

Wastewater Treatment Plant in Guardamar del Segura - Alicante

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The municipality of Guardamar del Segura initially had a pond system for treatment of sewage from the population, composed of three anaerobic lagoons and two facultative lagoons. The new Wastewater Treatment Plant is built in the basin of the west facultative lagoon, occupying an area of 20,500 m².

Location	Guardamar del Segura (Alicante)
Customer	Entidad pública de saneamiento de aguas residuales de la Comunidad Valenciana
Construction Period	17 months
Capacity	11.000 m³/day
Population	91.000 eq-inhabitants

Population development, with a higher flow rate demand and greater pollution, caused the system installed to be insufficient to obtain a treatment performance in keeping with the limits of current legislation and to offer sufficient quality for the reuse of water or its disposal into the river Segura.

This population has a marked seasonal nature. These changes considerably affect urban service operations, considerable increases being observed in the consumption of supplies and in the generation of wastewater during the summer.

Situation of the River Segura in its final section and the economic value represented by good water quality on the coast, it was

decided to design an advanced biological treatment area that would allow a reduction in organic matter and disinfection of treated effluent.

In the following table can be seen the design parameters of raw water at the inlet and the treated water parameters obtained by the WWTP:

	Influent	Treated water
DBO ₅	500 ppm	<15 ppm
SS	450 ppm	<15 ppm
Total N	100 ppm	<15 ppm
Total P	18 ppm	<2 ppm

Water line

The water line is formed by pre-treatment, advanced biological treatment and tertiary treatment, which includes filtration and disinfection. Treated water can in this way be reused for irrigation of crops in the country around the Guardamar.

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The **screening** is formed by two fine solid screening channels with two self-cleaning screens, with a three millimetre opening, it also has a third channel with a manual cleaning screen. Waste extracted through the screen is evacuated to containers by means of a screw conveyor-compactor.

The **grit removal** is formed by two grit removal-degreasing channels aerated by rotary piston blowers. Each grit channel consists of an area arranged for grit sedimentation and a second area for de-emulsifying grease, detergents and oils. Sedimented sand and grit is extracted by a vertical shaft pump and conveyed to the grit washing zone. The solid part is evacuated by a container to the disposal area. De-emulsified grease is extracted by surface skimming to a special channel provided for the purpose, where they are conveyed to the grease concentrator and, finally, from the latter to the container.

The **biological treatment** adopted is the patented A2O process commercialized in Spain by **DRACE Medioambiente**, in the form of extended aeration with nitrification, de-nitrification and biological removal of phosphorous. The A2O process is a variation of the activated sludge conventional treatment, but including a compartmented anaerobic zone at the entrance to the biological reactor and equipped with mix shakers that ensure a close contact between the influent and the recirculation biomass in absence of oxygen.

Tertiary treatment: Formed by an installation with two filtering lines with rings and an automatic washing system to treat the average flow rate in the high season, with filtration levels of 25 microns.

Water leaving the filters is led to a filtered water tank and is then pumped to the disinfection reactors.

To encourage disinfection and to comply with the contract covering the treatment plant, there is a chlorination labyrinth where hypochlorite is added to the treated water. The water is subsequently reused to irrigate the country around the Guardamar.

Sludge line

The sludge treatment is formed by two gravity sludge thickeners where the sludge is concentrated into 6% dry material and is left to be dewatered. Thickened sludge is dewatered through two high dryness centrifugal clarifiers with a 15 m³/hour processing capacity. The dewatered sludge is pumped and stored in the 60 m³ capacity sludge hopper awaiting its final disposal.

Sludge characteristics	
Dryness	25%
Sludge stability	40%

Complementary installations

The Wastewater Treatment Plant has a complete deodorization system which evacuates and treats foul air from the gravity thickeners, the pre-treatment building and the clarifying centrifuges. It is also equipped with an emergency power plant which allows half of the plant to remain working during any sporadic power cuts that may occur.