Ashburton Wastewater Treatment & Disposal System Upgrade

Please find enclosed Ashburton District Council's nomination for the 2009 Green Ribbon Award—Urban Sustainability

For further information, please contact:
Ashburton District Council
Community Planning Team
5 Baring Square West
PO Box 94
ASHBURTON

Phone: (03) 307 7700
Fax: (03) 308 1836

Email: tonis@adc.govt.nz or jennas@adc.govt.nz

Executive Summary

The Ashburton District wastewater system upgrade, which was commissioned in April 2008, signals our move to a more sustainable approach to dealing with Ashburton wastewater than in the past.

The previous wastewater system in Ashburton was recognised as being outdated and out of touch with environmental, economic, social and cultural requirements and expectations.

The upgrade to the Ashburton wastewater system includes enhanced treatment of the wastewater coupled with sustainable beneficial re-use of the treated effluent. The enhanced treatment includes a step screen, aeration, oxidation and maturation ponds. The effluent is then piped to Ocean Farm, a Council owned property, where it is 'polished' through a wetland system before it is re-used and irrigated onto pasture. The farm is currently managed as a 'cut and carry' operation using local contractors, and returning an income to meet some of the operating and maintenance costs of the system and therefore, lowering rates for Ashburton residents.

The upgrade has resulted in outstanding environmental benefits for Ashburton, including wastewater that is treated to a higher standard than ever before; improved Ashburton River water quality from the cessation of effluent being discharged into the river; a constructed wetland which is increasing the variety of wildlife and biodiversity on Ocean Farm; and a financial benefit by partially off-setting the costs of the system.

The required upgrade of the Ashburton wastewater system posed a potentially tricky problem for the community and Council to solve, as there were environmental, economic, social and cultural issues to consider. By taking an open approach and engaging the community from the earliest possible opportunity, the result has been a community-accepted solution which is, quite simply, outstanding.

Introduction

In 2008 the Ashburton wastewater system was commissioned, signalling the move to a more sustainable approach to dealing with Ashburton wastewater than in the past. The upgrade includes an enhanced treatment process for Ashburton wastewater coupled with sustainable re-use of the treated effluent. This has resulted in the production of a healthier natural environment in the Ashburton River and the use of a waste product that meets environmental, economic, social and cultural requirements and expectations.

What was the issue?

The previous wastewater system in Ashburton was constructed in 1976 and provided treatment using oxidation ponds prior to the effluent being discharged directly into the Ashburton River. The resource consent for this activity expired in December 2002, new consents and existing rights provisions enabled the operation to continue until the current wastewater system was designed and constructed.

It was widely recognised that dumping of wastewater into the Ashburton River could not continue due to increasing community concerns regarding the environmental impact this was having and the inability of the current system to meet current and expected future changes in wastewater standards.

Projected growth for the area also meant that the current system was unable to accommodate future demand resulting from population growth, meaning that Council needed to investigate options for a significant upgrade.

Council recognised that the upgrade must:

- Meet customer expectations with an acceptable community outcome
- Comply with foreseeable changes in resource consent requirements
- Minimise or mitigate any environmental impacts
- Be modular in design and able to accommodate future growth

Who decided on the solution?

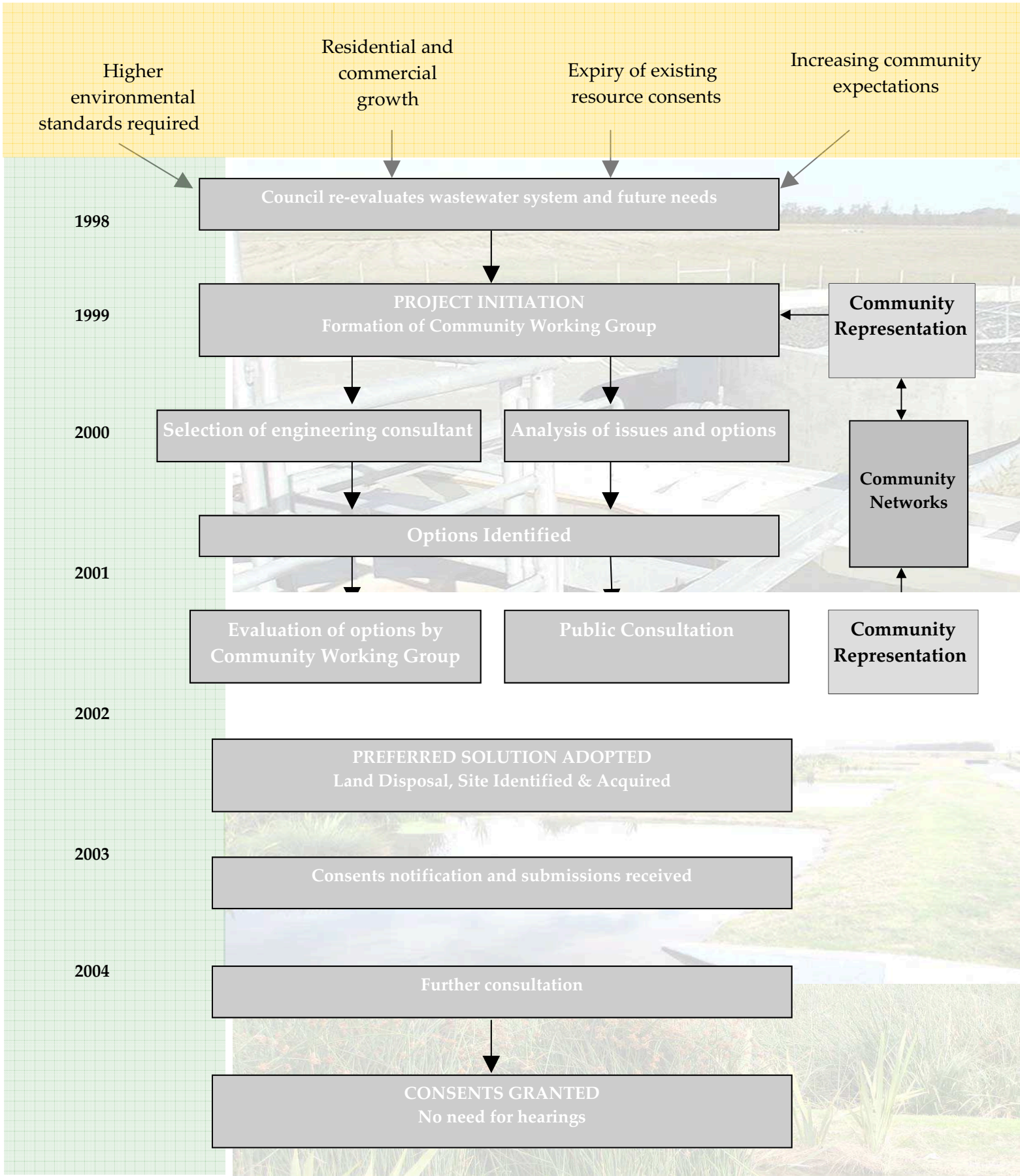
Given that this project would be the single largest project for the District Council to date (in terms of scale and cost implications), Council recognised that community involvement, buy-in and participation was essential to the success of the project.

Council made a conscious decision from the beginning of the project to include a high level of community input and decision-making throughout. The future of Ashburton Wastewater was a community issue that needed a community-accepted solution.

Through project initiation meetings, working groups and ongoing public consultation, various options for the Ashburton Wastewater Treatment and Disposal system upgrade were identified, developed and evaluated. The final consensus for the upgrade was for low-technology treatment with effluent disposal to land. Due to the high-level of community buy-in and consultation Council was granted the required resource consents for the new system without the need for a formal pre-hearing and hearing.

The following diagram shows the community involvement process in the decision-making for the Ashburton Wastewater Treatment and Disposal System upgrade.

Community Involvement in Ashburton Wastewater Treatment and Disposal System



What was the solution?

The key drivers for the design of the upgrade, identified from community and expert input, were:

- An efficient and sustainable system to meet existing and foreseeable demands
- The capacity to accommodate future growth and peak wastewater demands
- Efficient resource utilisation
- Employ best practise and technology

To meet the needs of the community both now and in the future it was determined that the Ashburton wastewater treatment and disposal system upgrade would include two elements. The first element would see the existing Wilkins Rd treatment site upgraded to a three-stage treatment process. The second element would see the treated effluent, which is rich in nutrients, conveyed along a pipeline for re-use through irrigation onto Ocean Farm for grass production.

The result has been an environmentally sustainable solution to a potentially tricky issue.

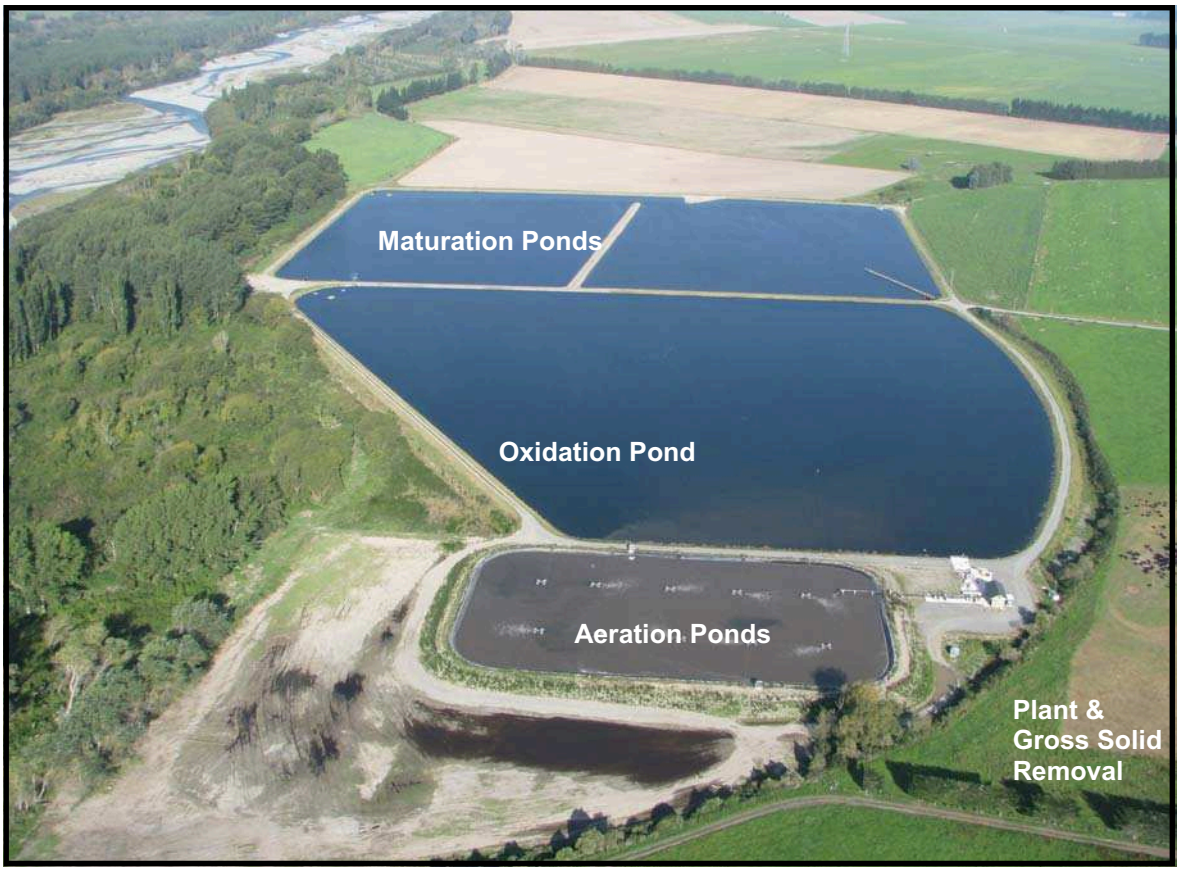
Ocean Farm - March 2009

Element One – Wilkins Rd Treatment Upgrade
Wastewater from the Ashburton urban area is collected in the Ashburton wastewater system and is conveyed to the Wilkins Rd treatment site, the system includes a pipeline under the Ashburton River.

Previously the site consisted of two oxidation ponds for the treatment of wastewater which was discharged into the Ashburton River.

The upgrade saw extra stages added to the treatment process, including a step screen, aeration and maturation ponds.

On arrival at the treatment facility the wastewater goes through a step screen where gross solids are removed. Next the wastewater enters the primary stage of treatment where it is collected into an 18,000 m³ aeration pond which includes 10 aerators. The secondary stage of the process sees the wastewater move into the oxidation pond. The tertiary stage of the process involves the wastewater moving into the maturation ponds, prior to entering the gravity pipeline that conveys the effluent to Ocean Farm.



Wilkins Rd Treatment Facility - March 2009

Element Two – Ocean Farm

Once the wastewater has gone through the treatment process outlined it is then piped eleven kilometres down to Ocean Farm. Here the effluent passes a further 'polishing process' through a wetland system before it is re-used and irrigated onto Ocean Farm, a Council owned farm. The farm is currently managed as a 'cut and carry' operation with revenue received offsetting the systems operating and maintenance costs.

Native Wetland System

The constructed wetland system is an added stage to the treatment process and has the benefit of being able to; treat a wide range of contaminants; handle shock loadings during peak flows; bring aesthetic value and provide wildlife habitat; and is more acceptable to Maori than direct discharge to surface waterways.

The wetland system is made up of a series of 16 filtration ponds, which have been planted with native reeds to optimise filtering and matter breakdown process of the effluent. The nine hectares of wetlands has over 287,000 native reeds planted with the main species being Kapungawha (*Schoenoplectus tabernaemontani*) and Kuta (*Eleocharis sphacelata*). These reeds provide a further step in the polishing of the effluent before it is channelled to the holding pond prior to irrigation onto pasture.

Kuta
(*Eleocharis sphacelata*)

The Kuta reed assists in maintaining water clarity by helping to stabilise bottom sediments. The tall hollow stems of Kuta pump oxygen down to the rhizomes and sediment, enabling the plant to grow deeper, while also pumping waste gases from the bottom, such as methane, back to the atmosphere. This increased aeration enhances debris composition and nutrient turnover.

Kuta
Photographer: John Smith Dodsworth, nzpcn.org.nz

Kapungawha
(*Schoenoplectus tabernaemontani*)

The Kapungawha reed is a tall spiky sedge that can grow in more brackish environments than the Kuta. It is tolerant of pollutants and generally grows well in nutrient-enriched waters. Kapungawha takes up and stores large quantities of nutrients, especially Nitrogen and Phosphorous, making it a popular plant for artificially constructed wetlands for the treatment of wastewater.

Kapungawha
Photographer: John Barkla, www.nzpcn.org.nz

Wastewater moves through the wetland system by being diverted into one of four channels. Each channel then is made up of four separate ponds, so every bit of water effectively passes through four wetlands before reaching the 11,000m³ irrigation storage pond.

Irrigation of the Treated Effluent

Once the effluent reaches the irrigation storage pond it has been treated to a higher standard than ever was achieved before and is now ready to be re-used through irrigation onto pasture at Ocean Farm. Irrigation has transformed the Ashburton District into one of the powerhouses of New Zealand's primary sector. Water is the life-blood of agriculture and securing reliable and sustainable supplies is essential in this District, making the re-use of the wastewater on Ocean Farm outstanding.

From eleven kilometres of pressurised control pipeline there is a network of irrigation laterals over 60 kilometres in length. These end in 1400 pop-up sprinklers which are computer controlled to irrigate over 280 hectares of farmland.

Farming activities at Ocean Farm are currently managed as a 'cut and carry' operation, meaning that the grass is sold to local contractors as standing grass (uncut), who then come and 'cut and carry' (remove) the grass away as either silage, bailage or hay.

Ocean Farrm—'Cut and Carry' operation

Why is this project outstanding?

The wastewater upgrade has resulted in outstanding environmental benefits for Ashburton and the income generated from the 'cut and carry' operation will reduce costs to the Ashburton ratepayer.

The river water quality of the Ashburton River close to the urban area has improved significantly. No longer is partly-treated wastewater being discharged into the river to flow out to the Pacific Ocean. Under the previous system wastewater could leave the treatment facility with faecal coliform counts of anywhere between 2000 – 130,000 cfu per 100 millilitres of water. With the new treatment system, the wastewater used for irrigation generally has a faecal coliform count well below 200 cfu per 100 millilitres of water (as required by the resource consent), with the lowest recording to date being a mere 15cfu/100ml.

A second outstanding benefit of the upgrade is that Ashburton wastewater is now being re-used beneficially, rather than simply being treated and discharged into existing water sources. Population pressures, declining environmental conditions, tighter environmental protection legislation and the desire for sustainable development all signalled that it was important for this upgrade to encompass more than just improved treatment of wastewater. By not discharging the effluent into existing waterways, respect is shown to Maori Kaitiakitanga (guardianship / stewardship) of the environment (Bristow & Prieto-Curiel, 2002, sourced from www.qp.org.nz/pubs/3707.pdf). The re-use of the effluent as an irrigation source for a fully functioning farm operation is a true example of a wastewater re-use scheme in action.

Pop=up irrigators at work

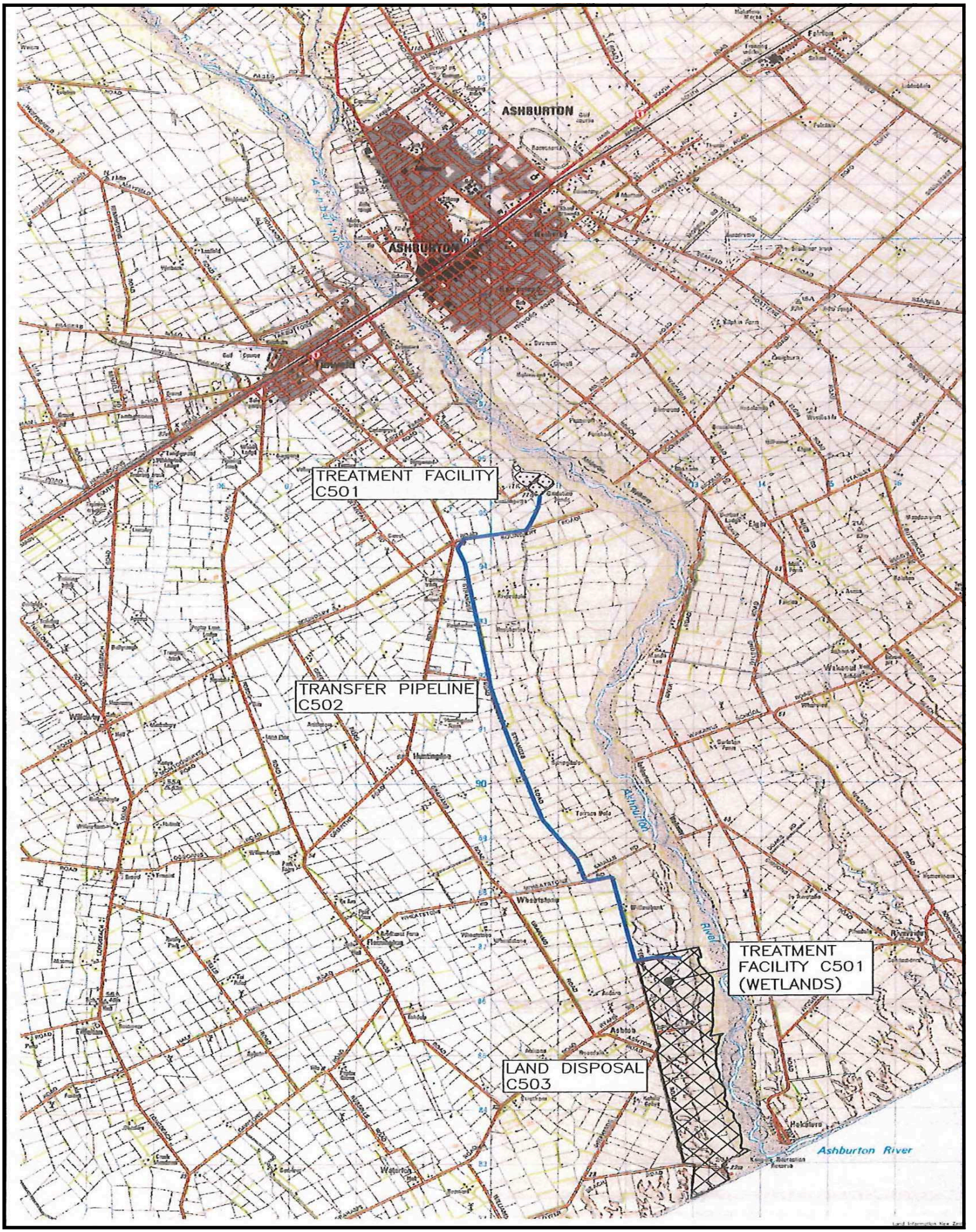
A third benefit from the project has been the construction of the wetlands on Ocean Farm. As well as providing a further stage in the treatment process, the wetland has become a habitat for an increasing variety of birdlife in the area, adding to the aesthetics and biodiversity of the natural environment.

The final benefit of the wastewater upgrade is that the treatment of the wastewater and effluent re-use provides Ashburton with a sustainable system designed to cope with future demand and growth. The treatment system is modular in design, therefore can be easily added to once trigger points are reached. Ocean Farm has a capacity for 30,000 m³ per day of treated wastewater via the irrigation system (as per the resource consent). At present, a typical dry weather loading per day is between 8 – 10,000 cubic metres. Flow can significantly increase with wet weather, but the systems have sufficient capacity for this increased flow and future growth.

The Ashburton wastewater treatment and disposal system has resulted in an outstanding system that enables the re-use of treated effluent onto land. This beneficial re-use is socially acceptable by the community as they have been involved throughout the process. The income produced from the cut and carry operation on the farm will assist in covering some of the operational and maintenance costs of the Ashburton wastewater system. The project has also been future proofed for projected growth and expansion of the town.

Pukeko—a thirving bird species at the Ocean Farm wetlands

Ashburton District Wastewater Upgrade



Ocean Farm Wetlands

Four channels of the wetland—March 1009

Flow between wetland areas—March 1009