

## Josephine Laing

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**From:** Shelander, Diane <Diane.Shelander@ccc.govt.nz>  
**Sent:** Friday, 18 September 2020 5:20 PM  
**To:** Plan Hearings  
**Cc:** Pizzey, Brent  
**Subject:** Christchurch City Council PC7 rebuttal evidence  
**Attachments:** LWRP CCC Geoff Butcher Rebuttal 2020-09-18.pdf; LWRP Carter Rebuttal 2020-09-18.pdf; LWRP CCC Bridget OBrien rebuttal 2020-09-18.pdf; LWRP CCC Mike Thorley rebuttal 2020-09-18.pdf

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

Kia ora,

Please find attached the Christchurch City Council's rebuttal evidence for Plan Change 7 of the Land and Water Regional Plan.

Attached is the rebuttal evidence of:

Geoff Butcher  
Janice Carter  
Bridget O'Brien  
Mike Thorley

We will be filing Dr. Belinda Margett's rebuttal evidence soon.

Ngā mihi,

**Diane Shelander** MPH MEIANZ  
Senior Policy Analyst/Environmental Scientist  
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**BEFORE THE CANTERBURY REGIONAL COUNCIL**

**HEARING COMMISSIONERS**

**IN THE MATTER** of the Environment Canterbury (Transitional Governance Arrangements) Act 2016

**AND**

**IN THE MATTER** of submissions on Proposed Plan Change 7 to the Land and Water Regional Plan and Proposed Plan Change 2 to the Waimakariri River Regional Plan

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**STATEMENT OF REBUTTAL EVIDENCE OF GEOFFREY VERNON BUTCHER  
FOR THE CHRISTCHURCH CITY COUNCIL**

**Dated 18 September 2020**

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## **INTRODUCTION**

1. My full name is Geoffrey Vernon Butcher. My experience and qualifications are set out in my Evidence in Chief dated 17 July 2020.
2. I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and that I agree to comply with it. I confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express, and that this evidence is within my area of expertise, except where I state that I am relying on the evidence of another person.

## **SCOPE**

3. My rebuttal evidence is provided in response to the Evidence in Chief filed by Mr Ford for Waimakariri Irrigation Ltd and Dr Doole for Dairy NZ Ltd. However, my comments may also apply to others who argue that the loss of profits associated with reducing nitrate leaching will lead to bankruptcy of dairy farmers<sup>1</sup> with consequential effects on the Canterbury economy.
4. Mr Ford and Dr Doole give explicit numbers to support their evidence that some dairy farmers will be unable to survive financially under PC7. I do not agree with their evidence on four grounds.
5. Firstly, while there will be a decline in farm value as farm profits decrease, this decline is probably already partially reflected in current farm prices. The balance of the decline will occur over the long term, giving farmers time to repay debt and hence stay solvent in spite of lower profitability, particularly in an environment of low interest rates.
6. Secondly, the modelling employed by Mr Ford and Dr Doole is pessimistic in that it does not allow for technological change aimed at lowering the costs of nitrate reduction and hence reducing the associated loss of profits.

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<sup>1</sup> For example, the evidence of Alan Hawkins on behalf of As One, para 9;

7. Thirdly, the world has entered a period of low interest rates and high liquidity which is leading to asset price inflation generally. This will help to offset the reduction in dairy farm values arising from reduced profits.
8. Finally, the declines in revenue which lead to the decline in profits are no greater than is typical in the volatility of milk prices, with which farmers seem able to cope – even in the medium term.
9. I do not agree that there is a sound basis in economic analysis for not implementing PC7 because of the financial effects on existing farmers.
10. In my evidence in chief<sup>2</sup> I have relied on the Harris reports<sup>3</sup> to estimate the costs of reducing nitrate losses. Dr Doole<sup>4</sup> has suggested that the Harris estimates are too low, but I show that Dr Doole has misunderstood the Harris report, and in fact Dr Doole's own figures on the relationship between reductions in nitrate leaching and reduction in farm profits suggest that in my evidence I may have overstated the costs to farmers of a 30 % reduction in nitrate.

## **EVIDENCE OF MR FORD**

### ***Effects on Cash Operating Surplus***

11. Mr Ford provides budgets on p10 of his evidence which show that for a "Dairy System 3 Farm System" the Cash Operating Surplus (COS) falls from \$790,000 per annum under GMP<sup>5</sup> in 2020 to \$705,000 per annum under PC7 in 2040 and \$625,000 under PC7 in 2050.
12. Cash Surplus is defined as the total farm revenue less farm operating costs, where operating costs include all direct farm labour – including herd management – and economic depreciation. Hence Cash Surplus needs

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<sup>2</sup> Paras 19 & 34, for example.

<sup>3</sup> Harris, S May 2019 Waimakariri land and water solutions programme: Economic assessment of the current state; Harris, S. July 2019; Waimakariri land and water solutions programme Options and Solutions Assessment: Economic Assessment

<sup>4</sup> Doole, para 6.1

<sup>5</sup> Good Management Practice

to be sufficient to cover owner's drawings, interest, debt repayment, and new capital. Note that because operating costs include economic depreciation, the budget covers the costs of replacing existing capital when it wears out.

13. If we deduct drawings of, say, \$100,000<sup>6</sup> per annum from the above figures, then the Operating Surplus available to cover interest, debt repayment and new capital falls from \$690,000 per annum in 2020 to \$605,000 in 2040 and to \$525,000 in 2050. This is equivalent to a reduction of 24% in operating surplus between 2020 and 2050, a reduction to which I refer in paragraph 17 below.

### ***Impacts of Debt Structure***

14. Mr Ford notes in para 40.1 that these budgets assume that "the debt structure of the farm does not change". He then states in para 43.1:

*"It is therefore my opinion that the first 15% of N leaching reductions is manageable for the average farm but then the second 15% (2040) would put the majority of dairy farms in a difficult financial position which could only be effectively resolved by selling the farm (with the loss of considerable equity to another farmer who could manage the farm at a much lower output status and debt, hence the loss of equity to the previous owner).*

15. In my opinion Mr Ford's conclusion depends primarily on his assumption that the debt structure of the farm does not change, and in my opinion this is unlikely to be the case. Debt depends on the price for farms purchased in coming years as well as the level of debt which is repaid by both existing owners and new owners between now and 2050. If farmers repay debt over the 20 years during which the first 30% of nitrate reductions take place, then it seems quite feasible that farms will not need to be sold. Debt repayment would seem to be quite feasible in a world where interest rates

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<sup>6</sup> This seems a generous amount to cover living expenses and enable a farm owner to get by without selling their farm, even if it does represent a very modest return on farmer equity.

have fallen significantly and hence where the portion of COS available for debt repayment rises.

### ***Impacts of Technology Changes and Efficiency Improvements***

16. The reduced Cash Surplus under PC7 will depend on the measures taken to reduce nitrate leaching. As Mr Ford notes in para 38 of his evidence, the mitigation measures are those modelled for five case study farms. Those mitigations will reflect current technologies available for reducing nitrate leaching. However, it is likely that over the next 20 years, new technologies will be developed to lower the cost of reducing nitrate leaching, and these new technologies will reduce the loss of profits modelled by Mr Ford. Moreover, there is generally an increase in productivity of dairy farms of about 1 % per annum<sup>7</sup>, and this should also partially offset the reduction in dairy farm profitability arising from PC7<sup>8</sup>. Furthermore, Mr Ford has made no allowance for likely general inflation which will increase nominal cash surplus but not debt, and hence will make interest and debt payments easier.

### ***Timing of the Decline in Land Value***

17. In para 13 above I used Mr Ford's figures to show that the required reduction in nitrate leaching on dairy farms will lead to a 24% reduction in annual Cash-Operating-Surplus-after-drawings between 2020 and 2050, which is equivalent to an average of 0.9% per annum compounded. Economic theory suggests that farm value is the Net Present Value of the stream of future profits, and hence that farm values will fall by 24 % once the lower cash operating surpluses are fully realised (see bottom right hand figure in table below).

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<sup>7</sup> Doole, p31. Quoting Dairy NZ (2020). Average increase over the last 20 years.

<sup>8</sup> Increases in productivity can be anticipated under GMP farming also. This means that the difference in profits between GMP and PC7 will be similar in percentage terms to the difference calculated by Mr Ford. However, the relative figure in estimating whether farmers will go bankrupt is their absolute level of income and debt.

	Annual Profit (\$ / yr)		Discount Rate	5%	Difference
Year	PC7	GMP	NPV next 50 yrs (\$000)		in NPV
2020	690,000	690,000	11,407	12,654	-10%
2021	685,778	690,000	11,331	12,654	-10%
2022	681,556	690,000	11,255	12,654	-11%
2023	677,333	690,000	11,180	12,654	-12%
2024	673,111	690,000	11,105	12,654	-12%
2025	668,889	690,000	11,031	12,654	-13%
2026	664,667	690,000	10,957	12,654	-13%
2027	660,444	690,000	10,884	12,654	-14%
2028	656,222	690,000	10,811	12,654	-15%
2029	652,000	690,000	10,739	12,654	-15%
2030	647,778	690,000	10,668	12,654	-16%
2031	643,555	690,000	10,597	12,654	-16%
2032	639,333	690,000	10,527	12,654	-17%
2033	635,111	690,000	10,457	12,654	-17%
2034	630,889	690,000	10,389	12,654	-18%
2035	626,666	690,000	10,321	12,654	-18%
2036	622,444	690,000	10,254	12,654	-19%
2037	618,222	690,000	10,188	12,654	-19%
2038	614,000	690,000	10,123	12,654	-20%
2039	609,777	690,000	10,058	12,654	-21%
2040	605,555	690,000	9,995	12,654	-21%
2041	597,500	690,000	9,933	12,654	-22%
2042	589,444	690,000	9,876	12,654	-22%
2043	581,389	690,000	9,823	12,654	-22%
2044	573,333	690,000	9,777	12,654	-23%
2045	565,278	690,000	9,736	12,654	-23%
2046	557,222	690,000	9,701	12,654	-23%
2047	549,167	690,000	9,673	12,654	-24%
2048	541,111	690,000	9,651	12,654	-24%
2049	533,056	690,000	9,636	12,654	-24%
2050	525,000	690,000	9,628	12,654	-24%
after 2050	525,000	690,000	9,628	12,654	-24%

18. However, this decline in value will not happen immediately. If we assume steady progress to achieve lower nitrate leaching and a steady fall in COS to the levels postulated by Mr Ford in 2020 and 2050, and apply a 5% discount rate<sup>9</sup> to this stream of values, then the knowledge that PC7 will be implemented should lead to an immediate loss in farm values of approximately 10%, compared to their value in the absence of PC7. (see Table above – top figure on right hand side). Farm values then fall steadily until 2050 by which time there is the 24 % decline that economic theory would suggest.

<sup>9</sup> I would expect farmers and banks to apply a discount rate of about this magnitude for commercial decision making. If the discount rate is 3 %, then the immediate decline in NPV of future profits, and hence in farm value, will be 12 %.



19. Moreover, that 10% decline in farm values by 2020 assumes that current farmland prices do not already factor in some risk of more restrictive nitrate leaching, which seems unlikely given the length of time for which nitrate leaching reductions have been under discussion. If there has already been a, say, 5% decline in prices because of the prospect of regulations similar in effect to PC7, then prices will only fall by a further 5% in 2020 and 19% in total by 2050. Furthermore, these price falls ignore the possibility of a rise in farmland price because of general asset price inflation, or because of general inflation in farm revenues and costs.
20. Although PC7 may lead to a decline in land values of 24% from what they would be in the absence of PC7, the actual decline in nominal land values compared to what they are today may be considerably less. It is this decline in nominal values which could lead to farmers being forced off their farms through insolvency.
21. I have shown in the Table above that the immediate decline in the NPV of long-term profits, and hence the immediate decline in dairy farm values, is likely to be 10% or less. For that reason, and given the expected effects of low interest rates in enabling debt repayment, I do not think that the implementation of PC7 will lead to large scale insolvencies. I do not doubt that there will be farms already near the brink of insolvency for which PC7 could be the final blow, but I suspect these are farms which are already overburdened with debt as a result of overly-optimistic investment decisions in the past. To blame their insolvency on PC7 would be erroneous. In that context, the impact of PC7 is equivalent to a decline of perhaps 3.5% in long term milkfat prices<sup>10</sup>.

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<sup>10</sup> Harris provides farm budgets based on \$6.80 per kg of milk solids, and these show a Cash Operating Surplus of 35 % of gross revenue, which is equivalent to \$2.38 per kg of milk solids. Hence a 10 % loss of farm value as shown in the Table above would arise from a projected long term decline of \$0.238 / kg of milk solids, which is only 3.5 % of the 6.80 / kg price. This is far less than the annual volatility of milk solids prices, with which farmers and banks already manage to deal without mass insolvencies. In the last 10 years the payout has varied from \$3.90 in 2015-16 to \$8.40 in 2012-14. This suggests to me that it is unlikely that PC7 will lead to a large number of dairy farm insolvencies.

Source of price series: <https://www.interest.co.nz/rural-data/dairy-industry-payout-history>.

### ***Changes in Technology***

22. As I noted above, this comparative decline in farm profits and values is based on the types of change in farm management that are currently expected to be implemented to reduce nitrate leaching, whereas it is quite possible that in the 20 years which will elapse until a 30% reduction is required, technology will develop which will enable farmers to reduce nitrate leaching at considerably lower cost than has been assumed in these farm budgets. If this is the case, then the effects on farm profitability and farm commercial viability referred to in Mr Ford's evidence are overstated. I also note that such technology is likely to be developed primarily in response to a requirement to reduce nitrate leaching. If reductions in nitrate leaching are not required, then the technology is unlikely to be developed, or at least to be developed more slowly.
23. In summary, I consider that economic analysis does not support the conclusion in para 43.1 of Mr Ford's evidence that the implementation of PC7 "would put the majority of dairy farms in a difficult financial position which could only be effectively resolved *by selling the farm*".

## **EVIDENCE OF DR DOOLE**

### ***Accuracy of the Harris Report***

24. In my evidence, I have relied on Mr Harris's estimates of the effects of reduced nitrogen leaching on farm profitability. Dr Doole's evidence<sup>11</sup> suggests that the 2019 Harris Report understates the loss of profits caused by a reductions in nitrate leaching, which in turn implies that my evidence understates the costs of reduced nitrate leaching. I consider that Dr Doole's suggestion is incorrect.
25. In para 6.1 Dr Doole states that "The 2040 target of a 30% decrease in nitrate leaching is identified by Harris as reducing operating profit in the dairy sector by 8% or \$4.93 million per annum. This is much lower than what I predict".

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<sup>11</sup> Doole, Para 6.1

26. This figure of \$4.93 million comes from Table 11 of the options and solutions report by Harris, but the preceding paragraph in that report and the title to Table 11 make it clear that Harris's \$4.93 million relates to only a 15% reduction in nitrate leaching, and to dairy farming in the NPA<sup>12</sup> only - which is a much smaller area than is covered by PC7. Moreover, on p7 of his report Harris notes that his comparison is between "Current Pathways" (which by 2030 one could expect will approximate GMP<sup>13</sup>) and PC7 in 2030, which requires a 15% reduction in nitrate leaching on dairy farms. As is also specified in Mr Harris's Table 11, the \$4.93 million is equivalent to an 8% decline in profits. This is similar to the 11% decline in profit shown by Dr Doole (top right figure in Table 1) as arising from shifting from GMP to PC7 over the entire area affected by PC7 in 2030. I conclude that as regards the impacts on profit of a 15 % decline in nitrate leaching, Mr Harris is in broad agreement with Dr Doole.
27. The formula given by Mr Harris (Table 3) implies that a 30% decline in nitrate leaching would lead to a 38% decline in profits, which if anything seems to be higher than is indicated by figure A3 shown in Appendix 1 of Dr Doole's evidence<sup>14</sup>. If Dr Doole's figures are correct, then my evidence in chief may have over-stated the costs of a more rapid decrease in nitrate leaching than is proposed in PC7.

### ***Loss of Profits and Ability to Pay Interest and Debt***

28. Dr Doole describes (Fig 1, p5) the reduction in operating profits when going from current practices to GMP to PC7 in 2030, 2040 and 2050. While he discusses the costs of going from the current base to GMP, this is in my opinion not relevant to the impacts of PC7, because the current regulatory environment requires farmers to achieve GMP by 2030 anyway<sup>15</sup>. The cost imposed by PC7 is the costs of shifting from GMP to

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<sup>12</sup> Nitrate Priority Area

<sup>13</sup> See evidence of Mr Ford, para 19.

<sup>14</sup> I have asked Dr Doole for the best fit coefficients he estimates for the equation he gives in Appendix 1 of his evidence,  $P=aN^b$ . I understand his reply to be that the best fit equation is  $P = -1.01 + 0.868 * N^1$ . This implies that a 30 % decline in N-leaching would be associated with a 27 % decline in profit, whereas the Harris formula implies a 30 % decline in N-leaching would be associated with a 38 % loss of profit.

<sup>15</sup> Mr Ford's evidence, para 19, seems to support my understanding

PC7 which, according to Dr Doole's evidence<sup>16</sup> is an 11% decline in profits by 2030, a 21% decline by 2040 and a 26% decline by 2050. While these losses are significant, the median operating profit on dairy farms is still expected to be approximately \$375,000 per farm per year<sup>17</sup>. In my opinion, as described above, this still leaves a significant amount for interest payments and debt repayment – particularly given the current interest rate environment.

29. One reason for the comparatively poor profit assumed under PC7 is that while efficiency gains are assumed by Dr Doole to increase profits by 1.5% per annum for the Base Case, he has assumed there will be no efficiency gains under PC7. I do not agree with that assumption. Financial pressures generally increase the incentive to improve efficiency and it is perverse to assume that the scenario with the most financial pressure will generate the least efficiency gain.
30. In para 8.4 Dr Doole argues that by 2050 75% of dairy farmers will not be able to cover living costs and debt and interest payments. I consider that he is incorrect. This will only be the case if:
- Farmers do not reduce their debt between now and 2050;
  - The decline in farm values arising from PC7 is not offset, at least in part, by the general rise in asset prices;
  - There is no general price inflation which would raise the price of both income and operating expenses, but would not affect the farm debt;
  - There is no development in the effectiveness of systems to reduce nitrate leaching; and
  - There is no increase in general productivity on dairy farms which are required to reduce nitrate leaching.
31. A principal reason that dairy farmers have long-term<sup>18</sup> negative cashflow is their costs of interest and debt repayment. This in turn is driven primarily by the amount that farmers have been prepared to pay for land for dairying. It has been clear for some years that high levels of nitrate leaching is causing environmental problems and that farmers are likely to

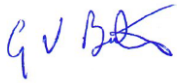
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<sup>16</sup> Doole Evidence, Table 1, p8.

<sup>17</sup> *Ibid* Figure 1, p 5m

<sup>18</sup> Short term effects include poor weather and poor market returns.

have to reduce such leaching. Farmers should have been taking this into account when making the decision as to what they were prepared to pay for their farms.



Geoffrey Butcher  
18 September 2020