

# Wastewater disposal solutions to support New Zealand's adventure town



## Project Description:

To provide a municipal wastewater disposal site, including development of 150ha of cleared land, roading, pump station, control services and surface irrigation. The site is required to interface with the existing Taupo Wastewater Treatment Plant.

Principal:	Taupo District Council (TDC)
Consultant to principal:	AWT New Zealand Ltd
Site coordination for consultant:	DMCS Ltd
Head contractor:	WaterForce
Installation completed:	December 2008

## Key infrastructure installed:

- Pumphouse and control building
- Wastewater and freshwater pumps
- Filtration system
- Control valves
- Irrigation ringmain
- Flow meters and air valves
- Eight centre pivot irrigators
- Irrigation PLC/SCADA controls
- Internal site roading

## Project Summary:

This project is the first stage of a potential three stage plan to secure the long term capacity to manage the disposal of Taupo's treated municipal wastewater.

With an expanding population base in the district and the existing Rakaunui Rd land disposal site due to be dissected by the construction of the East Taupo Arterial (ETA) roading project, TDC awarded a contract to develop a new disposal system at View Road.

The View Road land disposal site, is a step forward in that precision irrigation technology is now utilised to dispose of municipal wastewater. The wastewater is dispersed onto land planted with ryegrass. The nitrogen in the effluent is taken up by the grass, which is regularly cut, baled and sold for stock feed to offset operating costs.

A comprehensive design of the proposed site was developed by WaterForce in coordination with the principal and representatives and WaterForce subcontractors.

Environment Waikato set stringent resource consent parameters for the scheme. WaterForce had to ensure that the irrigation system would meet the application rates specified in the consent. The system also had to provide data for comprehensive logging and reporting of application rates, volumes and site operations.

## The design had to consider the following:

- A maximum application rate of 5mm of effluent applied per hour
- A maximum application rate of 15mm per any 24 hour period
- A maximum application rate of 45mm per week.
- A maximum nitrogen loading rate of 550 kg total nitrogen per hectare per year.

Furthermore, there is to be no detectable spray drift, run-off or application of wastewater to occur within defined buffer distances of the property boundaries. The irrigation system must automatically shut down during weather extremes: high wind, heavy rain or freezing temperatures.

# Taupo Wastewater Disposal System

To ensure uniform application, WaterForce provided centre pivot irrigation to disperse the treated wastewater.

The project site is particularly ideal for pivot irrigation with undulating land gradually falling away from the storage ponds at the high point to provide natural gravitational assistance to the system.

## The pivots for the project include a number of features:

- 'Turf grip' tires to reduce rutting
- 'Boom Backs' which irrigate behind the travelling wheels to reduce rutting and damage.
- Sprinkler sector control – sprinklers are controlled in banks to prevent irrigation outside the resource consent constraints.
- Adjustable trajectory end guns on the pivots dial in the distance of throw of the gun water jet.

WaterForce installed on each pivot irrigator a VALLEY PR02 control panel. At each pivot location the PLC system obtains position and other status information and sets pivot direction, speed, and operation. Each pivot is fitted with an effluent flow sensor, and a main control valve which operates to admit waste water to the pivot. This all interfaces back to the main wastewater treatment plant.

Weather stations are located on the main storage pond batter (at the high point of the site), and at each pivot.

Pivot operations are halted or modified according to measured weather events local to the site and the pivot.

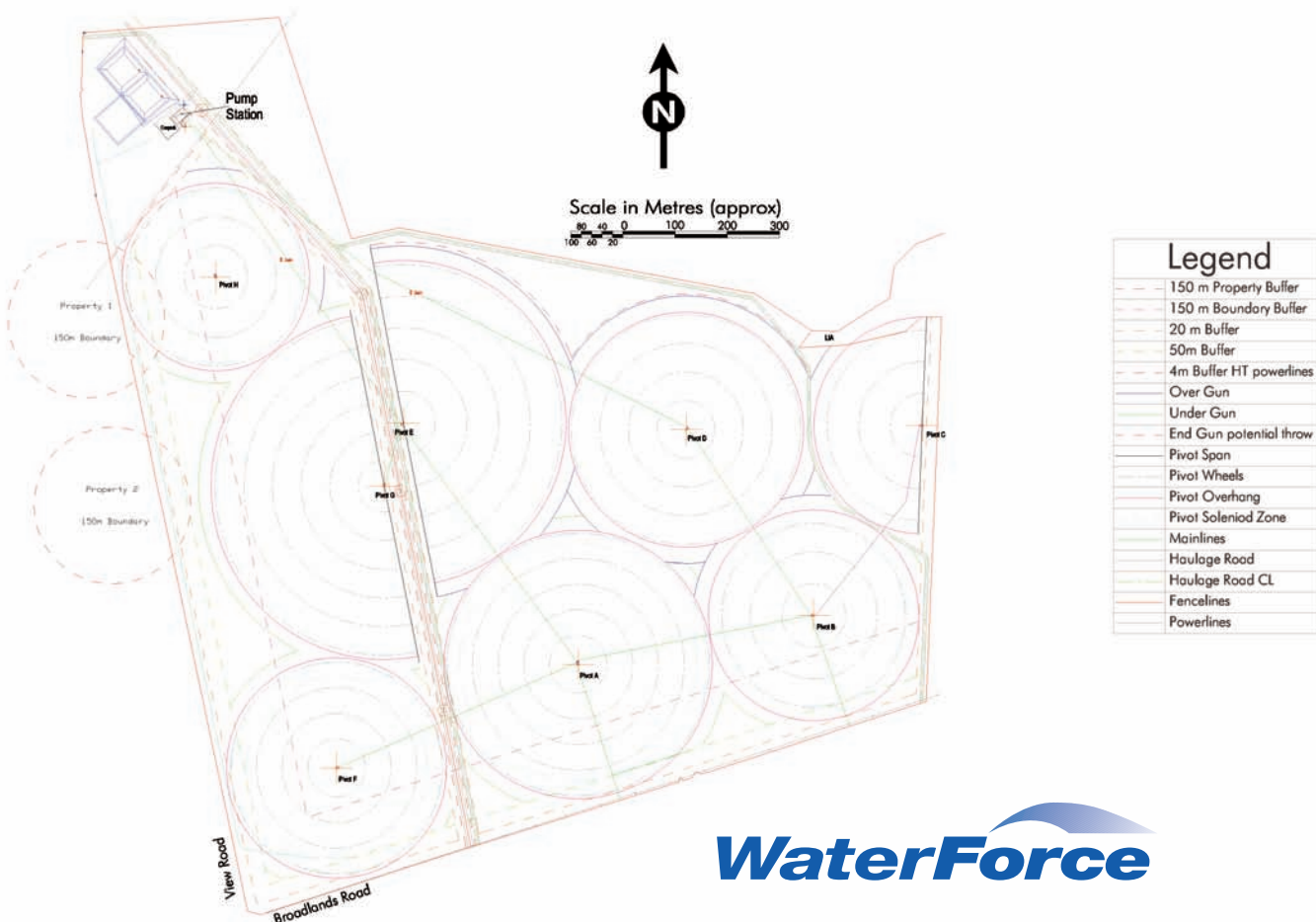
Following land clearance of the original farm services, WaterForce installed over 3.5km of uPVC ring main pipeline plus spur pipelines to outer pivot irrigator head works. The pipeline was laid with power, control water and fiber optic services required to operate each pivot as designed.

To develop the pasture, WaterForce worked alongside leading fertiliser consultants. The fertiliser provided would ultimately improve the soils around the site to optimise grass strike and initial growth prior to effluent application. A minimum of land contouring was carried out, sufficient only to ensure clearance of sprinkler heads.

Haulage roads, rigging and sealed areas were constructed through the property for site operations. Culverts, street lighting, signage, fencing and gates were included to complete the site facilities.

The pump station pipework was designed and prefabricated in WaterForce workshops, galvanised and FAT tested before delivery and assembled on site by WaterForce engineers.

The entire project installation went smoothly and the end result, is a pump station and system controls that are built to allow for future expansion.



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