

**BEFORE THE HEARING COMMISSIONERS
AT HAMILTON**

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

AND

IN THE MATTER of the hearing of submissions on The
Proposed Waikato Regional Plan Change 1 –
Waikato and Waipa River Catchments

**PRIMARY STATEMENT OF PRIMARY EVIDENCE BY CHRISTOPHER
MARTIN KEENAN – BLOCK 2
FOR HORTICULTURE NEW ZEALAND**

3 MAY 2019

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SUMMARY STATEMENT

1. This policy evidence addresses the Horticulture New Zealand (“**HortNZ**”) submission, further submissions and the Waikato Regional Council’s (“**WRC**”) Section 42A Report for Block 2 Hearings on the Proposed Waikato Regional Plan Change 1 – Waikato and Waipa River Catchments (“**PC1**”).
2. I remain supportive of the general direction of the Proposed PC1. I note the Block 2 hearings are addressing policies and methods for implementing the plan as it relates to activities other than Commercial Vegetable Production (“**CVP**”). The policies and methods for CVP have been deferred to Hearing Block 3. Notwithstanding the deferral of CVP policy and methods, there are matters raised in the Section 42A Report for Block 2 that are relevant to CVP and horticultural land use activities more generally.
3. This evidence addresses the relevant matters in relation to the treatment of discharges proposed in the Section 42A Report for Block 2 Hearings. The following is a summary of key points made within this evidence:
 - Models and methods operate at differing scales with some focussing at the block and property scale and others at the catchment or subcatchment scale. All these models are useful for assessing proposed activities if they are constructed according to some minimum performance standards.
 - In my view the plan should not prefer any particular models and methods as long as those methods are fit for the intended purpose. In my view the difficulty of using a model as a regulatory compliance tool is not enough reason to discount the use of such tools for resource consent applications and assessment of plan effectiveness.
 - The current limitations on increasing the scale of commercial vegetable production within the catchment area regulated by the plan are significant. The approach of not allowing for any increase in any contaminant is particularly limiting. While I support the Officers view that increases at the catchment or sub-catchment scale in contaminant discharge is difficult to justify, in my view this does not mean that every single enterprise or property should be managed according to the same principles.
 - Exceptions are provided for within PC1 to the requirement to reduce all four contaminant discharges. There are good reasons for these exceptions. In my view it is appropriate for

conversion of land for the purpose of commercial vegetable cropping to be considered as an exception as well.

- In my view some provision for new commercial vegetable production activities to be established is consistent with the provisions of the National Policy Statement for Freshwater Management and the Vision and Strategy for the Waikato River, as long as the scale of conversion does not lead to a degradation of water quality that impacts on the core values for freshwater being supported by the Vision and Strategy and the National Policy Statement for Freshwater Management 2017.
 - The evidence provided by HortNZ demonstrates that it should be possible to provide some targeted opportunities for new commercial vegetable production while managing any cumulative impacts that would result from making this provision within the plan.
 - I support this exception for commercial vegetable production activities on the basis that proposed PC1 is a transitional plan change that will require modification by 2026. In my view that should provide time to establish better regulatory controls.
 - I believe that fruit production should be considered as a low intensity activity and I support fruit production being managed within the permitted rules of the Plan.
4. It is proposed that further discussions are to be held between WRC and the vegetable production sector prior to Block 3 Hearings and it is my view those discussions will clarify the methods and policies to be discussed in Block 3.

QUALIFICATIONS AND EXPERIENCE

5. I am currently the Director of Water Matters Ltd. I have been in this role for nearly three years. Over that time I have provided specialist resource management advice to a range of fruit and vegetable growing businesses across New Zealand on a wide range of freshwater management and production related matters. These organisations include commercial vegetable growing businesses, indoor fruit production and Maori owned and operated agribusiness.
6. I also work for a range of contractors providing advice to Government agencies on the horticulture sector, primary production and resource management in general.
7. Prior to then I was managing water and resource management matters on behalf of HortNZ from early 2007 until mid-2016 as the

Manager of Natural Resources and Environment to Horticulture New Zealand.

8. Prior to that I was Senior Advisor at the Ministry for the Environment (2004-2007), working in the “Sustainable Water Programme of Action”. My areas of work included iwi and primary sector engagement. I have held officer positions in enforcement and compliance at Greater Wellington Regional Council and environmental research positions in freshwater and marine science at the then Auckland Regional Council; now the Auckland Council.
9. I have conjoint qualifications in resource management and science from Lincoln University (BRS/BSc). I have 19 years’ experience in resource management practice. I was a member of the small group on the Government’s Land and Water Forum, a foundation member of the Primary Sector Water Partnership and in the past have been involved in water related policy and planning processes across New Zealand in most Regional Council / Unitary Authority jurisdictions.
10. As a foundation member of the Land and Water Forum small group; I was also a member of four subcommittees (farm practice, quality allocation, quality over-allocation, and urban issues) which prepared recommendations for consideration by all stakeholders and partners to the Crown that were involved. In previous reports I was involved in producing water quality and quantity allocation policy and methods and limit setting advice to Government.
11. I was a member of the Water Measuring Device Implementation Taskforce and was closely involved with preparation and review of the regulation promulgated under section 360 of the RMA 1991 to mandate water meters on consented takes.
12. I was a foundation member of the reference group developing the National Objectives Framework, to underpin the water quality standards system developed for the National Policy Statement for Freshwater Management (NPS-FM). As a member of this group I provided advice to help the Government set standards relating to the attributes described for the national values set in the NPS-FM.
13. I am currently active on committees collaboratively establishing new freshwater policy in Waikato and the Bay of Plenty. In many of these committees I have been nominated not for my affiliation with the horticulture sector, but for my experience and the technical support I can provide. I have been involved in many regional collaborative processes designed to support limit setting under the NPS-FM including Hawkes Bay’s TANK process; Bay of Plenty’s Regional Freshwater Advisory Group, Gisborne’s Freshwater Advisory Group, The Matrix of Good Management process in Canterbury; and Auckland’s Rural Advisory Panel.

14. During my time as Resource Manager for HortNZ I was a member of the Collaborative Stakeholder Group (CSG) for the Waikato River.
15. In my role at HortNZ I was responsible for managing HortNZ's wider resource management programme. This included leading the sector's involvement in natural resource planning issues across the country, developing the supporting science and good management practice programmes and commissioning catchment scale decision support tools (catchment models) for the Tukituki Catchment, the Rakaia - Selwyn water management zone, The Waipaoa catchment in Gisborne and models used in the TANK catchment and various Bay of Plenty catchments.
16. I was a member of the recently established Technical Advisory Group to Ministers and Iwi Leaders on the Government's plans to reform water quality and quantity allocation. I was appointed to this position in March 2016. The group was discontinued in 2018 following Government election processes.
17. As a result of this role, my qualifications, and previous experience, I have considerable factual knowledge and expertise in the areas of horticulture, natural resource management, and freshwater policy.

CODE OF CONDUCT

18. While this is not a hearing before the Environment Court, I can confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses produced by the Environment Court and have prepared my evidence in accordance with those rules. My qualifications as an expert are set out above.
19. I confirm that the issues addressed in this brief of evidence are 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.

SCOPE OF EVIDENCE

20. This evidence provides a policy assessment of those provisions within the scope of Block 2 hearings on which HortNZ submitted and addresses the Section 42A Report prepared by WRC.
21. The planning framework is well described in both the Section 32 Report and the Section 42A Report provided by the WRC. Unless explicitly stated I generally agree with the analysis.
22. I was involved in preparation of the HortNZ's submissions and further submissions on PC1 and Variation 1 to PC1. In preparing

this evidence I have read many of the submissions to PC1. I have also read the evidence prepared by Gillian Holmes, Damian Farrelly, Andrew Barber, Stuart Ford, Vance Hodgson and Michelle Sands, as well as the technical reports mentioned by Ms Holmes in her evidence prepared by Jacobs for HortNZ.

23. The Section 42A Report provides a format within which submissions have been analysed. There are some practical difficulties in responding to the Section 42A report. As with Block 1, the policies and methods that address the submissions of HortNZ have been deferred to Block 3, in particular, proposed Policy 3 and Rule 3.11.5.5. These rules and policies primarily relate to Commercial Vegetable Production. Given that the policies and methods have not been explicitly covered at this stage, much of my evidence has to be provisional. With context, this evidence covers:
- (a) Management of diffuse discharges: Use of alternative models and methods to manage diffuse discharges.
 - (b) Management of diffuse discharges: Land use change to Commercial Vegetable Production.
 - (c) Management of diffuse discharges: Achieving the outcomes within the Vision and Strategy and relevant links to the National Policy Statement for Freshwater Management.
 - (d) Management of cumulative effects: The relationship between providing for increases in commercial vegetable production and achieving the objectives of PC1.
 - (e) Providing for point source discharges: Exceptions to the requirement to reduce all four contaminants.
 - (f) Fruit Production as a low intensity farming activity.
24. The purpose of this evidence is to set the scene on the matters I have raised for the Block 3 consideration of commercial vegetable production. I have, therefore, not gone into detail on each of the matters I have covered.

MANAGEMENT OF DIFFUSE DISCHARGES: USE OF ALTERNATIVE MODELS AND METHODS TO MANAGE DIFFUSE DISCHARGES

25. In my experience a wide variety of models and methods are used for freshwater accounting. The Fourth Report of the Land and Water Forum contains a description of freshwater accounting methods.¹

¹ Paragraphs 118 – 124, pp 27-30:
<http://landandwater.org.nz/includes/download.aspx?ID=141905>.

There is a useful commentary in that report which notes the importance of adequately describing the differing components of freshwater accounting that need to be provided for to ensure that a freshwater objective can be met.

26. A useful diagram of how site-specific accounting tools (such as OVERSEER, APSIM, SPASMO) and other models coordinate with catchment or subcatchment scale accounting frameworks (such as CLUES, SOURCE, MIKE-SHE and other models) can be utilised to support decisions on freshwater management. I have included this diagram as Appendix A.
27. In my opinion these tools are all useful, depending on the circumstance. There is considerable discussion on what tools should be utilised within the s42A Report.² In my view it is appropriate for PC1 to provide the flexibility to allow for the use of the full range of these tools. Mr Stuart Ford discusses this further in his evidence and I concur with his view that the Plan should simply specify criteria to ensure the use of the tool meets a standard acceptable for the intended use. Rather, than specifying a particular tool.
28. Mr Ford makes the same comment as the Officers in relation to the complexity of APSIM as a research model. But he does not consider it a less appropriate tool. He is simply recognising a challenge in the use of it. However, the challenge in my view is outweighed by the benefits of greater accuracy and the continued development of the tool.³
29. The vegetable production sector is relatively small and dominated by larger enterprises so use of a technical analysis tool such as APSIM is viable. Capacity exists to model commercial vegetable production to a standard that accurately represents the overall effect of the sector. Combined with the ongoing work on nitrogen measurement and erosion and sediment control, in my view this is a useful addition to the plan. I consider that APSIM should be listed as an appropriate model or method if Mr Fords suggestion of providing a list of criteria for model accuracy is not acceptable.
30. I concur with the Officers' views that the models may not be of use from a purely regulatory or compliance related standpoint. However, these models will be very important for a range of other statutory functions such as:
 - (a) accounting;

² Section 42A C1.1.10. Use models and methods other than Overseer p.22.

³ For example the creation of the SCRUM – APSIM user interface by Plant and Food.

- (b) measuring the overall plan effectiveness in achieving the desired state of the environment; and
 - (c) assessing whether an application for land use change / an alternative subcatchment management approach is likely to achieve the plan objectives.
31. My point in raising this is that compliance is only one of the few reasons to use modelling methods; and that a lack of ability to use the tool for compliance should not hinder the use for prediction or measurement of progress.

MANAGEMENT OF DIFFUSE DISCHARGES: LAND USE CHANGE TO COMMERCIAL VEGETABLE PRODUCTION

32. Land use change to commercial vegetable production (beyond the current land area utilised for this activity) is currently proposed to be restricted under Rule 3.11.5.7. HortNZ made submissions on Policy 6 seeking changes to ensure that applications for land use change to commercial vegetable production (increase beyond the notification date land use area) can be assessed on a net basis across all four contaminants. These suggestions are addressed and rejected⁴ on the basis that at a catchment scale “any increase in any contaminant cannot be justified”.
33. I agree with the Officers that increases at the catchment scale of any contaminant are difficult to justify. However, I do not agree that the same logic applies to an application for land use change made at the property or enterprise level. An application requesting an increase in nitrogen discharge made at the property or enterprise level would not necessarily result in any material increase in catchment scale discharges.
34. In my view, for an increase in discharges to be material; it would have to have a corresponding impact on the values for freshwater that are being protected by the freshwater objective or numerical attribute state. If an application is capable of demonstrating through reductions in other discharges (such as bacteria, sediment or phosphorous) that the effects on values are a net positive the application should be provided for in some circumstances.
35. There are a number of activities that are not required to reduce across all four contaminants, within the Plan on the basis that the activity is considered to be of a significant benefit to the community. Activities provided for include intensification of Maori Land and point source and diffuse discharges from regionally significant industry or

⁴ Section 42A Para 489.

infrastructure. I consider that there are sound reasons to provide for these activities.

36. There are also sound reasons why commercial vegetable production should be provided for as an exception. If it was provided for as an exception it would be appropriate to address this in the policies and methods relating to commercial vegetable production which are to be considered in Block 3.
37. I support Officer concerns about the cumulative impacts of providing for increases in any contaminant. However, in my view it is critical to provide some capacity to increase commercial vegetable production in the appropriate policies and methods. I will address this further in Block 3 evidence.

MANAGEMENT OF DIFFUSE DISCHARGES: ACHIEVING THE OUTCOMES CONTAINED WITHIN THE VISION AND STRATEGY AND LINKS TO THE NATIONAL POLICY STATEMENT FOR FRESHWATER MANAGEMENT

38. The importance of the activity of commercial vegetable production for the community is not, in my opinion, limited to the economic value alone. Waikato based commercial vegetable supply is an integral (and in my view non-substitutable) part of domestic food supply for the New Zealand community. I have outlined my reasons for this in evidence presented in Block 1.
39. Michelle Sands for Horticulture New Zealand has provided significantly more detail in her evidence to Block 2 Hearings about why commercial vegetable production is important in the Waikato Region; and what the consequences would be of limiting growth in commercial vegetable production to the current footprint. I concur with her analysis.
40. The NPSFM 2017 lists cultivation and food production as a national value within the National Objectives Framework. These are all part of the overarching framework of Te Mana o Te Wai. Cultivation of crops at an economic scale was also a significant activity for Waikato Tainui⁵; as it is for other parts of the Waikato Community.
41. The Vision and Strategy is incorporated into Schedule 2 of the Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010. In my opinion providing for an increase in commercial vegetable production activities is not contrary to either the Vision and Strategy or the NPS, as long as the impact of cumulative effects

⁵ Work carried out by archaeologists Alexy Simmons and Malcom Hutchison in 2014 identified 96 previously unrecorded pre-european heritage sites in the vicinity of Ngaruawahia alone primarily dedicated to horticultural production. Further work commissioned by NZTA since has identified many more horticultural sites between Cambridge and Ngaruawahia.

from these activities does not materially affect the values for freshwater that are protected by these instruments.

42. In my view for an effect to be material it would have to be conducted at a scale that confounds protection of a recognised value of freshwater such as contact recreation or food gathering.

MANAGEMENT OF CUMULATIVE EFFECTS: THE RELATIONSHIP BETWEEN PROVIDING FOR INCREASES IN COMMERCIAL VEGETABLE PRODUCTION LAND AND ACHIEVING THE OBJECTIVES OF PC1

43. The evidence of Gillian Holmes addresses the impact of providing a limited opportunity for increases in commercial vegetable production. The key policy question, in my view, is how cumulative effects should be managed. I consider there are a range of mechanisms that are required to manage cumulative effects as follows:

- (a) Some limit on the scale of increased area that could be provided for to ensure that commercial vegetable production can increase to meet growing domestic demand without impacting on the state of freshwater values.
- (b) A strong adherence to good and best management practices by all commercial vegetable producers on all land where commercial vegetable production is undertaken. In his evidence, Damian Farrelly covers the systems proposed and in place to improve the farm planning and reporting systems for commercial vegetable producers.
- (c) Andrew Barber describes the appropriate steps in ensuring good management practice related to his long experience with managing erosion and sediment control related to cultivation. In my opinion, it is clear the sector is not advocating for a “do nothing” approach to managing water quality effects.
- (d) Some ability to manage effects cumulatively at the enterprise scale while providing for migration of the activity across subcatchments in line with rotation and the available opportunities.

PROVIDING FOR POINT SOURCE DISCHARGES: EXCEPTIONS TO THE REQUIREMENT TO REDUCE ALL FOUR CONTAMINANTS

44. The Officers have recognised that there are particular features of some activities that require a tailored approach.⁶ Officers have also recognised that the provisions of PC1 relating to commercial vegetable production are also deserving of special consideration, As a result, consideration of the policies and methods relating to commercial vegetable production activities has been moved to Block 3 Hearings.
45. In my opinion, it is not ideal to provide exceptions for particular activities in the long term. It is clear from the section 42A Report that the exceptions provided for regionally significant industry and infrastructure, point source discharges, urban discharges and some other activities has been provided for on a transitional basis with strong policy signals that the approach is temporary.
46. I consider the policies and methods related to commercial vegetable production should be providing for some growth of this activity in the short term over the duration of this plan - noting that the non-complying activity land use change rule expires in 2026; suggesting the current plan provisions will change on or around that date.

FRUIT PRODUCTION AS A LOW INTENSITY ACTIVITY

47. Fruit production in the Waikato is described by Ms Lucy Deverall in her evidence to the Block 1 hearings. Significant crops include kiwifruit, apples and berry crops.
48. Outdoor fruit production is typically what is termed “permanent horticulture”. In other words; planted crops stay in the ground for an intermediate to long term; with peak production often being achieved after a crop has been in the ground for 7 years or more.
49. The root systems of permanent crops are significantly more extensive than annual crops used in rotational commercial vegetable production. The development of woody material along with the crop also increases the uptake of nitrogen and decreases the potential for leaching.
50. Additionally, minimal cultivation beyond orchard preparation is required; similar to a forestry rotation. I note forestry is provided for as a permitted activity under PC1. Compared to commercial vegetable production there is a comparative absence of cultivation;

⁶ Section 42a Report Section C5.5 (Alternative activity status to enable flexibility of landuse for Maori Land) and Section C6 (Urban/Point Source discharges).

decreasing the risk of overland discharges of sediment and phosphorous.

51. In terms of predictive leaching values, the most studied crop has been kiwifruit. Kiwifruit leaching values for the Waikato were recently described⁷ in a paper by Jayson Bengé and Dr Brent Clothier as varying between 2 and 4 kilograms of nitrogen per hectare per year. Further work is being carried out on kiwifruit in a fluxmeter programme but no results have been published to my knowledge.
52. There is less information on other crops although some other reports have been produced for other districts. In Gisborne⁸ grapes and citrus were covered alongside kiwifruit using SPASMO; a research model developed by Plant and Food. In the Waimea⁹, an analysis was undertaken on pipfruit using Overseer. Comparatively the numbers for nitrogen leaching for pipfruit in the Waimea report are significantly less than the values stated for kiwifruit.
53. In the CSG process I can recall that fruit production was lumped into the land use class of “miscellaneous” by NIWA when undertaking the assessment of baseline landuse contributions to nitrogen leaching. In terms of regulation fruit production was discussed and it was assessed to be a low intensity activity. The latest version of the PC1 permitted activity rules do not appear to reflect this and in my view it should be made clear the fruit production is classed as a low intensity landuse.

Chris Keenan
for Horticulture New Zealand

3 May 2019

⁷ <http://www.hortnz.co.nz/assets/Natural-Resources-Documents/Freshwater-quality-and-eco-verification-of-kiwifruit-FINAL.pdf>

⁸ <http://www.hortnz.co.nz/assets/Uploads/Plant-and-Food-Land-management-practices-and-nutrient-losses-from-farm-.pdf>

⁹ <http://www.hortnz.co.nz/assets/Natural-Resources-Documents/Nutrient-Performance-and-Financial-Analysis-of-Horticultural-Systems-on-the-Waimea-Plains-Final-May-2015.pdf>

APPENDIX A

ACCOUNTING FRAMEWORK - NITRATE

