
BEFORE THE HEARINGS PANEL

In the matter of hearings on submissions concerning the
Proposed One Plan notified by the
Manawatu-Wanganui Regional Council

STATEMENT OF EVIDENCE OF ANDREW JOHN BARBER

DATE: 19th February 2010

QUALIFICATIONS AND EXPERIENCE

- 1 My name is Andrew John Barber. I am a Director of AgriLINK NZ and work as an Agricultural Engineering Consultant based in Auckland. I have a Bachelor of Horticulture (Tech) with first class honours from Massey University.
- 2 I have spent over 16 years as a consultant in the agricultural industry, specialising in resource use optimisation. This includes energy efficiency, resource use benchmarking and most recently carbon footprinting everything from onions to ships. One of our most critical resources is the soil where I have helped develop vegetable industry soil and erosion management guidelines, and individual property erosion management plans.
- 3 Of particular relevance to the matter before the Hearings Panel is my involvement in the Franklin Sustainability Project where I was Project Manager and provided technical advice on managing soil erosion on cultivated land. This was a multi-stakeholder project that ran between 1996 and 2004, which while having a broad goal of improving the overall sustainability of outdoor vegetable production in the Franklin region, had a clear focus on keeping soil on the paddock and mitigating any effects of off-site discharges. The project directly involved the growers, Vegfed (now HortNZ), MAF, Auckland Regional Council, Environment Waikato, and the Franklin District Council
- 4 I have been involved in the preparation of a number of individual grower erosion management plans that has involved mapping the properties and designing suitable erosion control measures including the sizing and placement of silt traps.
- 5 I have also worked on stormwater projects for the Franklin District Council where I designed the stormwater system for Pukekohe Hill and the Bombay Hills that ensured an integrated system between the council and grower drains that were sized to cope with a range of different storm intensities.
- 6 Most recently I have been engaged by Horticulture New Zealand to help develop a set of Best Management Guidelines for cultivated soil in the Horowhenua District. These guidelines are based on local grower experience, my experience in the Franklin District, and trials that are being conducted both with and alongside the Holding it Together (HIT) Project. The HIT Project is a Horticulture NZ led research project that focuses on preventing soil loss, soil degradation and adverse effects on surface water ways.

- 7 In my opinion, my work and experience is relevant in assisting the Hearings Panel to make a decision.

SCOPE OF EVIDENCE

- 8 My evidence to the Hearing relates to soil management on cultivated land. In addressing this matter I am referred to the relevant rules in the Proposed One Plan as Rule 13-1 where sediment is a contaminant listed as part of the Controlled Activity Rule. There is a linkage to Rule 12-3 in the Land Chapter where the Hearing Panel has made Provisional Determinations relating to cultivated land. The planning aspects will be addressed in the evidence of Horticulture NZ.

IN SUMMARY

- 9 My conclusion is that to minimise soil loss from cultivated land, an inclusive process involving growers, industry representatives, council and soil management practitioners is essential for the development and implementation of robust long term erosion minimisation measures.

My evidence is in three parts.

Part 1: Best management practice approach and the Franklin Sustainability Project experience

Part 2: A best management code of practice for minimising soil erosion

Part 3: Recommended approach to soil management and minimising erosion on cultivated soils in the Horowhenua District

PART 1: BEST MANAGEMENT PRACTICE APPROACH AND THE FRANKLIN SUSTAINABILITY PROJECT EXPERIENCE

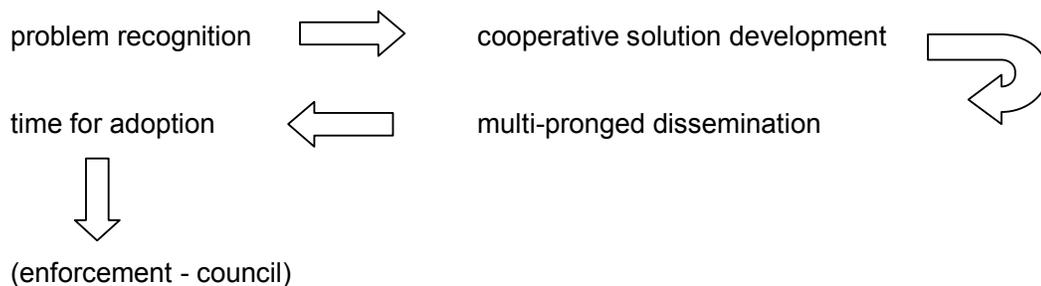
- 10 Through my 9 year involvement with the Franklin Sustainability Project (FSP) I gained a practical insight into field based trials, environmental education and information dissemination, development of best management guidelines, and implementing change on the land.

- 11 Environmental education does not result in significant widespread immediate changes. It is a cooperative, self empowering process that needs to be given an opportunity to work. FSP strived to develop solutions that were practical and could be championed by the growers themselves. However, human nature means that this approach does not induce change in everyone and that those people that do not change will need to be approached in a different manner.
- 12 Minimising soil erosion, while not the only issue that FSP was established to address, was the catalyst for the project and remained the key issue uniting the stakeholders. How this problem was addressed highlights the need for a multi-pronged approach.
- 13 Councils could strictly enforce the RMA that makes it illegal to discharge soil, which is classified as a contaminant. This approach would leave growers isolated as they are individually picked off and left to devise their own solutions; consequently there would be an enormous range of different solutions and results. The stage would then be set for confrontation which is ultimately extremely unproductive, costly and simply unpleasant for everyone involved.
- 14 The alternative adopted by FSP was to bring councils, growers and soil experts together to prepare a detailed guideline and then disseminate that information through a range of channels. With this cooperative multi-stakeholder approach there was general agreement on the solution. However the disadvantage is that this approach takes time and there is a ceiling on adoption, not everyone will respond to this approach. Without question Franklin still has a lot of soil erosion issues, as witnessed on the 3rd December 2009 when poorly protected paddocks were exposed by a short-duration high intensity storm. However this in no way negates the essential foundation work that is provided by a collaborative development of best management guidelines.
- 15 The speed of voluntary adoption has a lot to do with problem recognition. Soil loss can be an extremely difficult thing to see, unless it is the result of a major storm. This is highlighted by the often touted grower perception that soil loss really only occurs in large storms and then how can you be reasonably expected to do anything about it? In Franklin the reality is that soil loss occurs throughout the season but that unless it is captured it is lost to the downstream environment and never seen by the grower.
- 16 A study in 2000 highlighted this point where the role of wheel track ripping was investigated. In half of the paddock a silt fence captured any soil loss. Half of the silt trap protected area was wheel track ripped and the rest of the paddock was left

unripped. The results were staggering, ripping reduced erosion from 21 t/ha down to just 1 t/ha. The silt trap in the unripped plot was full to overflowing. But just as staggering was where the soil had not been captured but was obviously still being lost at the unripped 21 t/ha rate there was very little obvious signs of the loss, it had simply disappeared. Where is the problem?

- 17 In my opinion the best model for effective change is to get recognition of the problem, then cooperatively develop a solution, disseminate that information and allow sufficient time for the practices to be implemented before finally following up with enforcement where changes are not occurring. Enforcement without education is confrontational, the problem is not recognised and the solutions are disjointed and often inadequate. Likewise voluntary measures without enforcement, after an appropriate time, do not achieve widespread adoption and ultimately penalises the early adopters and creates an uneven playing field.

- 18 FSP tried to follow the path of:



PART 2: A BEST MANAGEMENT CODE OF PRACTICE FOR MINIMISING SOIL EROSION

- 19 A best management code of practice for minimising soil erosion on cultivated paddocks has four stages:
1. Paddock assessment – risk management.
 2. Identifying and then stopping or controlling water entering the paddock.
 3. Implementing in-paddock control measures to minimise soil movement within the paddock.
 4. Managing the water that flows off the paddock.

- 20 Paddock assessment initially involves walking the paddock, mapping and identifying significant features (drains, culverts, slope, etc) particularly overland flow paths, where water is coming from and going to, and the location and type of existing control measures. Knowing the site history is invaluable. This first paddock assessment becomes the basis on which the next stages are built as well as future updates.
- 21 Identifying and then stopping or controlling water entering the paddock is crucial. In Pukekohe on the 21st January 1999 a short-duration high intensity storm struck. The most severe damage was caused where uncontrolled run-off entered paddocks as a result of overflowing drains. In many places inadequately sized culverts also significantly contributed to the problem of drains overflowing. Keeping clean treated water off the paddock using interception drains wherever possible is crucial. However, in a number of paddocks that I have visited in Levin it is not possible to intercept the water due to the ground contour so in these cases grassed swales through the otherwise cultivated paddock are required.
- 22 Implementing in-paddock control measures to minimise soil movement will retain and even develop better soil structure. Although eroded soil caught in a silt trap can be redistributed back over the paddock, it is now in very poor condition.
- 23 Within paddock control measures include the use of cover crops, incorporation of compost, wheel track ripping, wheel track dyking, contour drains, short row lengths, cultivation practices like minimum tillage and minimising the number of cultivation passes, and minimising the fallow period.
- 24 Managing the water that flows off the paddock is about minimising the quantity of soil that enters the receiving environment and ensuring that water is discharged in a controlled co-ordinated manner. Water leaving the paddock is either kept clean by being diverted around the paddock or over a stabilised grassed spillway, or it is treated and then discharged. Treatment is all about achieving enough detention time that the soil can settle out. Managing water leaving the paddock can be achieved using raised headlands, bunds, raised accessways, silt fences, and silt traps. These measures need to be designed with regards to size, the type of decanting device, spillway size and stabilisation, and stabilised receiving areas.
- 25 Minimising erosion is about getting each of these four stages right. Within paddock measures without the planning and risk assessment could lead to unforeseen washouts, likewise within paddock measures without managing the paddock discharge

water still leaves the paddock vulnerable at certain times like around cultivation and harvest.

PART 3: RECOMMENDED APPROACH TO SOIL MANAGEMENT AND MINIMISING EROSION ON CULTIVATED SOILS IN THE HOROWHENUA DISTRICT

26 Commercial vegetable growing should be removed from Rule 13-1. Making cultivation a controlled activity subject to compliance with the FARM Strategy Workbook will not achieve the intended outcome of minimising soil erosion on these properties. The FARM Strategy Workbook is almost exclusively tailored to animal farming. Having reviewed the compliance checklist from a commercial vegetable growing perspective every section would be ticked not applicable except possibly the application of soil conditioners, which has been addressed in previous evidence, and the application of fertiliser. Control over the application of fertiliser is addressed as part of Chris Keenan's evidence on behalf of Horticulture NZ. Rule 13-1 seeks control over the management of sediment through compliance with the FARM Strategy Workbook yet this has no relevance to commercial vegetable growing. Sediment appears to only be considered in relation to exclusion of stock from water bodies. In my opinion the effects of cultivation, including the discharge of sediment, are dealt with much more effectively under Rule 12-3 and I propose that Rule 12-3 could be further amended to incorporate reference to Code of Practice for Soil Management that incorporate best management practices.

27 Rule 12-3 Cultivation - in the Provisional Determination seems to capture many of the managing paddock discharges that I have advocated in my evidence. Cultivation is a permitted activity within 5 metres of a water body where *"bunding, silt traps, interception drains, or other alternative methods to minimise sediment run-off to water bodies shall be installed prior to and maintained during cultivation"*. However as has been highlighted in my evidence this is only one aspect of erosion control. It is suggested that an additional clause be added to Rule 12.3 that states:

"Alternative methods for managing sediment run off can be found in the Code of Practice for Soil Management (Horticulture NZ, 2010) and implementing such methods will assist in meeting the Plan requirements."

- 28 Such an approach would see a range of practices being promoted and not limited to within 5 metres of the bed of a river, lake or wetland.
- 29 The industry quality assurance programme New Zealand GAP has recently included consideration of soil conservation as a matter in the programme, with an intent that when the Holding it Together research project is complete soil conservation strategies will be included in NZ GAP. In the future there is the potential for the COP to be referenced in the One Plan with compliance through a NZ Gap audit.
- 30 It is the development of the best management practice which is critical to achieving the desired outcome of Objective 5-2: *“Regulating potential causes of accelerated erosion. Land is used in a manner that ensures accelerated erosion and increased sedimentation in water bodies caused by ... cultivation are avoided as far as reasonably practicable, or otherwise remedied or mitigated”*. This approach is supported by Policy 5-5: *“Supporting codes of practice, standards, guidelines, environmental management plans and providing information on best management practices”*.
- 31 As established by FSP, and advocated by Policy 5-5, best management practices jointly engage land owners and council in problem recognition and solution development. It is this process of learning together for both growers and council that not only results in solution development but also how to assess the implementation and use of a matrix of control measures.
- 32 At the very beginning of the process is problem recognition. In my trips around the Horowhenua district I have witnessed erosion problems on cultivated land. However, how wide spread this is and the extent of erosion on the predominantly flat cultivated land is unclear. Growers have told me that erosion is not a significant issue in the district and even the Proposed One Plan states in Section 5.2 Issue 5-1: Accelerated erosion (e) Cultivation – *“Cultivation does not generally cause soil erosion problems within the Region”*. Enforcing control measures like bunding and often land consuming and expensive silt traps without problem recognition is a recipe for a long drawn out and ultimately futile battle between council and growers.
- 33 The vegetable industry has in 2009 initiated two programmes in the Horowhenua district to investigate and minimise soil erosion on cultivated paddocks. With industry funding, and more recently through the HIT project, we have established a number of field trials to assess the extent of erosion from several cultivated paddocks. These

trials used silt fences as a way of graphically showing the extent or otherwise of soil erosion. This work is on-going and will be expanded in the future.

- 34 The second programme has been the development of a best management practice guide for cultivated soils with a specific focus of minimising soil erosion in the Horowhenua district. A draft code has been developed using the four guiding principles described in my evidence (1. paddock assessment, 2. stopping or controlling water entering the paddock, 3. in-paddock control measures and 4. managing water that flows off the paddock). However to be effective this process takes time and we are currently right at the beginning, that being problem recognition, stakeholder engagement, and risk assessment.
- 35 Further engagement, collaborative development, information extension and incorporation of this best management practice guide into NZ GAP is the best long term solution for minimising soil erosion from cultivated land.

Appendix 1: References

- Allin, J., 2009. Provisional Determination of Land Hearing Panel Chapters 5 and 12 - Proposed One Plan
- Basher, L. R., and Thompson, T., 1999. Erosion at Pukekohe during the Storm of 21 January 1999. Prepared for Agriculture NZ and FSP. Prepared by Landcare Research, Lincoln.
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- Franklin Sustainability Project, 2004. Doing it Right Franklin Sustainability Project Guide to Sustainable Land Management.
- Roygard, J. K. F., 2009. Section 42a Report of Jonathon Kelvin Fletcher Roygard On Behalf of Horizons Regional Council.
- Supplementary Officers' Reports Chapter 13, 2009. 11 November 2009 – Track Changes As A Result of the Supplementary Officers' Reports For Water – Pink Version