

Tabled at Hearing 12/12/2016.

**BEFORE INDEPENDENT HEARING COMMISSIONERS APPOINTED BY THE
CANTERBURY REGIONAL COUNCIL**

IN THE MATTER OF the Resource Management Act 1991

AND

IN THE MATTER OF Submissions and further submissions by Irrigation New
Zealand Inc on Proposed Plan Change 5 to the
Canterbury Land and Water Plan

**MEMORANDUM OF COUNSEL ON BEHALF OF IRRIGATION NEW ZEALAND
INCORPORATED IN RELATION TO S42A REPLY REPORT**

9 DECEMBER 2016

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MAY IT PLEASE THE PANEL:

- 1 This memorandum is filed on behalf of Irrigation New Zealand Incorporated (**INZ**).
- 2 At the hearing on 23 August 2016, the Panel directed Canterbury Regional Council (**Council**) undertake a comparative analysis of the notified irrigation proxies in Schedule 28 and Method s28.4 and two further relief proposals submitted by INZ. That analysis was to be presented in Council's s42A Reply Report (**Reply Report**). INZ is grateful the Panel provided for that analysis to be undertaken.
- 3 INZ has now had the opportunity to review the Reply Report, including the comparative analysis and in particular Appendix E (the **November Hume Report**)¹.
- 4 Page 42 of the November Hume Report raises three 'unknowns' relating to INZ's relief. It is respectfully submitted the Panel would be assisted by INZ responding to those 'unknowns', which go towards providing the full picture for the Panel to consider in discharging their functions under the Resource Management Act 1991 in relation to Plan Change 5 (**PC5**).
- 5 Accordingly, INZ respectfully seeks leave to file responses to the three 'unknowns' raised in the November Hume Report. INZ provides these responses at paragraphs 9 - 11.2 below.
- 6 It is not considered that providing these responses will prejudice any other party.
- 7 Should the Panel require further comment on the below from INZ, or have any further questions, INZ is endeavouring to arrange for Mr McIndoe to attend the Reply Hearing on Monday 12 December.

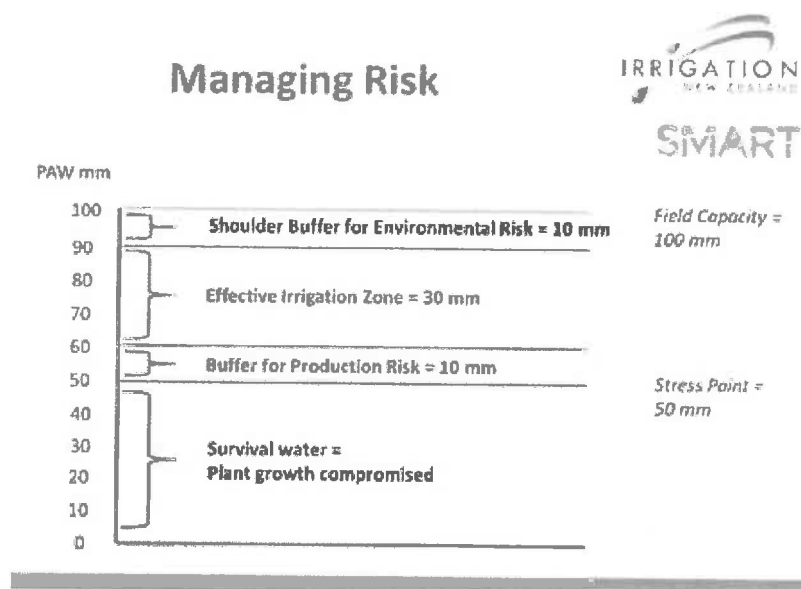
Responses to November Hume Report

- 8 Each 'unknown' is reiterated in substance below, and INZ responds in each subparagraph.
- 9 November Hume Report: *...for the INZ alternative proxy, the application depths and/or trigger points move up and down across different soil PAWS. For example,...*

¹ E Hume, *Assessment of the irrigation Good Management Practice modelling proxies proposed by Irrigation New Zealand for the Matrix of Good Management (PC5)* November 2016. PFR SPTS No.14038.

It is not clear what the underpinning justification for application depth and trigger points is or why they change up and down in the proposed manner.²

- 9.1 **INZ response:** The trigger points in INZ's alternative relief relate to the actual trigger points used for Good Management Practice irrigation in the field. They also take into account irrigation system risk – being the ability for an irrigation system to keep up during the peak of the season (see INZ's diagram below³). Irrigation systems are limited in the amount of water they can apply in a day (their system capacity) and irrigation strategies have to be adjusted to account for this to avoid plant stress.



- 9.2 INZ's trigger points were developed by three experts each of whom has been professionally advising irrigators in irrigation scheduling for over 30 years. One of the experts runs an irrigation scheduling service using neutron probes and likely has the most comprehensive data set of irrigation trigger points for soils in Canterbury.
- 10 **November Hume Report:** *...The analysis shows that the general relationship between PC5 and the INZ proxies reversed for travelling and sprayline irrigators for some soil PAWs within the range of 40 to 80 mm. This inconsistency is due to concerns originally raised by INZ relating to capabilities of these irrigator types to meet application depths and return periods being accommodated in the PC5 Proxy (Hume et al. 2015). ... It is unclear whether these original concerns from INZ that*

² November Hume Report, page 41, first paragraph.

³ Diagram taken from INZ's Irrigation Manager Training presentation.

were incorporated into the PC5 proxy are consistent with the changes that have been implemented in the INZ preferred and alternative proxies.⁴

- 10.1 INZ response: Both INZ's preferred and alternative relief set out in its submission and evidence to this Hearing better address the original concerns put forward by INZ.
- 10.2 INZ's concern with the proxies, prior to the tweaks made for PC5, was that they reflected a 100% efficient centre pivot⁵. This is not what was agreed to in the industry agreed GMP's document.
- 10.3 As described in INZ's evidence⁶ and submission⁷, INZ does not consider the irrigation proxy development process was collaborative. The draft modelling rules that INZ circulated for initial discussion and testing found their way into PC5 without industry sign-off and were incorrectly adapted⁸. Consequently, INZ developed robust evidence, in collaboration with its experts, to reflect Irrigation Good Management Practice in the field – being INZ's preferred and alternative relief.
- 10.4 INZ's preferred relief has revisited those initially circulated draft modelling rules (noting this would have been the result if a truly collaborative process had been followed). This resulted in refinement of the centre pivot rules for soils of low PAW and using a generic sprayline irrigator for soils with a PAW >60mm. For the alternate relief all the irrigation system rules have been refined.
- 11 November Hume Report: ...A key component of the original testing was to ensure that the PC5 proxy did not cause water stress in the plants while still acknowledging the limitations to different irrigation systems... Due to restricted time available for this assessment, it was not possible to undertake additional testing for likelihood of causing water stress. It is not known whether INZ have undertaken this aspect of testing, however it is potentially significant as the INZ proxies have minimum return periods set and therefore may restrict water availability for plants.⁹

⁴ November Hume Report, page 41, third paragraph.

⁵ Submission of INZ on Plan Change 5, dated 11 March 2016, at page 12.

⁶ Evidence of Andrew Curtis, dated 22 July 2016, at paragraphs 20-22 and 28-30.

⁷ Submission of INZ on Plan Change 5, dated 11 March 2016, at pages 11 and 12.

⁸ Evidence of Andrew Curtis, dated 22 July 2016, at paragraphs 28-30.

⁹ November Hume Report, page 41, fifth paragraph.

- 11.1 INZ response: INZ has not tested this. However, each of INZ's triggers, depths and return periods are based upon actual Good Management Practice rules for that particular irrigation system type.
- 11.2 All irrigation systems have limitations, which are driven by water supply and design cost. As a result, under certain climatic conditions the crops they irrigate may experience stress to a greater or lesser degree. However, given how the water balance operates in OVERSEER (a daily water balance based on long-term daily averages¹⁰) and the assumed system capacities for both INZ's preferred¹¹ and alternative¹² relief, and how these relate to different soil PAW's (higher system capacities on soils of low PAW), it is highly unlikely that the minimum return periods will restrict plant water availability.



J R King

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¹⁰ This smooths the periods of extreme evapotranspiration that can be observed in an annual daily water balance.

¹¹ 4.6 – 5mm per day

¹² 3.75 – 5mm per day

