CERTIFIED FARM ENVIRONMENT PLAN – Example

Dairy Farm
PARKVALE CATCHMENT

Greater Wellington
Te Pane Matua Taiao

Plan summary

Certified Farm Environment Plans (cFEP's) are required by Greater Wellington's Natural Resources Plan for properties within the priority catchments. cFEP's are a practical way for farmers and growers to identify, manage and reduce the impact of farming on the freshwater environment.

This farm plan is based on fictious information to cover possible options for a dairy farming system and does not truly reflect the current farming situation, risks or actions for the land.

Greater Wellington has produced this cFEP example to assist landowners and professionals with farm planning in the Greater Wellington region. It is based on information current at the time of publishing and may be changed or altered as regulations develop. It must be noted Freshwater Farm Plans (FWFP's) were introduced by the Government under the National Environment Standard – Freshwater Management (NES-FM 2020) and are currently paused. This plan aims to cover both regulations as best possible.

The template and format used is **one option** to consider when farm planning, there are a number of industry and professional plans available for landowner and rural professionals to use.

Document updated: 02/05/2025

Contents

1. Farm overview

1.1 Farm story

Farm history

John Farmer is the fifth generation on Dairy Farm, with his daughter interested in becoming the sixth. Slowly over his time owning the farm, focus has been on allowing for more control over the whole system including youngstock growth and supplementary feed production. John Farmer has a history of implementing environmental improvements on Dairy Farm, including several riparian plantings. He is interested in continuing this work and looking for more ways to improve the environment and create a sustainable farm system for the future generations.

Farm goals

- Reduce flooding risk of the Parkvale stream.
- Have a fully self-supported farm system, including all youngstock and majority of supplement taken care of.
- Prepare the farm for take-over by daughter, leaving it in a position to be able to support her in continuing the family history.

1.2 Property details

Summary	
Property name	Dairy Farm
Address	123 Dairy Farm Lane, Carterton
Name and contact details (email/phone)	John Farmer John@farming.co.nz 027 123 1234
Legal description of land	Lots 1-12, DP 987654
Legal description and ownership of land parcels (if different from above)	N/A
Farm identifiers	Fonterra Supply Number – 1234
Irrigation scheme and water permits	WAR123456 – Ground water take consent WAR234567 – Surface water take consent
Other consents i.e., discharge	WAR123456; WAR456798 & WAR324876 – Effluent discharge consent

2. Catchment information

2.1 Ruamāhanga Whaitua - catchment

Dairy Farm is located within the Ruamāhanga Whaitua. The mana of the Ruamāhanga is carved across the lower North Island. Ruamāhanga has massive scale, great diversity and a generative force that enables and empowers all life in the Wairarapa Valley.

2.2 Parkvale – sub-catchment

The Parkvale catchment is located on the lowland plains of the Valley floor streams Freshwater Management Unit group (FMU) in the Ruamāhanga Whaitua. This is an area of intensive farming activity and productive soils. Parkvale Stream is identified in Schedule H2 of the PNRP as a second priority water body for improvements for secondary contact recreation.

Some parts of the Parkvale Stream have the highest nitrate levels of any monitored waterway in the Ruamāhanga catchment. Data gathered on the catchment has noted that levels of nitrate-nitrogen in groundwater are generally elevated, which affects freshwater stream quality and ecology due to the inter-connected nature of the catchment's hydrology. A significant amount of flow is derived from groundwater (particularly during times of low flow) and these result in low dissolved oxygen.

Soil type plays a big part in how nutrients are held or lost within the catchment. In areas that have well drained soils, you will find a close connection to surface water and ground water. In poor drained soils, the surface water is less connected to ground water. In poorly drained soils, nutrients can stay within the soil profile for longer which gives plants more opportunity to use it, in a well-drained soil this opportunity is not the same. Nutrients are often leached into the ground water or into nearby streams before plants have a chance to use it.

2.3 Challenges

The Parkvale Stream has the following challenges:

- **E. coli** - The Parkvale Stream falls below the national bottom line for E. coli, which is a national driver for improvement in water quality for swimmability. Modelling shows high E. coli levels are driven through high rainfall. The stream is used for supplying stock water, improvements in E. coli will have a positive effect on the economic value (stock health) as well as other values.
- **High Nitrate levels (surface and groundwater)** - Some parts of the Parkvale Stream have the highest nitrate levels of any monitored waterway in the Ruamāhanga catchment. Data gathered on the catchment has noted that levels of nitrate-nitrogen in groundwater are generally elevated, which affects freshwater stream quality and ecology due to the inter-connected nature of the catchment's hydrology.
- **Run-off contamination including phosphorous and sediment** - Soil quality is also affected through elevated nutrients, particularly excessive phosphorus which can run off into waterways during storm events, and from intensified land use.

Table 1. Data for Parkvale Stream using Greater Wellingtons CCCV tool. See Appendix C.

Issue	Base Grade	Objective
E-Coli	**E** For more than 30% of the time, the estimated risk of Campylobacter infection is ≥50 in 1,000 (>5% risk). The predicted average infection risk is 7%.	**C (by 2040)** For at least half the time, the estimated risk of Campylobacter infection is <1 in 1,000 (0.1% risk). The predicted average infection risk is 3%.
Periphyton	**B** Occasional blooms reflecting low nutrient enrichment and/or alteration of the natural flow regime or habitat.	**B (by 2040)** Occasional blooms reflecting low nutrient enrichment and/or alteration of the natural flow regime or habitat.
Ammonia toxicity	**B** 95% species protection level: Starts impacting occasionally on the 5% most sensitive species.	**A (by 2040)** 99% species protection level: No observed effect on any species tested.
Nitrate toxicity	**B** Some growth effect on up to 5% of species.	**A (by 2040)** High conservation value system. Unlikely to be effects even on sensitive species.
MCI	**Fair**	**Good (by 2040)**

2.4 Community values

Mana whenua are Ngāti Kahungunu ki Wairarapa, who have Hurunui marae and Pahikitea pa located within the catchment, and Rangitāne o Wairarapa. Ngāti Kahungunu at marae level (Hurunui marae), note the following:

- Mana Whenua view Parkvale stream and Taratahi water race as one
- The industrial zone needs further investigation regarding its potential contribution to nitrate levels
- Wetlands have had a key role to play in the past and now in terms of cleaning water, as a growing and nurturing zone, a carbon sink, and a collection point for sediment.

Parkvale contains sites of significance to Tangata Whenua, including:

- Te Para, Te Para Stream. Te Para stream is a significant ancestral place (wāhi tūpuna), water is and was used for healing (wai ora) and the gathering of kai (mahinga kai).
- Te Awa Tapu o Ruamāhanga (Ruamāhanga River and named tributaries). The Ruamāhanga River as a whole is significant. The Ruamāhanga is the largest flowing body of water in the Wellington region. The Ruamāhanga at times is strengthened, as it receives water from many tributaries, and at others diminished, as water is given to the land, forming springs and streams that ultimately return to the main stem.

2.5 Farm focuses

The following is a list of good management practices that can assist in actions taken on farm, addressing the issues identified within the catchment (see Appendix A for a more extensive list):

- For E. coli: Mitigation efforts should focus on managing overland flow and Critical Source Areas (CSAs).
- Soil type influences how nutrients are held or lost within the catchment. Consideration should be given to the soil's drainage class and therefore connection between the surface and ground water.
- Consider wetlands for water quality treatment before discharges reach the stream
- Locate any springs on the property - exclude stock and manage effects from the surrounding area.
- Setbacks from depressions and waterways should be necessary for intensive land uses including winter grazing and winter cropping
- Riparian planting should be undertaken in strategic spots, including to provide shade to help improve periphyton and macrophyte problems
- Good management of stock access to streambanks and of winter grazing may prove important in this catchment

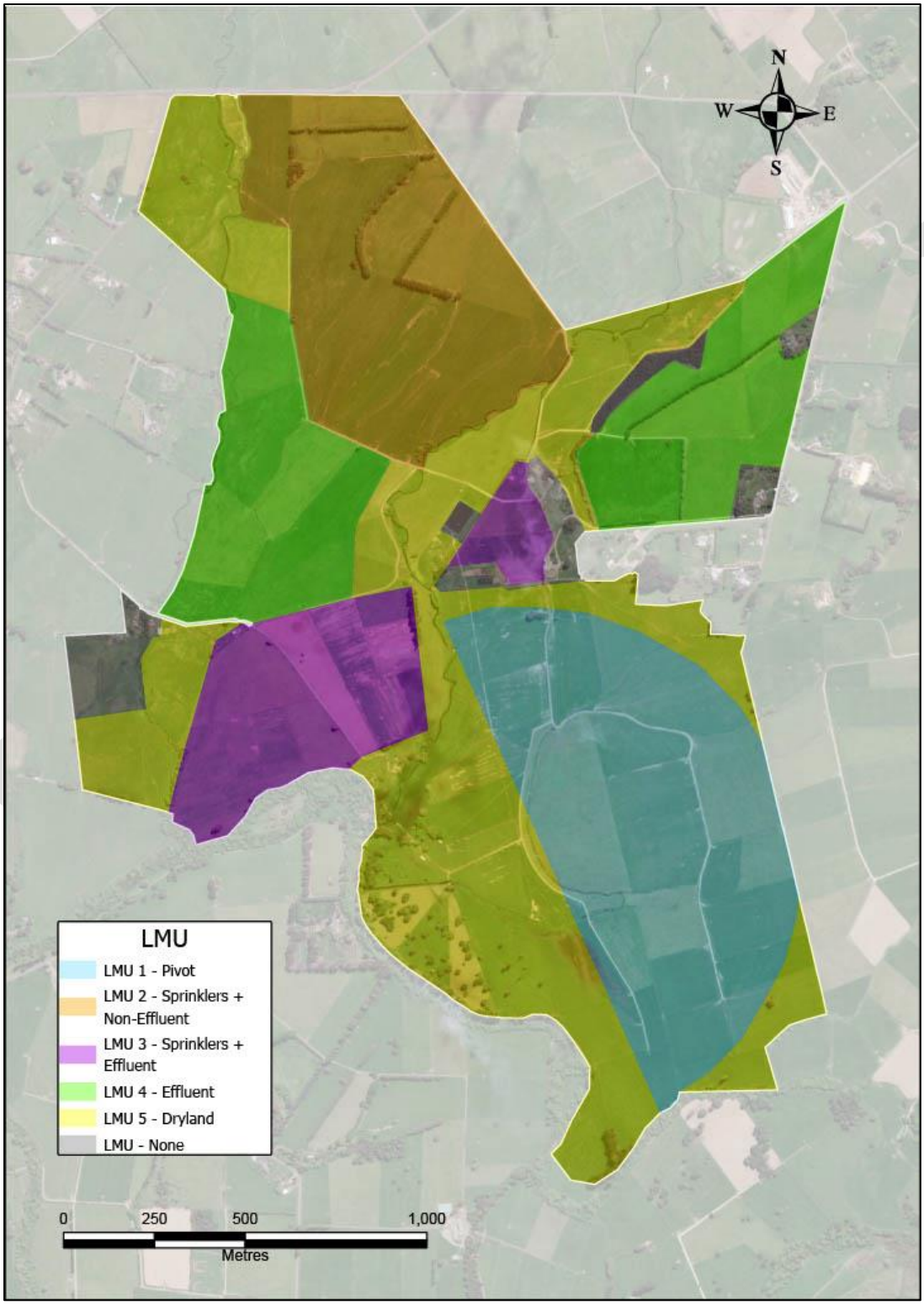
Source: www.fishing.net.nz

Ruamāhanga River near to Parkvale Stream, a site the Dairy farmer family hold important and frequently use.

3. Land management units & inherent vulnerabilities

Land Management Units (LMU's) are areas of land that can be farmed or managed in a similar way because of underlying physical similarities. LMU's for Dairy Farm were chosen considering irrigation, effluent, and dryland areas.

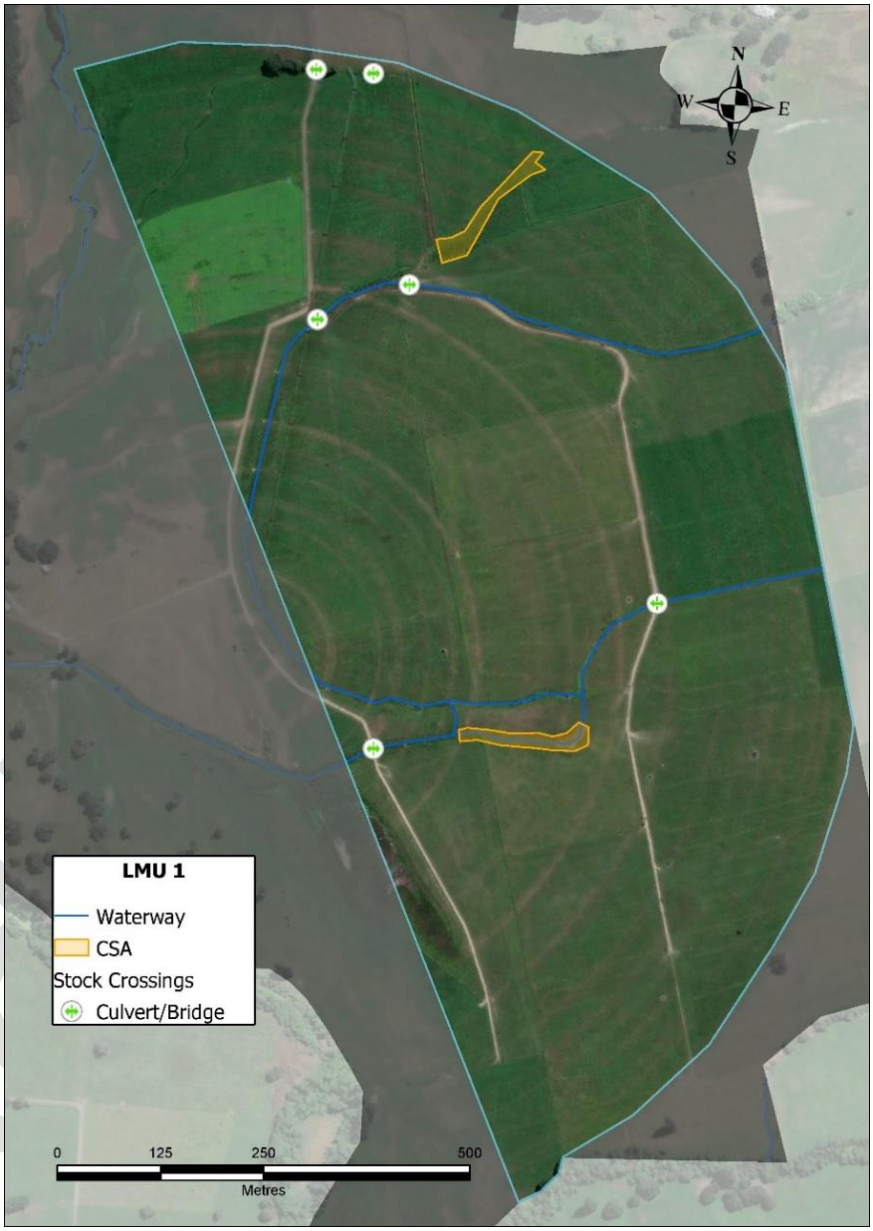
3.1 Farm map – land management units & farm boundary



3.2 Land Management Unit 1: Pivot

Description and management

Dairy platform under pivot irrigation. Topography is generally flat. Dairy platform, primarily pasture with turnips and barley occasionally rotating through. Direct drilling is used for re-grassing, and barley. Fertiliser applied throughout the milking season. Irrigation decisions are made on 2x soil moisture probes, on different soil types. There are tile drains, with unmarked outlets.



Inherent risks

Te Para stream runs at the southern side of this LMU, with an unnamed tributary running through the block. The block has a high flood risk under the Upper Ruamāhanga River Flood Hazard Extent, with a 100-year flood risk.

There are artificial drains, including tile drains, running through this block.

Irrigation can cause over watering, with these soils there is potential for run-off or over saturating soils leading to soil damage (pugging) if managed poorly. Sediment and E. Coli contamination are an issue for this catchment, in particular in the Parkvale Stream, which can be carried easily through artificial drains. Stock access tracks and crossings can contribute sediment and contaminants to waterways.

The imperfectly drained soils are prone to waterlogging, increasing risk of run-off to waterways, including sediment and contaminants. Waterlogged soils are more prone to soil damage from over stocking.

Actions within this LMU

- Complete pre summer service and checks for pivot
- Manage CSA's (depressions), avoid grazing/temporarily fence off in wet periods
- Map location of subsurface drainage and mark outlets
- Maintain tracks and races
- Monitor grazing practices in wet conditions to avoid pugging

3.3 Land Management Unit 2: Sprinklers + non-effluent

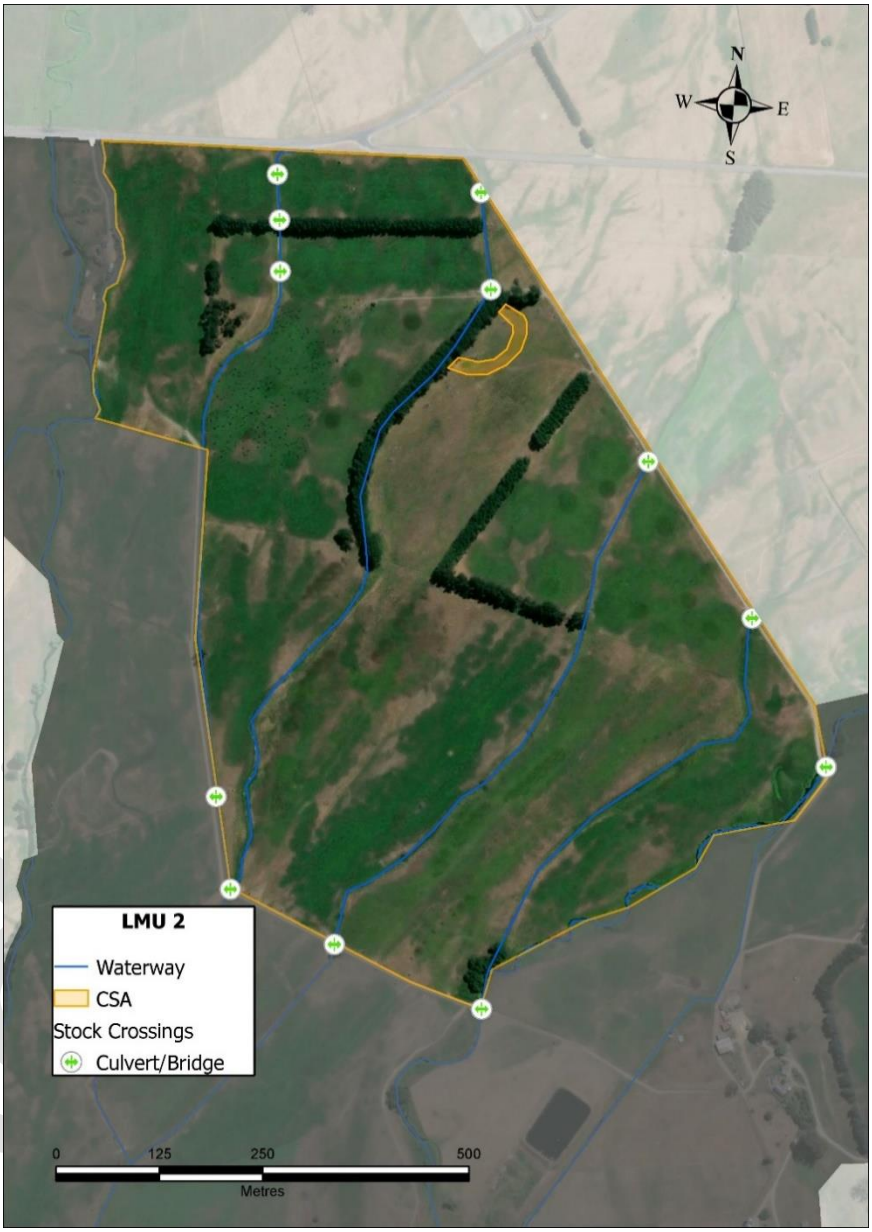
Description and management

Dairy Platform with sprinklers that do not have effluent going through. Topography is flat. Multiple drains and Parkvale stream run along parts of the LMU.

Dairy platform, primarily pasture with turnips and barley occasionally rotating through. Fertiliser applied throughout the milking season.

Irrigation decisions are made on 2x soil moisture probes, on different soil types. And are generally moved on a fixed rotation, GPS is on the motorbike to place sprinklers accurately.

Direct drilling is used for re-grassing, and barley.



Inherent risks

Te Para stream runs at the southern side of this LMU, with an unnamed tributary, and Booth's creek running through the block. The block has a high flood risk under the Upper Ruamāhanga River Flood Hazard Extent, with a 100-year flood risk.

There are artificial drains running through this block.

Irrigation can cause over watering, with these soils there is potential for run-off or over saturating soils leading to soil damage (pugging) if managed poorly. Sediment and E. Coli contamination are an issue for this catchment, in particular in the Parkvale Stream, which can be carried easily through artificial drains and the tributaries within this LMU. Stock access tracks and crossings can contribute sediment and contaminants to waterways. Some soils in this LMU are prone to waterlogging, increasing risk of run-off and soil damage from stock. Run-off and soil damage can carry contaminants including sediment to waterways.

Actions within this LMU

- Complete pre summer service and checks for irrigators
- Map location of subsurface drainage and mark outlets
- Maintain tracks and races
- Monitor grazing practices in wet conditions to avoid pugging
- Manage CSA's (depressions), avoid grazing/temporarily fence off in wet periods

3.4 Land Management Unit 3: Sprinklers + effluent

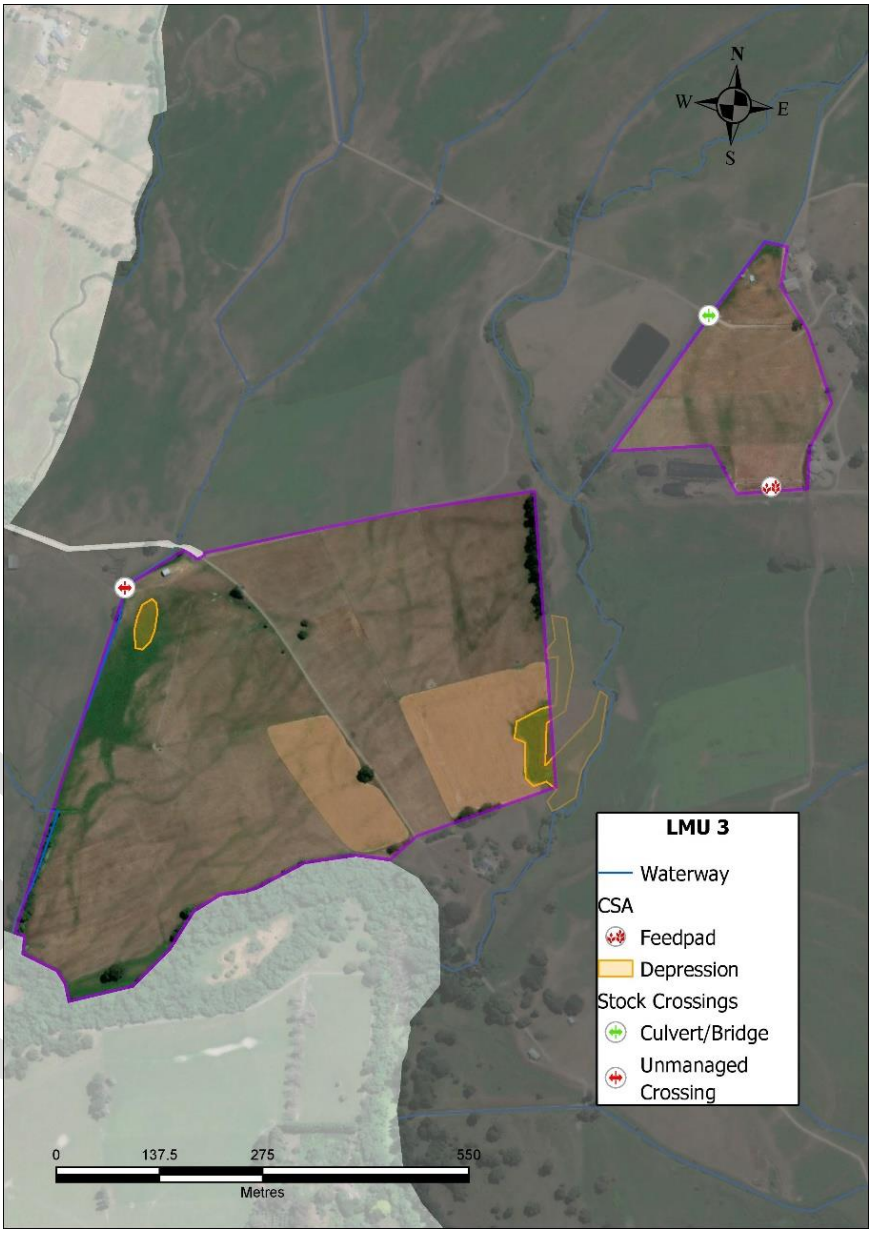
Description and management

Dairy platform area, receiving effluent through low application methods via sprinklers. Dairy platform, primarily pasture with turnips and barley occasionally rotating through. Fertiliser applied throughout the milking season.

Irrigation decisions are made on 2x soil moisture probes, on different soil types. And are generally moved on a fixed rotation, GPS is on the motorbike to place sprinklers accurately, including placement for effluent to adhere to consent conditions around waterways.

Direct drilling is used for re-grassing.

The discharge of effluent has 20m buffers in place around waterways, boundaries etc as per conditions of consent.



Inherent risks

Te Para stream runs at the southern side of this LMU, with an unnamed tributary running through the block. Part of the block has a high flood risk under the Upper Ruamāhanga River Flood Hazard Extent, with a 100-year flood risk.

Irrigation can cause over watering, with these soils there is potential for drainage, including draining nutrients (primarily nitrogen). Nitrogen is a risk in the Parkvale Stream, although not the primary issue, the soils coupled with irrigation can contribute to the issue.

Effluent has potential to over-flow into waterways, unless carefully managed.

Actions within this LMU

- Tailor fertiliser rates to account for effluent applications
- Mitigate unmanaged crossing (e.g., culvert)
- Manage CSA's (depressions), avoid grazing/temporarily fence off in wet periods
- Maintain tracks and races

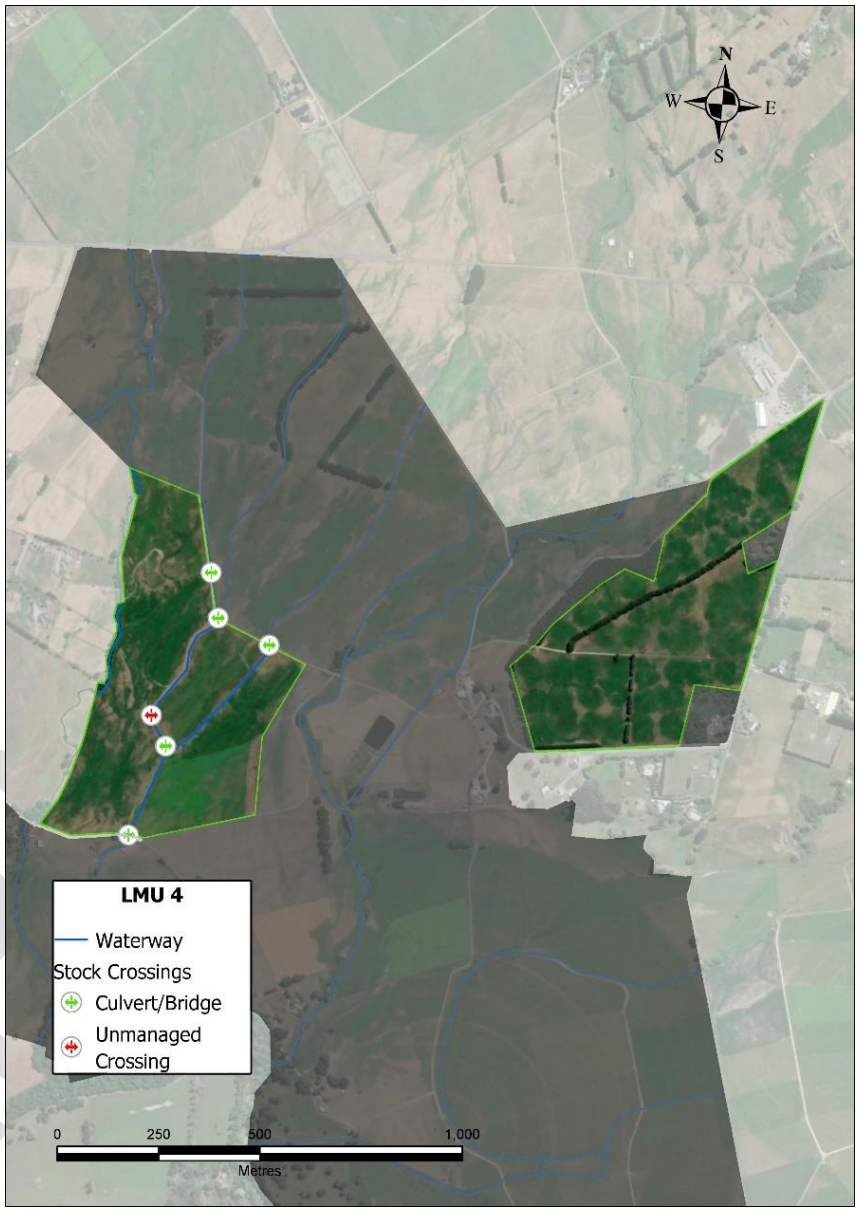
3.5 Land Management Unit 4: Effluent

Description and management

Dairy platform area receiving effluent through travelling irrigator. Flat to rolling topography. Booths creek runs alongside parts of this block. Dairy platform, primarily pasture with turnips and barley occasionally rotating through. Fertiliser applied throughout the milking season.

Direct drilling is used for re-grassing.

Effluent is applied through a travelling irrigator. 20m buffers are in place around waterways, boundaries etc as per conditions of consent.



Inherent risks

Booth's creek runs along the Western boundary of this LMU, Parkvale stream runs between the two LMU areas. Other drains run through the area.

Effluent applied at poor times, on the poorly drained soils can cause run-off, especially on the rolling hill. Sediment and E. Coli contamination are an issue for this catchment, in particular in the Parkvale Stream, effluent over-flow/run-off causes E. Coli contamination within surface water and needs to be carefully managed when being applied in areas near waterways.

Stock access, tracks and crossings can contribute sediment and contaminants to waterways.

Darnley is a high N leaching soil, due to its moderate PAW and being well drained, with the catchment being affected by groundwater quality impacting surface water with nitrogen. The other soils have high water logging potential especially in high rainfall periods increasing likelihood of run-off and contaminants including effluent into waterways flowing through the LMU.

Actions within this LMU

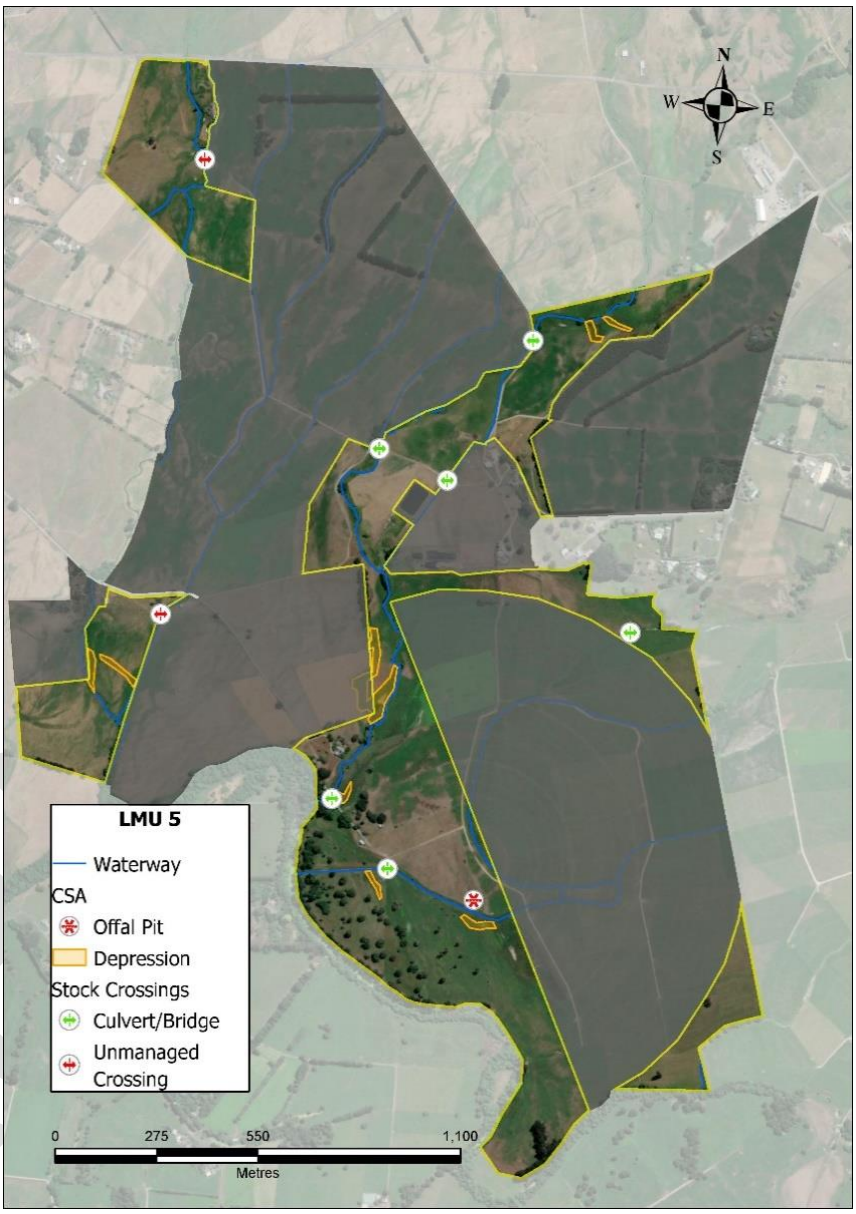
- Tailor fertiliser rates to account for effluent applications
- Mitigate unmanaged crossing (i.e., culvert)
- Maintain tracks and races

3.6 Land Management Units 5: Dryland

Description and management

Dairy platform area that is dryland with no effluent or irrigation taking place. Flat topography. Multiple waterways including Booth's creek, Parkvale Stream and Te Para Stream. Dairy platform, primarily pasture with turnips and barley occasionally rotating through. Fertiliser applied throughout the milking season.

Direct drilling is used for re-grassing, and barley.



Inherent risks

Multiple waterways including Booth's creek, Parkvale Stream, Te Para Stream and other drains flow through this LMU. Stock access, tracks and crossings can contribute sediment and contaminants to waterways.

Part of the block has a high flood risk under the Upper Ruamāhanga River Flood Hazard Extent, with a 100-year flood risk.

These soils are generally low N leaching vulnerability, with high waterlogging potential. With the drains and waterways running through this block, there is a high potential of sediment, phosphate and contaminants to enter waterways if overstocked. Paddock 2 and 3 (not grazed) are prone to flooding due to the Booths Creek flowing into the Parkvale Stream and willows causing water to back up.

Actions within this LMU

- Fence and plant in paddocks 2 and 3
- Mitigate unmanaged crossing (i.e., culvert)
- Manage CSA's (depressions), avoid grazing/temporarily fence off in wet periods
- Maintain tracks and races

4. Farming activities & risk assessment [Completed by a certifier]

4.1 Introduction

In identifying the level of risk specific to a farm, the lands inherent vulnerabilities must be considered alongside the farming or growing activities occurring. Any catchment context information relevant to each identified risk must also be considered. To fully understand the level, location and type of risks with potential mitigations the risk assessment is conduct at LMU scale.

Likelihood	Consequence		
	Slight	Serious	Major
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	High

This table has been used to assist in the assessment of risks for each area (Nitrogen, Phosphorous, Sediment and E. Coli). For example, nitrogen through poor fertiliser application near a waterway has a serious consequence, and if the likelihood of it occurring is high then overall the risk is high, however if the likelihood is low then it is a low risk.

4.2 Nutrient management

4.2.1 Contaminants overview

Four key contaminants have been identified as problematic to New Zealand waterways: nitrogen (N), phosphorus (P), sediment, and *E. coli*.

Nitrogen is a priority issue for the Parkvale catchment.

The cFEP process is designed to identify the ways that these contaminants could enter waterways and implement actions to prevent or lessen the likelihood of this occurring.

The loss of contaminants from land to water depends on several factors: availability of contaminants, presence of a transport pathway, and any treatment or reduction happening along the pathway. Both availability and transport can be significantly influenced by land use and land management. The main pathway for nitrogen loss is via leaching from the root zone of plants.

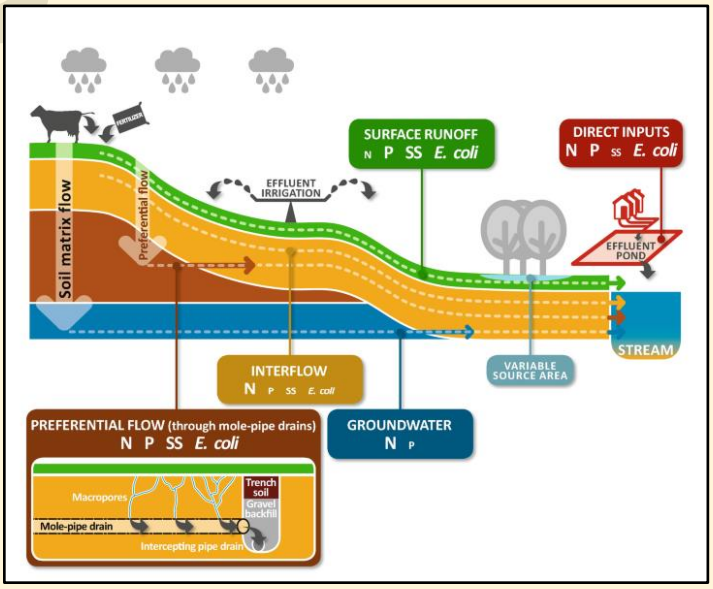


Figure 1 Source: www.lawa.org.nz

Phosphorus and microbial pathogens are principally lost to rivers and lakes via overland flow or artificial drainage. Sediment discharges result from a combination of eroded hill country, overland flows and riverbank and streambank erosion.

4.2.2 Nitrogen

Risk	Risk factors on your farm	Risk rating (High, Medium, Low)					
			Land Management Unit (LMU) or Paddock				
		Whole farm	1: Pivot	2: Sprinklers+ non-effluent	3: Sprinklers+ effluent	4: Effluent	5: Dryland
Nitrogen loss risk **Nitrogen potentially entering waterways impacting freshwater health or drinking water quality**	Animal loss risks: stock, feed type, grazing practices, off-paddock feeding	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**
	Fertiliser loss risks: excessive nutrient levels (beyond plant needs), direct application to waterways	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**
	Effluent loss risks: overland flow, application beyond plant requirements	**High**	**NA**	**NA**	**High**	**High**	**NA**
	Nutrient transport risk: artificial drainage, soils, climate, topography, structural mitigations	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**

Contaminant management and farm context:

Most of the farm soils have medium to low N leaching vulnerability. Dairy Farm applies low amounts of nitrogen fertiliser, focusing on pasture production in spring and autumn. The nitrogen fertiliser is coated which reduces gas losses and slows the rate of chemical change. This increases the products availability to plants. Fertiliser is spread by an Ag Contractor, with GPS mapping. Buffer distances are maintained around waterways.

The highest nitrogen leaching risk areas are LMU 2 and 3, which are reliant on sprinklers being moved regularly (12–24-hour shifts) in an appropriate pattern to reduce leachate risk. LMU 3 has the highest risk due to effluent and irrigation occurring on light, well drained soils that have a high nitrogen leaching vulnerability.

Areas have artificial drains and several water races and natural streams running through them, with potential to carry nitrogen. Effluent is applied at low rates (below 12mm) and at times when pasture can assimilate the nutrients.

4.2. 3 Phosphorus / sediment / E. coli

Risk	Risk factors on your farm	Risk rating (High, Medium, Low)					
			Land Management Unit (LMU) or Paddock				
		Whole farm	1: Pivot	2: Sprinklers + non-effluent	3: Sprinklers + effluent	4: Effluent	5: Dryland
Sediment and Phosphorus loss risk **Sediment or phosphorus potentially entering waterways may cause excess algae growth, habitat loss or other harm to freshwater health**	Erosion/Sediment loss risks: stock, grazing practices	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**
	Cropping loss risks: cultivation	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Fertiliser loss risks: excessive nutrient levels, direct application to waterways	**High**	**High**	**High**	**High**	**High**	**High**
	Effluent loss risks: overland flow, application beyond plant requirements	**High**	**NA**	**NA**	**High**	**High**	**NA**
	Nutrient transport risks: artificial drainage, soils, climate, topography, structural mitigations	**High**	**High**	**High**	High	**High**	**Medium**
Faecal microbe loss risk **Contaminants, like pathogens such as *E. Coli*, potentially impacting on human health**	Animal manure loss risks: stock, grazing practices	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Nutrient transport risks: artificial drainage, soils, climate, topography, structural mitigations	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**

Contaminant management and farm context:

Dairy Farm has flat to undulating topography, multiple flood risk waterways, and soils prone to waterlogging and damage. These factors increase the risk of phosphate, sediment, and contaminant losses. Phosphate is relatively insoluble and attaches strongly to soil particles, a large proportion of the phosphate added to the system will be retained or 'fixed' to soil particles. Therefore, activities which disturb soil can also contribute to losses of phosphate via erosion and surface water runoff. Phosphate is also lost by direct deposition or runoff of dung, fertiliser or farm dairy effluent to waterways. Effluent is spread to LMU's 2, 3 & 4, through lateral sprinklers, pods and two travelling irrigators. Solids are spread through the farms muck spreader, on areas that do not receive liquid effluent. Effluent has a high risk of containing E. Coli, which can move with soil and water into surface water.

Soil tests are completed every two years, monitoring the Olsen P and other nutrients. The Olsen P levels are mostly within the optimum range (21-41) on the platform. Fertiliser recommendations including super phosphate use are based off these soil tests.

Source: www.dairynz.co.nz/media/weyftswr/riparian-mgmt-wellington.pdf

Picture above is of completed riparian planting, as a mitigation for E.Coil and sediment loss.

4.3 Critical source areas

4.3.1 Critical source areas (CSA)

Critical source areas are areas within a paddock or catchment that contribute a disproportionately large (relative to their area) quantity of contaminants to water, negatively impacting water quality.

CSA's are overland flow paths, small low-lying parts of farms such as gullies and swales, that can accumulate and move runoff (water and contaminants) to waterways. These areas can transport large amounts of soil, phosphorus and E. coli to waterways. For a CSA to exist it must have both a potential contaminant source and a loss pathway or transport mechanism.

High traffic areas can be CSA's. These areas refer to specific locations on farm with large amounts of vehicle and livestock movement, including gateways, feeders, troughs, and laneways, leading to potential soil compaction and environmental impacts if not managed properly.

The Dairy Farm has several CSA's, including depressions and low-lying areas, stock water races, significant streams and two potential wetland areas. All the waterways on the dairy platform are fenced either permanently or temporarily (stock water races only) with buffers and majority with having bridges or culverts for stock and machinery access. The duck pond is also fenced, this area receives tile drainage water from under LMU 1 – the pivoted area. High traffic areas can be CSA's. These areas refer to specific locations on farm with large amounts of vehicle and livestock movement, including gateways, feeders, troughs, and laneways, leading to potential soil compaction and environmental impacts if not managed properly. Refer to map 7.6.

CSA Example: Post-winter grazing of an unprotected gully. (Note this photo was taken before IWG regulations came into effect)

Source: www.environment.govt.nz

4.3.2 Point source areas

Point Source Areas are areas where substantial amounts of contaminants are leached, which have a negative impact on the nearby environment. The key point source areas located on farm are, unmanaged high concentration stock crossing points, silage pits, rubbish pits, used agrichemical containers, fuel containment, deceased stock, compost and offal pits. Generally, stock crossings were in good condition. There are two crossings without culverts, both are non-regular with medium risk of sediment loss to water, due to good grass buffers on either side of culvert crossing to capture sediment and filter it from runoff. Refer map 7.6

Point Source example: Due to their immediate proximity to surface water, the risk of contamination from these critical source areas is high.

Source: www.environment.govt.nz

5. Action plan [Completed by a certifier]

5.1 Action plan table

Identified risk	Action to address risk	Location / LMU/paddock	Timeline	Person responsible	Budget	Priority	Regulatory/ supplementary / catchment	Evidence of completion	Date completed	Expected outcome
Sediment and contaminates entering waterway from stock access	Continue with fencing and planting of riparian buffers – refer specific project plan below.	refer specific project plan below.	On going 5yr plan	Farmer Contact GW to see support	Variable - refer specific project plan	High	Regulatory & Catchment	*[insert invoice details/photo /description]*		↓ N, Sediment and E. coli
Winter grazing / grazing near CSA's	Allow vegetation buffer to catch and filter contaminates. Refer Winter grazing plan in CSA Plan: *Graze from top of slope first moving towards water source. *Back fence breaks. *Leave 3-5m ungrazed buffer of waterway / CSA depending on slope *CSA is left ungrazed during wet periods, so vegetation cover maintained. *Troughs and feed out locations are located away from waterways and CSA's due to high intensity are being a hot spot for contamination	TBC	On going	Farmer	Nil – already have temporary fence equipment.	High	Catchment			↓ N, Sediment and E. coli

Identified risk	Action to address risk	Location / LMU/paddock	Timeline	Person responsible	Budget	Priority	Regulatory/ supplementary / catchment	Evidence of completion	Date completed	Expected outcome
Sediment and contaminates entering waterway from drains	Map location of subsurface drainage and mark outlets. Mapping drainage networks mitigate any risk from applying fertiliser or irrigation along these channels as they create preferential flow paths that can cause accelerated draining/leaching to a point source discharge.	Paddocks where you think tile drains are	By winter 2025	Farmer	Farmer inspection cost $200-400	Medium	Catchment			↓ N, P Sediment and E. coli
Contaminates entering waterway from fertiliser	Speak with relevant expert or consultant to tailor fertiliser application to each block. Effluent blocks receive nitrogen from effluent applications, it is recommended that nitrogen fertiliser rates be reduced or altered for the effluent block. This can include skipping a round if it is closely following an effluent application. This is to take the additional source of nitrogen into consideration and not apply anymore nitrogen than the pasture requires which may lead to nitrate leaching occurring.	Priority areas are LMU 3 & 4	By winter 2025	Farmer Agronomist	Consultant cost $200-700 or part of supply agreement with fertiliser company	Medium	Catchment			↓ N & P

Identified risk	Action to address risk	Location / LMU/paddock	Timeline	Person responsible	Budget	Priority	Regulatory/ supplementary / catchment	Evidence of completion	Date completed	Expected outcome
Sediment and contaminants entering waterway	Investigate installing a culvert in Parkvale where there are unmanaged stock crossings. Talk with GW regulation prior to undertaking works to see what are permitted or consented activities.	Refer maps 7.4 & 7.6 	Contact GW by April 2025. Install December 2025	Farmer GW Contractor	Culverts range from $300-800 pending size. Contractor @ $150/hr	Medium	Catchment			↓ N, P Sediment and E. coli
Sediment and contaminants entering waterway	Fix damage of culvert to ensure stock remain excluding and reduce instances of bank erosion	LMU 3 	June 2025			Medium	Catchment			↓ N, Sediment and E. coli
Sediment and contaminates entering waterway	Investigate fencing and planting options for paddock 2 and Paddock 3, to allow for Booths Creek to appropriately flow through the area and reduce sediment and contaminant losses. Due to closeness of the Parkvale stream there is an opportunity to create a wetland area, that will assist/absorb the pressure of the flooding and filter contaminants before entering the stream, assisting in the improvement of water quality.	LMU 5	By December 2030	Farmer Farmer Contact GW to see if funding available	Approx 175m of Fencing. 5 wire electric @ $21/m or 2 wire electric @18/m. Approx 250 of Native plants. Cost range $1.80-$4.20ea	Low	Catchment			↓ N, P Sediment and E. coli

Identified risk	Action to address risk	Location / LMU/paddock	Timeline	Person responsible	Budget	Priority	Regulatory/ supplementary / catchment	Evidence of completion	Date completed	Expected outcome
Nutrient run off into waterway	Tracks and races require maintenance and new coating of lime chip. Direct water running off tracks away from waterways and into paddocks thorough use of cut offs.	LMU's with tracks; marked as per map 7.7 	Yearly over summer	Farmer Rural contractor	Lime chip @$19/ton + cartridge. Contractor @ $160/hr	Low	Catchment			↓ N, P and E. coli
Irrigation efficiency	Complete pre summer service and checks of pivot to ensure all sprinkles heads and applications rates are functioning to required levels	LMU 1 - Pivot	On going, in winter prior to summer use.	Farmer Pivot service provider	Yearly service cost $500 Farmer inspection cost $0	Low	Supplementary			↓ N, P

Project:	**Stock exclusion / fencing waterways**					**Time: 2024-29**		
Area addressed:	Parkvale Stream (Refer Map 7.4)		**Desired outcomes:**	Stock Exclusion, Buffer zones established & decrease contaminates entering water.				
Tasks	**Timeframe**	**Location:**	**Person responsible**	**People involved**	**Budget**	**Priority**	**Date completed**	**Evidence of completion**
Established temporary electric fence of waterway when grazing for Stock exclusion from waterways.	Immediately by Winter 2025	Unfenced - Parkvale LMU 5 Unfenced - Drain LMU 1 & 3	John Farmer	Farmer	Cost nil – already have temp. fence equipment.	Critical Regulatory	Ongoing & continues until permanent fence established.	

Stage 1 - Permanent fence from south exit to fork & plant buffer zone with single line of flax or grasses	2025-2026	Unfenced - Parkvale LMU 5 Planned Planting Map 7.5	John Farmer GW funding application via advisor	Farmer GW funding application Fencing contractor	Approx. 700m of 2 wire electric @$15/m; --- 350 plants ranging from $1.50 - $4.50ea	High Catchment		
Stage 2 - Permanent fence Western branch & plant buffer zone	2026-2027	Unfenced - Parkvale LMU 5 Planned Planting Map 7.5	John Farmer GW funding application via advisor	Farmer GW funding application Fencing contractor	Approx. 900m of 2 wire electric @$15/m; --- 450 plants ranging from $1.50 - $4.50ea	High Catchment		
Stage 3 - Permanent fence Eastern branch & plant buffer zone	2027-2028	Unfenced - Parkvale LMU 5 Planned Planting Map 7.5	John Farmer GW funding application via advisor	Farmer GW funding application Fencing contractor	Approx. 500m of 2 wire electric @$15/m --- 250 plants ranging from $1.50 - $4.50ea	High		
Review drains stock exclusion	Once priority stages 1-3 of Parkvale stream is complete, establish plan for unfenced drain in LMU 1 & 3 (refer Map 7.4). Moving from a temporary solution to permanent based on current finances and farming activities.							

Regulations to consider prior to undertaking recommended works	
Stock exclusion rules	Minimum setbacks and exclusion for new fences – GW stock-exclusion-regulations
Mechanical Management of Highly Modified Waterways	Good-practices-for-the-mechanical-management-of-highly-modified-waterways
Culvert installation	Building structures in river and stream
Scheduled sites information	**Sites of significance B**; **Sites of significance C** & **Sites of significance F1 & F3** and impact on stock exclusion
Watercourse types	How to determine whether a watercourse is a river, ephemeral watercourse, highly modified river or stream, or artificial watercourse - Defining a watercourse guide

6. Land use & stock details

6.1 Farm summary

Summary	Dairy
Total farm area (ha)	410
Effective farm area (ha)	400
Irrigated area (ha)	220
Dryland area (ha)	180
Intensive winter grazing area (ha)	
Farm system/type	Dairy - Fonterra
Climate: **Average rainfall (mm)** **Average temperature (^{O}C)** **Sunshine hours**	 1116mm 18^{O}C 10.1/day

6.2 Dairy

Summary	
Peak cows milked	950 (150 of these are once-a-day milking herd)
Cow breed	Jersey x Friesian
Once per day milking	Nil for main herd.
Average milking cow live weight	450
Replacement rate	20%
Milk solids per cow per year	400
Non lactating stock	30 bulls Nov- Jan

6.3 Crop

Crop	Barley	Turnips (Bulb)
Area (ha)	3	3
Yield (t DM/ha)	5	10
Month sown	September	October
Cultivation method	Direct Drill	Minimum Tillage
Month/s harvested	January	January – March
Post crop treatment	Into pasture	Into pasture
Stock grazing	Nil	Dairy cows

Dairy Farm is typically pasture, with some Barley and summer grazed turnips. Minimum tillage and direct drilled are used for cultivation methods. Grazing rotates around the farm, intensively stocked with mixed aged milking cows rotating around dependent on pasture production.

6.4 Other farm management practice

Approximately 20% of re-grassing is completed annually, with the sward composing of 9% Plantain. Renewal of pasture is sown through direct drilling.

6.5 Farm infrastructure

Type	Description
Culverts	There are 24 culvert crossings on the farm ranging in age and construction. These are maintained to ensure that water can flow through freely and contaminates are run through pasture/buffers before entering any waterways.
Irrigation pivot	New 2022 Debont traveling irrigator, 180 degrees rotation spanning 49.13m. as well as long-line laterals and k-line pods. These are scheduled based on two soil moisture meters, which are located under the pivot one on heavy and one on lighter soils. The pivot is maintained through a service provider annually, with the sprinklers maintained in-house on a as needed basis, along with the pivot's nozzles and hoses
Unmanaged crossings	There are three areas where stock cross the stream by entering the waterway; stock are driven across no more than twice per month.
Effluent pond	The effluent pond is 11,341m3 in volume, and is lined with polyethene to prevent leakage and contamination.
Feed pad	Concrete outdoor fed pad, in good condition and regularly maintained to reduce build-up of dung and contamination run off.
Offal pit	An offal pit is located behind the pivot, which is higher than the nearby waterways including the duck pond. The offal pit is dug to ensure that there is no groundwater evident at the bottom, and is filled in when full, with a new one dug when required. New pits will need to comply with rule R91 of the natural resources plan; Greater Wellington — Managing waste
Silage stack	Silage pits are next to the feed pad, with a hardened lime floor with silage well-wilted, increasing Dry Matter percentage and therefore the amount of leachate.
Yards	Steel cattle yards, with a capacity of holding 150 cattle. These yards are 5 years old, with a head bale, weigh scales and a load out ramp. Metal is topped up annually to reduce pugging damage.
Old sheds	Historic corrugated iron or wooden sheds in average conditions situated around the property used for storage of farm equipment such as temporary fencing.

Milk shed	50-aside herringbone shed, equipped with automatic cup-removers, pro-track, and in-shed feeding.
Hay shed	Large, corrugated iron hay shed in good condition with new metal spread to stop pugging by machinery.
Chemical storage	All agrichemicals are brought onto site by contractors. Small quantities of chemicals are stored in a lockable area within the hay shed.
Fuel storage	Fuel is stored at the dairy shed, in above-head fuel tanks. These are not bunded to contain possible spills. The tanks are located away from waterways and critical source areas.
Fertiliser storage	All fertiliser is brought on to the farm by spreading contractors. Excess is removed once work is complete.
Farm laneways/tracks	Tracks are generally in good condition, with annual maintenance and resurfacing with lime and metal.
Farm dump	There are no rubbish pits located on the property, with dairy shed waste exported through a skip bin located at the shed. Baleage wraps and silage covers are recycled through Plasback.

6.6 Nutrient information

Block	Fertiliser product (Month applied)	Rate of application (kg/ha)	Nutrients applied (kg/ha)			
			N	***P***	***K***	***S***
Platform	N-Protect November January March Super Phosphate October	 60 60 60 350	 28 28 28	 32	 	 39
Barley	Cropmaster 20 September N-Protect November	 200 150	 38 69	 20 	 	 24
Turnips	Nil	Nil				
		Total Nutrient applied (kg/ha)	84	32		39

6.7 Soil testing

LMU	pH	Olsen P	Potassium		Potentially available N (crop paddocks)
1	5.8	35	6		
2	5.7	28	4		86 kg N
3	5.8	28	15		
4	5.9	30	17		
5	5.5	15	3		

Optimum Olsen P levels for pasture production are between 20 – 30. Applications of Phosphate aim to maintain these levels, with regular soil testing in the future to track trends in Olsen P levels. LMU 1 has a slightly higher Olsen P level and should work with a Nutrient Specialist to maintain this within optimal range.

As high Nitrogen levels are the priority catchments issue, it is critical the Nitrogen applied, and potentially available N within the soil, sit within the crop requirements to avoid any excess loss to the catchment. On Dairy Farm the Nitrogen applied is within the required levels for Spring Barley and with average potentially available nitrogen, it helps reduce excess N loss to the Parkvale catchment.

The rates of fertiliser detailed in section 6.6 are the intended ongoing applications planned for Dairy Farm. Any changes in fertiliser practices will be made in consultation with a fertiliser representative and considering soil test results.

6.8 Supplementary feed information

Feed type	Source	Amount (t DM)	Distributed location	Storage type
Barley grain	Imported	280	Dairy shed	Good - silo
Pasture hay	Imported	90-220	On pasture	Good – hay sheds
Pasture silage	Imported	60-315	Feed pad	Good - stack on compacted lime floor

The cropping practices detailed in section 6.3 and the supplementary feed detailed in section 6.8 are the intended ongoing cropping and feed practices planned for Dairy Farm. Any changes in cropping paddocks will be done with consideration of the inherent vulnerabilities of the LMU, in conjunction with advice from a professional agronomist.

6.9 Irrigation management

Water permit/consent details - WAR123456	
Take type i.e. surface or groundwater	Groundwater
Expiry date	30th November 2028
Maximum take (Monthly/Yearly)	460,000m3/year 4,000 m3/day
Consented irrigation area (if applicable)	82 ha
Any restrictions?	When the flow in the Ruamāhanga River at Wardells Bridge monitoring site falls below 2,400 l/s the consent holder shall: • Restrict the abstraction by 50%/day (abstraction limit of 2,000m 3 /day); and • Not take water between 8am and 5pm (in order to minimise evapotranspiration losses); unless otherwise agreed to the satisfaction of the Manager, Environmental Regulation.
Natural Resources Plan Efficient use criteria (Policy P118):	The amount of water applied for meets Schedule Q test. The annual volume applied for is less than the volume recommended by IrriCalc.

Water permit/consent details – WAR234567	
Take type i.e. surface or groundwater	Surface
Expiry date	30th September 2031
Maximum take (Monthly/Yearly)	300,000m3/year, 2,000m3/day
Consented irrigation area (if applicable)	58 ha
Irrigation rate	200/m3/ha/week
Potential restrictions	When the flow in the Parkvale Stream at Renalls Weir falls below 150 litres/second the consent holder shall: • Restrict the abstraction to 820.8m³/day (reduction by 50%); and • Not take water between 8am and 5pm (in order to minimise evapotranspiration losses); unless otherwise agreed to the satisfaction of the Manager, Environmental Regulation.

	When the flow in the Parkvale Stream at Renalls Weir falls below 100 litres/second the water take shall cease.
Natural Resources Plan **Efficient use criteria (Policy P118):**	The amount of water applied for meets Schedule Q test. The amount applied (246,240 m3 /year) for is less than the recommendation from the irrigation calculation (376,790 m3 /year).

Irrigation type	Pivot/linear	Sprinklers (k-line, long-line sprinklers)
Irrigation Area (ha)	90	130
Rotation length	Variable	5-10 days
Application rate (mm)	10-15ml	30ml
Irrigation season start and end date	October - April	October - March
Decision making tools	Soil moisture meter	Fixed application and return

6.10 Effluent Management

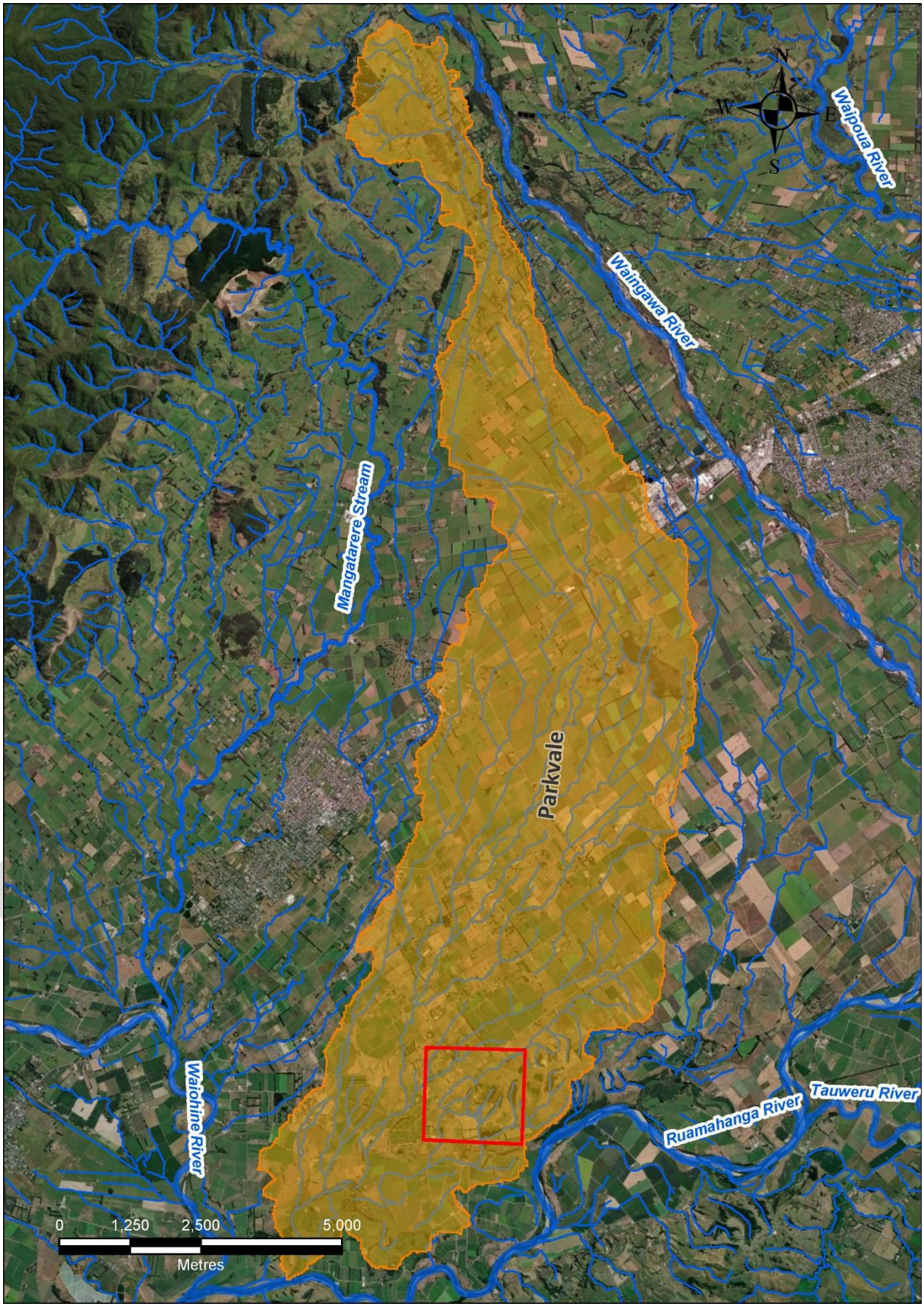
Consent/Permit details – WAR123456; WAR456798 & WAR324876 To discharge contaminants to land from collected dairy shed effluent arising from dairy shed and feed pad and to cross a waterway with a pipe carrying effluent.	
Expiry date:	30th September 2031
Irrigation Area:	155ha
Application depth	Travelling irrigator's hydraulic application rate for the dairy effluent shall not exceed 8mm per hour with the total application volume not to exceed a depth of 6mm before shifting on the disposal area. 7. K-line Pods hydraulic application rate for the dairy effluent shall not exceed 1.4mm per hour with the total application volume not to exceed a depth of 6mm before shifting on the disposal area. 8. Lateral sprinklers hydraulic application rate for the dairy effluent shall not exceed 2.1mm per hour with the total application volume not to exceed a depth of 2.1mm before shifting on the disposal area. 9. Irrigation may only occur when there is a sufficient soil moisture deficit that is greater than the application depth of 6mm. All slurry and/or sludge removed from the effluent management system shall be spread to land at no more than 5mm thickness on an area not utilised for dairy shed effluent disposal. An area of 35 hectares not utilised for dairy shed effluent irrigation shall be utilised to spread all slurry and/or sludge.
Nitrogen loading	150 kg N/ha/yr
Other consent conditions of note	The discharge shall occur no less than 20 metres from the neighbouring property boundary, any surface water body, farm drain, water supply race, any bore, or the coastal marine area. The discharge shall not pond on the surface of the ground or run off from the discharge area. The pond, solids sump and main sump shall be regularly maintained so that they do not overflow and are kept in an efficient operating condition at all times (there can be specific infrastructure updates required by certain dates. Check with one of GWs Resource Advisors).
Effluent Management Details	
Storage type (i.e. 2 pond system, solid separator to pond)	Sump > holding tank > lined pond Further detail on storage: Dairy shed and feed pad yard drains to a stone trap and weeping wall, and then into a sump. From the sump the liquid effluent is piped to the holding tank and then to the storage

	pond. Solids are collected from the weeping wall and stone trap and spread on 51ha with a muck spreader. Liquid effluent is stirred and then spread through either sprinklers (laterals and k-line pods) or a one of the two travelling irrigators.
Storage volume m3 **Storage days**	11,341 (required 6,404m^3) 90+
Irrigator Type	• 2x travelling irrigator (88ha) • K-line pods/laterals (66 ha) • Solids spread through farm muck spreader (55ha)
Tested application depth mm	• Travelling irrigator – 6mm • K-line – 6mm • Laterals – 2.1mm
Fail safe/s	• Fail-safe sensor on travelling irrigators (harvest system) • Variable speed drive and programme on pump • Pond level monitor • Hydrants and lines have been set up to ensure there is a 20-25m buffer between effluent application area and waterways including the Booths Creek.
Notes:	
GPS is used for moving the k-line pods and lateral sprinklers for accurate placement. All applications are recorded in the Dairy Diary App.	

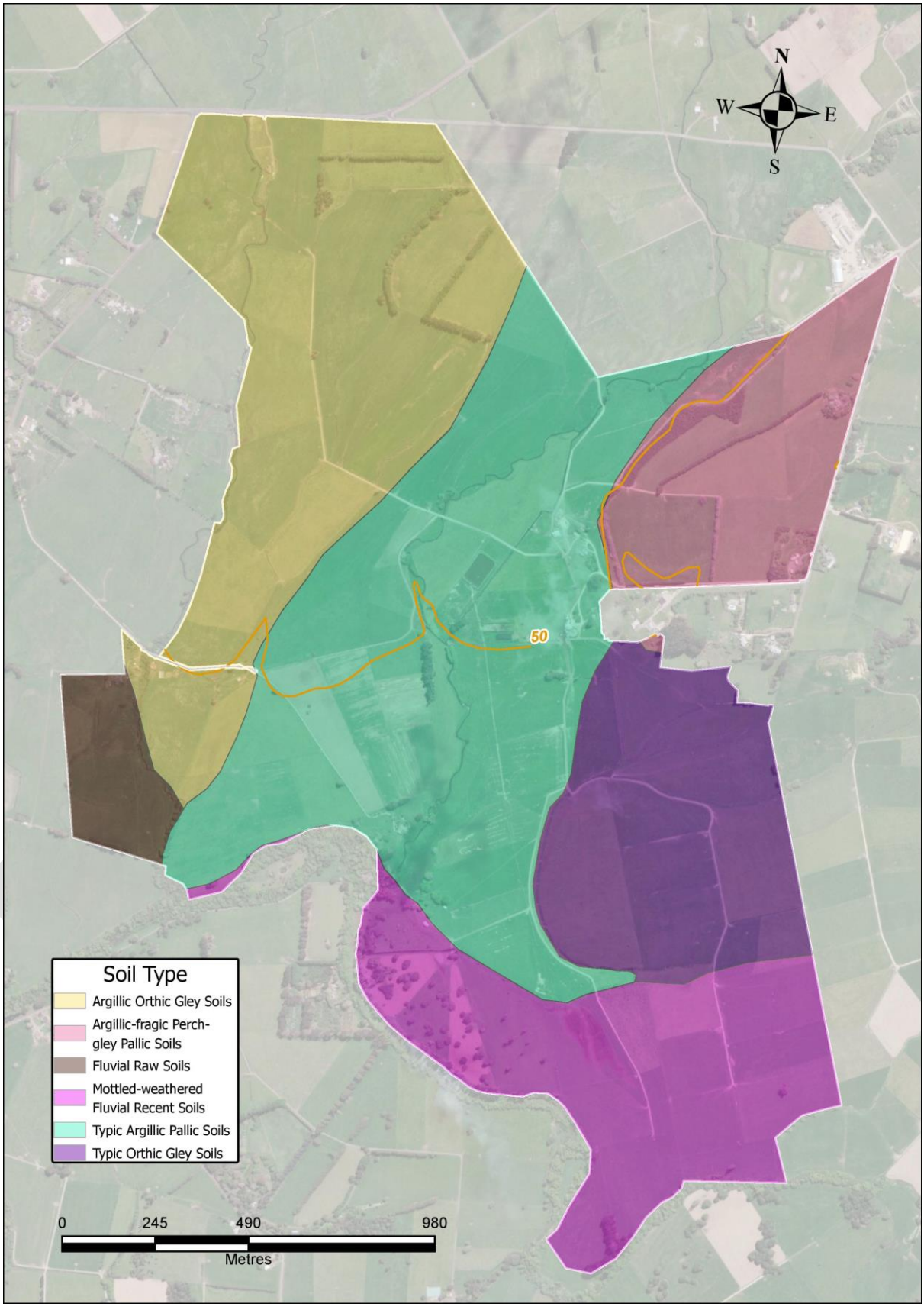
7. Farm maps

Map	Applicable (Yes or NA)	Map (name or number)
The property boundaries of the land being farmed	Yes	All maps
The boundaries of the main land management units or land uses on the land being farmed	Yes	Land management unit (3.1)
The catchment and sub-catchment that the farm is within and a map showing the location of the farm within the sub catchment	Yes	Sub-catchment (7.1)
Soil types and topography at 1:50,000 scale	Yes	Soils (7.2)
The location (and for named waterbodies, the names) of any permanently or intermittently flowing waterbodies on the property including; • **rivers,** • **streams,** • **drains,** • **wetlands,** • **lakes, and** • **springs, and** • **specifically identifying any waterbodies that meet the criteria for stock exclusion in the Regional Plan and/or Resource Management (Stock Exclusion) Regulations 2020**	Yes	Waterways and Scheduled Sites (7.3); and Waterway types and crossings (7.4)
The location of any site or river included in Schedules B, C, F1 and F3 of the Plan that is within, or adjacent to, the property	Yes	Waterways and scheduled sites (7.3)
The location of riparian vegetation and fences (or other stock proof barriers adjacent to water bodies)	Yes	Riparian Planting (7.5)
The location of any stock crossing points or structures on any water bodies where stock have access	Yes	Waterway types and crossings (7.3)
The location of any critical source areas, and hotspots for contaminant loss to groundwater or surface water	Yes	Critical source areas (7.6)
The location of any surface and (where known) sub-surface drains	N/A	N/A
The location(s) of the actions and practices that will be adopted to ensure the effective management of contaminant loss on the farm [completed by a certifier]	Yes	Map 3.1, &.4 & 7.5 – As outlined in action table above.
Any other feature or characteristic of the land necessary to assess the risk factors set out in Tables 1 to 3; • **Effluent applications including liquids and solids** • **Animal types** • **Erosion/sediment issues** • **Cropping areas**	N/A	Maps 3.1 – 3.6 & 7.2 – 7.7

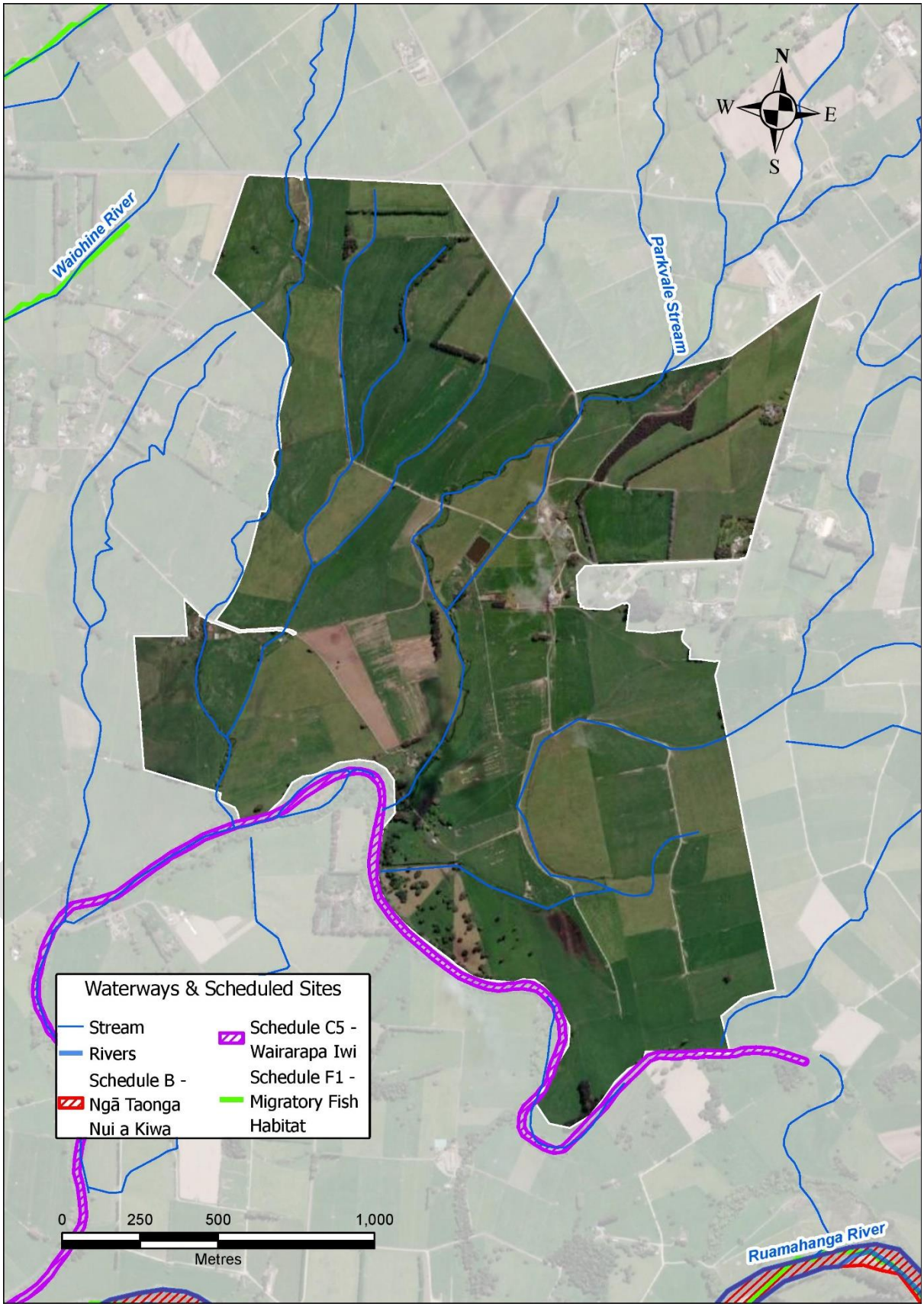
7.1 Farm map – Sub-catchment



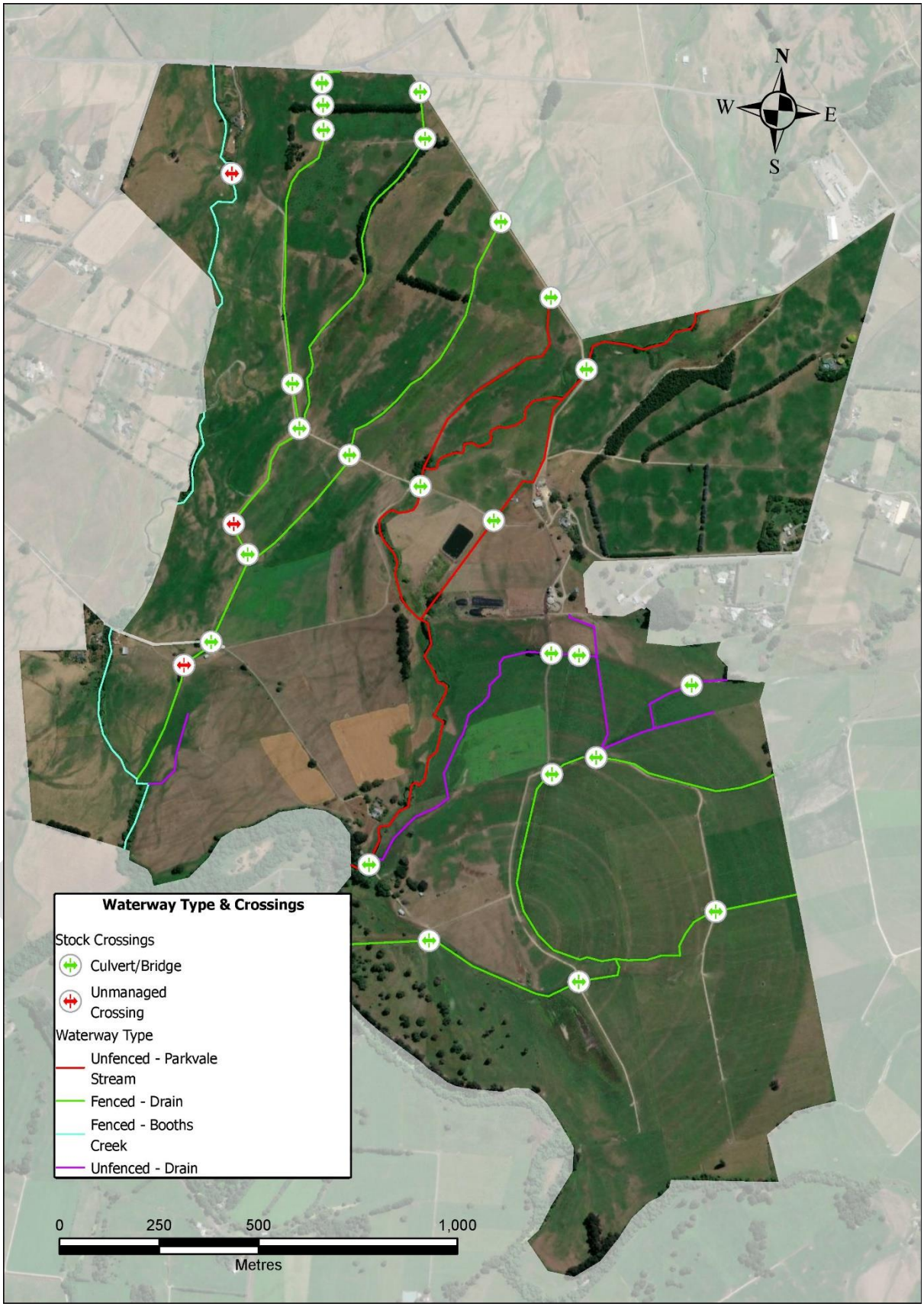
7.2 Farm map – Soils



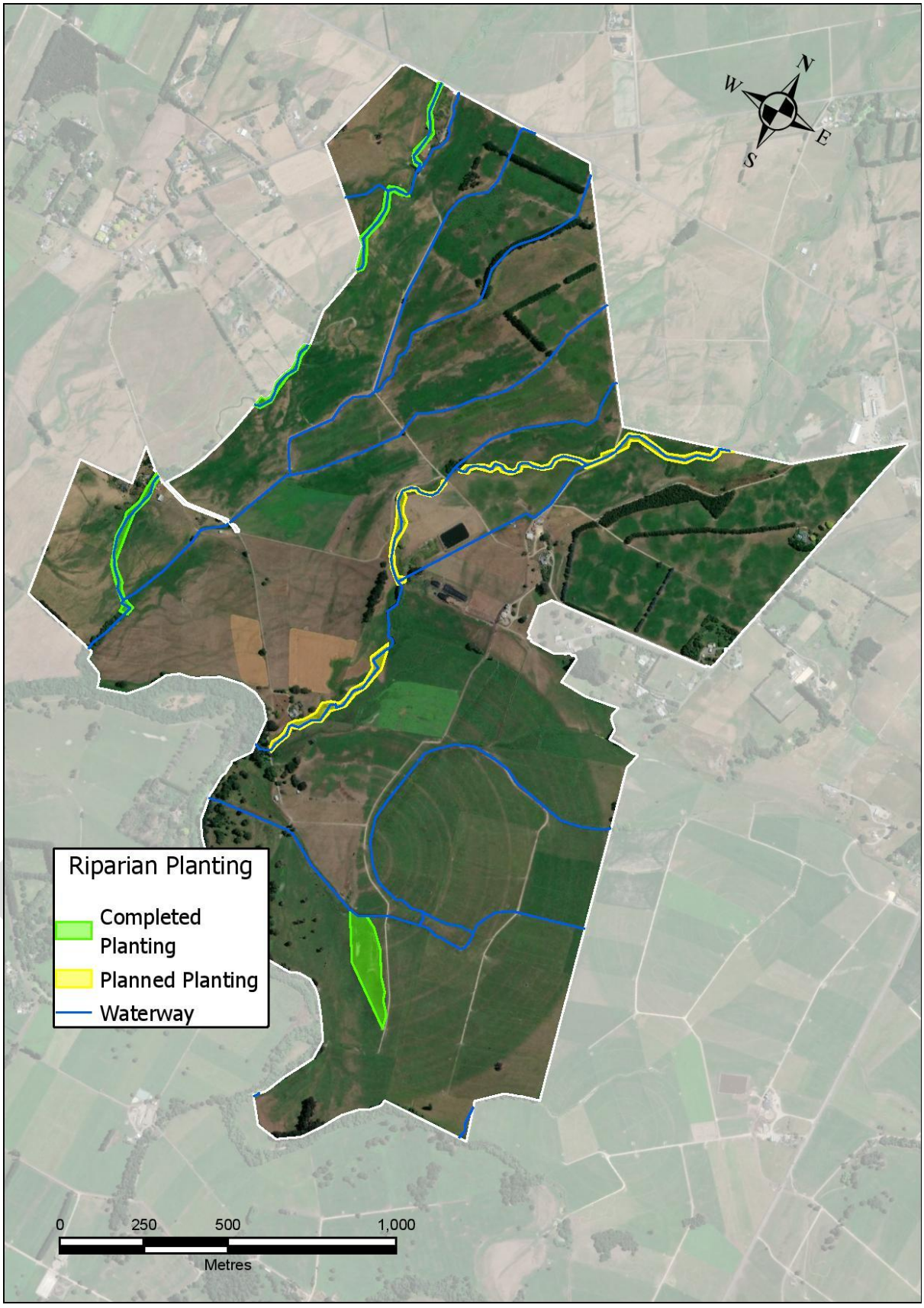
7.3 Farm map –Waterways and scheduled sites



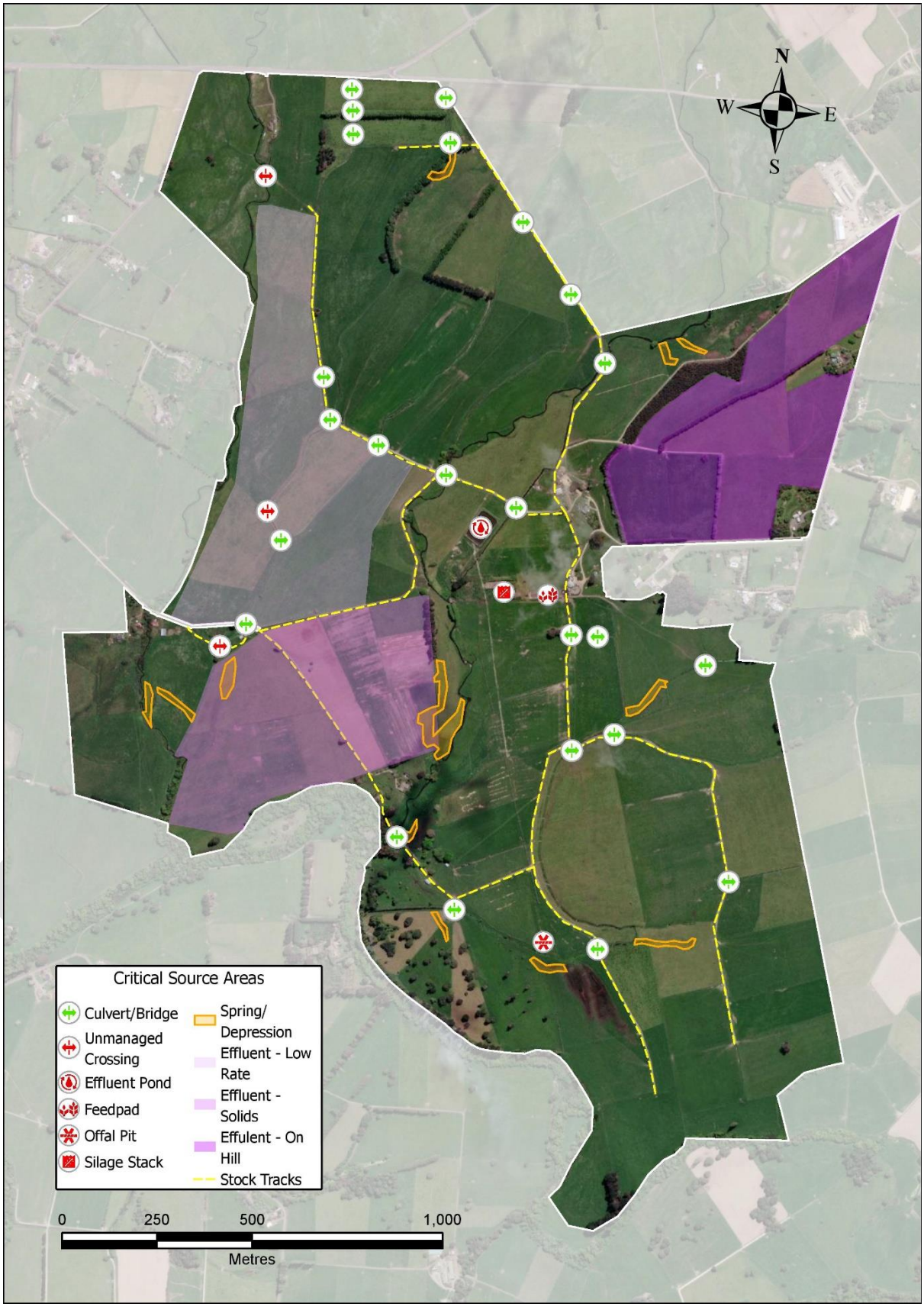
7.4 Farm map – Waterway types and crossings



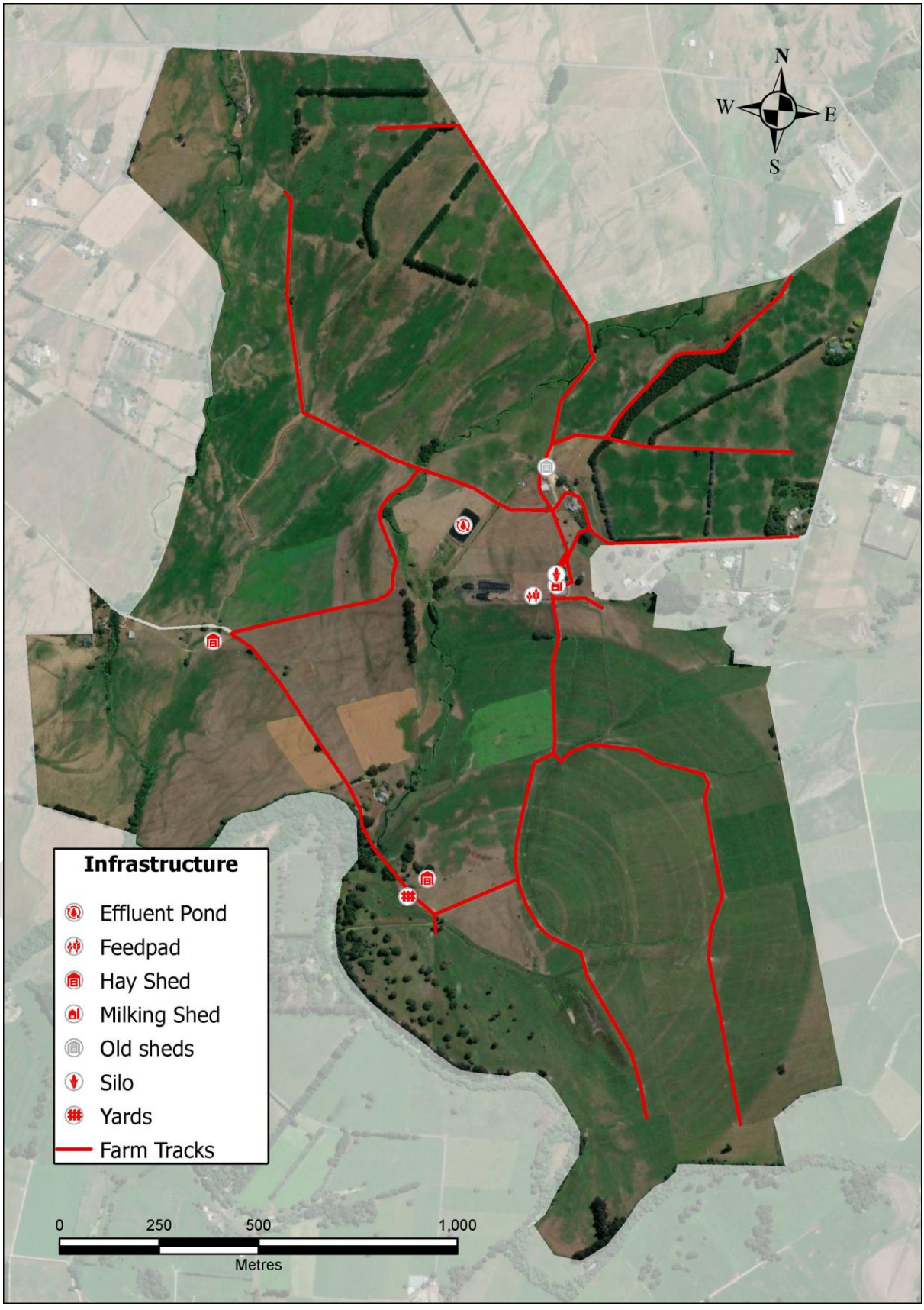
7.5 Farm map – Riparian planting



7.6 Farm map – Critical source areas



7.7 Farm map – Infrastructure



Appendix A: Dairy Farm mitigations/good management practices (GMPs)

Risk	Mitigation/GMP
Dairy industry specific GMP's - DairyNZ good-farming-practices-environmental-management	
Soil structure degradation, including erosion through run-off, and wind blow. Soil compaction, e.g., pugging	Continue no tillage or low impact cultivation methods and timing whenever possible. Direct drilling is known to maintain soil structure, reducing the risk of damage i.e., pugging, and can assist in growing the organic matter.
Nutrient contamination to waterways	Continue to feed out supplements away from waterways and/or critical source areas. Feeding out supplement can cause contamination of waterways and reduces utilisation if incorrectly placed. Ensuring that supplements are placed away from waterways and critical source areas reduces contamination risk and loss of feed.
Nutrient loss	Seek advice around the best way to read and operate irrigation off the two Harvest soil moisture meters. Consider recalibration if showing soil moisture incorrectly. Soil moisture meters often need to be recalibrated to the correct soil type that they are in, this ensures that they are measuring and displaying the correct mls required.
Nutrient loss	Continue to complete annual winter servicing checks with a provider on the pivot, and in-house checks regularly on all irrigation. Maintenance is crucial element to irrigation operation, ensuring that the machine irrigates efficiently and effectively.
Nutrient loss	Continue with the planning and planting of large riparian buffers. Engagement with Greater Wellington to investigate funding options and plant a selection of suitable native riparian plants.
Nutrient loss	Continue to utilise soil moisture meters, including the soil temperature for fertiliser application, especially in the shoulder seasons. It is recommended to apply nitrogen at temperatures rising from 8 degrees, this ensures that the plant is actively growing and will utilise the nutrient. The soil moisture probes give soil temperature information.
Nutrient loss	Continue to have a nutrient management plan for pasture and crop from a fertiliser advisor. Applying fertiliser to the plant requirements.

	This ensures that application rates are at optimum levels for plant response and utilisation, reducing losses through drainage and/or run-off.
Nutrient loss	Continue to monitor Nitrogen loss rates and purchased N surplus through the Fonterra programme. Monitoring the Nitrogen loss rates, and the purchased N surplus annually allows for understanding of slight farm system changes and their effect on Nitrogen within the system. This also shows long term trends of whether N losses are reducing or increasing.
Nutrient loss	Continue to monitor soil nutrients through soil testing to ensure Olsen P and other nutrients are maintained at agronomic levels. This is an efficiency and an environmental action, to ensure that the nutrients applied will be utilised and maintained to encourage and support plant health and growth, whilst not exceeding requirements and posing an environmental risk.
Soil damage/compaction. **Nutrient, sediment, E.coli loss**	Carefully select your paddocks, grazing routines and crops to minimise disrupting the soil and runoff to waterways, particularly during winter months. During wet periods it is best practice to focus on paddocks with moderate to well-draining soils, as these are less likely to have soil damage and therefore reduces the risk of sediment and phosphate entering waterways.
Nutrient, sediment, E.coli loss	Maintain races and direct the water run off away from waterways and into paddocks using cut-offs. Tracks are well maintained, with buffers in place between them and waterways. Culverts and bridges are generally bunded but over time these can erode, with fences needing to be shifted and rebunded to ensure contaminants do not directly enter waterways.
Nutrient loss	Continue to monitor and apply effluent carefully and at low rates, particularly on hilly areas. Hilly areas receiving effluent through a travelling irrigator is more susceptible to run-off which could contaminate surrounding property, bores and waterways. Ensuring effluent is applied at low rates and at appropriate times when the soil can assimilate it, reduces this risk.
Rubbish	Continue to recycle baleage and silage covers through Plasback. Continue to export rubbish through the skip bin at the shed
Contaminant loss to waterways	Ensure when a new offal hole is dug it follows the greater Wellington guidelines https://www.gw.govt.nz/assets/Userguide-for-Offal-Pits-Permitted-Activity.pdf, including ensuring it is at least 50m from a waterway, gully or wet area.

	When an offal pit is poorly managed or in the wrong place (close to a waterway), it can leach contaminants which negatively affect water quality, and potentially human and animal health.
Contaminant loss	Diesel and petrol can contaminate soil and move with run-off to waterways or bores. Investigate options to mitigate contamination, such as a concrete pad with bunds or a spill kit for the fuel storage to ensure that any spills that may occur can be contained. It is best practice to ensure that any spills are either contained or able to be mitigated through a spill kit (i.e. lime chip).

Appendix B: Soil nutrient risk table

Identifying and understanding soil types and their limitations is important. These should be accounted for when making land management decisions. Map 7.2 relates

Soil Sibling [Soil map colour]	Common Names	LMU's	Drainage Class	Structure & Leaching	Texture
Ayre_12a.1 ***Argillic Orthic Gley Soils*** **[pink]**	Ayreburnf deep silt over clay	3 & 5	The soil is poorly drained with very high vulnerability of water logging in non-irrigated conditions and has moderate soil water holding capacity. PAW: 100mm	Inherently these soils have a very high structural vulnerability and a low N leaching potential.	The topsoil typically has silt texture and is stoneless. The subsoil has dominantly clay textures, with gravel content of less than 3%. The plant rooting depth is 60 - 80 (cm), due to a continuous hard pan that impedes root growth and oxygen supply.
Darn_17a.1 ***Typic Argillic Pallic Soils*** **[Yellow]**	Darnleyf very stony silt	2, 3 & 5	The soil is moderately well drained with moderate vulnerability of water logging in non-irrigated conditions and has moderate to low soil water holding capacity. PAW: 73mm	Inherently these soils have a high structural vulnerability and a high N leaching potential	The topsoil typically has silt texture and is very stony. The subsoil has dominantly silt textures, with a very gravelly layer from less than 45 cm mineral soil depth to more than 100 cm. The plant rooting depth extends beyond 1m.
Lees_6a.1 ***Argillic Orthic Gley Soils*** **[Orange]**	Leestonf stony clay	2, 4 & 5	The soil is poorly drained with very high vulnerability of water logging in non-irrigated conditions and has moderate to high soil water holding capacity. PAW: 122mm	Inherently these soils have a high structural vulnerability and a very low N leaching potential.	The topsoil typically has silt texture and is stoneless. The subsoil has dominantly silt textures, with a very gravelly layer from less than 45 cm mineral soil depth to more than 100 cm. The plant rooting depth extends beyond 1m
Ruam_7a.1 ***Fluvial Raw Soils*** **[Blue]**	Ruamananoaf deep loam over sand	5	The soil is well drained with very low vulnerability of water logging in non-irrigated conditions and has moderate to low soil water holding capacity. PAW: 82mm	Inherently these soils have a very high structural vulnerability and a high N leaching potential.	The topsoil typically has sand texture and is moderately stony. The subsoil has dominantly sand textures, with a very gravelly layer from less than 45 cm mineral soil depth to more than 100 cm. The plant rooting depth is 50 - 80 (cm), due to an extremely gravelly horizon with extremely low water storage capacity.
Waka_25a.1 ***Mottled Immature Pallic Soils*** **[Green]**	Wakanuif deep silt over clay	1 & 5	The soil is poorly drained with high vulnerability of water logging in non-irrigated conditions and has high soil water holding capacity. PAW: 183mm	Inherently these soils have a moderate structural vulnerability and a very low N leaching potential	The topsoil typically has silt texture and is stoneless. The subsoil has dominantly clay textures, with gravel content of less than 3%. The plant rooting depth extends beyond 1m.
Kaia_5a.2 ***Mottled-weathered Fluvial Recent Soils*** **[Light green]**	Kaiapoif deep silt	1 & 5	Generally, the soil is imperfectly drained with low vulnerability of water logging in non-irrigated conditions and has high soil water holding capacity. PAW: 229mm	Inherently these soils have a high structural vulnerability and a low N leaching potential.	The topsoil typically has silt texture and is stoneless. The subsoil has dominantly silt textures, with gravel content of less than 3%. The plant rooting depth extends beyond 1m.

Appendix C: CCCV tool information [Above Sch Z requirement]

Freshwater Management Unit

Catchment context, challenges and values (CCCV)

Greater Wellington
Te Pane Matua Taiao

Find information useful for creating a Freshwater Farm Plan, such as contaminant goals, sites of significance, and implementation ideas for your catchment area.

Parkvale Stream

The Parkvale catchment is located on the lowland plains of the Valley floor streams Freshwater Management Unit group (FMU) in the Ruamāhanga Whaitua. The area is known for its high leaching soils and complex hydrologyand waterways. These waterbodies include the spring fed and intermittently flowing Parkvale stream and the Taratahi water race, which are fed by the Waingawa River. The catchment contains a mix of dairy/dairy support, sheep and beef farming, and lifestyle blocks, and sits between Carterton and Masterton townships.This is an area of intensive farming activity and productive soils. The soils tend to be very thin, meaning ground and closely connected surface water are at risk of becoming polluted with highly soluble contaminants such as nitrates. The Parkvale is impacted by high nutrient levels, lowish flows and a lack of shading, meaning that periphyton can be a considerable problem.Parkvale Stream is identified in Schedule H2 of the PNRP as a second priority water body for improvements for secondary contact recreation.

Freshwater Values, Priorities, and Outcomes

The Parkvale Stream falls below the national bottom line for E. coli, which is a national driver for improvement in water quality for swimmability. Modelling shows high E. coli levels are driven through high rainfall. This indicates that mitigation efforts should focus on managing overland flow and critical source areas. The stream is used for supplying stock water, so the improvements in E. coli will have a positive effect on the economic value (stock health) as well as other values.Some parts of the Parkvale Stream have the highest nitrate levels of any monitored waterway in the Ruamāhanga catchment. Data gathered on the catchment has noted that levels of nitrate-nitrogen in ground water are generally elevated, which affects freshwater stream quality and ecology due to the inter-connected nature of the catchment's hydrology. Soil quality is also affected through elevated nutrients, particularly excessive phosphorus which can run off into waterways during storm events, and from intensified land use.
A significant amount of flow is derived from groundwater (particularly during times of low flow) and these result in low dissolved oxygen.Soil type plays a bit part in how nutrients are held or lost within the catchment. In areas that have well drained soils, you will find a close connection to surface water and ground water. In poor drained soils, the surface water is less connected to ground water. In poorly drained soils, nutrients can stay within the soil profile for longer which gives plants more opportunity to use it, in a well-drained soil this opportunity is not the same. Nutrients are often leached into the ground water or into nearby streams before plants have a chance to use it.

Contaminants

Freshwater objectives from Parkvale Stream Whaitua Implementation Plan (as at August 2018)

	Base	Objective
E. Coli	E For more than 30% of the time, the estimated risk of Campylobacter infection is ≥50 in 1,000 (>5% risk). The predicted average infection risk is 7%.	C (by 2040) For at least half the time, the estimated risk of Campylobacter infection is <1 in 1,000 (0.1% risk). The predicted average infection risk is 3%.
Periphyton	B Occasional blooms reflecting low nutrient enrichment and/or alteration of the natural flow regime or habitat.	B (by 2040) Occasional blooms reflecting low nutrient enrichment and/or alteration of the natural flow regime or habitat.
Ammonia toxicity	B 95% species protection level: Starts impacting occasionally on the 5% most sensitive species.	A (by 2040) 99% species protection level: No observed effect on any species tested.

Nitrate toxicity	B Some growth effect on up to 5% of species.	A (by 2040) High conservation value system. Unlikely to be effects even on sensitive species.
MCI	Fair*	Good (by 2040)

Cultural Significance of the Catchment

Mana whenua are Ngāti Kahungunu ki Wairarapa, who have Hurunui marae and Pahikitea pa located within the catchment, and Rangitāne o Wairarapa. Ngāti Kahungunu at marae level (Hurunui marae), note the following:•Mana Whenua view Parkvale stream and Taratahi water race as one•The industrial zone needs further investigation regarding its potential contribution to nitrate levels•Wetlands have had a key role to play in the past and now in terms of cleaning water, as a growing and nurturing zone, a carbon sink, and a collection point for sediment.

Sites of Significance

This area contains sites of significance to Tangata Whenua.

- Te Para, Te Para Stream
- Te Awa Tapu o Ruamāhanga (Ruamāhanga River and named tributaries)

Implementation Ideas

- Consider wetlands for water quality treatment before discharges reach the stream
- Setbacks from depressions and waterways should be necessary for intensive land uses including winter grazing and winter cropping
- Riparian planting should be undertaken in strategic spots, including to provide shade to help improve periphyton and macrophyte problems
- Good management of stock access to streambanks and of winter grazing may prove important in this catchment

Other Relevant Information

Climate Change advice notes that Parkvale will increasingly be prone to drought with reduced rainfall and up to 70 days reaching 25 degrees or more annually by 2040. The change in the number of days of high and extreme forest fire danger will increase by up to 150%.Climate change will mean an increase in the volume of pests (and need for pest control) and tropical diseases. Heat stressed cows will affect milk production so land owners may need to diversify their land use, and alter stocking rates. Water quality will decrease due to increased evaporation and low water flows, particularly in summer (river mean annual flow discharge will decrease by up to 60% by 2040). The lack of water will also lead to water security issues, which, combined with greater demand for water, will lead to a need for more water storage.

About this Information

The content, data, and information used in this app comes from multiple sources, including Greater Wellington's Natural Resources Plan (2018) and Whaitua Implementation Plans, and the National Policy Statement for Freshwater Management 2020 (Amended January 2024).

Appendix D: Links [Above Sch Z requirement]

Offal pit information: https://www.gw.govt.nz/assets/Userguide-for-Offal-Pits-Permitted-Activity.pdf

Stock exclusion regulations https://www.gw.govt.nz/environment/land-use/stock-exclusion-regulations/

Stock water race maps: https://experience.arcgis.com/experience/f7448a0e5db4450a862ad434c1524ed6/

Stock water race information: https://www.gw.govt.nz/environment/land-use/water-races/

Good management practices

https://farmmenus.org.nz/

https://www.dairynz.co.nz/media/wgmfyjbo/good_management_practices_april_2016.pdf

https://beeflambnz.com/knowledge-hub/PDF/industry-agreed-good-management-practices-relating-water-quality.pdf