EXHIBITION OF STATE SIGNIFICANT INFRASTRUCTURE APPLICATION
Preferred Infrastructure Report and Response to Submissions
BELMONT DROUGHT RESPONSE DESALINATION PLANT

Application	No SSI-8896
Location	Belmont Wastewater Treatment Plant, Off Ocean Park Road, Belmont
Applicant	Hunter Water Corporation
Council Area	Lake Macquarie
Consent Authority	Minister for Planning and Public Spaces

Description of proposal
Construction and operation of a temporary desalination plant including: seawater intake nfrastructure (subsurface beach wells); desalination units (15 ML/d); brine discharge via existing ocean outfall; electricity/water supply; ancillary works.

Description of revised proposal
Revised application for the construction and operation of a drought response desalination plant at Belmont, including:
• Seawater intake infrastructure via direct ocean intake;
• Desalination process units (30ML/day);
• Brine discharge via existing ocean outfall;
• Electricity/water supply; and
• Ancillary works.

Submitter details:
- Name: Fluence Corporation, 62 Lygon Street (Level 3), Carlton, Victoria, 3053
- Application number: SSI-8896
- We are **MAKING A COMMENT** regarding the proposal
- We suggest a proved technological solution that can allow the Council to utilize independent desalination units, in a containerized design, suitable for 15MLD or 30MLD, within the defined are of the plant
- We had not made any political donations in the previous two years.

Following is the technical description of the proposed systems for the desalination plant

October 4, 2020

Dear Sirs

We appreciate the opportunity to present our technical proposal for sea water desalination plant for up to 15,000 m^3/day product water, based on ten (10) seawater desalination **NIROBOX SW-MEGA** units, or 30,000 m^3/day product water, based on twenty (20) seawater desalination **NIROBOX SW-MEGA** and optional post-treatment system composed of remineralization unit and chlorination unit.

NIROBOX SW-MEGA is a complete seawater desalination plant, mounted in a 40-foot, temperature-controlled container, allowing quick installation and easy operation, offering a solution for seawater desalination with low consumption of energy and chemicals. Below, please find a technical description of the equipment and proposed commercial conditions. We are at your disposal for further clarifications of technical or commercial discussions

Kind Regards,

Rafi Laderman

Regional Sales Manager

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1. COMPANY OVERVIEW

Fluence brings together breakthrough water-treatment technologies and proven delivery platforms to optimize the water cycle for the 21st century, providing the middle market with local, sustainable, and fast-to-deploy water and wastewater treatment and reuse solutions, empowering businesses, and communities worldwide to make the most of their water resources.

We offer an integrated range of services across the complete water cycle. Our solutions include:

- Packaged and pre-engineered decentralized treatment solutions for quick deployment
- Tailored financing packages to finance water and wastewater treatment plants
- Constructing and operating water assets under build-operate-transfer (BOT), operating and financing leases, and reuse-as-a-service (RaaS)

Fluence is a global leader in mid-sized, decentralized water and wastewater solutions. Fluence stands out from the competition by:

- Providing highly efficient packaged and pre-engineered treatment solutions
- Offering a differentiated product line
- Featuring high-quality water professionals with international experience servicing the decentralized market
- Serving all aspects of the water market value chain

With headquarters in New York, Fluence has a global staff of over 300 highly trained water professionals, and more than 7,000 references in 70 countries worldwide. Fluence has ongoing operations in a dozen countries, with core operations in North America, South America, the Middle East, and Europe.

For more information, please visit www.fluencecorp.com.

2. NIROBOX SW OVERVIEW

Each **NIROBOX SW-MEGA** uses three process stages for seawater desalination: disc filtration, ultrafiltration (UF) and reverse osmosis (RO). The system is equipped with the most efficient high-pressure pumps and energy recovery device (ERD) systems in the market and is completely installed in a 40-foot-high-cube container with thermo-acoustic insulation.

2.1 Design For Low CAPEX And OPEX

NIROBOX SW-MEGA includes the following systems (as further described in section 4 herein):

- Pretreatment system with disc filter (DF) plus ultra-filtration (UF) membranes, ensures continuous operation without problems, excellent and constant filtrate quality, at raw water quality up to 20 [NTU]
- Direct feeding from UF to RO - eliminates the need for an intermediate water tank and extra low-pressure RO feed pump, resulting in lower operating costs & footprint
- Direct backwash of UF modules by RO brine, using residual pressure of the brine line – eliminate the need for another operative tank for backwash and backwash pump
- Direct CEB (Chemical enhanced backwash) of UF modules by RO permeate, using residual pressure of the permeate line – eliminate the need for another operative tank for backwash and backwash pump
- Efficient positive displacement, high-pressure pump and advanced energy recovery device (ERD) - Reduces up to 60% of energy costs, compared to units without any ERD system
- High flux/ low energy Reverse Osmosis membranes of latest generation - reduce operating pressures and saves energy
- Flexibility of Operation - all pumps are equipped with variable frequency drives (VFD) that allows a wide operating range
- Fully automatic system with high availability and minimal maintenance – up to 99% availability. (under normal operating conditions, the system downtime is less than 80 hours / year for maintenance and cleaning)

3. SYSTEM OVERVIEW

Hunter Water expressed his interest in receiving Fluence's concept for a packaged seawater desalination plant, for production of 15,000 m3/day or 30,000 m3/day potable water at drinking water quality.

According to the GHD publication "Environmental Impact Statement November 2019", the preferred option for the Belmont Drought Response Desalination Plant – the purpose of the plant is to allow **"an additional level of water security with minimal additional cost compared to a single large or multiple small plants producing only 9 ML/day. To maintain Hunter Water's ability to choose a range of flow rates up to 15 ML/day, a modular design is nominated, such that Hunter Water can choose an initial capacity that retains the ability to expand the plant sensibly to 15 ML/day. The production of up to 15 ML/day can be provided as a combination of smaller desalination modules, meaning that supply can easily be scaled up or down depending on demand and operational circumstances**"

The Fluence packaged **NIROBOX SW-MEGA** can be supplied and/or operated in clusters or each independent. This will allow Hunter Water maximum flexibility in the construction and operation of the desalination plant, either as a combined plant of 15,000 m3/day or in smaller units:

Capacity	No of **NIROBOX SW-MEGA** units
4.5 ML/day	3
7.5 ML/day	5
10.5 ML/day	7
15 ML/day	10

The water treatment system proposed here is composed of the following major elements:

A) Ultra-filtration system

B) Reverse Osmosis system

C) Optional Post-treatment system combined of:

   a. Disinfection by chemical dosing/UV

   b. Remineralization by calcite filters/chemical dosing

D) Auxiliary equipment consists of:

   a. Cleaning In Place system for the UF and RO systems

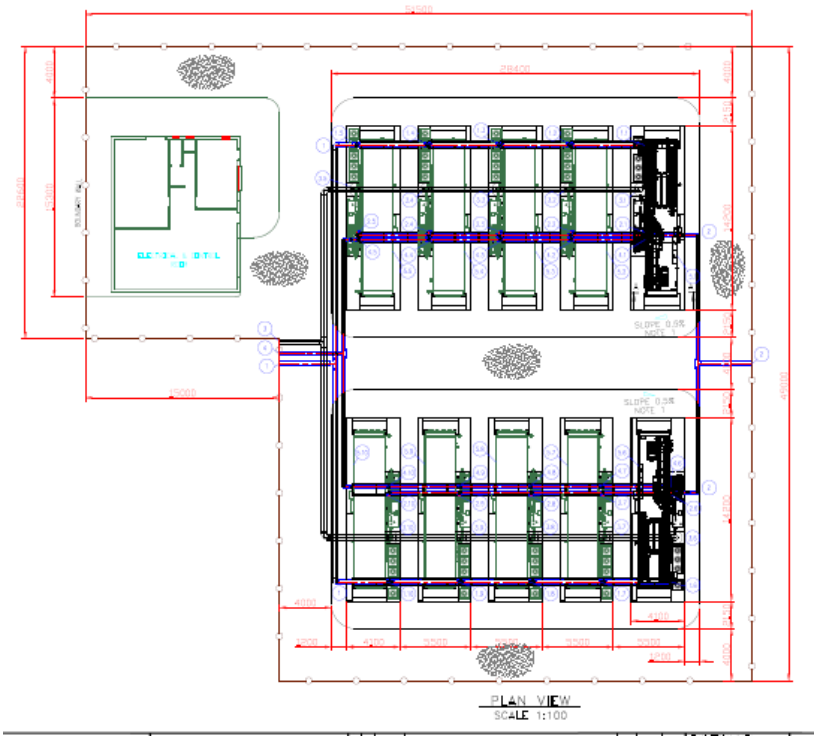
   b. Pressurized air system

   c. HVAC unit

   d. Feed pumps/product delivery pumps/brine disposal pumps/feed pumps control

E) Supervision of installation, Start-up, commissioning, and training

Conceptual Layout of a 15,000 m3/day desalination plant with NIROBOX SW-MEGA units



The conceptual design portrays the main treatment components for a desalination plant of 15,000 m3/day, comprised of 10 NIROBOX SW-MEGA units, or 30,000 m3/day, with two arrays of the above. The proposed will be offered not including the intake, storage tanks, distribution unit and discharge system.

Note: due to the unique design of the NIROBOX SW-MEGA the desalination plant does not need a UF Filtrate storage tank and UF Backwash pump. This feature can save considerable space, construction and operational costs.

The basic advantages of this concept are:

- The simplicity and flexibility of the installation – the investment in the major equipment can be planned gradually, over time.
- With the NIROBOX SW-MEGA, the system can be supplied and/or operated in the modules that were recommended by GHD, in their report from November 2019.
- The containerized systems can minimize the required civil works for the construction of the plant.
- The containerized system can fit in the boundaries of the defined area for the plant, even for a 30,000 m3/day capacity.