DAMWATCH
ENGINEERING BEYOND THE SURFACE

Carew Ponds Irrigation Scheme

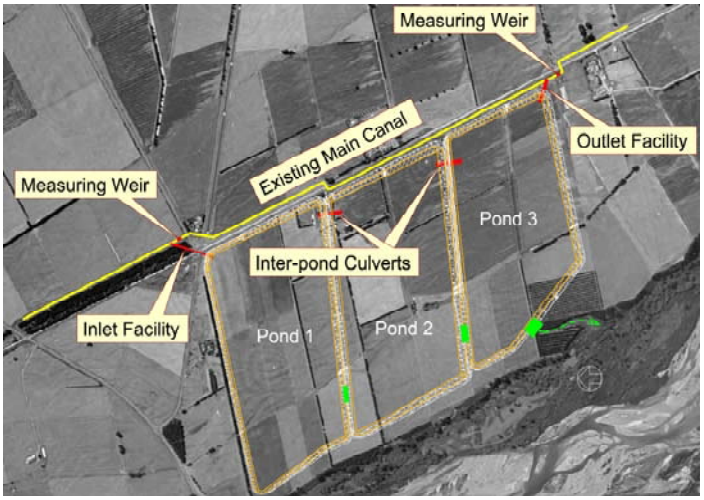
Client

Mayfield Hinds Irrigation Ltd (MHIL)
Canterbury, New Zealand

Scheme Components

The Mayfield Hinds Irrigation Scheme irrigates 32,000ha between the Rangitata River and Hinds River in mid-Canterbury. Off-stream irrigation water storage is required to supplement irrigation supply when supply is restricted due to low flow in the Rangitata river. Damwatch contracted with Rooney Earthmoving Ltd to design and construct storage and associated works to enhance efficient operation of the Mayfield Hinds Irrigation Scheme.

The Mayfield Hinds is a “run of river” scheme; it is subject to restrictions under resource consent conditions. The storage ponds will provide storage capacity in times when supply is greater than irrigation demand and conversely when irrigation demand is greater than supply. Once completed the storage ponds will form an integral part of the Mayfield Hinds Irrigation Scheme.



The Services Provided

Damwatch designed the storage ponds, associated inlet and outlet facilities and control system to regulate inflow and outflow. Specifically Damwatch carried out the

- Specification and interpretation of geological site investigations
- Design of inlet and outlet facilities and storage ponds
- Preparation of quantities for cost estimating
- Preparation of application and supporting material for Building Consent

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CASE STUDY

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RANGITATA SOUTH IRRIGATION

Background

Irrigation is increasingly important to the development of New Zealand's high value primary production. Damwatch contracted with Rooney Earthmoving Ltd to form a design and build team to design and construct an irrigation scheme on land adjacent to the Rangitata River diverting water during high flow periods to storage ponds to enable irrigation during dry summer periods.

The Service

Damwatch designed storage to enable irrigation of 12,000 hectares with flood water from the Rangitata river and storage pond capacity sufficient to regulate irrigation supply.

Client

Rangitata Water Ltd.

Location

Rangitata River, South Island, New Zealand

Scheme Components

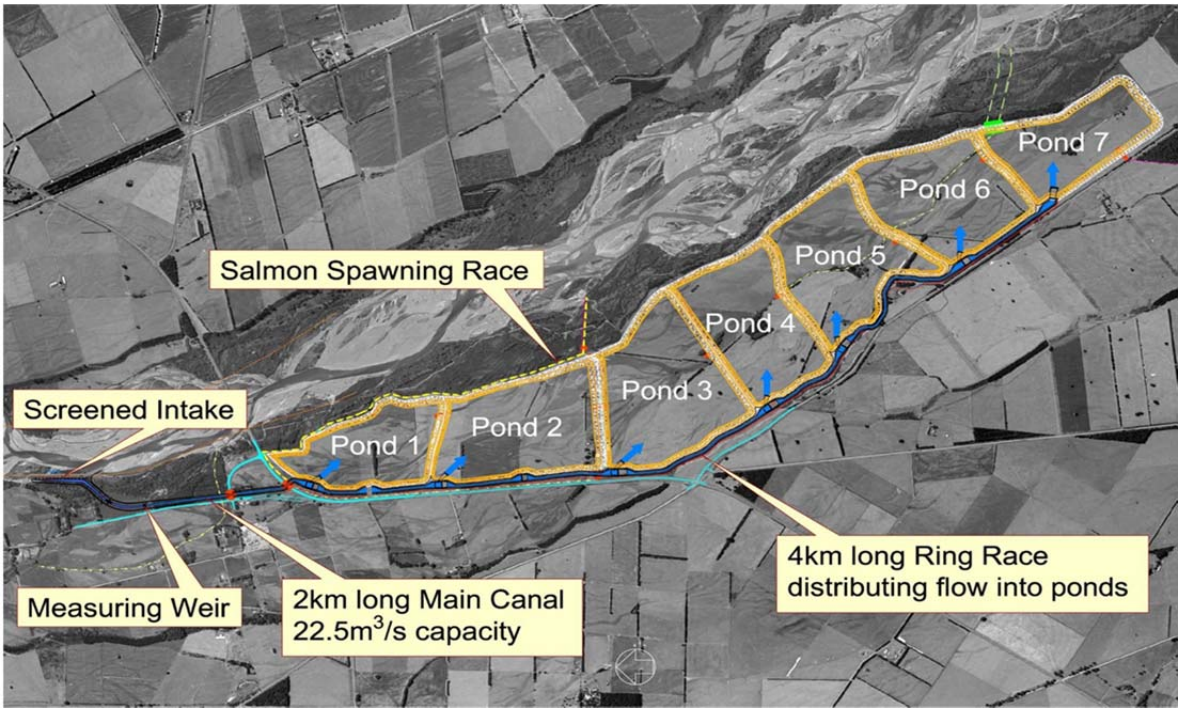
This scheme will capture flood waters from the Rangitata river and store it in the biggest storage facility for irrigation in New Zealand. The scheme comprises a screened intake, a 22.5m3/s capacity main canal, 7 off river storage ponds with total capacity of 16.5 million cubic metres. The challenge has been developing a liner that meets the economic requirements of the project.

Project Objective

To design a sustainable and commercially viable irrigation scheme.

Damwatch Services

- Specify and interpret geotechnical site investigations
- Undertake design for intake, canals and ponds
- Prepare quantities for cost estimating
- Prepare application and supporting information for Building
- Consent application
- Construction monitoring and design adjustments to suit site conditions



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Waimakariri Irrigation Ponds

Client

Waimakariri Irrigation Ltd (WIL)
Rangiora, New Zealand

Scheme Components

During periods of low flow the take is restricted and there is insufficient water for irrigation supply.

The proposed plan is to construct storage to supplement irrigation supply and be made available at critical times of the season when it will provide the most benefit to irrigators.

- Two ponds with a total footprint of approximately 1km x 1km square
- 8.2M m^3 storage capacity
- Six inlet and outlet culvert pipes
- One service spillway and 3 emergency spillways
- Two flow measuring crump weirs and ultrasonic flow measurement specific culverts to main race
- Two pump stations and a gate control system

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The Services Provided

Damwatch worked closely with the primary contractor Rooney Earthmoving Ltd to develop the irrigation scheme as a design-build project. The investigation work, concept design and feasibility analysis enabled the Resource consent application.

The detailed design including the selection of an economic liner solution, plus addressing the needs for a mixed high and medium Potential Impact Classification design taking into account the seismicity concerns with the recent earthquakes in the Canterbury region.

The ponds are within a few kilometres of the Queendale fault that produced the M7.3 earthquake in 2010. Community concern was that the site had higher seismicity than previously anticipated. Careful evaluation of fault trends and probabilistic seismic hazard results were required to assure the community of the dam's safety.

The scheme design provides for future development as a multi-purpose scheme incorporating a hydropower station, where there is potential general capability from the available head at Pond 2. A new canal option would deliver water to downstream power stations near the Waimakariri river.

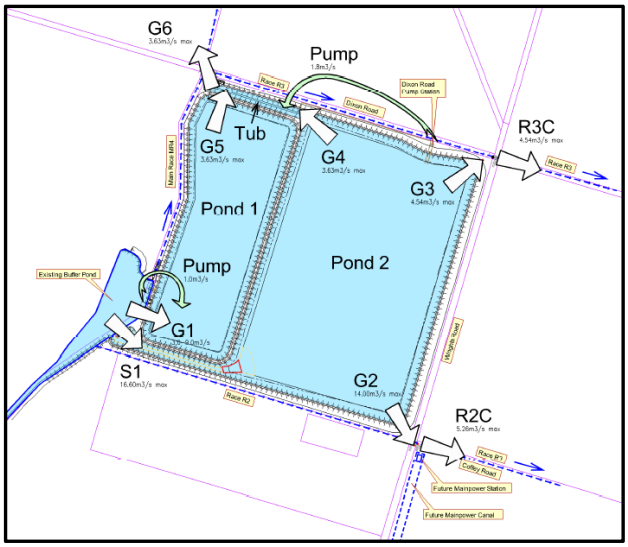

Figure 1 Storage Pond layout and flow arrangements

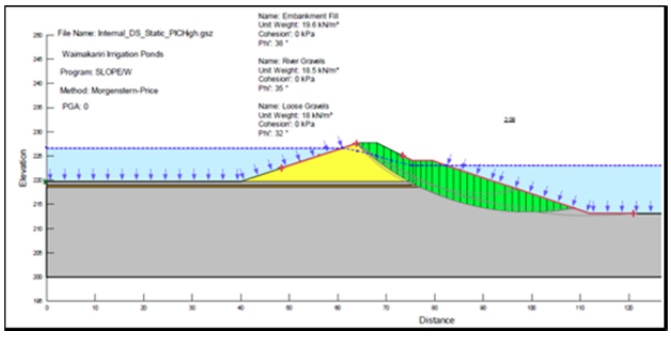

Figure 2 Example output from slope stability analysis

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