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TURFCRAFT

International

Dedicated to those responsible for the care of sporting and recreation turf

**Aeration controls
salinity at
racecourse**

**Former tip
transformed
to elite
sportsfields**

**Understanding
sub-surface
drip irrigation**

**Mega bunkers
highlight of new golf course**

Sustainable turf options promoted

Drip keeps fairways green, people safe

By ALASTAIR DOWIE

A NEW 600-lot housing development on sensitive coastal sand dunes on New Zealand's east coast required innovative solutions to the disposal of effluent water from the development.

The solution involved around 200 kilometres of sub-surface drip irrigation (SDI) to a new nine-hole golf course and a purpose-built tree plantation.

The new Omaha Beach development is in addition to an existing 800-lot development built in the 1970s on the north end of a narrow spit of land located about an hour north of Auckland.

Environmental scientist, Peter Gearing, from engineering and environmental management company, URS New Zealand, said the geography of the site was critical in solving the issues of effluent water disposal.

He said the spit comprised sand over a peat base and was edged by Little Omaha Bay on the east side, further east the ocean, and Wangateau Harbour (and the mainland) on the west side.

A causeway across the harbour connects the spit with the mainland about half way along. North of the causeway on the spit is the original development that includes a nine-hole golf course, while the southern end of the spit is the site of the latest development.

In part, resulting from of the 1970s development, a wastewater treatment plant was constructed on the mainland side of the harbour.

The new development meant the original plant required upgrading.

URS was given the responsibility of designing a wastewater disposal system for the new development.

Mr Gearing said the basis of the disposal design was to irrigate portions of nine new golf holes adjacent to the existing course and upgrading and

Greenkeeper's Planner

GOLF COURSE

Name: Peter Gearing and Steve Meale
Golf course: Omaha Beach, New Zealand.

In brief: Installation of sub-surface drip irrigation to dispose of treated effluent water from new 600-lot housing development on sensitive coastal dunes.

extending existing irrigation to a purpose plantation planted with short rotation eucalypts.

He said the design called for minimising the risk of human contact and the opportunity for cross contamination with rainfall run-off.

A sub-surface drip irrigation system was chosen to ensure the criteria were met.

Mr Gearing said the system meant there were fewer restrictions on the scheduling of irrigation and it was very friendly in terms of neighbours.

The original sewage treatment and disposal system was constructed in 1989 to meet the dual needs of sewage treatment for Omaha and a reclaimed water supply for horticultural activities on farmland immediately adjacent.

In conjunction with the original residential development a nine-hole golf course was constructed in 1973.

A bore drawing three million litres a year was used to irrigate the greens by pop-up sprinklers (outside of opening hours) and the tees by handheld hoses connected to quick coupling valves. The fairways of this course are not irrigated.

The Omaha communities mainly collect water from roof/tank supply. A community water supply scheme is

not planned. The average volume of wastewater for disposal is projected to vary from around 165,000 litres/day in year 2000 to 740,000 litres/day in 2015.

The existing treatment plant, owned by the Rodney District Council (RDC), was extended in 2002 by the addition of a porous ceramic dual media (PCDM) effluent filtration plant and the decommissioning of existing gravel wetlands.

The new nine-hole golf course is irrigated partly by a bore drawing eight million litres/year, which is used to irrigate the greens and the bunker surrounds.

This water allocation is effectively 80,000 litres/day for 100 days a year.

About five hectares of the fairways on the new golf course are irrigated with treated effluent. As a consequence, those fairways are lush and green throughout the year.

Mr Gearing said it was planned to eventually extend the fairway irrigation using the treated sewage effluent from the Omaha wastewater treatment plant.

SDI applies the effluent at a constant rate. However, the actual daily irrigation volume varies depending on the time of the year, being lower in winter and higher in summer.

The balance of treated effluent not used on the golf course is either stored in a storage pond, or irrigated to a purpose-planted forest, which was also expanded at the same time as the golf course SDI was installed in 2002.

Omaha Golf Course uses an advanced sub-surface drip technology that overcomes the problems typically associated with irrigation. The key features and advantages are:

- As all pipework is below ground, the system and its use are effectively hidden from public view, which is ideal for a golf course, and irrigation is able



Sub-surface drip irrigation has been installed in the mown section of this fairway at Omaha Beach Golf Course, New Zealand. The system is used to dispose of treated effluent water from a new housing development.

to proceed at any time, even while the golf course is in use;

- Effluent is applied below the ground surface, virtually eliminating aerosol and odour problems, the public health risk and the risk of surface runoff, even during rain, and enabling

irrigation to occur year round.

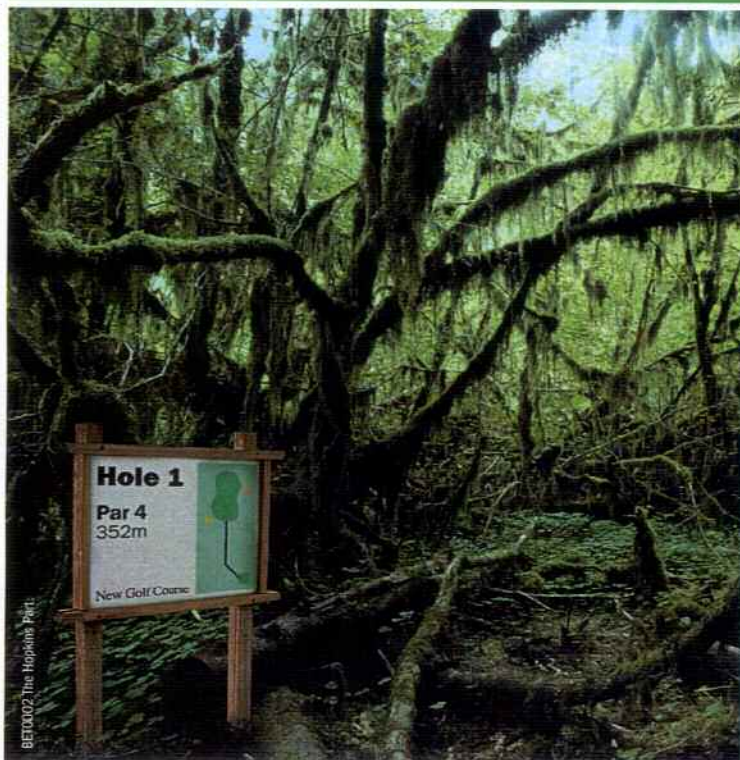
- Pressure compensating drip emitters ensure an even distribution of effluent.

- The plastic emitters are protected against root intrusion by being impregnated with a long-term

controlled-release herbicide.

- The plastic irrigation tube is co-extruded with a bactericide linings, which reduces the build-up of bacterial slime on the interior of the pipe, protecting the drip emitters from blockage by slime.

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◀ • By applying the effluent below the ground surface, it is also possible to continue irrigation, if desired, even during rain or high winds, with little risk of surface run-off of effluent if good management and monitoring is adopted.

With SDI the treated effluent may permeate the soil, meaning that the rain that falls will run off the surface, but the effluent will be retained within the soil and be either taken up by plants or percolate through the soil while further natural treatment takes place.

Hence SDI is a useful option where disposal is required in both wet and dry conditions.

Mr Gearing said well designed and managed SDI systems, operating with effectively filtered effluent, with the above features, had proven to be very reliable and had been in service for more than 10 years internationally.

He said one of the problems associated with effluent land disposal schemes was that the allowable winter disposal rate was usually lower

Zoning makes application adjustment easier

OMAHA Beach superintendent, Steve Meale, said there were three to four irrigation zones on each of the fairways incorporating the sub-surface drip system. Each zone could be individually adjusted to provide more or less water according to the needs of the turf and any rainfall received.

The new nine holes, designed by Brett Thomson of Darby Partners, Queenstown, NZ, is a typical links style course, built on coastal sand dunes and taking advantage of natural features like Totara and Kahikatea forest and extensive wetlands.

Mr Meale said the new section featured "dune sands" with little or no organic matter, while the older nine was set on "silty sand".

Within two years he expects the new nine to have a good cover of kikuyu, replacing the current browntop, ryegrass and kikuyu mixture, and matching the older nine.

Mr Meale said there were a lot of deliberately "unkept" areas running from the dunes into the cut areas left on the new nine holes.

As part of a program to bring the old nine up to the standard of the new nine, areas of uncontrolled rough had started, promoting browntop and fescue seed heads and controlling kikuyu.

Mr Meale said that because of the ongoing issue of water restrictions with the bore supplies, he was trialling some local paspalum types to see how they responded to different mowing heights.

than summer, requiring either a larger irrigation area or storage.

The ability to continue irrigation in winter at a lower rate provided a cost advantage for using SDI at Omaha, by

avoiding the need to increase the effluent storage dam capacity. ●

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