INNOFLOW TECHNOLOGIES
INNOVATIVE WASTEWATER MANAGEMENT

WASTEWATER MANAGEMENT - CASE STUDY

The Sands on Onetangi – Waiheke Island

The Sands on Onetangi is an upmarket beachfront apartment complex on Waiheke Island's Onetangi Beach. Onetangi Beach is a north-facing beach on Waiheke Island, popular with holiday makers and tourists. The Sands comprises a series of privately owned apartments, typically occupied during weekends and holiday periods.

Due to land so close to the beach being at a premium, a compact system was required. The owners also recognised the seasonal operation of the facilities, resulting in highly fluctuating wastewater production. Therefore, the Advantex™ Recirculating Textile Packed Bed Reactor was identified as the method most suited to achieve the goals of this project.

Figure 1. The Sands on Onetangi – View of the complex from Onetangi beach.

Using this set of criteria Innoflow Technologies NZ Ltd. (ITNZL) designed, produced and installed a wastewater management solution that met with the owner's high requirements, the council's strict resource consent conditions and the customer's high expectations from this facility.

The solution in this case was the use of Septic Tanks fitted with a Biotube® Effluent Filter pumped to a Recirculating Textile Packed Bed Reactor (rtPBR) discharging through a UV Sterilisation unit to a sectorised low pressure effluent distribution field, installed in deep trenches below the car parking area of the apartments.

Waiheke Island frequently experiences water shortages throughout the drier months, due to Waiheke's microclimate resulting in lower rainfall than on the mainland. To help combat this, a portion of the treated effluent is drawn off and disinfected using an Automatic Redox Chlorine dosing system before being used for flushing toilet cisterns and controlled irrigation. This has the added benefit of reducing the size of the required disposal field.

The following pages detail the system components and technical specifications. Also shown are the expected and required performance figures for this wastewater management system.

Table 1. Design Constraints

Constraint	Solution	Comment
Limited area for treatment plant	Utilise very small footprint of the Textile rPBR	The Textile Pods were configured specifically to meet site requirements
Materials needing to be ferried from mainland	Advantex™ Textile Pods did not present a problem to transport	The rtPBR process also has very low biosolids production meaning reduced costs for removal off site
Highly seasonal usage	Use rtPBR process designed for peak loading	The rtPBR process has a 100% turn-down ratio providing consistent performance under fluctuating loads
Limited area for disposal field and septic tanks	Tanks and disposal field both installed below car parking area	Tank risers required extra support to allow trafficability, disposal field installed in deep trenches
Water supply limited	Portion of treated effluent reused for toilet flushing and limited irrigation	Required automatic probe, proportional chlorine injection to ensure recycled water is free of pathogens
Remote location, limited onsite technical support	Use PBR process with programmable control system	Low operation and maintenance requirements for this process assist simple management of the system

Figure 2. A low visual impact was important for this installation. Trafficable riser covers can be seen clearly in this photo.

Table 2. Treatment System Performance

Parameter	Required Value*	Expected Performance
BOD_5	20 mg/ltr	< 10 mg/ltr consistently
Suspended Solids	20 mg/ltr	< 10 mg/ltr consistently
Faecal Coliforms	50 per 100 mls	<45 per 100 mls
Chlorine in Re-Use water	>0.5 ppm	>0.5ppm

** These figures are the set values in the Resource Consent for this project issued by the Auckland Regional Council*

Actual Performance

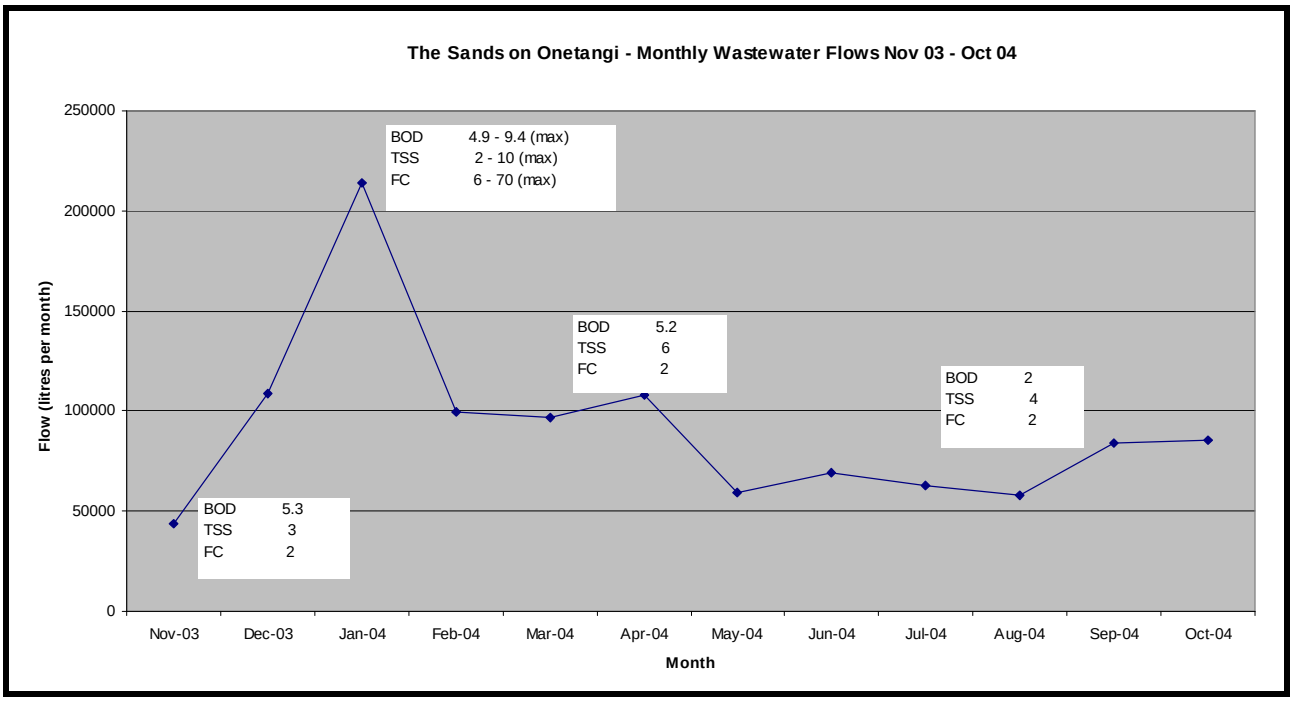

Figure 3. Graph showing effluent quality variation over time

This graph shows the flow per month and the corresponding effluent samples taken in the same month. The variation in effluent quality was very small, and was well within the consent limits specified by Auckland Regional Council.

Transportation of tanks, pods and various heavy machinery from the mainland provided some interesting logistics.

By using trafficable riser lids the area taken up by these underground septic tanks could be effectively utilised as car parking.

Figure 4. Installing the tanks.

The low footprint of the Advantex™ rtPBR pods and flexibility in the arrangement of the units lent itself well to a customised installation such as this.

With a low visual impact, no noise and no odours produced from them it was not a problem to install the units relatively close to the apartments.

Figure 5. The rtPBR pods.

Table 3. System Summary

System Component	Specification	Comment
Design Flow (Peak)	30 m^3/day	Fluctuating flow – reached on weekends and during holiday periods
Septic Tanks	3 x 36 m^3	Installed under car park with extra support on riser lids for trafficability
Recirculation Tank Size	36 m^3	
Recirculation Pump	2 x High Head Turbine	At peak – 7.5 hours run time per day @ 0.375kW per pump
Packed Bed Reactor Area	42 m^2	Installed near the back of the section, in front of a large retaining wall
Treated Effluent Tank Size	47 m^3	
Discharge Pump	Existing	Reconfigured
UV Disinfection System	Steriflo Series L2	High transmissivity and low flow rate mean that the CT value is very high
Recycle System Tank	4.6 m^3 water storage, 1 m^3 Chlorine storage	Dual chamber tank
Disposal	Sectorised Deep Trenches, 5 sectors, 2 trenches per sector	Installed under car park to allow best use of space available

The size and layout of the treatment system were important as the only available position for the plant was near the rear apartments. The rtPBR was designed and constructed to fit within the available area and the finished plant is all flush at ground level to eliminate any visual impacts.

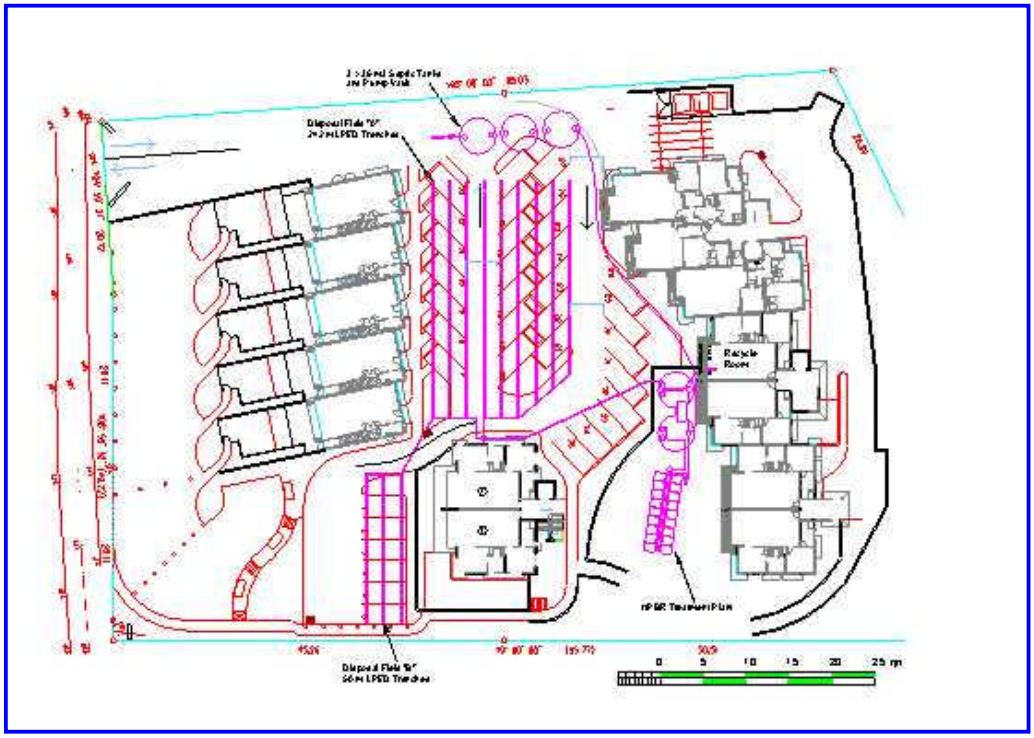

Figure 6. Schematic as built of the wastewater treatment system.

Maintenance

Much of the monitoring and control of the wastewater treatment plant is managed with a remote telemetry unit (RTU), programmed specifically to cater for the needs of the site. The two-way dial-up system (via modem) means that not only can the service company dial in to the modem to monitor the system, but the telemetry panel can dial out alarm states. Once an alarm state is received, the service company can then explore the system to change any required settings, or learn more information about how the system is currently running. This allows for much improved efficiency in maintenance, as information can be known before visiting the site. At the remote location of Waiheke Island, this has proven invaluable.

In addition to the presence of the RTU, a service contract has been taken out, providing for quarterly servicing and maintenance.

Figure 6. Control Panel and RTU