

Ringsend Wastewater Treatment Works



The Design, Build and Operate Contract for the Ringsend Wastewater Treatment Works (WwTW) was undertaken to provide preliminary, primary, secondary and tertiary treatment (disinfection) for a 1.7 million PE in the Greater Dublin City area. Operations began in 2003 following completion of the Construction phase which started in 1999. The original treatment

Works had to be kept operational throughout the construction period. The new Works is built on the site of an old landfill, which meant extensive piling was required to support the new structures. Ringsend is now home to the largest double-decker Sequence Batch Reactor Plant in the world, and is fundamental to maintaining blue-flag status for beaches in Dublin Bay.

At Ringsend WwTW wastewater from the greater Dublin area arrives at the inlet channels from 4 sources. These are - the Ringsend Main Lift, Sutton, and Dun Laoghaire Pumping Stations, and the Dodder Valley Gravity Sewer. The incoming wastewater passes through fine screens (6mm) to remove paper, plastics and large solids. Grit is then removed in special tanks (which are aerated to reduce buoyancy).

At the primary treatment stage readily settleable solids are removed through gravity settlement in 12 Lamella Plate settlement tanks. These tanks are specially designed to maximise surface area for settlement - an important consideration due to relatively small area of land available for a Works which is treating for one of the largest population equivalents in Europe.

Following primary treatment the settled wastewater is pumped to 24 Sequencing Batch Reactors (SBR's) for secondary treatment. The secondary treatment processes encourage the selective growth of a diverse population of micro-organisms which remove carbon-based organic matter from the wastewater along with ammonia and other forms of nitrogen. The food source for these organisms is the organic matter in the wastewater, and the only other requirement is oxygen which is supplied in diffused air provided by large blowers. The SBR technology is used to achieve BOD/COD removal, and also provides ammonia removal through a process known as nitrification.

The SBR Plant at Ringsend are the largest in the world and are contained in a two

storey structure, this globally innovative and unique design was dictated by the limited footprint available for the Works. The SBR Plant comprises 24 individual processing tanks which operate in a stepped sequence of fill/aerate/settle/decant. During the aeration phase micro-organisms grow in conglomerates known as 'flocs' which are held in suspension until aeration stops. The micro-organisms effectively filter the polluting material from the surrounding water, and the flocs they form subsequently settle to the bottom of the tank during the settle phase, allowing clean water to then be decanted from each basin in the final stage.

Secondary treated water then undergoes tertiary treatment in the form of ultraviolet disinfection for pathogen removal making it of suitable quality to meet Bathing Water Standards.

Sludge is a by-product which is generated from the primary and secondary stages of wastewater treatment. It is an energy rich resource, with a high calorific and nutrient content. The aims of sludge treatment are volume reduction, stabilisation, and pasteurisation. At Ringsend this is done through a number of stages. An advanced pre-treatment hydrolysis step prepares the sludge for anaerobic digestion, ensuring a high rate and stable anaerobic digestion process. Following anaerobic digestion (in which more than 50% of the organic matter in the sludge is converted to biogas) the digested sludge is then thermally dried. This kills any remaining pathogens, resulting in a pasteurised, organic nutrient-

rich fertiliser, Biofert, which meets the Class A BioSolids standard, 16,000 tonnes of Biofert is produced at the Ringsend Treatment Works each year. Another valuable by-product of the sludge digestion process is biogas, which has a high methane content, and through combustion this biogas can provide 50% of the heat and electricity required at Ringsend, greatly reducing the Works carbon footprint.

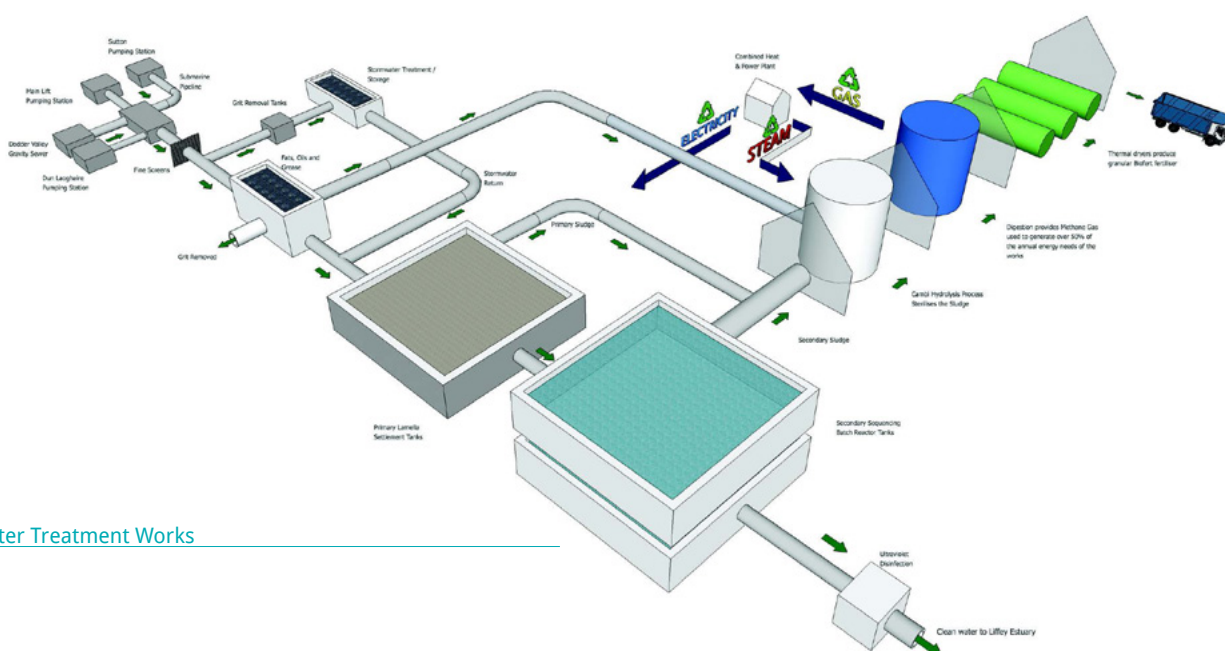
The wastewater and sludge treatment processes at Ringsend rely only on natural and simple physical processes - these being the biological activity of micro-organisms (secondary treatment and anaerobic digestion) and the physical addition of heat (Hydrolysis and Thermal Drying).

The outputs from the treatment Works are:

- Clean water
- Biofert (fertiliser)
- Energy - up to 50% of the energy needed to run the plant is generated from the Biogas which is produced during anaerobic digestion.

KEY DATA:

Population Equivalent:	1.7 million
Dry Weather Flow:	4.65 m ³ /s
Flow to Full Treatment:	11.1 m ³ /s
Maximum flow to storm:	11.5 m ³ /s
Maximum flow to Works:	22.6 m ³ /s
BOD:	98,400 kg/d
TSS:	101,000 kg/d



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