process of soakage within the site.

3.6 Any stormwater/flooding impacts associated with development of the site can be mitigated through the proposed on-site mitigation measures as discussed in the report. If these mitigation measures are adopted, I consider the effects will be less than minor.

3.7 We have no concerns with the consent conditions that have been proposed.

3.8 We believe the revised proposal, that responds to submitter and landscape Peer Reviewer's concerns, will be beneficial. Some consideration will need to be given to the size and concentration of the planting on the constructed wetland margins so as not to adversely impact on storage volumes however.

4. SCOPE AND STRUCTURE OF EVIDENCE

4.1 I have structured my evidence as follows:

(a) Summary of my report and key conclusions as to effects

(b) Response to matters raised by submitters

(c) Response to Officers' s42A Report

(d) Revised Proposal

(e) Conclusion

5. SUMMARY OF STORMWATER EFFECTS

Ecological Effects

5.1 Under the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 it is a requirement to consider the implications on the natural wetlands where the discharge of water within 100m requires a non-complying activity consent.

5.2 The stormwater design for this development has therefore been to focus on retaining the natural hydrological function of the wetland areas. To mitigate any negative impacts of development on the existing hydrological processes occurring within the wetland areas, the proposed design methodology will

- Look to put all stormwater back into the ground by focusing on soakage solutions;
- Look to do this in a distributed/diffuse way by having swales along the roads and soakage fields at household raintank overflows (i.e. the rainfall will be put back to ground as close to where it fell as practicable possible; and
- For larger events runoff from roads will be directed via the swales to under-drained bio-infiltration devices at the low point in the road. These devices are designed to return all the runoff to ground.

Proposed development solutions

5.3 The site has been split into two distinct areas, northern (rural life-style) and southern (residential), reflecting the two different subdivision methodologies. This has informed the proposed mitigation measures. In the northern (rural life-style) area individual lot soakage devices are proposed. In the southern (residential) area a traditional kerb and channel subdivision discharging to a constructed wetland is proposed.

5.4 When considering soakage as the primary form of stormwater mitigation it is important to understand the soakage potential of the soil and the underlying groundwater levels as these will impact on the feasibility of soakage as a mitigation solution and the size of the mitigation device required.

5.5 Cuttriss Consultants were engaged to undertake 7 soakage tests across the site with rates recorded between 120 and 1200mm/hour. This is typical for dune environment in this area.

5.6 These soakage rates are high compared to much of the Wellington Region, and allow for soakage based stormwater solutions to be effective

5.7 In the northern area rural-residential lots, each of the house roof areas will be directed to a rain tank, and this will discharge to individual soakage devices when it becomes overfull. The size of the individual soakage device will depend upon the total impervious area of the lot, however, due to the larger lots sizes there is sufficient space available within each lot to mitigate development run-off. The advantage of this method is its diffuse nature, it does not concentrate flow into one location, it minimises the amount of stormwater infrastructure required, and it returns run-off to the ground in close proximity to the source.

5.8 In the northern area run-off from the roads will be captured in under-drained bio-infiltration devices consisting of a swale, at ground level, with a wrapped perforated pipe running beneath connected to the swale via sumps. The benefit of this method is it captures sediment within the vegetated swale, soakage into the swale occurs along the length of the road keeping velocities low and it returns run-off to the ground in close proximity to the source.

5.9 Within the southern (residential) area a constructed wetland is proposed as the primary form of stormwater mitigation. The reason a constructed wetland was used in this location rather than soakage includes;

(a) The residential zone has higher comparative runoff, and some storage was required to mitigate this development.

(b) The density of this portion of the development did not lend itself to swales.

(c) The location of the constructed wetland is low lying. Soakage solutions could have been impacted by groundwater in this location making them less effective.

(d) The constructed wetland provides for treatment of runoff from this residential zone.

5.10 The constructed wetland has been designed to retain a natural look within the area allocated. It consists of an elongated forebay for maintenance access, a series of planted macrophyte zones, and an open water zone. This follows Wellington Waters Water Sensitive Design for Stormwater. The benefits of the constructed wetland will include attenuation of flood flows, water quality treatment, and providing habitat for aquatic plants and wildlife by mimicking the treatment processes of natural wetlands for detention, fine filtration and biological adsorption, to remove contaminants from stormwater runoff.

Groundwater

5.11 Groundwater was assessed for both the northern and southern ends of the site. This work was undertaken by RDCL.

5.12 We relied on this data in undertaking our design solution. The information provided to us was consistent with our experience of groundwater in Kapiti, that low lying areas experience frequent groundwater impacts in wet periods, but elevated dunes in the main do not.

5.13 Groundwater levels have been taken into account in our design and will not impact on the effective function of the devices.

Flood Risk

5.14 GWRC/KCDC Flood hazard mapping for this site was limited to the low lying northern portion of the site. This flooding, shown in figure 1, is associated with the Mangapouri Stream which runs into the Waikanae River.

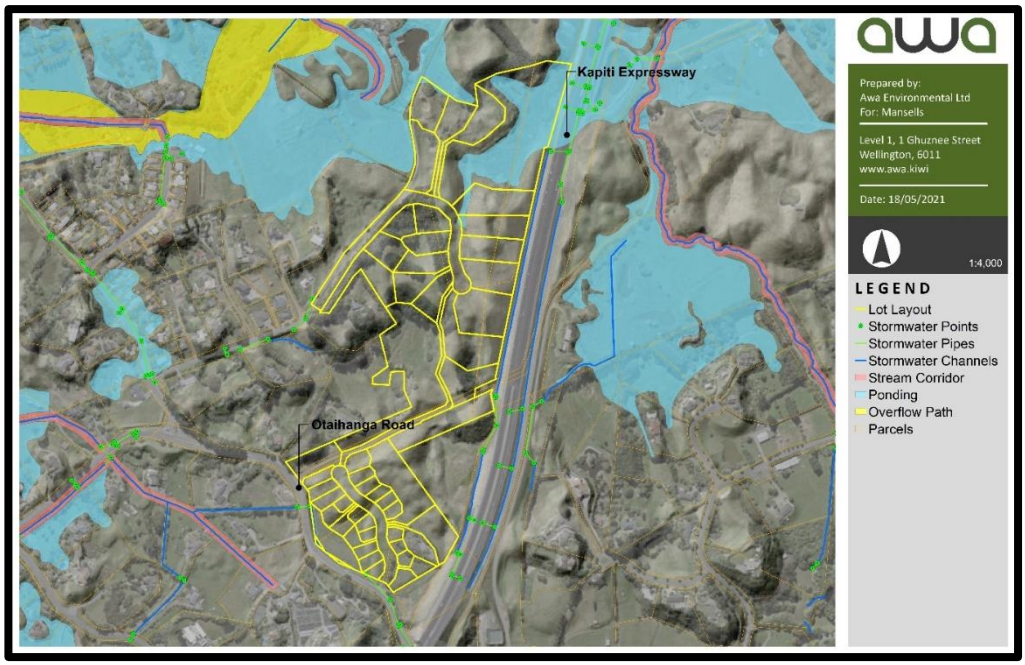

Figure 1: KCDC/GWRC flood hazard management plans.

5.15 In this northern area any increases in development runoff have been designed to be fully mitigated up to and including the 100 year event. For this reason there are no changes to the existing flood extents.

5.16 The Southern part of the site was not covered by any Regional Council or KCDC model extent and as such is not in the Councils planning maps.

5.17 We extended the existing Mazengarb hydraulic model under Otaihanga Road to include this upper catchment extent. Existing base flooding showed that the lower lying areas of this southern site were subject to flooding in extreme events as shown in figure 2.

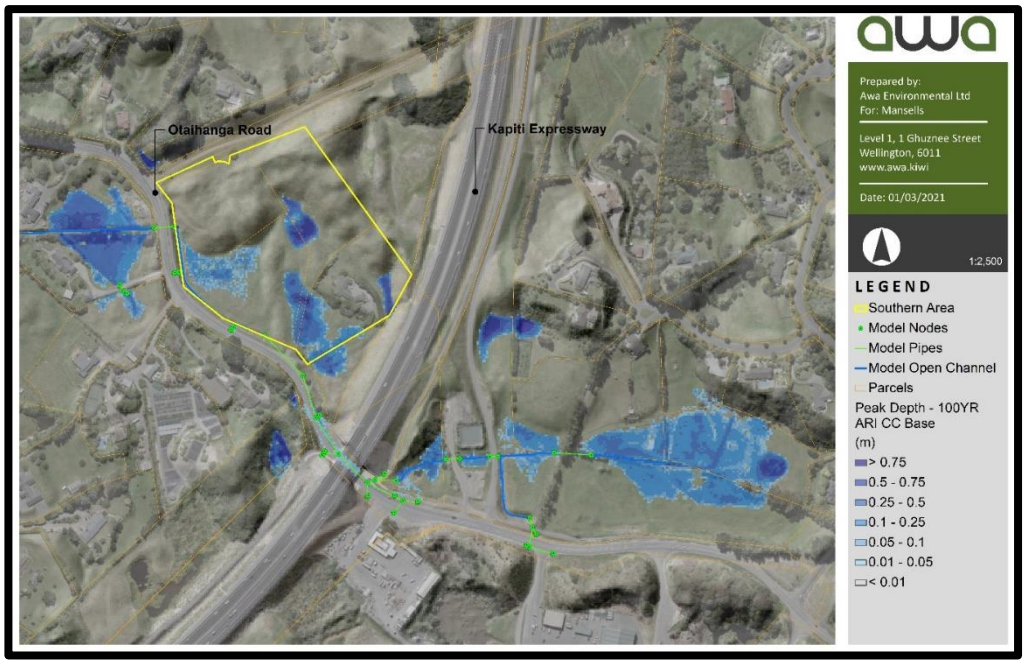

Figure 2: Base Model Flood Extents (100 year ARI including CC)

5.18 In the southern development area some areas of flooding will be displaced by development. This lost storage will be mitigated by providing increased flooding capacity in the areas that remain.

5.19 The stormwater solution in this residential area has been assessed using the same hydraulic model. The design has been undertaken iteratively until a solution was found that mitigated the effects of fill and increased runoff. Figure 3 provides the modelled evidence that these areas of flooding have been adequately mitigated.

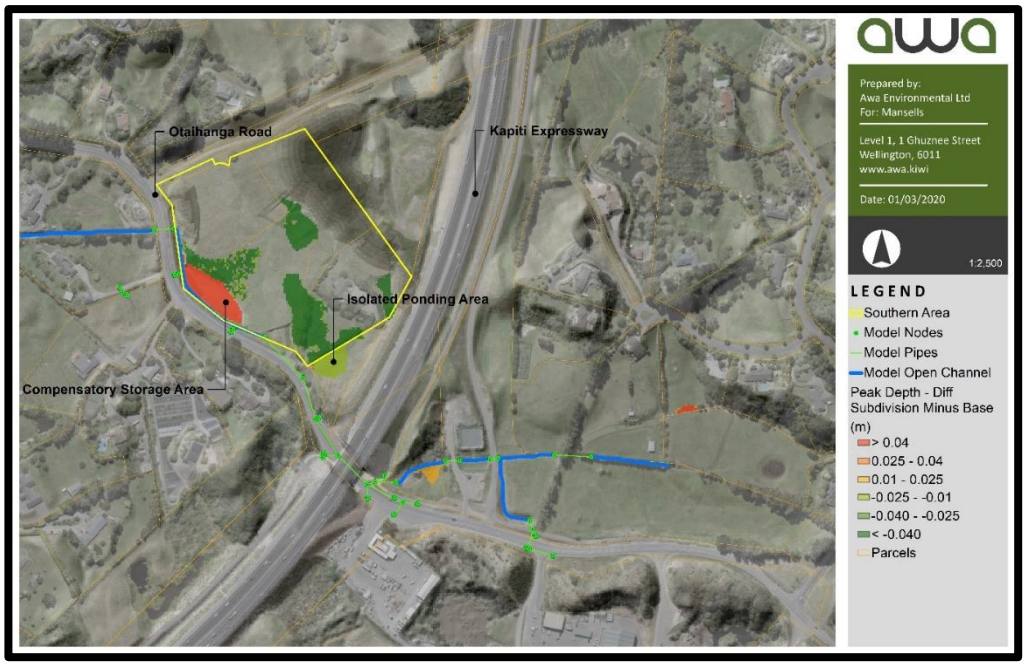

Figure 3: Post Development Flood Difference Map

Summary

5.20 Our client supported all of our suggestions for developing this land in a way that mitigated stormwater impacts as practicably as possible including sacrificing density for good outcomes.

5.21 My report demonstrates that any stormwater/flooding impacts associated with development of the site can be mitigated through the proposed on-site mitigation measures as discussed in the report. Overall, I conclude that the adverse effects of the proposal with the conditions proposed are no more than minor.

5.22 I note that there have been some revisions since my report, namely a reduction of 3 lots in the Southern Area. I confirm that I have no concerns about this, it will if anything result in a slight reduction of the effects identified in my report.

6. RESPONSE TO SUBMITTERS

6.1 The following concerns relevant to hydraulic modelling, flood plain management and stormwater management have been raised in submissions on this proposal.

6.2 Waka Kotahi (submitter 9) has expressed concern regarding any changes to the existing flood hazard on crown owned land administered by Waka Kotahi and works within crown property administered by Waka Kotahi.

6.3 In Waka Kotahi's submission regarding flood hazard, they have acknowledged the proposed mitigation includes a drain and constructed wetland which will reduce the existing flood hazard and as such the potential flooding effects on crown land administered by Waka Kotahi. Waka Kotahi has confirmed that the effects on their property has been sufficiently mitigated.

6.4 Regarding Waka Kotahi's submission about works within the crown property administered by Waka Kotahi they have accepted the solution for a drain to be installed on crown property. Waka Kotahi notes that the applicant will be required to seek approval from Waka Kotahi outside of the consenting process for an 'Agreement as to Works' to gain legal access to undertake works within this land. This is outside of the RMA process.

6.5 Ms Sheryn McMurray (submitter 5) has expressed concern regarding the further damage that will be incurred once all the drainage systems and roading, etc are in place.

6.6 I have interpreted this to mean the proposed stormwater mitigation devices will damage the existing environment. The rest is unclear, so I will limit my response to this point. Ms McMurray may wish to clarify this in her submission to the panel.

6.7 Low impact mitigation devices are proposed throughout the development utilising soakage and attenuation/storage to mitigate the effects of the development.

6.8 While the initial implementation of these low impact stormwater devices will require disturbance of the ground a sediment and erosion control plan is required to undertake the earthworks which will mitigate the impacts of any disturbed sediment entering the environment during construction. this WGN 210352 these consist of consent to:

(a) [37614] Discharge Permit (sediment laden runoff to land/water).

(b) [37803] Discharge Permit (operational stormwater to land where it may enter water including to land within 100m of a natural wetland).

(c) [37804] Land Use consent (earthworks soil disturbance).

6.9 Conditions 2 through to 5 of the Regional Consents require the Applicant to undertake detailed design of the final stormwater solutions to be consistent with Awa assessment of stormwater effects.

6.10 Condition 7 require an operations and maintenance plan to be prepared and signed off for the constructed wetland.

6.11 Once fully implemented the swales, bio-infiltration devices, soakage and constructed wetland will provide treatment of run-off as it passes through these devices. The planting within the constructed wetland has been undertaken with Wildlands advice and will provide additional habitat.

6.12 **RESPONSE TO OFFICERS REPORT**

6.13 The Officers Report/ supporting review etc, has raised very few concerns that are within my area of expertise.

6.14 As mentioned above the Applicant has worked closely with the KCDC Stormwater team and with GWRC. This was important for all parties as this was one of the first consents to be processed under the new Proposed Natural Resources Plan, and also following the recent introduction of three waters, which provides for greater levels of co-ordination and cooperation between district and regional councils in respect of stormwater management and water infrastructure. At the time these consents were applied for the Councils had not yet had the chance to consider the greater policy implications of three waters.

6.15 One way this was achieved was by GWRC treating KCDC as an affected party under the Regional Consent. Ms Rita O'Brien provided a memorandum outlining the conditions on which KCDC considered the proposal suitable and would give their provisional approval. Conditions of consent on the Regional Consents were then drafted with input from each party, with care being taken to reflect the differing responsibilities for vested stormwater infrastructure.

6.16 Once the Regional Consents were granted these consents and framework have provided a good base for discussions on conditions on the stormwater and water infrastructure aspects of the consent that are also relevant to KCDC, and for which it has responsibility for. These conditions have been agreed and mirror those of the GWRC consent.

6.17 I therefore support conditions 46 - 51 Officers Report.

6.18 Council report paragraph 140 require Standard 2 of Rule 9A.3.2 to be met. We can confirm the earthworks proposed already meet this requirement with minimum ground levels of RL7.05m being well above the recommended building levels of RL6.1m.

7. REVISED PROPOSAL

7.1 The Applicant has revised its proposal as a result of feedback from Council and in response to submitters concerns. I have reviewed the responses to Further Information Requests and Revised layout submitted by the Applicant.

7.2 I have assessed the impact of these changes, from a stormwater and flooding perspective. These are all positive changes. Some consideration will need to be given to the size and concentration of the planting on the constructed wetland margins so as not to adversely impact on storage volumes however.

7.3 The changes to the earthworks design for the proposal – realignment of the shared path and reconfiguration of the dune formation at the front on Otaihanga road, will have a no impact on stormwater and flooding.

7.4 Overall these changes will have a beneficial impact on the effects of the proposal. Further reducing environmental effects of the development. Some consideration will need to be given to the size and concentration of the planting on the constructed wetland margins so as not to adversely impact on storage volumes however.

9. CONCLUSION

7.5 The site is being developed at a low density of development, in particular this is the case for the northern rural-residential portion of the site, with average Lot sizes of 2-3000m^2.

7.6 Due to the low density of the development and it's peri-urban nature low impact solutions for stormwater, (where water is retained and stored for slow release into the stormwater network, or soaks into the existing ground), is the most appropriate.

7.7 The landowner approved this approach and made land available for low impact solutions.

7.8 Soakage rates were tested and are moderate to high, as typical in Kapiti sands.

7.9 The hydrological impacts of developing the site can be mitigated using low impact devices including swales, soak pits and a constructed wetland which utilise the soakage potential of the dunes and maintain a distributed hydrological profile that, as close as possible, mimics the existing process of soakage within the site.

7.10 Any stormwater/flooding impacts associated with development of the site can be mitigated through the proposed on-site mitigation measures as discussed in the report. If these mitigation measures are adopted, I consider the effects will be less than minor.

7.11 We have no concerns with the consent conditions that have been proposed.

7.12 We believe the revised proposal will be beneficial. Some consideration will need to be given to the size and concentration of the planting on the constructed wetland margins so as not to adversely impact on storage volumes however.

Signature:

Full name: Craig Murray Martell

Date: 19/07/2022