

Appendix G – Irrigation Development Plan



Glenturret Farm Limited

Infrastructure Development Plan

September 2017

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1. Introduction

1.1 Background

The following Infrastructure Development Plan (IDP) has been prepared on behalf of Glenturret Farm Limited, to meet the requirements of the Hurunui Waiau River Regional Plan (HWRRP).

The IDP has been developed specifically for the properties owned and operated by the Harris family, as detailed below. In addition, the development of the irrigation infrastructure has been forward looking, with redundancy incorporated into the intake and reticulation system to enable further expansion and delivery of water to neighbouring properties, if required.

Management of the farms is undertaken in accordance with the Farm Management Plans (FMPs) and consent conditions. In addition, Glenturret Farm (and Wharenui) is in the process of joining the **Cheviot Irrigators Group**, which is an ECan approved irrigators group

1.2 Purpose of this report

The purpose of the IDP is to clearly identify the infrastructure plan and opportunities for Glenturret and neighbouring properties to efficiently access and use water from the Hurunui River.

1.3 Infrastructure Development Plan – Definition

The HWRRP states that an Infrastructure Development Plan is a Plan submitted with a resource consent application. The definition of what is to be included in the IDP is summarised in Table 1-1, with the applicability of the requirements to the Glenturret Farm and Wharenui Farm irrigation plans noted.

Table 1-1 IDP Requirements

IDP Clause	Requirement	Comment
(a)	Description of infrastructure development for optimal irrigation, including additional land adjacent to the site	Applies
(b)	Location of any water storage reservoirs, and description of: (i) the size of reservoirs (ii) the operating rules (iii) any recreational activities that could be provided (iv) any riparian management	Does not apply
(c)	A map and a description of the location of the point(s) of take, any diversion(s) and any discharge(s)	Applies
(d)	A description of how existing abstractors' reliability, within the affected area, will remain the same or improve under the proposed development	Applies
(e)	A description, including the location, of any riparian planting or other biodiversity works proposed to assist in managing water quality.	Applies

(f)	A description of the properties, including their location, that will be provided with water from the proposed scheme (or where this is not confirmed, the properties that could be provided with water) and the application rate that is proposed for each property.	Applies
(g)	A description of how any water will be distributed and the measures proposed to ensure it is used with maximum efficiency.	Applies
	<i>Clauses (h) to (j) apply to hydro-electric proposals and are not addressed in this IDP</i>	

1.4 Limitations

This report: has been prepared by GHD for Glenturret Farm Limited and may only be used and relied on by Glenturret Farm Limited for the purpose agreed between GHD and the Glenturret Farm Limited.

GHD otherwise disclaims responsibility to any person other than Glenturret Farm Limited arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

1.5 Assumptions

The following assumptions were adopted in the formation of the IDP:

- Land identified for potential future irrigation are indicative only and in no way implies that water will be supplied or agreements have been entered into in terms of supply with the infrastructure owners.
- Demand areas are based on desktop analysis only.
- Optimisation of irrigation systems to be undertaken during detailed design.

2. Infrastructure Development

2.1 Overview

The IDP has been developed to address the requirements of the HWRRP. Glenturret Farm Limited and its associated entities have invested in the construction of irrigation infrastructure to enable the irrigation of their lands, with the potential for increased irrigation areas incorporated into the existing infrastructure through redundancies.

Much of the irrigation infrastructure is already constructed, with the on-farm distribution and irrigation systems continuing to be installed and commissioned on the Glenturret and Wharenui properties.

Figure A1 provides a schematic of the existing system (**Appendix A**).

2.2 Reliability of supply

The water used for irrigation is a run-of-river abstraction with no on-site storage currently provided for or planned. There are currently two intakes for the properties, which are described in section 2.3.

The operational rules of the irrigation of the properties are governed by the minimum flow restrictions placed on the existing consents. The reliability of the irrigation is subject to the flows in the Hurunui River, measured at SH1 Bridge. Aqualinc (2016) undertook an assessment of reliability of supply to the lower reaches of the river following the proposed piping of the Amuri Irrigation Company scheme water.

Aqualinc (2016) found that the existing A permit reliability for takes below SH1 between October and March were 98%. Post the AIC piping of the reticulation network the change in reliability in the lower reaches would be between 96%-98% (i.e. very minimal change).

Given the very high reliability, the investment in on-site storage is not currently envisaged given the allocation of A – Permit water and the existing irrigation command area. In the future, B-Permit water may require storage to be more reliable through the summer months. However, at this stage there are no plans for storage.

2.3 Irrigation Infrastructure

The following provides a description of the existing and potential future irrigation infrastructure owned by Glenturret Farm Limited.

2.3.1 Intake Infrastructure

The following provides information on the intake infrastructure. Photographs of the main intake are provided in **Appendix B**.

- Water is diverted from the Hurunui River at or about NZTM 2000: 1617130-5252560, via a former channel within the existing riverbed, before flowing into a ponded area around the intake gallery system. A bypass channel connects the diversion back to the river at or about NZTM 2000: 1618680-5252239.
- The main intake is at or about NZTM 2000: 1618580 – 5252510. It consists of two pumps and a combination of a gallery and direct surface water intake.
- A static fish screen is installed across the entrance to the intake pond.
- A secondary abstraction point for the lower terraces of Wharenui is located at or about NZTM 2000: 1615945-5252625, which is from a gallery/surface pond, which is directly

connected to the Hurunui River at or about NZTM 2000: 1615890-5252515 (point of diversion). A fish screen is placed over the intake.

- A bypass channel returns flow back to the Hurunui River at or about NZTM 2000: 1616110-5252585.

2.3.2 Rising Main Capacity

The primary intake for the Glenturret Property has been designed to pump up to 0.5 m³/s from the pond. The main riser conveys water to the booster pump shed located on Darrochs Road. From the booster pump water is directed to Glenturret Property (i.e Downlands West LMU, Downlands East LMU) and has the potential to provide water to the following neighbouring properties:

- Kidd Property (KDR LMU1)
- LePine Property (LPE LMU1)

Midway between the intake and the main booster pumps, water is directed through the mainline to HAR LMU2. Additional capacity is available in the design to direct water to:

- McLaughlans (MCL LMU1 and MCL LMU2)

The secondary intake has been sized for the supply of the HAR LMU1 block only.

2.3.3 Irrigation Areas (existing)

The table below provides a summary of the existing irrigation areas (as currently commissioned)

Land Management Unit	Area irrigated (Ha)	Rate (L/s)
Downlands West LMU	127.6	~74 L/s
Downlands East LMU	~ 22	~36 L/s
HAR LMU1	89.5	52 L/s
HAR LMU2	165.2	96 L/s

2.3.4 Irrigation Areas (future)

The table below identifies future consented irrigation developed (already planned) and options for additional areas for irrigation subject to consent approval. The demand is based on 0.62 L/s/ha and will be confirmed during detailed design. The LPE LMU is already irrigated with a private supply. However, the Glenturret scheme could physically provide water to the property if required.

Land Management Unit	Area irrigated (Ha)	Demand (L/s)	Consented
Downlands West LMU	26	~16 L/s	Y
Downlands East LMU	215	~133 L/s	Y
HAR LMU1	14.8	~9	Y
HAR LMU2	17.8	~11	Y

MCL LMU1	52	~32 L/s	N (currently applied for)
MCL LMU2	18	~11 L/s	N (currently applied for)
KDL LMU1	25	~16 L/s	N
LPE LMU1	34	~21 L/s	Y

3. Water Quality Management

3.1 Introduction

Each farm has its own Farm Management Plan, which incorporates the fencing of waterways, establishment of riparian planting, and other water management aspects. The following provides an overview of the measures undertaken to date and those proposed for future irrigation areas.

3.2 Riparian Zones and Wetlands

Figure A2 provides an overview of the various areas of the properties that have existing or proposed riparian fencing and planting. Table 3-1 below provides a summary of the completed and proposed works.

Table 3-1 Land Management Activities

Area	Sensitive Area	Action	Status
Downlands West LMU	Terrace seepages	Seeps have been fenced and planted with natives	Completed
	Farm Drains	Fenced drains and plant banks	Completed
	Western drain – swales	Create wetlands in areas of low point to capture silt/sediment	Completed
Downlands East LMU	Honeymoon Creek – riparian	Fence creek main channel to prevent stock access. Plant area between creek and fence	Planned – no irrigation yet
	Gullies of Honeymoon Creek	Fence off main gully areas and plant in exotic or natives.	Planned.
HAR LMU1	Base of Terrace	Fence off drain and remove silt from drain. Provide planting	Terrace drain is fenced. Planting is planned.
	Willow and wetland areas	Fencing of willow/wetland area, progressive removal of willows and establish native plants	Completed fencing. Some willows removed but more planned.

	Former channels with high GW levels	Drainage to be installed with flows diverted to wetlands	Planned – no stock in these areas until completed.
HAR LMU2	Flood channels across terrace taking sediment and nutrients.	Eastern channel to be fenced and planted. Discharges to wetland on lower terrace	Completed. Wetland planting developed adjacent to Darrachs Road. Existing willow wetland area to be enhanced. Fencing complete.
		Western channel to be converted to grass swale. Discharge to sediment trap on lower terrace.	Continued improvement and adjustment of land management. Natural sediment trap area to be enhanced.
HAR LMU3	Wetlands and open water bodies	Old river channels have standing water and large willow stands.	Area is fenced off. Removal of willows over time. Enhance wetland areas.
	River Erosion of land	Willow trees along margin of river bank to be maintained to protect against erosion.	Maintain status quo
	Wilding pines / exotic plants and willows	Maintain a programme to remove exotic trees that do not serve purpose for erosion control	Planned
MCL LMU1	Honeymoon Creek	Provide set back fencing prior to irrigation.	Planned
		Riparian planting around areas of sustained water / pond	Planned
	Sediment runoff	Minimise irrigation on steep slopes and riparian planting / buffer zones	Planned

MCL LMU2	Lower Honeymoon Creek	Fencing and development of wetland areas through removal of willows	Planned
	Erosion of land	Maintain willows along margin of the Hurunui River	Planned

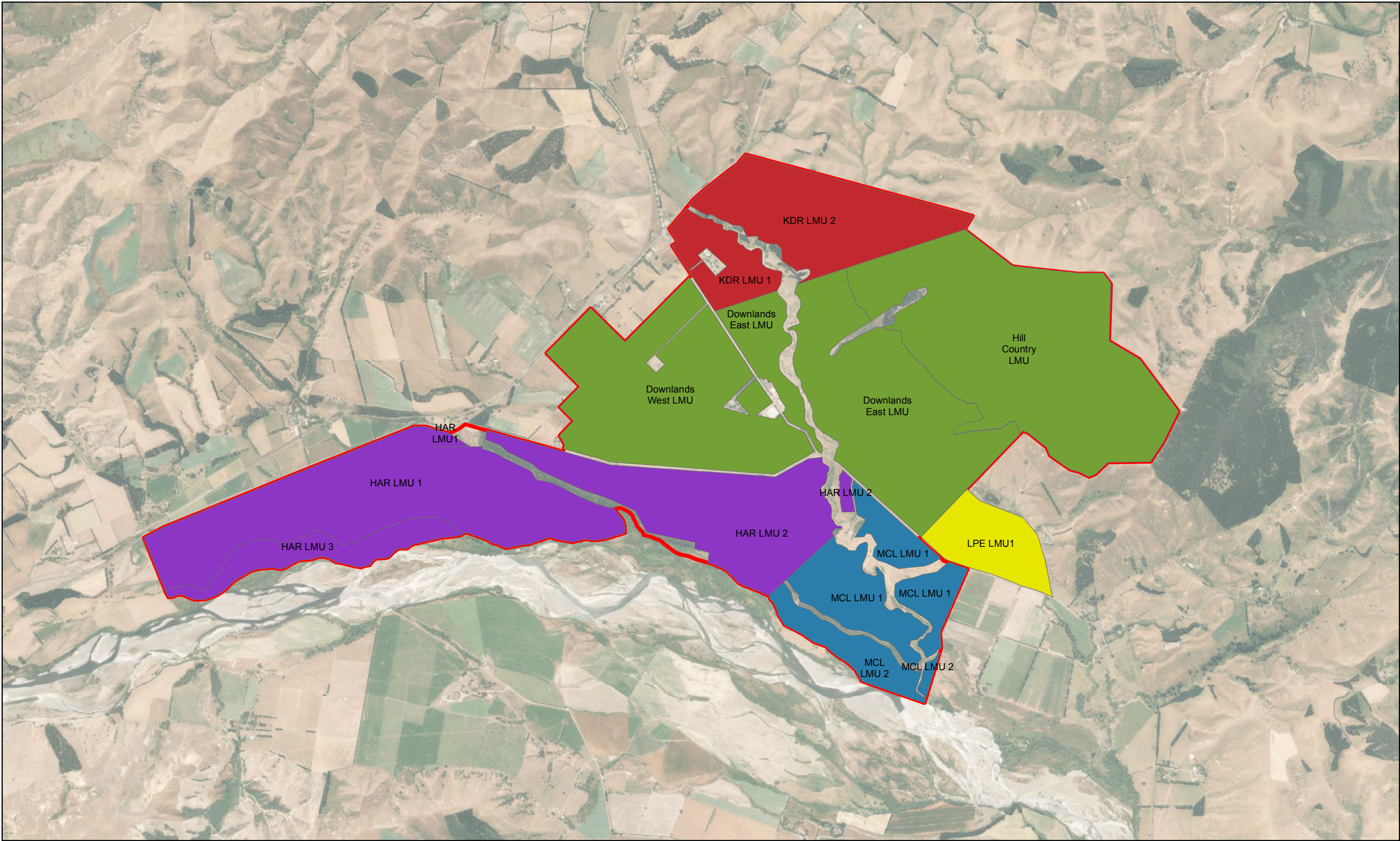
3.3 Other Management Tools

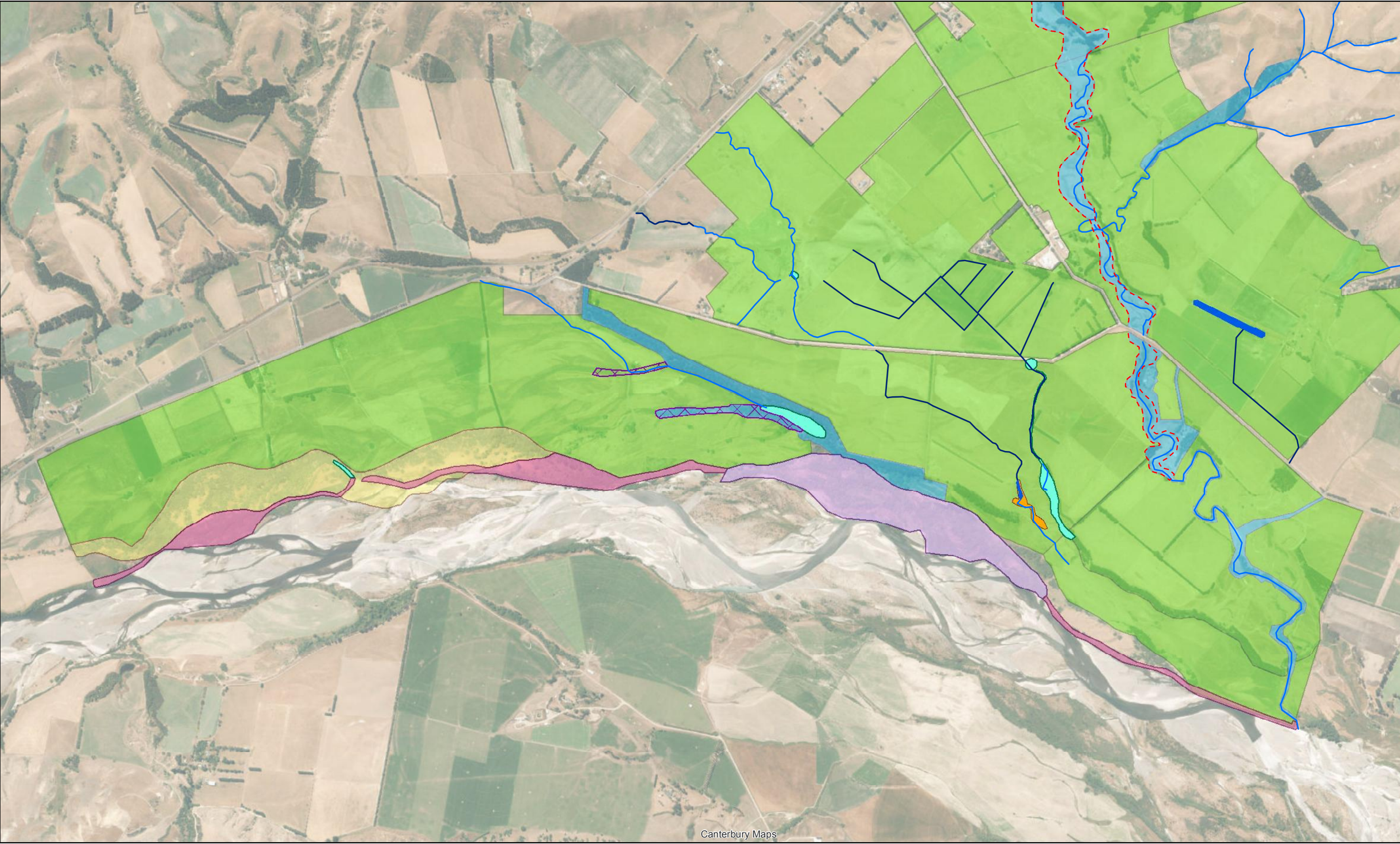
The Farm Management Plans and the regular audits of the FMPs will ensure that the management of the property meets the industry good management practice. In addition, Glenturret Farm (and Wharenuui) is in the process of joining the **Cheviot Irrigators Group**, which is an ECan approved irrigators group.

- Implementation of technology to assist with tracking of farm activities (e.g. Farm at Hand App)
- Irrigation scheduling using soil moisture probes
- Maintain vegetative buffer between winterfeed areas and waterways.
- General pasture and animal management practices on farm to prevent sediment run-off.
- Targeted fertilizer applications in accordance with best practice (as stated in the FMP).
- Adaptive management of land to identify areas where improvements could be made to continually improve pasture, stock, and water management outcomes.

Appendices

Appendix A – Irrigation Infrastructure & Management Plans





Paper Size A3

0 200 400 800

Metres

Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

LEGEND

Drain	Fenced Off Areas	Wetland
Ephemeral Waterway	Sediment Trap	Willows
Hotwire Fencing (flood prone)	Pond	Willows/exotics

Farm Management Area Irrigation Areas

Irrigated Area
Pastoral Area
Riparian Plantings and Fencing

Domett Plains Irrigation

Irrigation Command Area Sensitive Areas

Job Number	5133730
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Figure 2C

Appendix B – Photographs

Photographs



Fenced waterway and vegetative buffer – Wharenuī



HAR-LMU2: Pivot and fencing – stream fencing



Early wetland development HAR LMU2



Fenced waterway – Plantings – Downlands West LMU



Booster Pump House – Darrochs Road



Primary Intake Pond – Pump house



Primary Intake



Diversion channel upstream of Pond



Fenced waterway HAR LMU1



Fenced waterway – sediment trap – wetlands in the distant background

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