BEFORE THE INDEPENDENT HEARING PANEL APPOINTED BY WAIKATO REGIONAL COUNCIL

IN THE MATTER	of the Resource Management Act 1991 (the Act)
AND	
IN THE MATTER	Submissions made on Proposed Waikato Regional Plan Change 1 – Waikato and Waipa River Catchments

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STATEMENT OF REBUTTAL EVIDENCE OF GILLIAN MARGARET HOLMES FOR HORTICULTURE NEW ZEALAND (WATER QUALITY)

26 FEBRUARY 2019

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SUMMARY STATEMENT

1. This rebuttal evidence addresses the concept of a sub catchment versus whole catchment management approach to managing water quality, with the whole catchment approach currently the basis of PC1.

QUALIFICATIONS AND EXPERIENCE

2. My full name is Gillian Margaret Holmes. I have described my qualifications and experience in my statement of evidence dated 15 February 2019.

3. In relation to this rebuttal statement of evidence I reiterate and confirm my compliance with the Code of Conduct for Expert Witnesses as set in my primary evidence.

CONTEXT AND SCOPE OF REBUTTAL EVIDNECE

4. In preparing my rebuttal evidence, I have reviewed the statements of evidence of numerous parties (Dairy NZ, Fonterra, Beef + Lamb NZ and Wairakei Pastoral) regarding Plan Change 1 appeals. My rebuttal evidence focuses on the matters of disagreement and agreement.

5. The key issue covered in my rebuttal evidence is the concept of sub catchment versus whole catchment management approach to Plan Change 1.

SUBCATCHMENT VS WHOLE CATCHMENT MANAGEMENT APPROACH

6. Many of the submitters to PC1 have discussed the concept of subcatchment versus the whole catchment approach to managing water quality in the Waikato River catchment.

7. As an example, Mr Craig Depree states that

   "*I agree with the Officers assessment (S42a, para 142-143) that a move to more of a focus on sub catchment management is not supported by the technical work, and in doing so runs the risk of not having an 'eye on the prize' – with the prize being the health and restoration of the whole river system*" (paragraph 7.2).[1]

8. I disagree with this statement as I believe that allowing communities to manage water quality in specified sub catchments allows them to actively achieve water quality targets, through allowing the flexibility to adopt tailored solutions.

[1] EIC Craig Verdun Dupree for Dairy NZ; para 7.2

9. In addition, the proposed sub catchment approach proposed by Horticulture New Zealand (HortNZ) does not mean that the water quality in the whole catchment is ignored. By meeting the requirements within a sub catchment, this feeds into the whole catchment.

10. Other submitters have supported the sub catchment approach including:

    (a) Mr Nicholas Conland

        i. "*In common with other submitters, WPL seeks opportunities to work with others to share mitigation practices and the science to achieve the Vision and Strategy within sub-catchment groups*" (paragraph 86) and

        ii. '*as such it is important that flexibility is retained in the plan for sub-catchments to proactively respond to the different FWO's and economic opportunities. This means that where the Vision and Strategy is achieved there is flexibility for parties to explore land use options*" (paragraph 95).[2]

    (b) Ms Corina Jordan

        i. "*Tailored integrated sub-catchment management provides an efficient and effective method to sustainably manage land and water resources in a way which provides for the economic, social, and cultural wellbeing of communities, and as should be enabled and empowered through PC1*." (paragraph 29) and

        ii. "*the application of the regulatory instruments – it considers they are applied in a 'blanket' manner so local conditions and communities are not recognised. It* (B+LNZ submission) *seeks a tailored sub catchment approach, which B+LNZ submit would provide a more efficient and effective approach*. (paragraph 33 (f)). [3]

11. Mr Craig Depree also states that "*On their own, targets in Table 3-11-1 do not permit a sub catchment focussed approach*." (paragraph 7.6). [4]

12. I agree with this point, which is why Jacobs developed estimates of sub-catchment unattenuated loads for short term water quality targets (excluding point sources in Jacobs (2017) and included in HortNZ's original submission to PC1.

13. As discussed in my primary evidence (15 February 2019) I did not include this table in that evidence as I considered this would be better discussed in the Block 2 hearing. However, given the level

[2] EIC Nicholas Ashley Conland for Wairakei Pastoral Limited, Paras 86 and 95
[3] EIC Corina Jodi Jordan for Beef + Lamb New Zealand, Paras 29 and 33 (f)
[4] EIC Craig Verdun Dupree for Dairy NZ; para 7.6

of discussion among the submitters regarding the sub catchment approach, I have now included this table in Appendix A of this evidence.

14. I discussed the NIWA review of the calculations for the sub catchment load table in my statement of evidence. The initial table submitted with HortNZ's original submission and presented in Jacobs (2017) has changed slightly following the NIWA review in February 2019. Here I outline the specific changes made. The updated short term target load table in Appendix A indicates the changed values in red along with the value of change in brackets.

15. In summary, the following changes made:

    (a) One change to Total Nitrogen (TN) and two changes to nitrate (N) which relate to the Waikato at Ohaaki and Pueto sub catchments. This change occurred as a point sources into Pueto and Ohaaki sub catchments had not been reported correctly and this was identified during the NIWA review. Once added into the calculation, this slightly increased the TN load in this catchment.

    (b) Five changes were made to Total Phosphorus (TP) loads reported. These changes were the result of clarification being obtained around the methodology for estimating sediment-P during the NIWA review.

    (c) All *E. Coli* loads have been updated, as shown in Appendix A. During the initial calculation process, there was uncertainty associated with the *E. Coli* attenuation factors used by NIWA, and as such they were estimated based on Jacobs interpretation. Following the NIWA review, clarification was obtained on what attenuation factors were used, and as such, these calculations were recalculated.

    (d) During the NIWA review, it was determined the calculated baseline loads were equal to those calculated by NIWA, therefore I am confident that the short term loads calculated based on the short term concentration targets in Appendix A are correct.

16. The Block 1 hearing may not be the correct location to discuss the finer details of the sub catchment load table in Appendix A, and as such I support Mr Chris Keenan's rebuttal evidence point that caucusing around Table 3-11-1 may be the most efficient way of addressing this component of PC1.

Gillian Holmes for Horticulture New Zealand
26th February 2019

APPENDIX A: PROPOSED SUBCATCHMENT LOAD TABLE

Site	FMU	Annual Median Chlorophyll a (mg/m3)		Annual Maximum Chlorophyll a (mg/m3)		Annual Median Total Nitrogen (mg/m3)		Annual Total Nitrogen Load t/yr	Annual Median Total Phosphorus (mg/m3)		Annual Total Phosphorus Load t/yr	Annual Median Nitrate (mg NO3-N/L)		Annual 95th percentile Nitrate (mg NO3-N/L)		Annual Nitrate Load t/yr	Annual Median Ammonia (mg NH4-N/L)		Annual Maximum Ammonia (mg NH4-N/L)		Annual Ammonia Load t/yr	95th percentile E. coli (E.coli/100mL)		Annual E.coli Load 10^15 organisms/yr	Clarity (m)	
		Short term	80 year	Short term	80 year	Short term	80 year	Short term	Short term	80 year	Short term	Short term	80 year	Short term	80 year	Short term	Short term	80 year	Short term	80 year	Short term	Short term	80 year	Short term	Short term	80 year
Upper Waikato Freshwater Management Unit																										
Waikato River at Ohaaki Br	Upper Waikato	1.5	1.5	13	13	134	134	262 (+7)	10	10	18	0.039	0.039	0.062	0.062	262 (+7)	0.002	0.002	0.013	0.013		70	70	0.66 (-0.34)	3.8	3.8
Waikato River at Ohakuri Tailrace Br	Upper Waikato	3.2	3.2	11	11	206	160	555	17	17	51 (+1)	0.084	0.084	0.172	0.172	555	0.003	0.003	0.017	0.017		15	15	1.81 (-0.35)	3.4	3.4
Waikato River at Whakamaru Tailrace	Upper Waikato		5		25	260	160	364	20	20	31 (+1)	0.101	0.101	0.23	0.23	364	0.003	0.003	0.01	0.01		60	60	1.22 (-0.17)	2	3
Waikato River at Waipapa tailrace	Upper Waikato	4.1	4.1	25	25	318	160	552	25	20	49 (+1)	0.164	0.164	0.32	0.32	552	0.007	0.007	0.017	0.017		162	162	2.49 (+0.26)	2	3
Pueto Stm at Broadlands Rd Br	Upper Waikato											0.45	0.45	0.53	0.53	114 (-15)	0.003	0.003	0.009	0.009		92	92	0.34 (-0.14)	1.8	3
Torepatutahi Stm Vaile Rd Br	Upper Waikato											0.5	0.5	0.8	0.8	79	0.002	0.002	0.011	0.011		216	216	0.45 (-0.24)		
Waiotapu Stm Homestead Rd Br	Upper Waikato											1.257	1	1.563	1.5	229	0.112	0.03	0.176	0.05		281	281	0.98 (+0.32)		
Mangakara Stm (Reporoa) SH5	Upper Waikato											1.27	1	1.59	1.5	24	0.008	0.008	0.062	0.05		1584	540	0.06 (-0.01)	0.9	1
Kawaunui Stm SH5 Br	Upper Waikato											2.58	2.4	2.85	1.5	32	0.006	0.006	0.079	0.05		2335	540	0.08	1.4	1.6
Waiotapu Stm Campbell Rd Br	Upper Waikato											0.915	0.915	1.1	1.1	48	0.291	0.24	0.315	0.05		18	18	0.16 (-0.02)	1.2	1.6
Otamakokore Stm Hossack Rd	Upper Waikato											0.74	0.74	1.19	1.19	60	0.006	0.006	0.024	0.024		680	540	0.27 (0.05)	1.2	1.6
Whirinaki Stm Corbett Rd	Upper Waikato											0.77	0.77	0.87	0.87	10	0.002	0.002	0.012	0.012		98	98	0.06	2.7	3
Tahunaatara Stm Ohakuri Rd	Upper Waikato											0.555	0.555	0.83	0.83	204	0.003	0.003	0.015	0.015		783	540	0.67 (-0.02)	1.3	1.6
Mangaharakeke Stm SH30 (Off jct SH1)	Upper Waikato											0.525	0.525	0.75	0.75	35	0.003	0.003	0.015	0.015		684	540	0.12 (+0.01)	1.1	1.6
Waipapa Stm (Mokai) Tirohanga Rd Br	Upper Waikato											1.189	1	1.5	1.5	102	0.003	0.003	0.005	0.005		1147	540	0.42 (-0.09)	1.2	1.6
Mangakino Stm Sandel Rd	Upper Waikato											0.65	0.65	0.86	0.86	222	0.003	0.003	0.012	0.012		251	251	0.82 (+0.04)	1.8	3
Whakauru Stm SH1 Br	Upper Waikato											0.26	0.26	0.45	0.45	86	0.003	0.003	0.033	0.033		2106	540	0.26 (+0.03)	0.8	1
Mangamingi Stm Paraonui Rd Br	Upper Waikato											2.76	2.4	3.12	1.5	113	0.091	0.03	0.296	0.05		2151	540	0.33 (+0.04)	0.8	1
Pokaiwhenua Stm Arapuni - Putaruru Rd	Upper Waikato											1.68	1	2.04	1.5	484	0.002	0.002	0.02	0.02		1363	540	1.35 (+0.13)	1.3	1.6
Little Waipa Stm Arapuni - Putaruru Rd	Upper Waikato											1.522	1	2.04	1.5	210	0.002	0.002	0.085	0.05		1377	540	0.74 (+0.06)	1.5	1.6
Central Waikato Freshwater Management Unit																										
Waikato River Narrows Boat Ramp	Central Waikato	5.5	5	23	23	404	350	204	28	20	10	0.235	0.235	0.5	0.5	204	0.009	0.009	0.018	0.018		340	260	1.20 (+0.44)	1.7	1.7
Waikato River Horotiu Br	Central Waikato	6.1	5	23	23	432	350	78	34	20	4 (+1)	0.26	0.26	0.53	0.53	78	0.007	0.007	0.029	0.029		774	540	0.66 (+0.15)	1.4	1.6
Karapiro Stm Hickey Rd Bridge	Central Waikato											0.52	0.52	1.689	1.5	94	0.008	0.008	0.031	0.031		4518	540	0.60 (-0.15)	0.9	1
Mangawhero Stm Cambridge-Ohaupo Rd	Central Waikato											1.99	1	2.49	1.5	94	0.041	0.03	0.072	0.05		2920	540	0.48 (+0.18)	0.3	1
Mangaonua Stm Hoeka Rd	Central Waikato											1.455	1	1.878	1.5	126	0.036	0.03	0.051	0.05		6372	540	0.82 (+0.39)	1	1
Mangaone Stm Annebrooke Rd Br	Central Waikato											2.58	2.4	2.94	1.5	105	0.009	0.009	0.02	0.02		2052	540	0.34 (-0.01)	0.9	1
Mangakotukutuku Stm Peacockes Rd	Central Waikato											0.8	0.8	1.788	1.5	55	0.077	0.03	0.132	0.05		11394	540	0.31 (+0.17)	0.5	1
Waitawhiriwhiri Stm Edgecumbe Street	Central Waikato											0.88	0.88	1.24	1.24	36	0.256	0.24	0.318	0.05		5922	540	0.24 (+0.10)	0.4	1
Kirikiriroa Stm Tauhara Dr	Central Waikato											0.815	0.815	1.572	1.5	14	0.096	0.03	0.183	0.05		2124	540	0.17 (+0.06)	0.5	1
Lower Waikato Freshwater Management Unit																										
Waikato River Huntly-Tainui Br	Lower Waikato	5.9	5	19	19	562	350	314	43	20	9	0.365	0.365	0.9	0.9	314	0.005	0.005	0.015	0.015		1944	540	1.72 (+0.72)	0.9	1
Waikato River Mercer Br	Lower Waikato	10	5	30	25	631	350	484	49	20	31	0.365	0.365	0.87	0.87	484	0.003	0.003	0.01	0.01		1494	540	4.10 (+1.29)		
Waikato River Tuakau Br	Lower Waikato	11.3	5	37	25	571	350	156	50	20	10 (+1)	0.325	0.325	0.88	0.88	156	0.003	0.003	0.008	0.008		1584	540	0.78 (+0.32)	0.7	1
Komakorau Stm Henry Rd	Lower Waikato											1.279	1	4.4	3.5	414	0.25	0.24	0.419	0.4		3474	540	2.27 (+1.29)	0.3	1
Mangawara Stm Rutherford Rd Br	Lower Waikato											0.765	0.765	2.76	1.5	695	0.103	0.03	0.172	0.05		4955	540	3.80 (+2.01)	0.3	1
Awaroa Stm (Rotowaro) Sansons Br @ Rotowaro-Hunt	Lower Waikato											0.7	0.7	1.19	1.19	35	0.021	0.021	0.089	0.05		1800	540	0.47 (+0.13)	0.8	1
Matahuru Stm Waiterimu Road Below Confluence	Lower Waikato											0.715	0.715	1.689	1.5	113	0.016	0.016	0.059	0.05		6147	540	0.82 (+0.09)	0.4	1
Whangape Stm Rangiriri-Glen Murray Rd	Lower Waikato											0.004	0.004	0.69	0.69	386	0.006	0.006	0.134	0.05		584	540	4.18 (+1.01)	0.3	1
Waerenga Stm SH2 Maramarua	Lower Waikato											0.82	0.82	1.41	1.41	17	0.005	0.005	0.022	0.022		5098	540	0.16 (-0.03)	0.9	1
Whangamarino River Jefferies Rd Br	Lower Waikato											0.625	0.625	1.842	1.5	117	0.012	0.012	0.147	0.05		4712	540	1.01 (+0.47)	0.6	1
Mangatangi River SH2 Maramarua	Lower Waikato											0.11	0.11	1.12	1.12	174	0.005	0.005	0.038	0.038		5567	540	1.13 (+0.47)	0.5	1
Mangatawhiri River Lyons Rd Buckingham Br	Lower Waikato											0.013	0.013	0.37	0.37	20	0.003	0.003	0.011	0.011		5108	540	0.12 (+0.04)	1.6	1.6
Whangamarino River Island Block Rd	Lower Waikato											0.075	0.075	0.7	0.7	135	0.011	0.011	0.054	0.05		655	540	0.80 (+0.33)	0.3	1
Whakapipi Stm SH22 Br	Lower Waikato											3.39	2.4	5.12	3.5	99	0.006	0.006	0.081	0.05		1773	540	0.32 (+0.06)	1.1	1.1
Ohaeroa Stm SH22 Br	Lower Waikato											1.473	1	1.806	1.5	29	0.003	0.003	0.015	0.015		4667	540	0.10 (+0.01)	0.8	1
Opuatia Stm Ponganui Rd	Lower Waikato											0.74	0.74	1.06	1.06	71	0.005	0.005	0.016	0.016		2898	540	1.13 (+0.40)	0.6	1
Awaroa River (Waiuku) Otaua Rd Br Moseley Rd	Lower Waikato											1.369	1	2.31	1.5	32	0.021	0.021	0.135	0.05		1017	540	0.17 (+0.06)	0.4	1
Site	FMU	Annual Median Chlorophyll a (mg/m3)		Annual Maximum Chlorophyll a (mg/m3)		Annual Median Total Nitrogen (mg/m3)		Annual Total Nitrogen Load t/yr	Annual Median Total Phosphorus (mg/m3)		Annual Total Phosphorus Load t/yr	Annual Median Nitrate (mg NO3-N/L)		Annual 95th percentile Nitrate (mg NO3-N/L)		Annual Nitrate Load t/yr	Annual Median Ammonia (mg NH4-N/L)		Annual Maximum Ammonia (mg NH4-N/L)		Annual Ammonia Load t/yr	95th percentile E. coli (E.coli/100mL)		Annual E.coli Load 10^15 organisms/yr	Clarity (m)	
		Short term	80 year	Short term	80 year	Short term	80 year	Short term	Short term	80 year	Short term	Short term	80 year	Short term	80 year	Short term	Short term	80 year	Short term	80 year	Short term	Short term	80 year	Short term	Short term	80 year
Waipa Waikato Freshwater Management Unit																										
Waipa River Mangaokewa Rd	Waipa											0.38	0.38	0.6	0.6	17	0.003	0.003	0.017	0.017		2417	540	0.26 (+0.07)	1.5	1.6

Waipa River Otewa	Waipa											0.228	0.228	0.502	0.502	224	0.003	0.003	0.008	0.008		2036	540	**2.53 (+0.77)**	2.1	2.1
Waipa River SH3 Otorohanga	Waipa											0.37	0.37	1.05	1.05	301	0.004	0.004	0.02	0.02		3289	540	**1.42 (+0.48)**	1.2	1.6
Waipa River Pirongia-Ngutunui Rd Br	Waipa											0.565	0.565	1.27	1.27	977	0.008	0.008	0.023	0.023		4441	540	**5.31 (+2.75)**	0.7	1
Waipa River Whatawhata Bridge	Waipa											0.673	0.673	1.319	1.319	612	0.009	0.009	0.026	0.026		3657	540	**3.81 (+1.87)**	0.6	1
Ohote Stm Whatawhata/Horotiu Rd	Waipa											0.495	0.495	1.37	1.37	57	0.023	0.023	0.052	0.05		2142	540	**0.43 (+0.25)**	0.6	1
Kaniwhaniwha Stm Wright Rd	Waipa											0.35	0.35	0.89	0.89	116	0.007	0.007	0.022	0.022		1917	540	**1.11 (+0.59)**	0.9	1
Mangapiko Bowman Rd Stm	Waipa											1.369	1	2.49	1.5	592	0.022	0.022	0.076	0.03		7074	540	**2.52 (+0.60)**	0.6	1
Mangaohoi Stm South Branch Maru Rd	Waipa											0.23	0.23	0.39	0.39	2	0.003	0.003	0.008	0.008		943	540	**0.04 (-0.01)**	1.6	1.6
Mangauika Stm Te Awamutu Borough W/S intake	Waipa											0.21	0.21	0.28	0.28	4	0.002	0.002	0.003	0.003		1008	540	**0.04 (+0.02)**	3.3	3.3
Puniu River Bartons Corner Rd Br	Waipa											0.65	0.65	1.28	1.28	511	0.007	0.007	0.029	0.029		2790	540	**1.75 (+0.25)**	0.9	1
Mangatutu Stm Walker Rd Br	Waipa											0.38	0.38	0.88	0.88	152	0.003	0.003	0.012	0.012		738	540	**0.78 (+0.17)**	1.5	1.6
Waitomo Stm SH31 Otorohanga	Waipa											0.52	0.52	0.83	0.83	45	0.008	0.008	0.025	0.025		1453	540	**0.60 (+0.32)**	0.6	1
Mangapu River Otorohanga	Waipa											0.86	0.86	1.36	1.36	236	0.015	0.015	0.057	0.05		4284	540	**2.70 (+1.36)**	0.7	1
Waitomo Stm Tumutumu Rd	Waipa											0.63	0.63	0.8	0.8	33	0.004	0.004	0.013	0.013		2241	540	**0.49 (+0.26)**	1.1	1.6
Mangaokewa Stm Lawrence Street Br	Waipa											0.53	0.53	0.98	0.98	165	0.004	0.004	0.013	0.013		6224	540	**2.39 (+0.51)**	1.4	1.6