



# 2018

## Water / Wastewater Project of the Year

For the water or wastewater treatment plant, commissioned during 2017, that shows the greatest innovation in terms of optimising its physical or environmental footprint.

# Ulu Pandan wastewater treatment pilot, Singapore

### What is it?

A 12,500m<sup>3</sup>/d demonstration facility at Ulu Pandan, designed to pilot technologies for the new Tuas Water Reclamation Plant.

### Who is involved?

A joint venture of Black & Veatch and AECOM designed the facility for Singapore's Public Utilities Board (PUB). As the lead contractor Mitsubishi Corporation hired Mitsubishi Heavy Industries (MHI) to build the plant. Technology suppliers included Nordic, Suez WTS, and Lar Process Analyzers.

### What makes it special?

PUB envisages the forthcoming Tuas WRP as the most energy-efficient membrane bioreactor (MBR) in the world, with a net process energy consumption target of 0.1kWh/m<sup>3</sup>, 2.5 times lower than a typical MBR. The Ulu Pandan pilot takes this dream several steps closer to reality. The biologically enhanced primary treatment system boosts COD capture to maximise biogas production downstream, while a step-feed MBR configuration – deploying Suez's membranes and LEAPmbr aeration system – slashes energy requirements.

Intense space constraints in Singapore have forced PUB to target an ambitious land intensity of 0.04 ha/m<sup>3</sup>/d for the Tuas WRP. The decision to place a Lamella clarifier on top of a circular sludge collection system was truly inspired, radically reducing the footprint of the primary treatment process. Integrating the reverse osmosis polishing stage into the wastewater treatment plant is also groundbreaking for Singapore, drastically reducing the need for future NEWater production space.

The demo project is no less innovative on the automation front: it is a fertile testing ground for hundreds of advanced water quality analysers, including the first real-time BOD analyser in Singapore. Going forward, the operators are already planning to test in-basin nutrient removal, and to convert the MBR from a five- to a three-pass configuration to reduce construction costs – all of which underscores Singapore’s unparalleled reputation as a global hydrohub.

## Distinction

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# El Paso zero discharge plant, Texas

### What is it?

A zero discharge treatment facility located adjacent to the 27.5MGD (104,088m<sup>3</sup>/d) Kay Bailey Hutchison brackish water reverse osmosis plant in El Paso, Texas.

### Who is involved?

The owner is Enviro Water Minerals, which funded the project and contracted Veolia to operate and maintain the facility for ten years. Suez and Hydranautics supplied the membranes, while the ion exchange media and systems were supplied by ResinTech and Lanxess. The facility treats brine and brackish groundwater supplied by El Paso Water Utilities.

### What makes it special?

A first-of-its-kind public-private partnership, this privately owned and operated facility utilises cutting-edge membrane and ion exchange treatment technologies to recover up to 2.2MGD (8,327m<sup>3</sup>/d) of potable-grade water from brine produced at the Kay Bailey Hutchison desalination plant, providing El Paso Water Utilities with a low-risk, low-cost brine management solution.

By recovering and commercialising valuable minerals and chemicals from the brine stream, and powering the facility using a co-located natural gas power plant instead of relying on the grid, Enviro Water Minerals succeeded in reducing the overall cost of its brine treatment process to such an extent that the service fee it charges El Paso is on a par with the unit cost of the utility’s own desalinated water.

With the water yield of its desalination plant effectively enhanced to 99%, El Paso is able to reduce the volumes of brackish groundwater it treats, thus extending the life of the Hueco Bolson Aquifer. By eliminating the need for brine disposal, it also neatly circumvents the environmental concerns of deep well injection. One day, all plants will be this resourceful.

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