

DEFENDING THE ENVIRONMENT

A new swimming pool water treatment system has proven a great success in north London. **John Murrer** explains how the system addresses both economic and environmental challenges

Defender Filters swimming pool water treatment system (System Patent number 1020924.5 (pending)) has proved to be a great success at the Tottenham Green Leisure Centre.

This article summarises the technical aspects of the scheme and reviews its performance in the first full year of operation.

The leisure centre, which is owned and operated by Haringey Council, was built in the late 1980's and opened in 1989.

The leisure centre has two swimming pools, a main pool with a wave machine, a large beach area, a slide and a teaching pool with adjustable floor depth.

The original water treatment was a combination of sand and gravel filters followed by sodium hypochlorite dosing and pH correction with hydrochloric acid.

The filters were washed on average twice per week, with the waste backwash water replaced by the town's mains water. This had the effect of diluting the pool water chemistry but it also reduced the pool water temperature.

New system in place

In 2009 Haringey Council awarded a contract to replace the old filters with a new Defender – Diluter system, comprised of

three Defender filters and a small reverse osmosis (RO) plant.

The new filters have a very small footprint – only 25 per cent compared to that of conventional filters – and were easily installed along with the reverse osmosis plant in the existing plant room.

The 'Defender' filter comprises a pressure vessel containing a number of stainless steel tubes covered with a permanent polyester coating. The filter media is 'Perlite', which coats the filter tubes. A process known as the 'bump' regenerates the media

“ The new filtration system is very energy efficient as there are no large backwash pumps or air compressors to operate

daily by shaking off the material from the tubes and then recoating them with media exposing new surface areas for the filtration process before the unit is put back into service. The media is renewed every two months by discarding the used media and then filling with new. This process takes about 20 minutes per filter to complete.

The Defender filters installed at the Tottenham Green site are four-micron-rated and are very effective at removing solids and organic material from the water.



One of the Defender filters at Tottenham Green

three Koch TFC-ULP 4" diameter membrane elements, a control panel and instrumentation. The membranes are designed to remove more than 93 per cent of most elements found in the water, such as chloride, sodium, sulphate and total dissolved solids (TDS).

The RO plant operates on a small 2 m³/hour side stream of filtered water, at the design recovery of 75 per cent. It produces 1.5 m³/hour high quality water, which blends back with the filtered water. This reduces the concentration of TDS, chloride, sodium and sulphate in the pool water, reducing the use of town mains water for dilution. This significantly reduces the gas demand needed to maintain swimming water temperature.

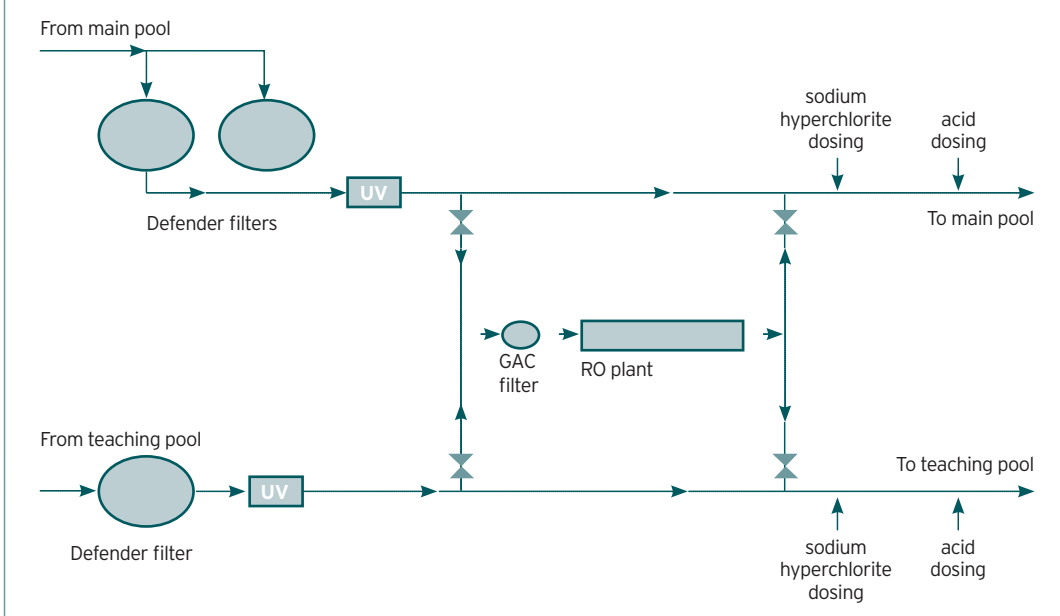
They have extremely low wash water requirements compared to conventional filters.

The new filtration system is very energy efficient as there are no large backwash pumps or air compressors to operate. For 10 hours, during the night, the filters operate at 50 per cent flow, saving considerable pumping costs.

Efficiency measures

The RO plant is made up of a feed pump, pre-filters, and three pressure vessels, each containing

Tottenham Green Leisure Centre Water treatment plant basic process flow diagram



In its first year of operation, the Defender – Diluter system has had a waste-water stream of only 27 per cent of that produced by the conventional filters. This will be even less in future years, now that the water quality has stabilised.

The main pool filters at Tottenham Green were replaced in December 2009; the teaching pool filters were replaced in January 2010; and the RO plant was installed in March 2010.

A process schematic is shown in the diagram above.

As soon as the new filters became operational there was a significant visual improvement in the clarity of the pool water.

The chemicals used for chlorination and pH control reduced by about 33 per cent,

probably due to the improved removal of solids and organic material by the new filters.

From January to March 2010 there was an increase in the levels of TDS, chloride, sodium and sulphate. This was mainly due to the addition of the chlorination chemicals, plus a lack of dilution following the replacement of filter backwash water.

When the RO plant was commissioned in late March 2010 it had to be operated at 50 per cent recovery because the TDS level was 6,000mg/l – double the design level.

Since March, the water quality has steadily improved, and by December 2010 the TDS was about 1600 mg/l, close to the pool target figure of 1500 mg/l.

In this first year of operation there have been very impressive savings in chemicals, water, gas and electricity at the Tottenham Green site.

Comparing the actual costs

for gas, electricity and water in 2009 with 2010, cost savings of more than £154,000 have been achieved, with additional savings in chlorination and pH control chemicals of about 12 tonnes of sodium hypochlorite and 1.03 tonnes of sodium bisulphate. The carbon footprint of the pool has also been reduced by 60 tonnes per annum.

The application of the Defender – Diluter water treatment technology at the Tottenham Green Leisure Centre has proved to be a great economic and environmental success. It provides excellent water quality for the bathers and has already achieved impressive cost and chemical savings for Haringey Council.

ABOUT THE AUTHOR: Guido Doyer is technical manager for Haringey Sports and Leisure Services. John Murrer is an independent water treatment consultant.





Proud Supplier to
Tottenham Leisure Center
London, England

**Superior Filter,
Responsible Choice**

- **Saves 90% of backwash water**
- **Removes particles down to 1 micron**
- **Reduces chemical consumption**
- **Reduces energy and motor requirements**
- **Saves valuable plant room space**
- **Rapid payback on capital investment**



Respected & Installed Worldwide

Since 1956

www.neptunebenson.com
www.defenderfilter.com