Potable Water Treatment

10th of Ramadan / El Sharkia

Egypt

BAMAG was awarded with planning, supply and installation as well as commissioning for the 10th of Ramadan potable water treatment plant which has a capacity of 600,000 m^3/d.

10th of Ramadan is a district in the north of Cairo, the capital of Egypt. The water for the treatment plant is drawn from Ismailia Canal approximately 22 km apart from the treatment station.

The treatment plant itself is located outside of the city in the desert place. The water produced by the station is to supply the Cities 10th of Ramadan , Badr and Elshrouq and Gulf of Suez Area in order to overcome their regular shortage of potable water.

Bamag is an international EPC contractor for water and wastewater treatment plants as well as thermal processes.
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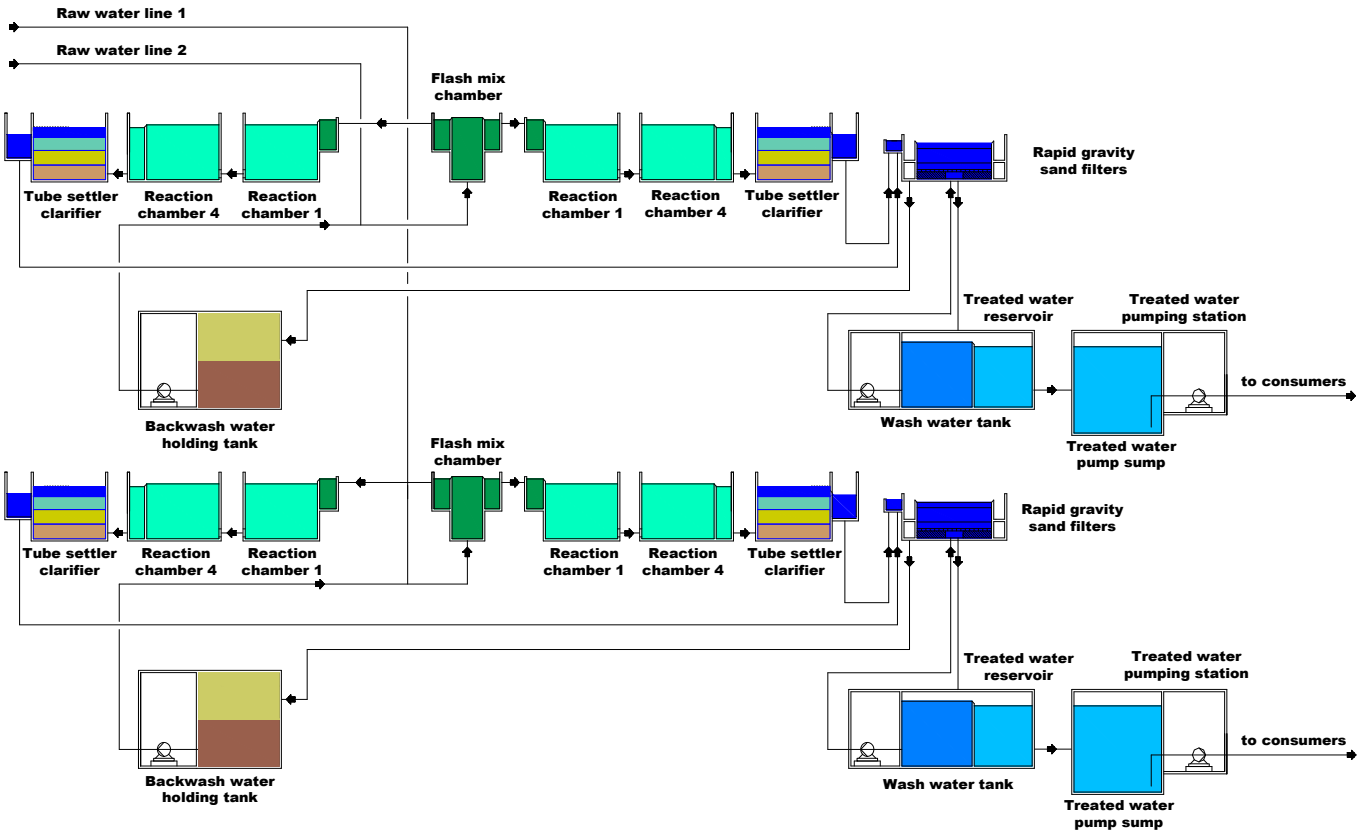

1. Objective

Treatment of Potable Water

Design Data

Source: Ismailia Canal

Throughput:	600,000 m^3/d
Turbidity: approx.	15 NTU
Total coliforms: approx.	10^4 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 m^3/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	4,583 m^3/h each
Six booster water pumps	4,583 m^3/h each
Two flash mix chambers	317 m^3 content each
32 flocculation chambers	480 m^3 content each
12 tube settler clarifiers	8.4 x 37 m
48 rapid gravity sand filters	86 m^2 each

1 Chlorine dosing station

1 Alum. Sulphate dosing station

Treated water reservoirs:

6 reservoirs with a capacity of	120,000 m^3 in total
3 treated water pumps	2,084 m^3/h each
6 treated water pumps	2,396 m^3/h each
6 treated water pumps	2,500 m^3/h each
2 Sludge Lagoon	36,000 m^3 each

C/W supernatant pumping station

4. Schedule

Contract award	2008
Under commissioning	2016

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