IN THE MATTER **of the Resource Management Act 1991**

AND

IN THE MATTER **of the hearing of submissions on Proposed Plan Change 1 (and Variation 1) to the Waikato Regional Plan**

TOPIC 1

BY **FEDERATED FARMERS OF NEW ZEALAND INC, FEDERATED FARMERS OF NEW ZEALAND (WAIKATO REGION) 1999 INCORPORATED, FEDERATED FARMERS OF NEW ZEALAND – ROTORUA TAUPO PROVINCE INCORPORATED, FEDERATED FARMERS OF NEW ZEALAND (AUCKLAND PROVINCE) INCORPORATED**

("FEDERATED FARMERS")

Submitter with ID: 74191

To **WAIKATO REGIONAL COUNCIL**

("WRC")

STATEMENT OF PRIMARY EVIDENCE OF ANDREW PETER MCGIVEN FOR FEDERATED FARMERS ON HEARING TOPIC 2

3 May 2019

FEDERATED FARMERS OF NEW ZEALAND

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STATEMENT OF EVIDENCE OF ANDREW PETER MCGIVEN

Introduction

1. My full name is Andrew Peter McGiven. I grew up on our family farm and I am a fifth generation dairy farmer. My wife and I have owned a 180 ha dairy farm at Seddon Road, Te Aroha since 2000.

2. Attached as **Annexure AM1** is a map showing the property boundaries of our farm.

3. Our farm is not in the Waikato/Waipa Rivers catchment that is the subject of Plan Change 1 (**PC1**). It is instead in the Waihou River catchment that is currently scheduled to be part of Plan Change 2 (which I understand is going to be drafted following completion of PC1).

4. Part of my evidence relates to how the setback rules would affect our farm if we were in the PC1 catchment. While these rules do not yet apply to us (we expect that any rules for Plan Change 2 are likely to mirror PC1), I consider our farm to be very similar to farms within the PC1 catchment and therefore it provides a good indication of how farms in the catchment are likely to be affected.

5. I am the president of the Waikato province for Federated Farmers. I have been the president for two years. In my role as president, I have visited many farms and spoken to many farmers within the PC1 catchment. Based on this I consider that our farm is very similar to many of the dairy farms in the PC1 catchment and that I have a good understanding of the concerns of farmers in the catchment.

Setbacks

6. I understand that the section 42A report proposes that the setback rules for stock exclusion in Schedule C are amended so that:[1]

    a. Stock must be excluded from permanent and intermittent rivers, streams or artificial watercourses.

    b. For fences installed after 22 October 2016, a setback of 1m must be provided for land with a slope of less than 15 degrees, a setback of 3m must be provided for land with a slope of between 15 and 25 degrees and a setback of 10m must be provided from council controlled drains.

[1] Paragraph 2 in Schedule C, page 51 of the section 42A report track changes to PC1.

7. I am concerned that the stock exclusion and setback rules as notified are unduly onerous. Since PC1 and Variation 1 were notified, we have held numerous meetings with our members. The feedback from our membership has overwhelmingly been that the stock exclusion and setback rules are likely to be very onerous and impractical. This was confirmed by the Ag First report commissioned by Federated Farmers and dated 4 November 2016. A copy of that report is attached as **Annexure AM2**.

8. The Ag First report showed that the costs associated with stock exclusion could be very high, particularly if water reticulation and stock crossings were required as a result. For one farm, the cost of excluding stock from permanent waterways was estimated at around $783,000 (if the cost of erosion control are ignored).[2] The costs are not dissimilar to the findings of the Baker Ag report dated 8 June 2018 and commissioned by the Hill Country Group.[3]

9. I am concerned that the amendments proposed in the section 42A report will result in the stock exclusion and setback obligations becoming even more onerous and impractical. I am very concerned that the costs associated with the proposed stock exclusion and setback rules are likely to significantly outweigh any environmental benefit.

Setback from council drains

10. I am particularly concerned about the proposal that a 10m setback from council drains is required for fences constructed after 22 October 2016.[4] I am concerned about the cost in terms of loss of land and the practical difficulties in terms of how that 10m strip is to be maintained.

11. We have two council drains running through our property that are controlled by the Waikato Regional Council. The total area of council drains on our property is 3.3km. These are indicated by the blue lines in the map attached as Annexure AM1.

12. The council drains are currently fenced with setbacks of around 3-4m on average (although in some places the setback is only 1m). The following four photographs shows the council drains, the current setbacks and riparian planting:

[2] Farm 11, Ag First Report, page 21.
[3] The Baker Ag report is annexed to the Statement of Evidence of Richmond Beaumont Evan Beetham for the Hill Country Group dated 15 February 2019.
[4] As required in paragraph 2c of Schedule C, page 51 of section 42A report.

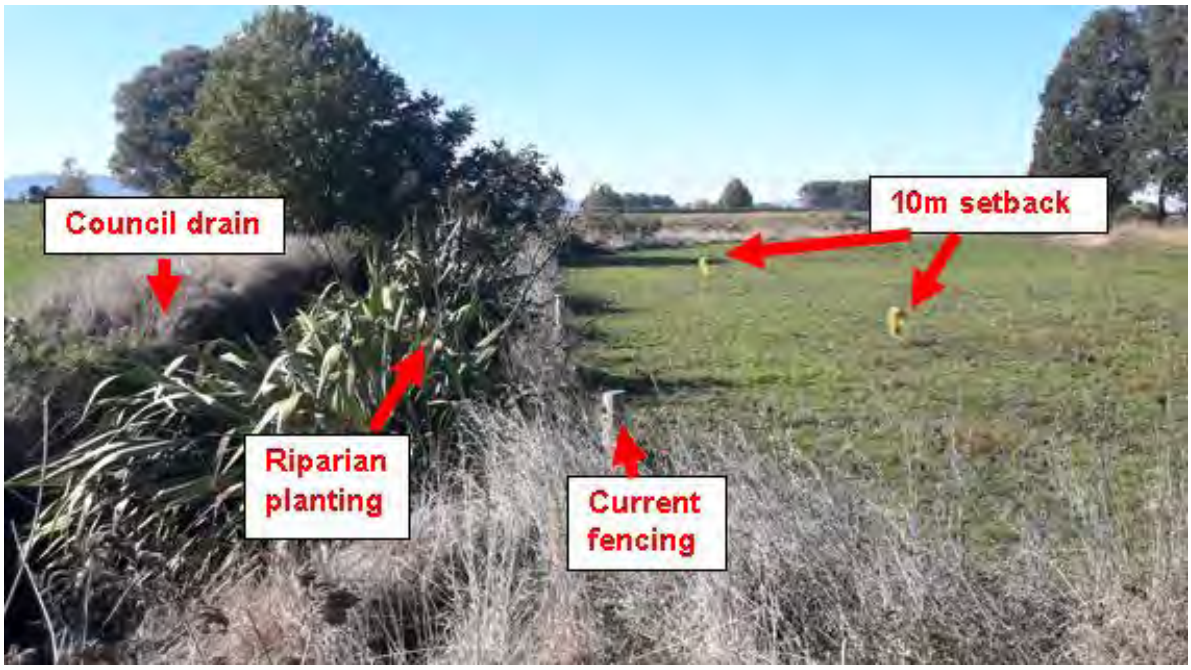


Photo 1: Illustration of council drain, riparian planting, current 3-4m setback and area that would be included in the setback if a 10m setback was required. The drain is able to be mechanically cleaned form outside the current fencing but could not be cleaned from outside fencing if a 10m setback was required.

Photo 2: Council drain with riparian planting and fencing on right illustrating the current setback.

Photo 3: Council drain with riparian planting and fence on left illustrating setback.

Photo 4: Illustration of setback distance changing with post at corner of junction of council drain (see post in bottom centre of photo).

13. We set the distance for our setbacks based on what made sense for the drains in terms of things like the topography around the drains, the shape of the drains, their location in our paddocks and our desire to establish riparian planting around them. It is important that a degree of flexibility is provided to farmers to establish the appropriate setback.

14. I consider that Schedule C should require a 1m setback and farmers should have discretion to provide a greater setback if that is their preference or if it is recommended by their farm environment planner to address a critical source area or other risk. I also consider that farmers need the flexibility to provide a setback of less than 1m if it is justified in the circumstances.

15. As illustrated in photos 1 to 4, we have planted the areas of land contained in the setbacks. One of the reasons for doing this is that it is an effective means of controlling the weeds and grass – if it was not planted, we would need to keep the grass down and I expect that weeds like thistles, brambles and gorse would grow there.

16. Contractors from council come to our property twice a year to spray the sides of the council drains. They also mechanically clean the drains as required, which can be as often as every 5-10 years (but sometimes it is longer). They last visited about five or six years ago to mechanically clean our drains. Every so often we have a person from Waikato Regional come out and walk the banks to assess whether they need to be cleaned. The current setback and riparian planting does not hinder them in their job and they are able to clean and maintain the drain.

17. I am very concerned that under the amendments proposed in the section 42A report, if our council drains were not already fenced (and presumably if we were to replace the fence with a new fence) a 10m setback would be required. I asked Federated Farmers' GIS analyst to quantify the area of land that would be lost if the setbacks from the two council drains on our farm were at different distances. She advised me as follows:

    a. A setback of 10m from each of our council drains would equate to 4.10ha of land on our property.

    b. Assuming that the average setback from our council drains is 3.5m, this means that we would lose an additional 2.65ha if we had to move the fences back to 10m from the council drains.

18. Our dairy land is valued at around $70,000/ha. Therefore, the loss of 2.65ha of land would equate to a capital loss of around $185,500. Our income per hectare is $7,800 per year (this is based on 1,300 milk solids per hectare at $6 per milk solid). Therefore, the loss of 2.65ha of land would equate to a loss of income of $20,670 each and every year. In addition to the significant financial costs, there are the practical issues with providing a 10m setback.

19. At present, the drains are cleaned from outside the fencing. However, if a 10m setback was required the drains would need to be cleaned from inside the fencing. This means that we could not riparian plant all of the area contained in the setbacks. We also could not graze the setbacks so the only option for keeping the grass down would be to mow it. I also expect that weeds such as gorse, thistles and brambles would grow there. We would need to spray and mechanically remove those. That would most likely create a hazard when contractors come to spray the sides of the drain and clean them because it would create holes and stumps that would be hard to see.

20. I do not see a reason to treat council drains any differently from any other drain. I consider they should be subject to the same 1m setback in Schedule C.

Stock exclusion and setback obligations

21. I support Federated Farmers' submission, which seeks stock exclusion and a 1m setback from the Sustainable Dairying Water Accord waterways[5] as the standards in Schedule C. The Accord requires stock exclusion from waterways and drains greater than 1m in width and deeper than 30cm in depth, and from significant wetlands. Waterways are also defined to mean permanent waterways and to expressly excludes ephemeral watercourses. I note that Farm Environment Plans could propose fencing of other waterbodies or larger setbacks if necessary.

22. I do not support the section 42A proposal to require stock exclusion and setbacks from streams and artificial watercourses that are permanently or intermittently flowing. My concern is that this will create uncertainty as to whether a water body needs to be fenced e.g. whether something is an intermittent waterbody will depend on the time of year and often the type of season we experience, including extreme weather events. I am also concerned that this will impose significant cost on farmers (both in terms of fencing, water reticulation and stock crossings and in terms of loss of productive land) for no apparent benefit (if there was a need to do this to address a critical source area, that could be required through the Farm Environment Plan).

23. The waterways, setbacks and stock exclusion requirements in the Sustainable Dairying Water Accord have worked for dairy farmers because they are practical and reasonable. They have also achieved significant environmental benefits.

[5] These are set out on page 6 of the Water Accord: https://www.dairynz.co.nz/media/3286407/sustainable-dairying-water-accord-2015.pdf

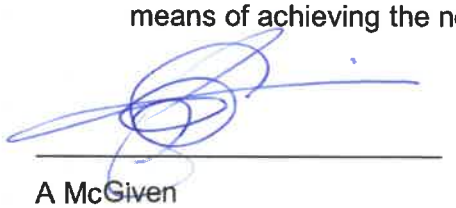
24. I also support Federated Farmers' proposal that the setback and stock exclusion requirements are determined on a stock unit as opposed to slope basis. While slope would not be an issue for my farm (as it is all flat), I can see that it would be a significant issue for many farmers with rolling or hilly land. I can foresee numerous practical difficulties for a farmer in determining the whether setbacks or stock exclusion are required.

25. As a result of the changes proposed by the section 42A report, the rules require, for example, a "1m setback from the outer edge of the bed for land with a slope of less than 15 degrees." The questions this raises for me as a farmer are: is this the slope of the drain or slope of the land adjoining the drain? What if the land immediately beside the drain is flat but then has a slope? What if the land beside the drain is a mixture of slope and flat? What if the slope changes along the waterway – do the setback and stock exclusion requirements change? How is slope measured? Would a farmer have to get a Council officer out to confirm in writing the slope, setback and stock exclusion requirements?

26. This will create significant uncertainty for farmers and this will only add to the cost of compliance with the rules as well as making them impractical.

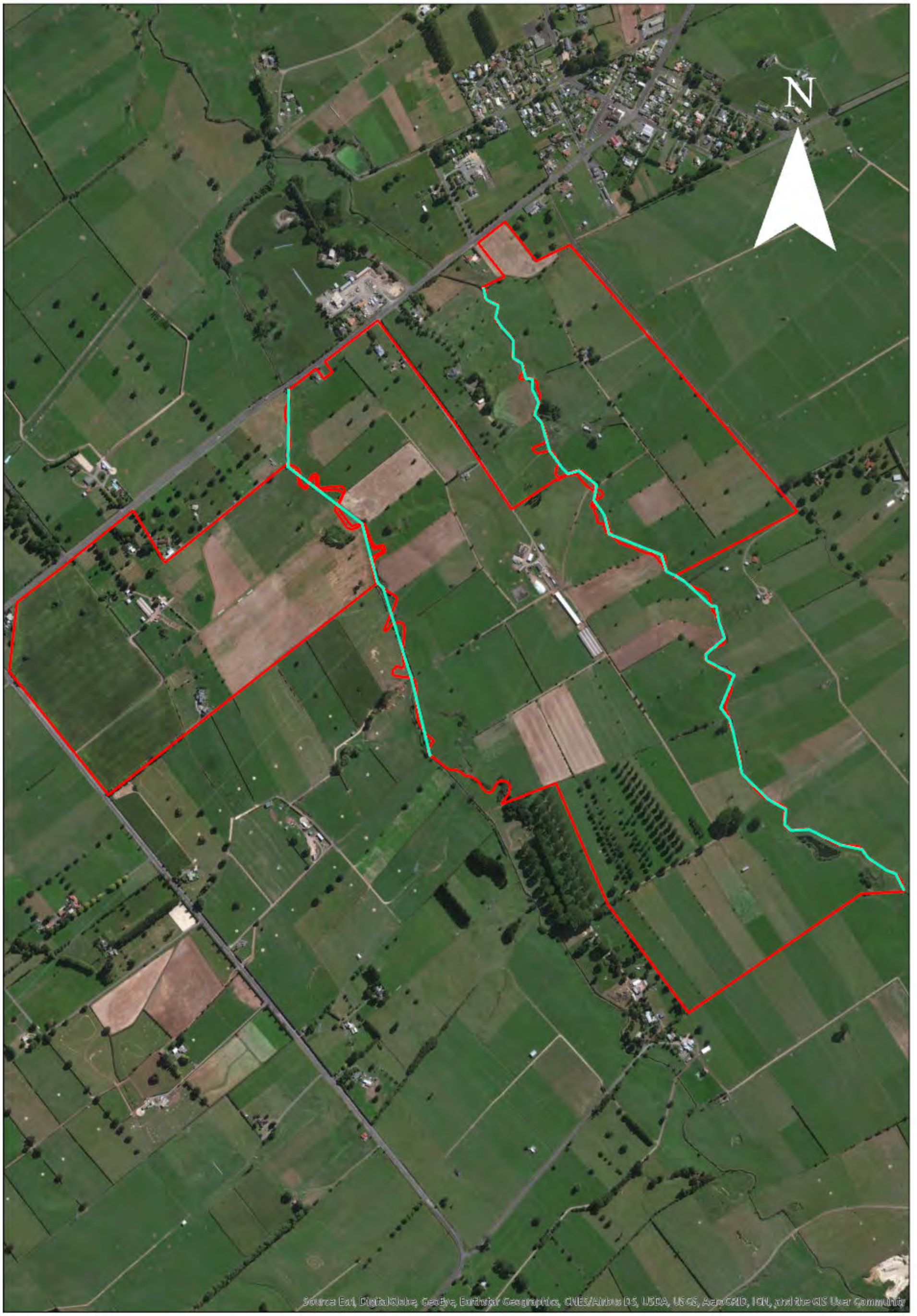
27. I also support Federated Farmers' proposal that resource consent can be sought for those farms that cannot meet the standards in Schedule C. I consider that flexibility needs to be provided to tailor the standards through the Farm Environment Plan if they make sense for the particular farm and its risks or critical source areas.

28. In conclusion, I was concerned about the potentially onerous obligations on farmers contained in Schedule C of the notified version of PC1. I am even more concerned about the changes proposed by the section 42A report. I support the changes proposed by Federated Farmers as a more reasonable, practical and affordable means of achieving the necessary environmental benefits.



A McGiven

Annexure AM1



Annexure AM2

Report to Waikato Federated Farmers

Farm Environment Plan Project

Phil Journeaux
AgFirst Waikato

4 November 2016

Disclaimer
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1.0 EXECUTIVE SUMMARY

The purpose of this project was to develop Farm Environment Plans (FEP) on several farms throughout the Waikato/Waipa River Catchments in order to:

(i) Undertake an analysis of actual costs of producing and developing a FEP including the Nitrogen Reference Point.

(ii) Assess the cost to the farmer of implementing the farm environment plan actions and any resource consent requirements and the impact on farm profitability.

(iii) Any issues arising with the process of developing the FEP.

(iv) Any wider issues that could be raised in the submission process.

Thirteen farms were visited by AgFirst - three dairy farms, two cropping farms, one lifestyle block, and seven drystock farms, with Fonterra visiting 11 dairy farms. This was done over the period 19 September through to 7 October 2016.

The process essentially involved:

- Development of the Nitrogen Reference Point for the farm
- Development of the FEP to the point where it was accepted by the farmer and consultant
- Review of the FEP by WRC to ensure it met their requirements

Once agreed with the farmer, the FEPs were provided to WRC for them to peruse and see if the FEPs met their requirements. WRC noted a number of omissions in the FEPs and that further refinement of the definitions in Schedule 1 of the proposed plan are required.

The results of the exercise were:

Time taken for the AgFirst Farms

Action	Average time (hours)	Range (hours)
Farm Visit/ Collate data	5.3	2.5 – 9.5
Nitrogen Reference Point	4.75	1.0 – 8.0
Complete FEP	14.7	4.5 – 26.25
Total	**24.75**	**8.0 – 43.75**

Note these times exclude the time taken for the lifestyle block (= 6.5 hours total)

Time taken for the Fonterra Farms

Action	Average time (hours)	Range (hours)
View farm	3.75	3.0 – 5.0
On-farm data collection/collation	3.0	2.0 – 4.0
Develop NRP	1.8	1.5 – 2.0
Complete FEP	5.2	4.5 – 6.0
Total	**13.8**	**11.0 – 17.0**

Costing for the FEP for the AgFirst Farms

Item	Average	Range
LandBase initial subscription	$480	
Farm map	$100 if have electronic map. $500 to develop one.	
Farm Visit	$795	$375 - $1,425
Nitrogen Reference Point	$712	$150 - $1,200
Complete FEP	$2,205	$675 - $3,937
Total*	$4,692	$2,180 - $7,542

*Assumes the farmer does **not** have an electronic map

On-farm costing of actions required: AgFirst Farms

	Total Costing
Farm 1	$12,200 + annual cost of $6,000
Farm 2	$62,800-$67,100
Farm 3	$18,100
Farm 4	$210,000
Farm 5	$113,500
Farm 6	$18,000
Farm 7	$425,432
Farm 8	$0 (change in grazing management only)
Farm 9	$41,000
Farm 10	$9,500
Farm 11	$306,549-$785,687**
Farm 12	$385,500
Farm 13	$1,000

**Range due to issues of interpretation of stock exclusion requirements of Schedule C and Schedule 1

On-farm costing of actions required: Fonterra Farms

	Total Costing
Farm 1	$7,500
Farm 2	$5,000
Farm 3	$88,000
Farm 4	$27,000
Farm 5	$12,000
Farm 6	$67,000
Farm 7	$24,000
Farm 8	$17,000
Farm 9	$56,000
Farm 10	$111,000
Farm 11	$41,000

Note some of the costings on the dairy farms relate to effluent management/storage, which is covered by existing regulations.

Issues identified pertaining to the proposed plan were:

(i) The main issue was around stock exclusion from waterways for drystock farms, and the practicality and cost of fencing, particularly on land >25^0 slope. Currently there is something of a contradiction between Schedule C which requires stock exclusion, and Schedule 1 which allows for alternative mitigations.

(ii) Associated with (i) was the current timeline for stock exclusion, which was felt to be impractical due to the difficulties associated with fencing a lot of hill country, along with the cost involved.

(iii) Identifying permanent versus intermittent/ephemeral waterways.

(iv) Issues around the cultivation of peat land, particularly the need for a 5 metre buffer strip.

(v) Incorporation of mitigation practices that are not in OVERSEER™, and hence difficult to measure.

(vi) Incorporation of cover crops within the Nitrogen Reference Point calculation.

(vii) How lease blocks are to be handled. Potentially they will require separate FEPs and some negotiation between landowners and lessees.

(viii) How to handle future possibilities within an FEP. It is not possible that every eventuality can be covered within an FEP.

(ix) The 5-year rolling average N leaching figure requires a calculation every year, which would then be available for any FEP audit.

(x) If slope is an important issue for the farm and FEP, data needs to be available to allow for accurate mapping.

(xi) Mediation. This is more of an operational issue, but could be a least-cost option if a farmer and consultant cannot agree on a mitigation strategy or some component of the FEP.

2.0 BACKGROUND

The Healthy Rivers Plan Change 1 has recently been notified by the Waikato Regional Council (WRC). A key component of the requirements on farmers will be to have a Farm Environment Plan (FEP) which outlines the issues relating to the discharge of the four contaminants (nitrogen, phosphorus, sediment, microbes) and how the farmer will manage these.

In addition, the FEP will outline actions to prevent stock access to waterways as per conditions of Plan Change 1, as well as indicating the Nitrogen Reference Point for the farm.

3.0 PURPOSE

The purpose of this project was to develop a range of FEPs in order to investigate:

(i) An analysis of actual costs of producing and developing a FEP including the Nitrogen Reference Point. [Excludes any administration/interaction costs with WRC]

(ii) Assess the cost to the farmer of implementing the farm environment plan actions and any resource consent requirements and the impact on farm profitability.

(iii) Any issues arising with the process of developing the FEP.

(iv) Any wider issues that could be raised in the submission process.

Note that while the intent was to have the FEPs as real as possible, they are not binding on the farmers.

4.0 AGFIRST FARMS

4.1 Methodology

Thirteen properties were selected across the Waikato and Waipa River Catchments, via a request from Waikato Federated Farmers for members to volunteer to take part. The farms were:

Table 1: Selected farms

	Description	FMU	Priority catchment
Farm 1	240 ha Dairy	Upper	3
Farm 2	165 ha Dairy	Central	2
Farm 3	197 + 120 ha Dairy farms + 57 ha support block	Upper	1
Farm 4	454 ha Drystock	Waipa	3
Farm 5	443 ha Drystock + arable cropping	Lower	2
Farm 6	107 + 65 ha + 34 ha Arable cropping	Lower	3
Farm 7	1,000 ha Drystock, including intensive finishing	Waipa	2
Farm 8	50 ha Beef + cropping	Waipa	2
Farm 9	124 ha Intensive Drystock	Central	3
Farm 10	202 ha Drystock including grazing dairy heifers (all year)	Upper	3
Farm 11	240 ha Drystock	Lower	1
Farm 12	330 ha Drystock + dairy grazing (all year) + deer	Waipa	2
Farm 13	18 ha Lifestyle block: beef + horses	Central	3

The general process for developing the FEPs was:

(i) Information sheet sent out to the farmer in advance of the meeting

(ii) Consultant views farm/discusses issues with farmer

(iii) Organises an electronic farm map

(iv) Calculates the Nitrogen Reference Point using OVERSEER™

(v) Develops the FEP using AgFirst's "LandBase" software programme

(vi) Discusses the draft FEP with the farmer

(vii) Finalises the FEP

Once the FEPS were completed, they were viewed by WRC staff to gain their view as to how well, or not, the FEPs were sufficient to meet the requirements of the Healthy Rivers Plan Change 1. In a number of instances, the farmer identification detail was removed at the request of the farmer.

4.2 Results

4.2.1 Nitrogen Reference Points

For each farm, the nitrogen leaching level for 2014/15 and 2015/16 was determined using OVERSEER™, with the farmer then choosing which figure to use as the NRP; invariably the higher figure if there was a difference.

These were relatively straightforward to calculate, provided the farmer had good information readily available. Issues arose for a few farms that had little historic (i.e. 2014/15, 2015/16) information available, in which case such information as available was used, with the consultant following the Data Input Standards to determine which defaults within OVERSEER™ were used.

Issues:

(i) Farm 6 had three very geographically distinct blocks, which resulted in three NRPs calculated, one for each block. Given the geographic separation, this farm had three separate FEPs developed – there was no advantage seen in incorporating it all into one FEP.

(ii) Farm 3 had two dairy farms and a support block that while geographically separate, were in relatively close proximity. This enterprise was covered by one FEP, although an NRP was calculated for each separate block.

(iii) Some farms had nutrient budgets calculated on the effective area of the farm. The NRPs calculated were based on the total area of the farm.

Time taken to determine the NRPs varied from 1 (review of existing files) to 8.5 hours, depending on the complexity of the farm system, and the availability of data to enter into OVERSEER™.

Average time across all the farms was 4.75 hours.

4.3 Farm Environment Plans

The first step in developing the FEP was to obtain a farm map in order to record a range of information on it, (e.g. boundaries, internal subdivision, waterways (and fencing thereof), critical source areas, and other pertinent information). The AgFirst LandBase system requires an electronic map, which most of the farmers did not have.

While this was easily remedied, it did add some time and cost to the process. While a hardcopy could suffice, an electronic map is easier to manipulate with regard to drawing in fence lines, waterways, calculating areas, etc.

Given the importance of slope for a number of the FEPs, an attempt was made to map the slope areas within a farm, broken down by $<15^0$, $16\text{-}25^0$, and $>25^0$. The only data available for this was the digital elevation model (DEM) information, which has an 8-metre contour band. It was found that this was too coarse to be very useful, so was abandoned. Good Lidar information is required if slope mapping is to be done with any accuracy.

Prior to the consultant visiting the farm, an information sheet was sent to the farmer detailing the information required to complete the OVERSEER™ analysis, and to input into the LandBase programme.

The time spent on the farm visit varied from 2.5 hours through to 9.5 hours, depending (mainly) on the size of the farm, contour, complexity of the farming system, and the degree to which environmental mitigation work had been carried out previously. Average time was 5.3 hours.

Time taken to complete the FEPs, including liaising back with the farmer and discussing through the options again varied considerably, depending on the issues identified. Excluding the time taken for the NRP and farm visit, but including the mapping component, time taken varied from 4.5 hours through to 26.25 hours, with an average of 14.7 hours. There was a definite time advantage in having an electronic system to develop the FEP.

Table 2: Summary of time taken to develop the FEPs

Action	Average time (hours)	Range (hours)
Nitrogen Reference Point	4.75	1.0 – 8.0
Farm Visit	5.3	2.5 – 9.5
Complete FEP	14.7	4.5 – 26.25
Total	**24.75**	**8.0 – 43.75**

Note these times exclude the time taken for the lifestyle block (= 6.5 hours total)

Average total time to complete the dairy FEPs; 20.5hours
Average total time to complete the arable FEPs; 23.5 hours
Average total time to complete the S&B FEPs; 26.5 hours

4.4 Cost of the FEPs

Assuming a consultancy time cost of $150/hour, the overall cost of the FEPs were:

Table 3: FEP Costs

Item	**Average**	**Range**
LandBase initial subscription	$480	
Farm map	$100 if have electronic map. $500 to develop one.	
Nitrogen Reference Point	$712	$150 - $1,200
Farm Visit	$795	$375 - $1,425
Complete FEP	$2,205	$675 - $3,937
Total*	**$4,692**	**$2,180 - $7,542**

*Assumes the farmer does **not** have an electronic map. Also excludes any costing of the lifestyle block.

4.4.1 Costs of completing the actions within the FEPs

Within each FEP, the various actions that the farmer would need to undertake were costed out. Within the time constraint of the project it was not possible to get quotes for these actions, so the costings noted below are based on the consultants and farmer estimates.

Also note that in two of the FEPs the farmer had not agreed with 1 or 2 of the recommendations from the consultant. In the normal course of events these would be discussed through and a solution found. Again given the time constraints on the project, the costings shown include the current consultants' recommendation.

Table 4: Total Costings required to meet FEP Recommendations

	Total Costing
Farm 1	$12,200 + annual cost of $6,000
Farm 2	$130,800 - $135,100
Farm 3	$18,000
Farm 4	$210,000
Farm 5	$113,500
Farm 6	$18,000
Farm 7	$425,432
Farm 8	$0 (change in grazing management only)
Farm 9	$41,000
Farm 10	$9,500
Farm 11	$306,549-$785,687**
Farm 12	$385,500
Farm 13	$1,000

**Range due to issues of interpretation of stock exclusion requirements of Schedule C and Schedule 1

A more detailed breakdown of the individual farm expenditure required is shown in Appendix 1.

5.0 FONTERRA FARMS

5.1 Methodology

Eleven farms were selected, again across the four FMUs. These are outlined below:

Table 5: Selected Dairy Farms

	Description	FMU	Priority Catchment
Dairy farm 1	251 ha: 620 cows calved	Upper	3
Dairy farm 2	195 ha: 430 cows calved	Upper	3
Dairy farm 3	340 ha: 840 cows calved	Upper	2
Dairy farm 4	84 ha: 175 cows calved	Upper	2
Dairy farm 5	115 ha: 300 cows calved	Waipa	2
Dairy farm 6	87 ha: 196 cows calved	Central	3
Dairy farm 7	240 ha: 710 cows calved	Waipa	2
Dairy farm 8	192 ha: 569 cows calved	Lower	1
Dairy farm 9	75 ha: 230 cows calved	Waipa	2
Dairy farm 10	196 ha: 640 cows calved	Lower	1
Dairy farm 11	255 ha: 500 cows calved	Lower	1

The methodology used was very similar:

(i) Sustainability officer views farm/discusses issues with farmer

(ii) Calculates the Nitrogen Reference Point using OVERSEER™

(iii) Develops the FEP

(iv) Discusses the draft FEP with the farmer

(v) Finalises the FEP

Fonterra does have some advantage in that it already has the OVERSEER™ files for all their shareholder farms, plus farm maps, so the process is generally much quicker.

Again once the FEPS were completed, they were viewed by WRC staff to gain their view as to how well, or not, the FEPs were sufficient to meet the requirements of the Healthy Rivers Plan Change 1. All farmer identification detail was removed from the FEPs before being viewed by WRC.

5.2 Time involvement

Average time taken, and the range involved is shown below.

Table 6: Summary of time taken to develop the FEPs for dairy farms

Action	Average time (hours)	Range (hours)
View farm	3.75	3.0 – 5.0
On-farm data collection/collation	3.0	2.0 – 4.0
Develop NRP	1.8	1.5 – 2.0
Produce FEP	5.2	4.5 – 6.0
Total	**13.8**	**11.0 – 17.0**

5.3 Costs of completing the actions within the FEPs

Again within the FEPs there was a range of actions required by the farmers, the cost of which have been estimated by Fonterra staff as indicated below.

Table 7: Total Costings required to meet FEP Recommendations on Dairy Case Study Farms

	Total Costing
Dairy farm 1	$7,500 plus some minor management changes, data recording and maintaining existing improvement actions
Dairy farm 2	$5,000 plus some minor management changes, data recording and maintaining existing improvement actions
Dairy farm 3*#	$88,000 plus some minor management changes, data recording and maintaining existing improvement actions
Dairy farm 4	$27,000 plus some minor management changes, data recording and maintaining existing improvement actions
Dairy farm 5	$12,000 – $62,000 dependent on pond sealing test, plus some minor management changes, data recording and maintaining existing improvement actions
Dairy farm 6*	$67,000, plus some minor management changes, data recording and maintaining existing improvement actions
Dairy farm 7	$24,000, plus some minor management changes, data recording and maintaining existing improvement actions
Dairy farm 8	$17,000, plus some minor management changes, data recording and maintaining existing improvement actions
Dairy farm 9	$56,000, plus some minor management changes, data recording and maintaining existing improvement actions
Dairy farm 10*	$111,000 plus some minor management changes, data recording and maintaining existing improvement actions
Dairy farm 11	$41,000 plus some minor management changes, data recording and maintaining existing improvement actions

*Most of this cost is to meet effluent storage conditions, which is a requirement of existing regulation.

#This farm is also thought to be above the 75th N leaching percentile. Cost of remedying this was not calculated.

The “maintaining existing improvement actions” refers to where a well-managed risk area has been identified and there is an “action” to maintain it; i.e. if it wasn’t maintained it would be in non-compliance with the FEP.

6.0 WAIKATO REGIONAL COUNCIL COMMENT

WRC appreciates the initiative of Waikato Federated Farmers in setting up this project as it provides a perfect opportunity to check the implications of the policies in Plan Change 1 when they are put into practice on the ground. The findings of this project can be used to support submissions to refine and improve the policies, and to help in the development of the Implementation Plan.

To support the project WRC drafted a set of standards for each consideration or provision in schedule 1 of the proposed regional plan change 1 (PC1) that are linked to Good Management Practice, and methodologies to ensure that the risks of contaminant discharge are assessed equitably between farms throughout the Waikato and Waipa catchments. The consultants then used those as a guide for their work with the farmers who took part in the project. No specific feedback on those standards is provided in this report and they remain a work-in-progress.

It is important that this work is able to distinguish between the cost of complying with the requirements of Healthy Rivers and other matters, and equally important that it should identify any issues with the wording of PC1 that could lead to uncertainty or confusion.

In some instances on the dairy farms the costs of complying with existing regulation (effluent management) are included but not itemised so it is not clear how much of an impact his has on the overall cost assessment. These are matters that all dairy farmers should have addressed several years ago and are not a cost of PC1.

The project also identified an issue in the wording of Schedule C (stock exclusion) and Schedule 1 (Requirements for Farm Environment Plans) which could be interpreted in two different ways. That resulted in one dry stock farm identifying $479,138 in fencing associated with steep gully fencing to allow sheep grazing while excluding cattle. Schedule One provides for alternative mitigations to be used in these circumstances, but Schedule C does not. Those mitigations would normally involve providing stock water, shade and shelter away from the water body, and in this instance the costs already include a water supply, so depending on the interpretation the costs to this farm could range between $306,549 and $785,687.

It is acknowledged that there is no analysis in the report of the farm systems benefits of such things as soil testing, improved nutrient efficiency, improved stock health and performance as a result of being excluded from contaminated drinking water, or subdivision opportunity arising from the fencing of streams. These matters were not included in the terms of reference of the study, but would in some measure balance the financial impact in some cases.

The project identified a number of matters that provide guidance on both the standards and the process of consistently carrying out Farm Environment Planning as required by Schedule 1. Those matters will be used to further refine the minimum standards where applicable, and to provide training and advice for Farm Environment Planners. Those matters include:

- There needs to be a clearer linkage between the required actions in a farm plan and the farm map so there are no misunderstandings what actions need to be completed and where those actions are required.

- Actions to be completed (as in physical works such as erosion control) require timelines in all cases to ensure a clear understanding to aid the farmer in planning works, and for compliance purposes. This is especially important for fencing for stock exclusion given the compliance dates for the different sub-catchment priority rankings as described in Schedule C of the purposed regional plan.
- Many plans do not have any reference to the sub-catchment they are located in, that is required to ascertain key dates for completion of farm plans and waterway fencing. It should also be used to identify the priority of the risks and therefor the cations to be taken.
- In some cases it is not clear that all of the Schedule 1 provisions have been considered – even if there are no actions required.
- There is inconsistency between identification of wetlands vs springs, and their required actions or mitigations and fencing requirements
- Many farm plans do not give appropriate consideration to animal management and grazing management to protect pasture cover, nor the assessment of appropriate land use and grazing management for specific areas of the farm to maintain or improve the physical and biological condition of the soils and minimise the discharge of contaminants.
- It's not clear that the consultants have considered the farm systems implications of intermittent cropping which may be in different areas over the life of the FEP, either for fodder or for pasture renewal and built this in to the FEP.
- None of the FEPs included actions, timeframes or other measures to ensure that they would remain under the NRP 5 year rolling average.
- It was surprising that none of the plans referred to the management of Olsen P within optimum levels as a cost saving mitigation.

Arising from these points it is clear that further refinement of the interpretations of Schedule 1 will be needed. For example, what are the minimum alternative mitigations expected when it is impractical to fence streams on slopes over 25^{o}?

It is expected that further case studies, including those in the Beef + Lamb NZ LEP project will help to inform this over the next several months. It is also apparent that there are some matters that don't lend themselves to the setting of clear minimum standards, so the skill and judgement of the Farm Environment Planner will remain critical to the quality of the FEPs. Therefore it will be important to provide for ongoing moderation processes to ensure consistency of interpretation of real world situations.

These matters are currently being considered in the Implementation Plan process and we look forward to further work with stakeholders in helping to refine these kinds of details.

Finally the approach of Healthy Rivers in choosing tailored Farm Environment Plans as a key policy tool for getting good practice onto farms recognises the complexity and challenge of defining what is meant by Good Practice in a wide range of farm settings. This relies heavily on the ability of farmers and their consultants to develop practical solutions to problems and make them work.

Our thanks go to those farmers who chose to front-foot the implementation of Healthy Rivers by getting involved in this project and contributing to the further improvement of these policies and their implementation.

7.0 COMMENT

There are several factors to consider as a result of the project.

(i) As noted, the purpose of this project was primarily around developing an FEP, and within that calculating a NRP. It did not involve calculating the cost of reducing N leaching to the 75th percentile. AgFirst Farm 6 had one block which is very probably over the 75th percentile level (given that the actual level is currently unknown). This was a cropping farm, where the block in question had recently come out of pasture. 10-year modelling with OVERSEER™ showed that over this period the N leaching level will drop significantly and hence was not considered an issue.

(ii) Many of the farms have already carried out a range of environmental mitigation strategies, which were not necessarily commented on in the FEP; the FEPs basically concentrated on issues requiring actions into the future.

(iii) Similarly, most of the farmers were not looking at altering their farm system or grazing management, and nor was it felt necessary at this stage.

(iv) In the same vein, the arable farms were operating at Best Practice, and again any mitigations required tended to be minor.

(v) As noted the costs were largely based on estimates, and in a few instances questions could be raised as to whether the mitigations planned include some degree of farmer preference which is above strictly required, or there could be lower-cost alternatives.

(vi) As discussed in the section on NRPs, Farm 3 had several different farms which were geographically separate, but in reasonable proximity. This involved calculating 3 NRPs, but incorporating the whole enterprise in one FEP. Farm 6 also had 3 separate farms, which resulted in 3 separate NRPs and FEPs. Either approach is permissible, depending on the farmers' preference. Time involvement for both approaches was identical.

8.0 ISSUES

The following are a range of issues that arose while developing the FEPs

(i) The main issue was around stock exclusion from waterways for drystock farms, and the practicality and cost of fencing, particularly on land >25^0 slope. This was especially so for grazing beef or deer, and the limited opportunities around alternative grazing such as sheep. It is currently unclear if other alternative mitigations, e.g. silt traps and/or wetlands on lower ground would be acceptable. As noted in the WRC comment, provision of reticulated water (the cost of which was included in several drystock FEPs) along with provision of shade and shelter could well be an alternative to fencing in steep country.

This highlights an issue in regards to meeting the requirements of Schedule C Stock exclusion and Schedule 1 Requirement for a Farm Environment Plan. Schedule C requires exclusion by specified dates with no provision for alternative mitigations whereas Schedule 1 does allow the provision of alternative mitigations where the slope is greater than 25 degrees and stream fencing is impracticable. This is directly reflected in the situation Farm 11 faces; under Schedule C the costs for Farm 11 would be at the higher end shown ($785,687), whereas under Schedule 1 alternatives could be considered.

(ii) As part of (i) was also the proposed time limits on stock exclusion, which under the proposed plan are currently:

- Priority 1 catchments – July 2023
- Priority 2 catchments – July 2026
- Priority 3 catchments – July 2026

A number of the case study farmers did not want time limits included in the FEP around fencing, as they felt these were impractical due to both practicality - there would not be enough time to do the fencing required, as well as meeting the financial cost. Several did not want limits included due to a combination of factors, including practicality and cost; uncertainty around alternatives, information available, and wanting clarification on rules.

(iii) Identifying permanent versus intermittent/ephemeral waterways. The weather over the period of time when carrying out the FEPs was particularly wet, and hence ephemeral waterways were not readily apparent. This potentially could lead to a greater degree of fencing than required.

(iv) The need for a 5-metre buffer strip when cultivating peat, as this will have a significant opportunity cost. The peat cropping farm visited had minimal soil run-off from cultivated areas, even after periods of heavy rain. Direct drilling, which is not classified as “cultivation” is problematic on peat soils. The farmer raised the idea of strip tillage, where only a 150mm strip is cultivated in front of each seed coulter as a possible mitigation, but at this stage strip tillage is included as “cultivation”.

(v) Incorporation of mitigation practices that are not in OVERSEER™ - how are these to be handled/how will the benefits be shown?

(vi) OVERSEER™ does not readily incorporate cover-crops in its calculation; it assumes that a fallow period (with attendant run-off/leaching) always follows a crop. For one cropping farm (maize), a cover crop is sown via helicopter prior to harvesting, so no fallow occurs; the trash remains in place and the cover crop grows through it.

(vii) Several of the farms incorporated lease blocks, which for the purposes of the exercise were treated as part of the whole farm. It could be assumed that the responsibility of meeting any regulations lies with the land owner, who presumably would then include any related conditions in the lease agreement. It is probable therefore that a lease block may require its own separate NRP/FEP, which is then incorporated into the wider FEP for the lessee. Conditions of incorporation could vary depending on a range of issues, including the length of the lease, and therefore some guidelines around handling lease arrangements would be useful.

(viii) How to handle future possibilities within an FEP. It is not possible that every eventuality can be covered within an FEP, which needs to be recognised. [For example: when visiting the farm there is no evidence or history of sacrifice paddocks, so consequently is not included in the FEP. A few years later, the farmer uses a sacrifice paddock, for whatever reason]. This issue would also cover annual farm management, and the need to stay within a 5-year rolling average NRP. Many farmers alter farm management in minor ways due to circumstances at the time; it is very difficult to foresee these and incorporate them within the FEP. Which raises the issue of how readily the FEP needs updating relative to changes in management.

(ix) The 5-year rolling average N leaching figure requires a calculation every year, which would then be available for any FEP audit.

(x) If slope is an important issue for the farm and FEP, data needs to be available to allow for accurate mapping.

(xi) Mediation. This is more of an operational issue, but could be an option if a farmer and consultant cannot agree on a mitigation strategy or some component of the FEP, given that (a) the farmer needs to agree with the FEP and similarly, (b) the consultant needs to sign off on the plan. In such instances the option of independent arbitration could be the easiest and least cost method of solving the issue.

9.0 APPENDIX 1. PROPOSED INDIVIDUAL FARM EXPENDITURE REQUIRED: AGFIRST FARMS

	Practice	Cost
Farm 1	Undersow 20 ha/yr to reduce erosion	$6,000/yr
	Re-fence Paddock 12	$400
	Fence duck pond Paddock 9/10	$300
	Fence Paddock 47 to create a wetland	$3,500
	Opus drop test	$1,500
	Lay culvert under Crossing 3	$3,000
	Extend solids storage pad	$3,500
	Total	**$12,200 + annual cost**
Farm 2	Soil test individual paddocks or five LMU blocks every two years	$700 – 5,000
	Fence remaining peat drains	$12,000
	Slope races alongside waterways and upgrade hill races with cut out drains	$30,000
	Fence off and riparian plant blocked Novaflo	$10,000
	Replace blocked culvert and re- fence another culvert	$10,100
	Total	**$62,800-$67,100**
Farm 3*	Installing sump at underpass to direct effluent to the main effluent system	$18,100
	Total	**$18,100**
Farm 4	Stock water reticulation covering 90% of farm	Est $140,000
	Fencing of waterways <25 degrees where a more intensive stocking rate is managed. 2-wire fencing to exclude cattle only. 10km	Est $70,000
	Total	**$210,000**

*Farm 3 also included a cost of $125,000 for installation of a new effluent storage system. This is a requirement of existing regulation.

	Practice	Cost
Farm 5	Planting wetland area by woolshed	under $500
	Resolve cattle yard runoff into drain	Research options with specialist - $3,000. Implement option $10,000
	5-metre buffer zone from drains on crops. Opportunity cost of income forgone	$76,000 lost profit in the downturn. Normal year $100,000 lost profit.
	Total	**$113,500**
Farm 6	Fencing of Stopbank	$18,000
Farm 7	Reticulated water system	$145,000
	Waterway crossings	$190,000
	Fencing waterways. Eight wire post/batten 3,656m	$80,432
	Erosion control and shade planting	$10,000
	Possible plantation forestry (100ha)	No cost estimated at this stage
	Total	**$425,432**
Farm 8	No costs	
Farm 9	Waterway fencing. 4,530m single hot wire	$22,650
	Culverts for waterway crossings (x4)	$13,493
	Ephemeral waterway/seep fencing when water present. Single hot wire.	$1,358
	Planting willow poles for erosion control	$2,000
	Water reticulation system (4 paddocks)	$1,500
	Total	**$41,000**
Farm 10	Completion of fencing programme, 1,500m 2 wire.	$9,500

	Practice	Cost
Farm 11	Waterway fencing, 1,745m 3 hot wires.	$31,549
	Waterway crossings (13)	$100,000
	Reticulated water system	$173,000
	Willow and poplar pole planting for erosion control	$2000
	Potential fencing if cattle need to be kept off steep gully sidings. 21.78km 8 wire post/batten. Most of this land involves broad ridges with steep gullies/sidings.	$479,138
	Total	**$785,687**
Farm 12	9,000 metres of deer fencing flat paddocks along waterways	$180,000
	Reticulate water of remaining 15% of farm	$12,000
	Contouring and subsurface drainage of flat paddocks	$70,000
	Install whisper wires on all deer fences	$10,000
	Metal sites in every paddock for PKE trailer	$10,000
	Crown hill race and install cut out drains	$25,000
	Fill in existing deer wallows connected to waterways and provide artificial wallows	$12,000
	Fence off and plant erosion or erosion prone areas	$35,000
	Riparian plant stream bank erosion	$1,500
	Total	**$355,500**
Farm 13	Fencing and planting of seep	$1,000

10.0 APPENDIX 2. SCHEDULE 1 PROTOCOLS

This describes standards and technical guidance to complete "trial runs" of Farm Environment Plans as prescribed in the Proposed Waikato Regional Plan Change 1 – Schedule 1
This guide describes, for each section of Schedule 1, the provision required, draft standards to be used as a guide for recommending mitigations and actions, and a suggested methodology which includes sources of information.
The appendices provide a reference to the available sources of information, and a reference to the applicable pages of the Visual Soil Assessment Field Guide

Proposed Waikato Regional Plan Schedule 1 requirements

1. Farm Environment Plans should contain as a minimum
    a. Full name, address, and contact details (including email addresses and telephone numbers) of the person responsible for the property or enterprise
    b. Trading name (if applicable, where the owner is a company or other entity)
    c. A list of land parcels which constitute the property or enterprise.
        i. The physical address and ownership of each parcel of land (if different from the person responsible for the property or enterprise) and any relevant farm identifiers such as dairy supply number, Agribase identification number, valuation reference; and
        ii. The legal description of each parcel of land

2. An assessment of the risk of diffuse discharge of sediment, nitrogen, phosphorus and microbial pathogens associated with the farming activities on the property, and the priority of those identified risks, having regard to sub-catchment targets in Table 11-1 and the priority of lakes within the sub-catchment. As a minimum, the risk assessment shall include (where relevant to the particular land use):

(a) A description of where and how stock shall be excluded from water bodies for stock exclusion including:

Provision	Standards / GMPs	Assessment Methodology
(i) the provision of fencing and livestock crossing structures to achieve compliance with Schedule c; and (assume that this provision is only for fences on landscapes up to 25°, as areas above 25° are described below in subsection (ii)) *A water body from which cattle, horses, deer and pigs must be excluded include:* • *Any river that continually contains surface water* • *Any drain that continually contains surface water* • *Any wetland, including a constructed wetland* • *Any lake* *Livestock crossing structure means a lawfully established structure installed to allow livestock to cross a water body*	Fences must be present to a standard to exclude Cattle Deer Pigs Horses (whatever stock classes present on farm) *Modified standard to meet Schedule C requirements*. New fences setback 1 metre on land up to 15° and setback 3 metres on land between 15° and 25° Existing fences can stay in their current position Crossings Stock must not be permitted to enter or pass across the bed of a water body except when using a livestock crossing structure	Measuring the angle of land: Using an inclinometer or smartphone with a suitable app, the angle is measured by standing next to the waterway and sighting the adjacent ridgeline (irrespective of any intervening paddock or property boundaries). Also refer to Waikato Regional Council Best Practice Guidelines for Waterway Crossings
(ii) for areas with a slope exceeding 25° and where stream fencing is impracticable, the provision of alternative mitigation measures.	May include: • Reticulation • Receiving wetland downstream • Land management practices to minimise loss of contaminants such as no grazing in winter, or sheep only for those paddocks • Temporary fencing	Demonstrate that alternative measures effectively minimise the chance of livestock entering the stream, or where this is not practicable demonstrate how any adverse effects of stock access into the waterway will be minimised

(b) A description of setbacks and riparian management, including:

Provision	Standards / GMPs	Assessment Methodology
(i) The management of water body margins including how damage to the bed and margins of water bodies, and the direct input of contaminants will be avoided, and how riparian margin settling and filtering will be provided for; and	That this provision is met in all but severe weather events. No obvious continuous contaminant loss or erosion of the steam banks	Assess site by looking for: • Stream bank erosion • Flattened grass after rain events • Loss of vegetation cover • Soil or other debris deposited from "upstream" Plot all problem areas on a farm plan map with photos? Describe how the direct input of contaminants will be avoided, and how riparian margin settling and filtering will be provided for
(ii) Where practicable the provision of minimum grazing setbacks from water bodies for stock exclusion of 1m for land with a slope of 15° and 3m for land with a slope between 15° and 25°; and	As per a(i) – previous page	
(iii) The provision of minimum cultivation setbacks of 5m. *Cultivation means preparing the land for growing of pasture or crops, and the planting tending and harvesting of that pasture or crop – but excludes:* • *Direct drilling of seed* • *No-tillage practices* • *Re-contouring land* • *Forestry*	No cultivation within 5 metres of a waterway.	Seen as straight forward – NO cultivation within 5 metres of a waterway, irrespective of the location of the riparian fence. Requirement written into the plan as a reminder Plot or shade all applicable no-cultivation areas on the farm plan

(c) A description of the critical source areas from which sediment, nitrogen, phosphorus and microbial pathogens are lost, including:

Provision	Standards / GMPs	Assessment Methodology
(i) the identification of intermittent waterways, overland flow paths and areas prone to flooding and ponding, and an assessment of opportunities to minimise losses from these areas through appropriate stocking policy, stock exclusion and/or measures to detain floodwaters and settle out or otherwise remove sediment, nitrogen, phosphorus and microbial pathogens (e.g. detention bunds, sediment traps, natural and constructed wetlands); and	All active and potential losses through erosion or overland flow are managed to prevent further erosion and minimise sediment loss	Assess for evidence of: • Erosion • Flattened grass after rain events • Loss of vegetation cover • Soil or other debris deposited from "upstream" Plot all problem areas on a farm plan map with photos Possible ranking system so that the most at risk sites are dealt with first. Present options – apply land management planning or land environment planning principles, and/or sediment control principles – refer appendices for further information.
(ii) the identification of actively eroding areas, erosion prone areas, and areas of bare soil and appropriate measures for erosion and sediment control and re-vegetation; and	All active and potential erosion sites are managed to prevent further erosion and minimise sediment loss	Assess for evidence of: • Erosion • Loss of vegetation cover (see Section d methodology) • Areas of slippage or mass movement • Deposition of eroded soil • Areas of slippage or mass movement Plot all problem areas on a farm plan map with photos? Possible ranking system so that the most at risk sites are dealt with first.

		Present options – apply land management planning or land environment planning principles, and/or sediment control principles – refer appendices for further information. Refer to the NZ Soil Conservation Technical Handbook
(iii) an assessment of the risk of diffuse discharge of sediment, nitrogen, phosphorus and microbial pathogens from tracks and races and livestock crossing structures to waterways, and the identification of appropriate measures to minimise these discharges (e.g. cut-off drains, and shaping); and	Avoid or minimise sediment or microbial loss to waterways No obvious discharges to waterways No potential issues of contaminant loss to waterways	Assess for evidence of: • Erosion • Loss of vegetation cover (pasture areas only) • Deposition of eroded soil • Soil or other debris deposited from "upstream" • Proximity of critical source area to waterway, and likelihood of losses during rain events Plot all problem areas on a farm plan map with photos? Possible ranking system so that the most at risk sites are dealt with first. Present options – apply land management planning or land environment planning principles, and/or sediment control principles – refer appendices for further information.
(iv) the identification of areas where effluent concentrates including yards, races, livestock crossing structures, underpasses, stock camps, and feed-out areas, and appropriate measures to minimise the risk of diffuse discharges of contaminants from these areas to groundwater or surface water; and	No actual or potential loss of effluent to waterways Introduce/assess structures or changes to the farm system to ensure minimal build-up of areas of effluent	Assess for evidence of any actual or potential loss of effluent to water: • Examine all areas where effluent is concentrated/captured • Assess proximity to water or overland flow paths or ephemeral waterways and risk of loss during rain events

	Compliance with existing WRC Permitted Activity Rules	Plot all problem areas on a farm plan map with photos? Possible ranking system so that the most at risk sites are dealt with first. Present options – apply land management planning or land environment planning principles, and/or sediment control principles – refer appendices for further information. Refer to industry good management practice guidelines
(v) the identification of other 'hotspots' such as fertiliser, silage, compost, or effluent storage facilities, wash-water facilities, offal or refuse disposal pits, and feeding or stock holding areas, and the appropriate measures to minimise the risk of diffuse discharges of contaminants from these areas to groundwater or surface water.	No diffuse or point loss of contaminants to water Compliance with existing WRC Permitted Activity Rules	Assess for evidence of any actual or potential loss of contaminants to water: • Examine all hot spots • Assess proximity to water or overland flow paths or ephemeral waterways and risk of loss during rain events Plot all problem areas on a farm plan map with photos? Possible ranking system so that the most at risk sites are dealt with first. Present options – apply land management planning or land environment planning principles, and/or sediment control principles – refer appendices for further information. Refer to industry good management practice guidelines

(d) An assessment of appropriate land use and grazing management for specific areas on the farm in order to maintain and improve the physical and biological condition of soils and minimise the diffuse discharge of sediment, nitrogen, phosphorus and microbial pathogens to water bodies, including:

Provision	Standards / GMPs	Assessment Methodology
(i) matching land use to land capability; and	• No erosion • No less than 70% pasture cover in open pasture areas (isolated areas should be treated as a critical source area) • Feed out areas in should be treated as critical source areas • No grazing on permanently wet areas • "Managed" grazing on intermittently wet areas • No grazing in areas of ponding • No widespread areas of pugging or compaction. Poor Condition as described in the Visual Soil Assessment, Volume One, second edition (2009) requires actions to avoid and remedy	Visual Soil Assessment for pasture cover, pugging and compaction: Visual Soil Assessment, Volume One, second edition (2009) • Page 30, Surface Relief • Page 47, Area of Bare Ground See appendices Apply farm systems management principles, or present options by applying land management planning or land environment planning principles – refer appendices for further information. Include in the plan a description of how the physical and biological condition of soils, and how the diffuse discharge of sediment, nitrogen, phosphorus and microbial pathogens to water bodies will be minimised. Refer to industry good management practice guidelines
(ii*)* identifying areas not suitable for grazing; and		
(iii) stocking policy to maintain soil condition and pasture cover; and		
(iv) the appropriate location and management of winter forage crops; and	See section (f)	

(v) Suitable management practices for strip grazing.	• No erosion • No less than 70% pasture cover in open pasture areas • Feed out areas should be treated as critical source areas • No strip grazing on permanently wet areas • "Managed" grazing on intermittently wet areas • No strip grazing in areas of ponding • No widespread areas of pugging or compaction. Poor Condition as described in the Visual Soil Assessment, Volume One, second edition (2009) requires actions to avoid and remedy	Visual Soil Assessment for pasture cover, pugging and compaction: Visual Soil Assessment, Volume One, second edition (2009) • Page 30, Surface Relief • Page 47, Area of Bare Ground See appendices Apply farm systems management principles, or present options by applying land management planning or land environment planning principles – refer appendices for further information. Refer to industry good management practice guidelines

(e) A description of nutrient management practices including a nutrient budget for the farm enterprise calculated using the model OVERSEER® in accordance with the OVERSEER® use protocols, or using any other model or method approved by the Chief Executive Officer of Waikato Regional Council.

Provision	Standards - Methodology
Overseer Budget completed for the 2014/2015 and 2015/2016 years to ascertain N Reference Overseer Budgets completed to demonstrate a reduction in nitrogen leaching to a level below the 75%ile (where appropriate) Overseer Budgets completed to demonstrate no increase in nitrogen leaching (over a five year rolling average)	See Schedule B of the Proposed Waikato Regional Plan Change 1

(f) A description of cultivation management, including:

Provision	Standards / GMPs	Assessment Methodology
(i) The identification of slopes over 15 ° and how cultivation on them will be avoided; unless contaminant discharges to water bodies from that cultivation can be avoided; and *Cultivation means preparing the land for growing of pasture or crops, and the planting tending and harvesting of that pasture or crop – but excludes:* • *Direct drilling of seed* • *No-tillage practices* • *Re-contouring land* • *Forestry*	Greater emphasis on sites close to a waterway – where overland flows could transport contaminant into the waterway. No actual or potential contaminant losses to waterways from cultivated areas.	Measuring the angle of land: Using an inclinometer or smartphone with a suitable app, the angle is measured by standing at the bottom of the cultivated area and sighting the top of the cultivated area (irrespective of any intervening paddock or property boundaries). Apply farm systems management principles, or present options by applying land management planning or land environment planning principles – refer appendices for further information. Refer to industry good management practice guidelines
(ii) How the adverse effects of cultivation on slopes of less than 15 ° will be mitigated through appropriate erosion and sediment controls for each paddock that will be cultivated including by: (a) assessing where overland flows enters and exits the paddock in rainfall events; and (b) identifying appropriate measures to divert overland flows from entering the cultivated paddock; and	Greater emphasis on sites close to or immediately "upstream" of a waterway – where overland flows could transport contaminant into the waterway. No actual or potential contaminant losses to waterways from cultivated areas.	Methodology as per the description in the provision (opposite) • assessing where overland flows enters and exits the paddock in rainfall events; and • identifying appropriate measures to divert overland flows from entering the cultivated paddock; and • identifying measures to trap sediment leaving the cultivated paddock in overland flows; and

(c) identifying measures to trap sediment leaving the cultivated paddock in overland flows; and (d) maintaining appropriate buffers between cultivated areas and water bodies (minimum 5m setback). (g) A description of collected animal effluent management including how the risks associated with the operation of effluent systems will be managed to minimise contaminant discharges to groundwater or surface water. (h) A description of freshwater irrigation management including how contaminant loss arising from the irrigation system to groundwater or surface water will be minimised.		• maintaining appropriate buffers between cultivated areas and water bodies (minimum 5m setback). • A description of collected animal effluent management including how the risks associated with the operation of effluent systems will be managed to minimise contaminant discharges to groundwater or surface water. • A description of freshwater irrigation management including how contaminant loss arising from the irrigation system to groundwater or surface water will be minimised. Apply farm systems management principles, or present options by applying land management planning or land environment planning principles – refer appendices for further information. Refer to industry good management practice guidelines

3. A spatial risk map(s) at a scale that clearly shows:

    (a) The boundaries of the property; and

    (b) The locations of the main land uses[1] that occur on the property; and

    (c) The locations of existing and future mitigation actions to manage contaminant diffuse discharges; and

    (d) Any relevant internal property boundaries that relate to risks and mitigation actions described in this plan; and

    (e) The location of continually flowing rivers, streams, and drains and permanent lakes, ponds and wetlands; and

    (f) The location of riparian vegetation and fences adjacent to water bodies; and

    (g) The location of critical source areas for contaminants, as identified in 2 (c) above.

Use Landbase® or similar FEP mapping software

Use industry available GIS systems

Plot all risk areas on this map and link to part (4) actions and mitigations (below)

4. A description of the actions that will be undertaken in response to the risks identified in the risk assessment in 2 above (having regard to their relative priority) as well as where the mandatory time-bound actions will be undertaken, and when and to what standard they will be completed.

Expand and complete this table – use reference numbering or similar to link the Risks and actions to the Farm Plan map

Assessment result – RISK	Mitigations - Actions	Timing – Date action is due	Budget
As per WRC resource consent templates As per industry scheme guidelines outlined in Schedule 2 of the Proposed Waikato Regional Plan Change 1			

5. A description of the following:

(a) Actions, timeframes and other measures to ensure that the diffuse discharge of nitrogen from the property or enterprise, as measured by the five-year rolling average annual nitrogen loss as determined by the use of the current version of OVERSEER®, does not increase beyond the property or enterprise's Nitrogen Reference Point, unless other suitable mitigations are specified; or

(b) Where the Nitrogen Reference Point exceeds the 75th percentile nitrogen leaching value, actions, timeframes and other measures to ensure the diffuse discharge of nitrogen is reduced so that it does not exceed the 75th percentile nitrogen leaching value by 1 July 2026, except in the case of Rule 3.11.5.5.

Provision
Overseer Budget completed for the 2014/2015 and 2015/2016 years to ascertain N Reference Overseer Budgets completed to demonstrate a reduction in nitrogen leaching to a level below the 75%ile (where appropriate) Overseer Budgets completed to demonstrate no increase in nitrogen leaching (over a five year rolling average) **Nutrient Budgets completed as per Schedule B of the Proposed Waikato Regional Plan Change 1.**

Assessment result – RISK	Mitigations - Actions	Timing – Date action is due	Budget
As Identified in nutrient budgets and assessment of the farm system			

APPENDICES

Further information

Waikato Regional Council – For Farmers page
http://www.waikatoregion.govt.nz/forfarmers/

Farm Dairy Effluent Design Code of Practice
http://www.dairynz.co.nz/media/2793698/fde-design-standards-and-cop-2015.pdf

Sustainable Milk Plans
http://www.dairynz.co.nz/environment/in-your-region/waikato-environmental-policy/upper-waikato-sustainable-milk-project/

Dairy NZ Guide to Managing Farm Dairy Effluent
http://www.dairynz.co.nz/media/2832537/farmers-guide-to-managing-fde.pdf

Dairy Effluent Storage Calculator
http://www.dairynz.co.nz/environment/effluent/effluent-storage/dairy-effluent-storage-calculator-desc/

Dairy NZ Farm Enviro Walk
http://www.dairynz.co.nz/media/721533/FEW-checklist.pdf

Dairy NZ Riparian Planner Tool
http://www.dairynz.co.nz/environment/waterways/riparian-planner/

Waikato Regional Council Farm MENUs
http://www.farmmenus.org.nz/

Sustainable Dairying Water Accord
http://www.dairynz.co.nz/media/3286407/sustainable-dairying-water-accord-2015.pdf

Supply Fonterra Programme
https://www.fonterra.com/nz/en/sustainability+platform/sustainable+dairying/new+zealand/new+zealand

Pocket guide to determine soil risk for farm dairy effluent application
http://www.dairynz.co.nz/media/757892/fde_soil_risk_pocket_guide.pdf

Industry Agreed Good Management Practices Relating to Water Quality
http://www.ecan.govt.nz/publications/General/Industry_Agreed_GMPs_A5_Version2_Sept2015_FINAL.pdf

Land and Environment Planning Guidelines
http://www.beeflambnz.com/lep

Waikato Regional Council Farmers Guide to Permitted Activities
http://www.waikatoregion.govt.nz/PageFiles/1247/3892_Guide%20to%20permitted%20Activites%20Booklet_2014-WEB.pdf

Land Management on Waikato Dairy Farms
http://www.dairynz.co.nz/environment/land-and-nutrient/land-management-guides/

NZ Deer Farmers Landcare Manual
http://deernz.org/sites/dinz/files/NZ%20Deer%20Farmers%20Landcare%20manual%202012%20for%20web_0.pdf

NZ Landcare Trust Landcare Guide
http://www.landcare.org.nz/Landcare-Guide

Fertiliser Association Code of Practice for Nutrient Management
http://www.fertiliser.org.nz/Site/code_of_practice/default.aspx

Fertiliser Association Code of Practice for Fertiliser Application
http://www.fertiliser.org.nz/Site/code_of_practice/best_management_practices_considerations/fertiliser_application/default.aspx

Irrigation NZ Farm Environment Plan
http://irrigationnz.co.nz/news-resources/irrigation-resources/farm-plans-asm/

Foundation for Arable Research Farm Environment Plans

https://www.far.org.nz/research/environment/farm_environment_plans

Overseer Nutrient Budgets
http://overseer.org.nz/

Farmax
http://www.farmax.co.nz/

NZ Pork Farm Environment Plan
http://www.nzpork.co.nz/nzporkservices/environmental-management
and http://www.nzpork.co.nz/images/custom/enviropork_manual.pdf

Horticulture NZ Erosion and Sediment Control Guidelines for Vegetable Production
http://www.hortnz.co.nz/assets/Uploads/Auckland-Waikato-ES-Control-Guidelines-1-1.pdf

Horticulture NZ Code of Practice for Nutrient Management
http://www.hortnz.co.nz/assets/Uploads/Code-of-Practice-for-Nutrient-Management-v-1-0-29-Aug-2014.pdf

NZ GAP
http://www.nzgap.org.nz/

Landcare Research S-Map
http://smap.landcareresearch.co.nz/home

NZ Soil Conservation Technical Handbook
https://www.mfe.govt.nz/sites/default/files/soil-conserv-handbook-jun01.pdf

Plant and Food Research, Trees for the Farm
http://www.poplarandwillow.org.nz/documents/Trees-for-the-Farm-Booklet.pdf

Waikato Regional Council Best Practice Guidelines for Waterway Crossings

http://www.waikatoregion.govt.nz/PageFiles/4998/TR0625R.pdf

Visual Soil Assessment
http://www.landcareresearch.co.nz/publications/books/visual-soil-assessment-field-guide/download-field-guide

Spreadmark Code of Practice
http://www.ecan.govt.nz/publications/Plans/hinds-spreadmark-cop.pdf

SURFACE RELIEF

- Observe the surface relief (smoothness) of the paddock at the end of the winter and compare it with the three photographs and criteria given in Plate 24.
  Although soils are most susceptible to treading damage (pugging) during wet winter months, observations of surface relief at any time of the year will give useful information on damage caused by past grazing and its likely effects on soil quality.

GOOD CONDITION VS = 2
Surface is relatively smooth and unbroken

MODERATE CONDITION VS = 1
Surface terrain is somewhat broken up and incised by occasional heavy treading events but it is not difficult to walk over

POOR CONDITION VS = 0
Surface is very broken and deeply incised by severe repeated treading. The terrain is difficult to walk across and care must be taken to avoid twisting ankles

PLATE 24. Visual scoring (VS) of surface relief under pasture

Surface relief shows the severity of pugging under stock treading, and can indicate structural damage below the surface. Wet soils can pug severely under intensive grazing by heavy weight animals when the load-bearing capacity of the soil is insufficient to support the weight of the animal. This damages the soil structure and reduces the pores in the soil, which are important for water, nutrient and air movement, and root penetration. Infiltration rates and the movement of water through the soil decreases, increasing runoff, soil erosion, and the risk of flash flooding. Very broken and deeply incised soil as a result of severe pugging can also damage the pasture root system and increase the area of bare ground. It can further induce surface ponding and anaerobic conditions, reducing pasture utilisation and impairing pasture growth as a result of poor shoot growth, fewer tillers and poor plant vigour (see p. 28). In addition, the decay and turnover of organic matter is impaired by the production of methane, alcohol, and aldehydes as described on p. 29.

AREA OF BARE GROUND

- Assess the area of bare ground in winter or early spring. Compare the surface of the ground with the three photographs and criteria given in Plate 44. If there is canopy closure due to good growth, part the pasture with your hands and score at ground level. An assessment of an area of bare ground after a long dry period will show how much pasture has died from lack of moisture.

GOOD CONDITION VS = 2
Pasture covers all or most of the surface area. Surface cover is ≥ 80 %

MODERATE CONDITION VS = 1
Pasture shows significant areas of bare ground and sporadic growth with the ingression of weeds and white clover caused by treading damage. Surface cover is > 40 % and < 60%.

POOR CONDITION VS = 0
Large areas of bare ground (≤ 20 % cover) occur because of treading damage and the reduction in density and vigour of the pasture. White clover and less desirable pasture species and weeds may have invaded degraded and bare areas

PLATE 44. Visual scoring (VS) of area of bare ground

In addition to stock camping, disease, insect pests and drought effects, bare ground is formed by the physical churning up of the soil from treading and pugging. This churning causes leaf and stem crushing, reduced tiller density, the uprooting or burial of plants, and root damage, all of which reduce tiller numbers and pasture density, vigour and growth. Weeds and less desirable pasture species can invade the resulting gaps, further reducing pasture production. Like surface relief, the area of bare ground can be a good indicator of below-ground damage.

Bare ground on fields with a slope can increase their susceptibility to water erosion. Good pasture cover on the other hand, and its below-ground root system, returns organic matter to the soil and promotes soil life including earthworm numbers and activity. The physical action of the roots and soil fauna, and the glues they produce promote the development of soil structure, soil aeration and drainage. As a result, infiltration rates and the movement of water through the soil increases, decreasing runoff, soil erosion, and the risk of flash flooding. Pasture cover on sloping ground also reduces soil erosion by intercepting high impact raindrops, and minimising rain-splash and saltation. Moreover, it acts as a sponge, retaining rainwater longer so that it infiltrates into the soil. The root system of good pasture cover further reduces soil erosion by stabilising the soil surface, holding the soil in place during heavy rainfall events. As a result, water quality downstream is improved, with lower sediment loading and lower nutrient and coliform content. The ground surface needs to have at least 70% cover to give good protection; ≤ 30% cover provides poor protection.

Good ground cover (with a high leaf-area index) intercepts and absorbs a large amount of carbon dioxide (CO_2) as it escapes from the soil. The greater photosynthetic uptake of CO_2 increases pasture production and decreases the amount of CO_2 emitted into the atmosphere, thus decreasing the level of greenhouse gas emissions.

11.0 APPENDIX 3. FARM ENVIRONMENT PLAN TEMPLATE

BUSINESS DETAILS

Farm name	
Address	
Legal description and farm identifier	
Owner/s	
Phone	
Mobile	
Email	
Manager	
Phone	
Mobile	
Email	
Who is responsible for implementation of this plan?	
Contact information (if different from above)	
Phone	
Mobile	
Email	
Resource consents held in relation to this business (list consent numbers)	

FARM BUSINESS DESCRIPTION

Describe the farm enterprise and the size of the operation (hectares)

Outline the goals and objectives for the business
• • • • • • • • •

Describe the existing farm management policy including:	
Stock types and classes:	
•	•
•	•
•	•
•	•
•	•
•	•
•	•

Numbers wintered:	
•	•
•	•
•	•
•	•
•	•
•	•
•	•

Feed supplement inputs:
•
•
•

Fertiliser inputs:
•
•
•
•
•

Winter management:

Annual and permanent crops grown:	
•	•
•	•
•	•

LAND MANAGEMENT UNITS

Land Management Unit	Description	Strengths	Weaknesses and risks	Uses and Management
1.	•	•	•	•
2.	•	•	•	•
3.	•	•	•	•
4.	•	•	•	•
5.	•	•	•	•
6.	•	•	•	•
7.	•	•	•	•
8.	•	•	•	•

NITROGEN REFERENCE POINT

Overseer calculates nitrogen leaching for the 2014/15 season as ….. kg N/ha/year.
Overseer calculates nitrogen leaching for the 2015/16 season as ….. kg N/ha/year.

FARM MAPS

ENVIRONMENTAL OBJECTIVES & PLANNED PRACTICES

Objective One – Nutrient Management To maximise nutrient use efficiency while minimising nutrient losses to water	
What practices help you achieve objective one?	How can you demonstrate this?

Issue/Risk	Significance (L, M, H)	Response	Timeframe	Who is responsible?

INSERT PHOTOS BELOW RISKS IDENTIFIED with caption underneath referring to the risk

Objective Two – Soil Management To maintain or improve the physical and biological condition of soils in order to minimise the movement of sediment, phosphorus and other contaminants to waterways.	
What practices help you achieve objective one?	How can you demonstrate this?

Issue/Risk	Significance (L, M, H)	Response	Timeframe	Who is responsible?

Objective Three – Wetlands and riparian Management To maintain or improve wetlands and water margins to maximise nutrient filtering and enhance biodiversity	
What practices help you achieve objective one?	How can you demonstrate this?

Issue/Risk	Significance (L, M, H)	Response	Timeframe	Who is responsible?

Objective Four – Livestock Management To manage wetlands and water bodies so that stock are excluded from water to avoid damage to the bed and margins of a water body, and to avoid the direct input of nutrients, sediment, and microbial pathogens.	
What practices help you achieve objective one?	How can you demonstrate this?

Issue/Risk	Significance (L, M, H)	Response	Timeframe	Who is responsible?

Objective Five – Offal Pits, Silage Pits and Waste Management To manage the number and location of offal pits, silage pits and waste to minimise risks to human health and soils and water quality.	
What practices help you achieve objective one?	How can you demonstrate this?

Issue/Risk	Significance (L, M, H)	Response	Timeframe	Who is responsible?

Objective Six – Cropping Management To manage the preparation, harvest and grazing of the crop to avoid the movement of sediments and other contaminants to waterways and to avoid or mitigate soil compaction	
What practices help you achieve objective one?	How can you demonstrate this?

Issue/Risk	Significance (L, M, H)	Response	Timeframe	Who is responsible?

Objective Seven – Irrigation Management To operate irrigation systems (if applicable) that are capable of applying water efficiently and to implement management practices that ensure actual use of water is monitored and is efficient.	
What practices help you achieve objective one?	How can you demonstrate this?

Issue/Risk	Significance (L, M, H)	Response	Timeframe	Who is responsible?

COSTS OF PLANNED PRACTICES

Practice	Description	Total Cost

APPENDICES

Overseer Nutrient Budget for 2014/15

Overseer Nutrient Budget for 2015/16

LandBase Risk Assessment