

Potable Water Treatment

El Marg / Cairo

Egypt



BAMAG was charged with planning, supply and installation as well as commissioning for the El Marg potable water treatment plant which has a capacity of 600,000 m³/d.

El Marg is a district in the north of Cairo, the capital of Egypt.

The water for the treatment plant is drawn from Ismailia Canal approximately 8 km apart from the treatment station.

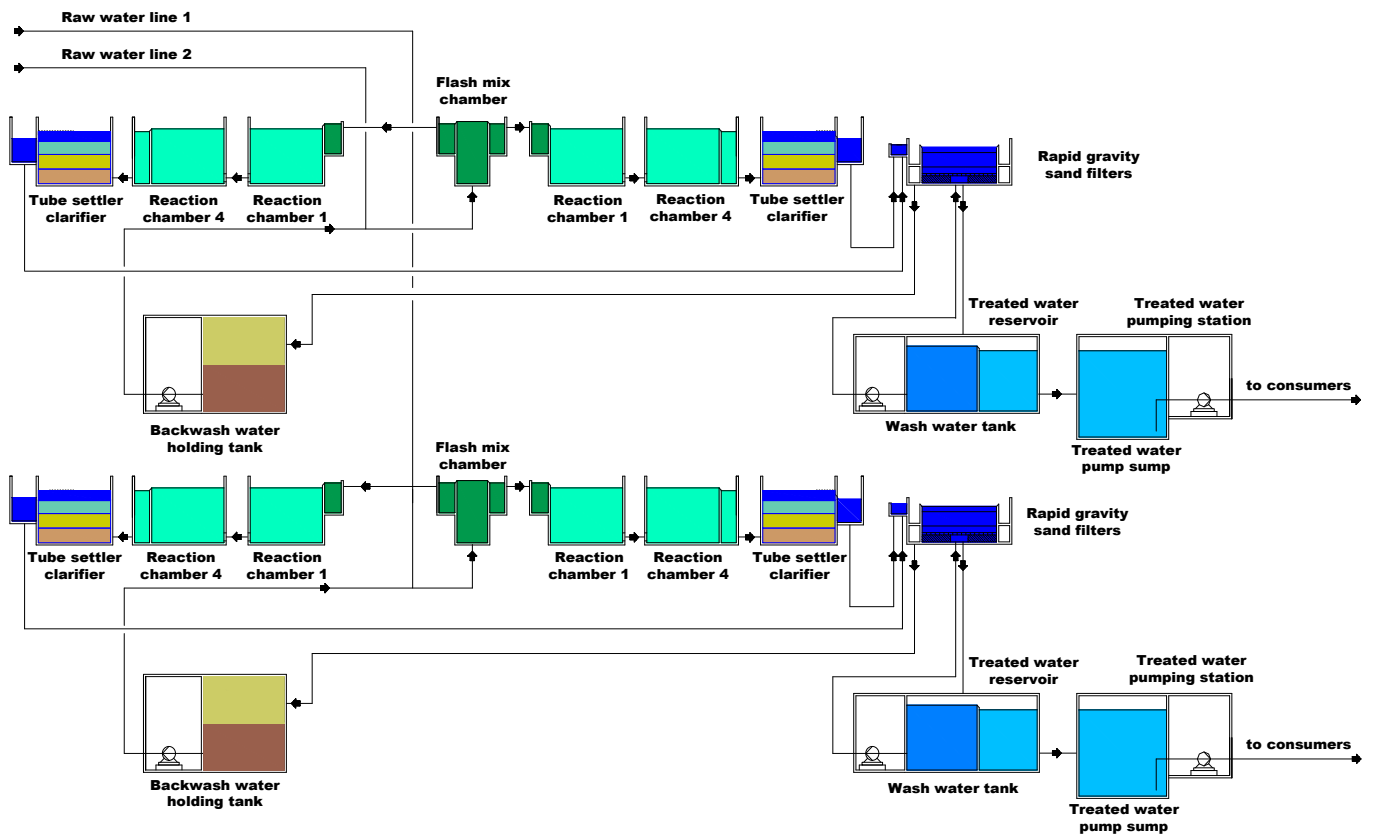
The treatment plant itself is located in the middle of the city on a narrow place where a small ground water treatment plant was situated before. The water produced by the station is to supply El Marg and the neighbour districts in order to overcome their regular shortage of potable water.

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1. Objective

Treatment of Potable Water

Design Data

Source: Ismailia Canal

Throughput: 600,000 m³/d

Turbidity: approx. 15 NTU

Total coliforms: approx.

10⁴ colonies/100 ml

Total algae count: approx. 20,000

Treated Water Quality:

Turbidity: 0.4 NTU

Total coliforms: nil

2. Plant concept

2.1. Process steps

Raw water intake and pump station

Pre-chlorination, rapid mixing, flocculation, sedimentation, filtration by rapid gravity sand filters, final chlorination, backwash water recovery, sludge thickening and dewatering.

2.2. Brief description

The intake including manually and automatically raked bar screen as well as travelling band screens is located at the shore of the canal together with the raw water pumping station.

The treatment station consists of two trains with a capacity of 300,000 m³/d each. The area available for the station is extremely narrow and a basement could not be established because of the neighbouring apartment houses. The whole treatment facilities are housed in a huge building of about 350 m long and 45 m wide with the main process units on the roof level and the auxiliaries on the ground floor level.

Each of the two raw water pipelines feeds into a flash mix chamber, where chlorine and coagulant is added and distributed in the water by special mixers of high energy input.

From each of the flash mix chambers, dosed water is distributed evenly to four sets of flocculation chambers. Each tank is equipped with a special agitator providing low energy input but high mixing rate. Tapered input of energy ensures careful building and growing of flocks. Water from the flocculation tanks is collected and re-distributed to longitudinal tube settler clarifiers.

Such tanks are covered with a layer of inclined hexagonal tubes. While passing these tubes the flocks are settling on their surface and sliding downwards counter-currently to the flow of water. Suspended matter settles as sludge on the bottom of the tank and is removed continuously by submersible pumps suspending from a scraper. The surplus is passed to three sludge thickeners.

Clarified water from the settlers is collected and re-distributed to mono-bed gravity filters of the constant level type. Filtered water is collected in the wash water tanks below after having passed the nozzle free M-Block filter bottom.

Filters are backwashed by using both air and water.

Filtered water leaving the wash water tanks is sterilized by adding chlorine and passed into the treated water storage reservoirs beside.

From the treated water reservoirs potable water is flowing into the pump sumps of the treated water pumping station.

By two groups of treated water pumps, potable water is discharged to the two different networks of the district.

Surge facilities are provided for protection of the pumps and network.

Used backwash water from the filters is collected in four holding tanks. The supernatant is recycled to the flash mix chamber of the related train while the underflow is pumped to the sludge thickeners.

In the circular thickeners beside the main building sludge is concentrated with the support of picked fence scrapers. Supernatant from the thickeners is passed into an overflow receiver outside the station. Thickened sludge is dewatered by two belt filter presses. Dewatered sludge is collected in containers and carried to the dump by trucks. Turbid water from the presses is returned to the inlet of the thickeners.

3. Characteristic plant data

Three intake trains equipped with manual bar screen, automatic bar screen and a travelling band screen.
 Six raw water pumps 6,900 m³/h each
 Two flash mix chambers 317 m³ content each
 32 flocculation chambers 480 m³ content each
 12 tube settler clarifiers 8.4 x 37 m
 48 rapid gravity sand filters 86 m² each
 1 Chlorine dosing station
 1 Alum. Sulphate dosing station
 Treated water reservoirs:
 6 reservoirs with a capacity of 29,000 m³ in total
 10 treated water pumps 4,200 m³/h each
 3 Sludge Thickeners 20 m diameter
 2 belt filter presses
 flock aid dosing station and accessories