

Shanganagh Waste Water Treatment Plant Shankill, Dun Laoghaire County (Ireland)

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Location	Shankill, Dun Laoghaire County, Ireland
Developer	Dun Laoghaire – Rathdown County Council
Starting Construction date	November 2008
Construction period	137 weeks
Capacity Design (year 2018)	43,700 m³/day
Population	186,000 e.i.

Bray PS: two gravity sewers serve the existing works; the treatment comprises inlet screening, grit removal pumping station to the long sea outfall and pumping station to the twin short sea outfalls.

	Input	Outlet
DBO ₅	270 mg/l	< 25 mg/l
DQO	550 mg/l	< 125 mg/l
SS	340 mg/l	< 35 mg/l

The Project is for the provision of design and construction for a wastewater treatment works at the site of the existing Shanganagh wastewater treatment works, the refurbishment of the existing Bray Pumping Station and the MEICA works associated with a Stormwater Storage Tank at Bray.

The Project also includes for the provision of operation and maintenance services for the wastewater treatment works, Bray Pumping Station, Stormwater Storage Tank and Bray to Shanganagh Transfer Pipeline (to be designed and constructed by others) for a period of 20 years.

Description of the Existing Works

Shanganagh WWTW: Two gravity sewers and one pumped sewer serve the existing works which currently includes screening, grit removal, storm separation an outfall pumping station, a long sea outfall and a gravity short sea outfall.

The Contract includes the following works:

- Preliminary Treatment at Shanganagh
- Secondary Treatment at Shanganagh
- Stormwater handling at Shanganagh
- Sludge Treatment at Shanganagh
- Sludge Disposal from the Shanganagh WwTW
- Refurbishment of existing assets where appropriate at Shanganagh
- Refurbishment of Bray PS
- MEICA works at Bray Stormwater Storage Tank
- Odour Control
- Operation and Maintenance for all the above including the Transfer Pipeline.

Main consideration on the project is the control of Odor during the Construction and O&M phase of the project, this is a specific requirement of the project.

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New Works

- Bray PS: Upgrade of the MEICA equipment installed in the Pump Station; construction of a new 5,000 m³ storm tank and a 600 mm, 5.6 Km long foul transfer pipe to Shanganagh.
- Shanganagh WWTW: construction of a new Pretreatment Building that comprises inlet Pumping Station, Coarse and fine Screening, 1,300 m³ storm tank, Grit and FOG removal. Construction of Primary Lamella Clarifiers, Biological reactors, Secondary Settling and Anaerobic Digestion.

It is proposed to construct the plant in 3 phases, representing 3 key stages of the operation of the treatment works

- Phase one: operation of the existing works at both Shanganagh and Bray. Pretreated flows from Bray will be discharged through the long sea outfall at Bray, and pretreated flows from Shanganagh will be discharged through the long sea outfall at Shanganagh.
- Phase two: This phase will start at the completion of the new pretreatment at Shanganagh. During this phase, the inlet sewers at Shanganagh will be diverted one at a time to the new treatment works, so both pretreatments plants will be operative in order to carry out these works. There will not be any changes for the operation at Bray PS.
- Phase three: This phase includes the demolition of the existing facilities at Shanganagh, the construction of the new plant at Shanganagh and the connection between Bray and Shanganagh through the proposed new rising main. The wastewater at Bray will be pretreated and pumped to Shanganagh; the sea outfalls at Bray will be retained and maintained to use them in case of overflow.

Description of the Works

- The raw sewage lifting pumping consists of four 200 kW pumps and three 55 kW pumps. The three 55 kW pumps and one 200 kW pump are equipped with frequency shifters. The three 55 kW pumps and the three 200 kW pumps may operate simultaneously, leaving one 200 kW pump as standby.
- Screening is carried out in 4 channels 1 m wide that are isolated by powered gates located upstream and downstream of each channel. These contain self-cleaning step screen type fine screens with a mesh of 6 mm.
- Sand and grease removal: The water leaving the screening area is led by an access channel to the grit & oil chambers which are isolated by powered sluice gates. There are 4 sand and grease removal lines, each 6 m wide and 25 m long, operating at a hydraulic load of 28,81 m³/m²/h at maximum flow. Air is supplied to them by 5 blowers (one on standby), each supplying a flow of 2,500 m³/h.
- The grit and oil chambers are equipped with a wide gantry running the length of the channels, on the edges of which the sand removal pumps are located.

- Each pump sucks up the sand from the bottom of the removers and pumps it to two central channels which lead the sand/water mix to one sand classifier which evacuate the sand to a 5,000 litre containers..
- Grease is collected by surface scrapers that push the grease stored on the side of the grit and oil chambers, to a collection channel behind it. The grease and floating matter is sent from the grease channel to 1 grease and floating matter concentrator, which also treats the floating matter from primary decanting, this residue is treated in a hydrolysis tank for complete FOG degradation; it consists on an aerated bio-reactor.
- Storm management: when the wastewater flow exceeds the flow to full treatment, the excess flow will be diverted to a 1,300 m³ storm tank. An automatic penstock will isolate the storm tank from the inlet chamber, when the inlet flow decreases, this penstock will be automatically open to send the waste water to the process. Once the storm holding tank is full, excess storm flows will be discharged via the long sea outfall.
- Primary decanting: There will be 6 primary lamella decanters. The primary decanters are rectangular and measure 9 m wide and 9 m long. All lamella tanks will be closed with a GRP cover to avoid odour emissions.
- Biological reactor: Consists of 4 streams (1 on standby). Each stream is divided into two separated zones, Anaerobic and Aerobic. Each anaerobic zone volume will be 600 m³; each anaerobic zone will be 3,000 m³.
- Secondary decanting: The mixture liquor from the aeration tanks will be conducted to the Clarifiers Distribution Chamber. There will be 4 circular radial flow suction clarifiers (1 on standby). Each unit will be of 36 m diameter and 3.8 m water height.
- Discharge Outfall: the existing short and long outfalls at Shanganagh WWTW and Bray PS will be retained. In Shanganagh WWTW, the existing pump station will be upgrade with the installation of 4 new pumps (1 on standby) to deliver a total combined flow of 11,520 m³/h to 10,25 m of manometric height. There will be an overflow chamber in the inlet of the outfall pumping station to discharge of excess and overflows from the outfall pumping station to the short sea outfall.
- Sludge treatment: all sludge will be fine screened to maximum 5 mm in two dimensions. Primary sludge will be thickened one primary sludge screening in series with one primary sludge thickener with a unitary capacity of 50 m³/h. Secondary sludge will be thickened in 2 drum thickeners (1 on standby) with a unitary capacity of 55 m³/h.
- Anaerobic Digestion: The sludge stabilization will be mesophilic anaerobic. The process will be carried out in 2 anaerobic digesters with a retention time of 20 days. Digested sludge will be pumped to a 17 m diameter buffer.
- Sludge Dewatering: will be carried out in two high Dryness Centrifuge Decanters with a unitary capacity of 25 m³/h. Finally, the sludge will be thermal dried in 2 thermal drying streams. Each one will have a maximum capacity of 1,680 l/h for evaporated water. Dried sludge will be transported to 1 storage silo of 70 m³ by pneumatic transportation means.