



WASTEWATER TREATMENT PLANT BRAILA



Concept & Location

The idyllic region of Braila in Romania is famed for its natural beauty. Situated in close proximity to the historic Danube River, Braila is a rapidly growing city with rising population that has led to increasing demands on basic facilities.

Population growth is always accompanied by an increase in the amount of wastewater generated and proper disposal of wastewater is essential to maintain hygiene levels in cities. The traditional method of dealing with wastewater in Braila had been to simply dump it into the Danube. But sewage levels had been increasing steadily in the last few decades, and the Danube River witnessed a rise in pollution levels, due to the inability of the natural eco-system to absorb pollutants and reduce toxicity in water. The Romanian government decided to setup a modern wastewater treatment plant in Braila, to reduce the pollution levels in the Danube River.

Passavant Energy and Environment, Drake & Scull International PJSC's specialised German water and wastewater global specialist fully-owned subsidiary was contracted by the Braila Municipality to undertake the Design, Supply and Installation of a Wastewater Treatment Plant with a total capacity of 100,000 m³/day, catering to a Population Equivalent of 270,000 people.

Passavant Energy and Environment took over the reins of the project from previous contractors who had not been able to meet the complex requirements of the Braila Wastewater Treatment Plant for well over 6 years.

Passavant Energy and Environment's experienced and highly skilled team were able to achieve substantial progress in rapid time, and the wastewater plant became a reality in an incredibly short span of one year. As an example of efficient Design & Build largescale wastewater treatment plant, the Braila project proved to be a boon to the residents of the Braila region, as the River Danube recorded significantly reduced pollution levels shortly after the plant became operational.

Passavant Energy and Environment's work ethic and technical expertise were widely lauded both by the client and government, and received acclaim in the media as well. The Braila Wastewater Treatment Plant is a strong example of Passavant Energy and Environment's commitment to a cleaner and safer water ecosystem.



Scope of Work & Innovation

As Main Contractor, Passavant Energy and Environment was in charge for the mechanical, electrical and civil portions of the Braila Wastewater Treatment Plant. The wastewater treatment plant itself consists of:

- A Main pumping station to supply the collected wastewater to the treatment plant.
- Rising Main section for transportation of the wastewater to the plant.
- Mechanical Pre-treatment Unit (using both Coarse and Fine Screens) to remove large particles in the water.
- Aerated Grit & Grease Removal Chamber to absorb oily layers and mineral particles (sand) contained in the wastewater stream.
- Aeration Tank (Plug Flow Aeration) with Fine Bubble Aeration to provide dissolved oxygen for the biomass and to prevent sedimentation.
- Final Sedimentation Tanks and Sludge Treatment with Mechanical Thickening and Dewatering of sediments. The dewatered sludge can be re-used to generate biogas.
- Flood Pumping Station using effluent pipes to discharge the cleaned water into the river.

Simple Design, Ingenious Thinking

The Braila Wastewater treatment plant's operations can be broken down into simple, but very well-conceived steps.

Stage 1: Inlet Works

In the first stage, wastewater is fed into the plant via the pumping stations and passed through the Rising Main section,

then the pre-treatment plant and finally the Aerated Grit and Grease Removal Chamber, to eliminate large sized impurities and particles in the water.

Stage 2: Biological Treatment

The remaining wastewater is then channelled through to the Aeration Tank in the next stage. The Braila wastewater treatment plant received a very unique tank concept.

Normally, aeration tanks are constructed in a rectangular form (with a slight difference between the length and width, usually in the range of 6:1 to 10:1). These tanks are equipped with mixers in the non-aerated zones to prevent sedimentation and a permanent aeration system ensures a constant aeration in the aerated tank zones.

However in Braila, pure plug flow tanks were installed. In this method, each of the four aeration tanks is constructed like a sewage channel, (5m in width, 5.15m in depth and 468.6m in length).

Each aeration basin is equipped with longitudinal baffle walls to direct the flow along a twisted path through three compartments. A diffuser system without any mixers has been installed in the aerated zones. Around 4,000 diffusers have been installed in each aeration tank, to achieve a constant air distribution, which prevents the build-up of sediments. The implementation of a plug flow system creates a concentration profile in the wastewater which mimics the progress of the biological degradation processes.

By means of final sedimentation tanks, the biomass is then separated from the treated effluent.



Stage 3: Sludge Treatment

The sludge produced from the biological treatment stage is forwarded to the sludge treatment plant, in which it is drained of water.

Thanks to its strong, long-term experience and patented technologies, Passavant integrated a complete sludge line for mechanical sludge dewatering with belt thickeners and centrifuges. The dewatered sludge is fed to the covered sludge storage area via a conveyor system and a turntable belt conveyor feeding it directly into sludge containers that are taken off-site for disposal.

Stage 4: Water Discharge

In the final stage, the drained water is then diverted to the discharge station, where it is fed back into the Danube River, for the natural cleansing of water and its re-introduction into the natural water cycle.

To realize the WWTP at Braila, Passavant Energy and Environment undertook 165,000 m³ of excavation, 3,345 tons of Reinforcement, 49,000 m³ of Concrete, 84,000 m² of Formwork, 4,500 piles of 25 m length each and nearly 5,750 m of total pipelines on site.

To deliver substantial progress on site and to meet the finalization date, Passavant Energy and Environment combined its expert knowledge and expertise in the realization of turnkey projects, and worked in constant consultation both with the client and the engineers.

Passavant Energy and Environment's strong technical know-how and stellar human resources management of the project team on site allowed it to fast track the project and deliver its intended target of a wholly natural waste-water

treatment process by mechanical and biological treatment through the process of extended aeration with activated sludge treatment. This modern engineering approach resulted in an environmentally friendly initiative that delivered positive results for the Danube eco-habitat.

At peak activity, around 350 Passavant Energy and Environment personnel worked round the clock, split into several teams working in parallel, and centrally coordinated. Passavant Energy and Environment also designed and installed a complete SCADA system for plant control.

From a post installation perspective, Passavant Energy and Environment enhanced plant operation procedures to ensure that the maintenance routines and management of consumables have been perfectly adapted to the needs on site and not only achieve, but even exceed the set purification objectives without exceptions.

The Braila Wastewater treatment plant was completed and launched successfully in 2011, a realisation of nearly a decade old wish of the Braila Municipality to clean up the Danube River and to bring about a greener landscape.

The Braila Wastewater Treatment Plant is already compliant with the upcoming European Pollution norms and environmental requirements. This is an example of Passavant Energy and Environment's strong foresight and its cutting edge, modern solutions.

The Braila Wastewater Treatment Plant is a perfect showcase of Passavant Energy and Environment's fast-track project execution skills and professional work approach. It is a significant addition to Passavant's considerable history of complex water, wastewater, sludge and waste treatment plants

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Project Case Study
Braila

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