

Memorandum

To: Gavin Kemble **Of:** Ryder Consulting
From: Ian McIndoe **Date:** 10 August 2009
Subject: FIVE RIVERS PROJECT SUMMARY

1 BACKGROUND

1.1 Property Location

Map References: NZMS 260 H39:658-500
Legal Description: PT Section 1 BLK IV Ohau Lake SD
PT Section 2 BLK IV Ohau Lake SD
Physical Description: Ohau Downs

PUMP STATION AND INTAKE

Map References: Intake to be located at or about map reference NZMS 260 H38:6563-5352. Pumping stations to be located at or about map references NZMS 260 H38:6566-5350 and H38:6572-5347.
Legal Description: PT Section 1 BLK IV Ohau Lake SD
Physical Description: Ohau Downs

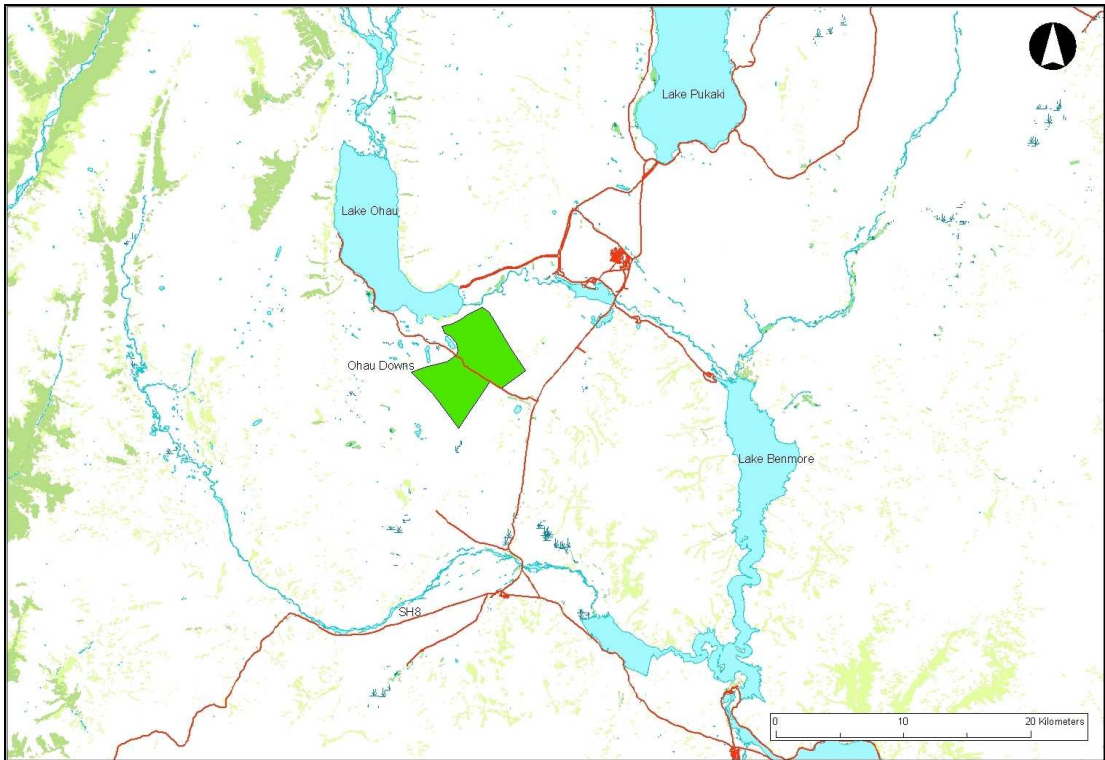


Figure 1: Property location

1.2 Intake/ delivery Options

Intake to be located at or about map references H38:6563-5352 along the shoreline of Lake Ohau. An underground submersible pump station is to be located at or about map reference H38:6566-5350, and the main booster pump station at or about map reference H38:6572-5347. Refer to Figures 2-4.

1.3 Consent Applications

CRC061154: A water permit to take up 950 ℓ/s of water from Lake Ohau between map reference H38:6563-5352 for spray irrigation of pasture and crops, including dairy, and for stock water and domestic use.

CRC100225: A land use consent to place an intake structure under the bed of lake Ohau at or about map reference H39: 6566-5350.

A resource consent associated with the proposed discharge of effluent to land via spray irrigation has recently been prepared and will be submitted to Environment Canterbury shortly.

2 IRRIGATION

Location of irrigated area: Part of Ohau Downs, located to the south of Lake Ohau, between Lake Ohau and Twizel Omarama Road. See Figure 5.

Area proposed to be irrigated: 1,493 ha, within a total area of approximately 5,120 ha. An additional 400 ha has also been applied to be irrigated under resource consent CRC040835 (Southdown Holdings – Glen Eyrie Downs).

Proposed land use: Pasture and crops for livestock farming, including dairy/ dairy support.

Irrigation method: Centre-pivots covering up to 1,881 ha and K-Line covering up to 119 ha.

Note: The irrigation area may be expanded to 2,000 ha in the future, therefore all analyses of effects and mitigation proposed to be for 2,000 ha.

3 WATER TAKE

3.1 General

MIC shares held: 1,493

Source: Lake Ohau

Maximum flow rate taken: 950 ℓ/s

System capacity: 0.63 ℓ/s/ha (5.5 mm/d)

Daily volume: 82,080 m³/d

Annual volume: 8,958,000 m³/y for irrigation, stockwater, domestic

4 NUTRIENT MANAGEMENT

Stocking rates: On average, 3.5 cows/ha

Fertilizer plan: Detailed in Ravensdown Whole Farm Nutrient Management Plan dated 03 February 2009.

5 INFRASTRUCTURE DETAILS

5.1 Intake layout and design

Intake type: Bed mounted infiltration gallery located buried beneath the shoreline

Screen type and size: Not required.

Pump type: Two stage pumping (low head submersible and booster pumps), or single stage direct pumping from gallery. The pump station associated with the intake will be buried underground.

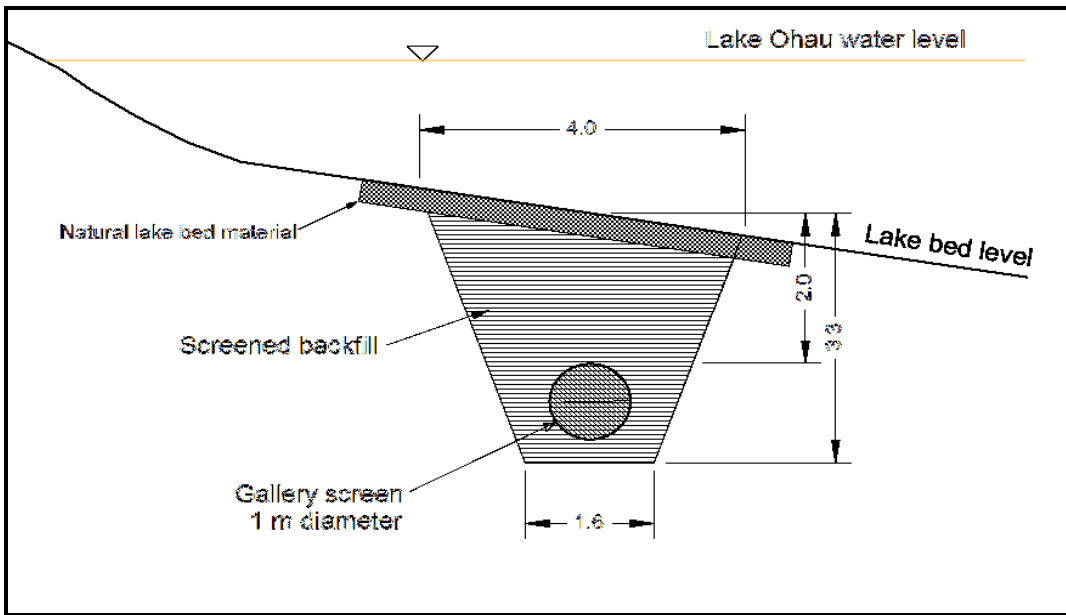


Figure 2: Gallery details

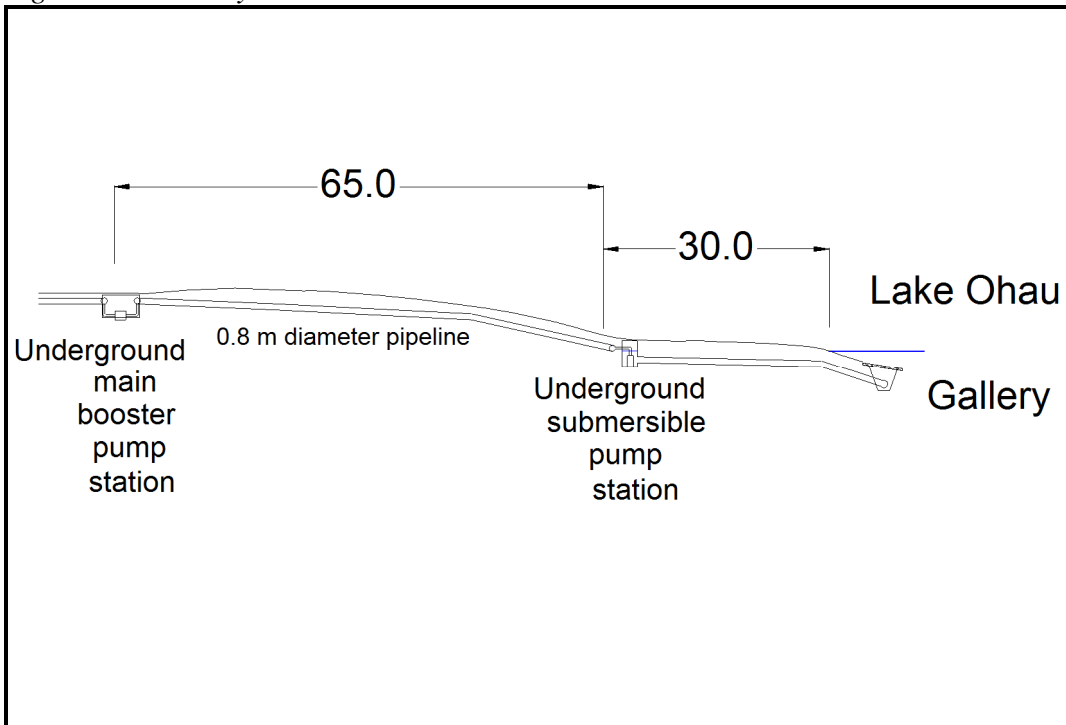


Figure 3: Gallery intake layout



Figure 4: Gallery intake plan

5.2 Distribution from Lake Ohau intake to farm

Pipeline: Buried 800 mm diameter GRP, or similar, minimum 600 mm cover

Road crossings: None required

Location: From Lake Ohau to go around the QEII Covenant area which borders Ohau Downs (Figures 2-4).

River crossings: None required

5.3 Irrigation system

5.3.1 Design layout

Irrigators: Proposed 38 centre-pivots (26 full circle and 12 half to three-quarter circle pivots, ranging from 299 m to 677 m long) covering 1,881 ha (Figure 5). K-lines to be used in gaps and corners.

Pipelines: Buried PVC pipe or similar.

5.3.2 Culverts & bridges

The irrigators will not cross over either of the Six Mile or Wairepo Creeks. It is proposed that the existing stockwater races from Six Mile Creek and Wairepo Creek be closed.

The Six Mile water race is estimated to be approximately 4,270 m in length, 0.5 m wide, and 0.2 m deep, resulting in an earthworks volume of 430 m³.

The Wairepo water race is estimated to be approximately 2,474 m in length, 1.5 m wide, and 0.5 m deep, resulting in an earthworks volume of 1,860 m³.

5.3.3 Above-ground infrastructure

The only potentially visible water related infrastructure is the irrigators and associated equipment. All other infrastructure, including the proposed pumping stations, is proposed to be buried beneath the ground.

5.3.4 Irrigation application efficiency

Target: Will be greater than 80% on a seasonal basis over the property.

Actual performance: Irrigation design standards and operational performance will need to result in an application efficiency (exceeding 80%) to achieve target production levels, due to restrictions on irrigation system capacity and seasonal allocation limits.

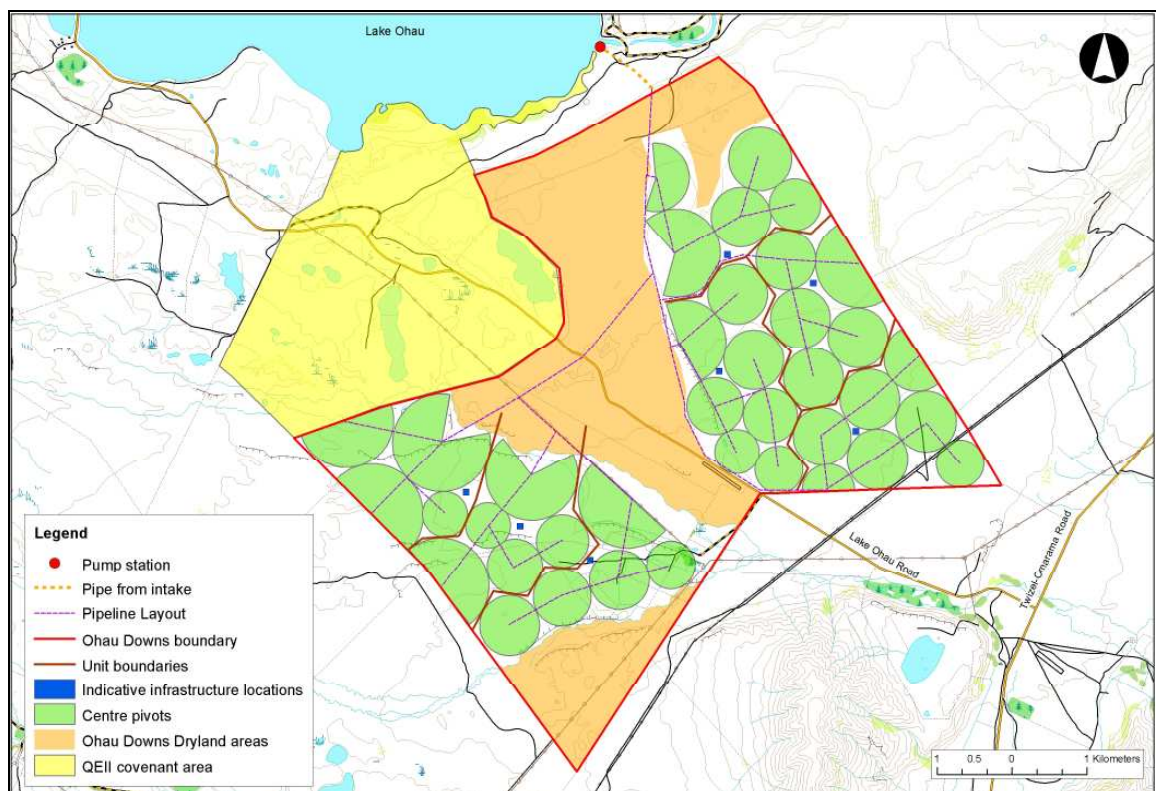


Figure 5: Ohau Downs proposed farm layout

6 EFFLUENT DISCHARGE

6.1 General

Seven separate stand alone dairy units are proposed to be established, comprising of a total of 7,000 cows.

Cubicle stables: Cows will be housed in two cubicle stables (per dairy unit), each stable housing approximately 500 cows for 100 % of the time during the months of March to October, and for 50% of the time during the summer months of November to February.

Days Milking: Cows on each dairy farm will be milked at the property (by conventional methods) for factory supply, for up to 300 days of the year.

Effluent produced: For each dairy unit up to approximately 378,000 ℓ of raw effluent will be produced each day. The average total diluted effluent will be approximately 875,000 ℓ/day.

6.2 Storage and discharge

Effluent storage: For each dairy unit, effluent from the stables will be dry-scraped and discharged into a sump, from which the effluent will be separated into liquids and solids using an effluent press. The liquids will be held in a storage pond. The proposed holding capacity of the liquid storage pond on each of the dairy units is approximately 30,000 m³, which will provide for up to seven months storage. The solids will be stored on a concrete pad.

Effluent discharge: Both the collected solid and liquid effluent will be discharged to the land during the summer months (October to March). The liquid effluent will be applied via centre pivot irrigators. The effluent will be injected in to the irrigation water at a ratio of approximately 5-10%, prior to it being irrigated onto the land.

Buffers to streams: The effluent will not be applied at a rate that exceeds the rate of plant uptake of nitrogen within the discharge area, within 20 m of any bore, soakhole, surface waterbody or artificial watercourse, in any location where it may run-off and enter ground or surface water, or on frozen or snow-covered ground.

7 LAND USE

7.1 Areas of vegetation to be removed

Unimproved vegetation: Unimproved grasses, sweet briar, hieracium.

Proposed cultivation: All of the land (1,493 ha, plus 400 ha under CRC041835) proposed to be irrigated is currently used for pasture and crop production. This is proposed to continue.

7.2 Setbacks from waterways

7.2.1 Six Mile Creek

Location: Approximately 4,300 m of Six Mile Creek runs through the centre of the property south of Lake Ohau Road and into Wairepo Creek (Figure 6).

Flow: Generally flowing.

Setback from irrigation area: Irrigation will not pass over the creek. A 5m riparian setback is proposed. Permanent fencing will also be established where stock may be present adjacent to the waterway.

7.2.2 Wairepo Creek

Location: Approximately 3,400 m of stream crosses the south-eastern corner of the property (Figure 6).

Flow: Generally flowing.

Setback from irrigation: Irrigation will not pass over the creek. A 5m riparian setback is proposed. Permanent fencing will also be established where stock may be present adjacent to the waterway. Irrigation will not occur on the south side of Wairepo Creek.

7.2.3 Existing stockwater races

Location: Two, one sourced from Six Mile Creek, the other from Wairepo Creek. The water races join and flow back into Wairepo Creek (Figure 6).

Flow: Generally flowing.

Setback from irrigation: It is proposed that existing stockwater races on the property will be shut down. All water will then flow down Six Mile and Wairepo Creeks, which will be restored to their original flows and thereby enhanced.

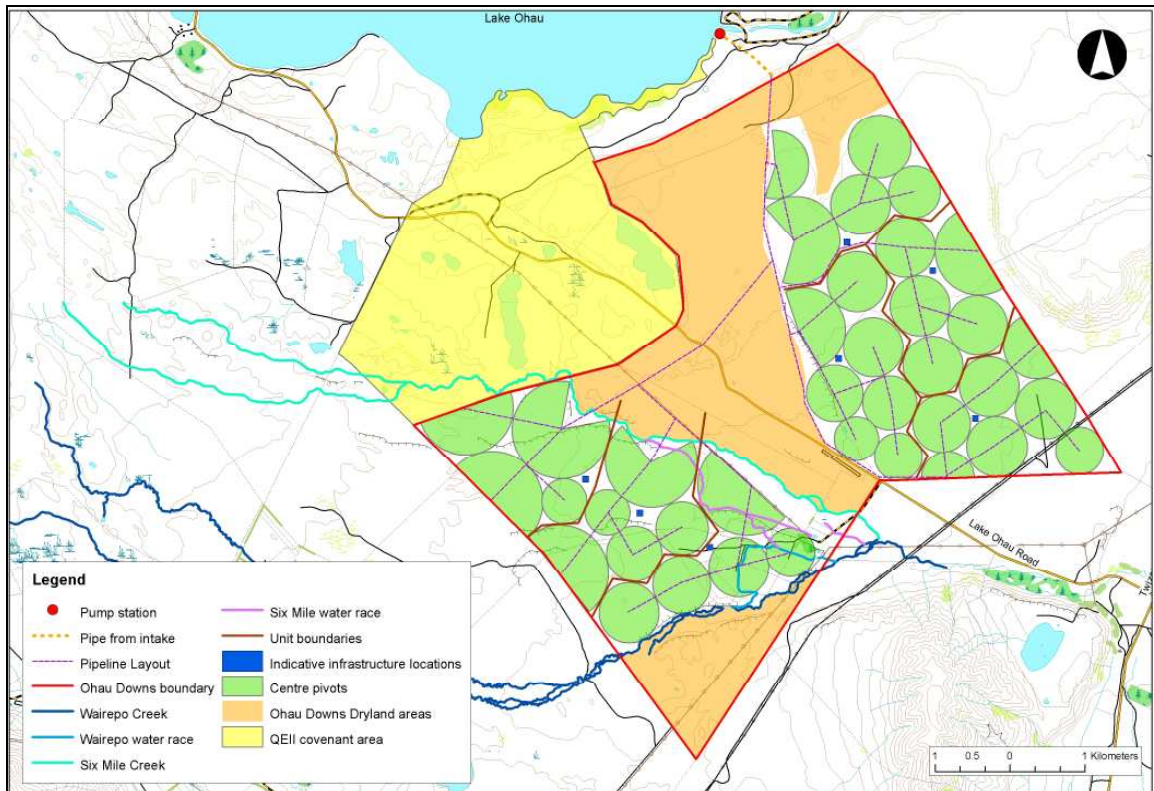


Figure 6: Waterways within irrigation area