REGIONAL SEWAGE TREATMENT PLANT - KUALA SAWAH

NEGERI SEMBILAN BRANCH

Ir. Dr Oh Seong Por

On 29 March, 2019, the Institution of Engineers, Malaysia, Negeri Sembilan Branch (IEMNS) organised a technical visit to the Regional Sewage Treatment Plant (RSTP) in Kuala Sawah, some 10km from Seremban, Negeri Sembilan. A group of 47 participants from engineering consultant firms, Jabatan Kerja Raya (JKR), Jabatan Pengairan & Saliran (JPS), industry sectors and engineering students spent a half day touring the facilities at RSTP Kuala Sawah, which was operated by Indah Water Konsortium Sdn. Bhd. (IWK).

Following the enactment of the Sewage Services Act 1993, sewage treatment was privatised to IWK, which started operations in April 1994. However, in June 2000, the Malaysian Government, through the Ministry of Finance, took over IWK. To date IWK is operating and maintaining all public sewage systems in the country except in Kelantan, Sabah, Sarawak, Johor Baru Municipal Council and Pasir Gudang Council.

Led by Ir. Dr Oh Seong Por, the group arrived at RSTP Kuala Sawah at 10 a.m. and was greeted by Encik Mohd Hafizal Awang (Engineer Treatment). We were ushered into the meeting hall where Encik Hafizal briefed us on the company profile, operation and services.

RSTP Kuala Sawah covers a total catchment area of 10,600 hectares, consisting of areas shown in Table 1. It is the largest sewage treatment plant in Negeri Sembilan.

After upgrading work was completed in January 2019, the plant had been operating with the new design Population Equivalent (PE) of 360,000.

PE or unit per capita loading used in waste water treatment, is the ratio of the sum of pollution load produced in 24 hours by industrial facility & service to the individual pollution load produced in household by one person in a day. The new 360,000 PE provides maximum sewage flow of 199,000 m3/day. According to Encik Hafizal, the plant is large enough to be upgraded ultimately to 1,400,000 PE with maximum flow of 735,000m3/day. The design effluent quality (water quality after treatment) targets are:

i. Biological Oxygen Demand or BOD: 10mg/litre.
ii. Suspended Solid or SS: 20mg/litre.
iii. Total Nitrogen or TN: 10mg/litre.
iv. Ammonium Nitrogen or NH3-N: 2mg/litre.

RSTP Kuala Sawah is equipped with the latest facilities such as

Regional Sewage Treatment Plant Kuala Sawah

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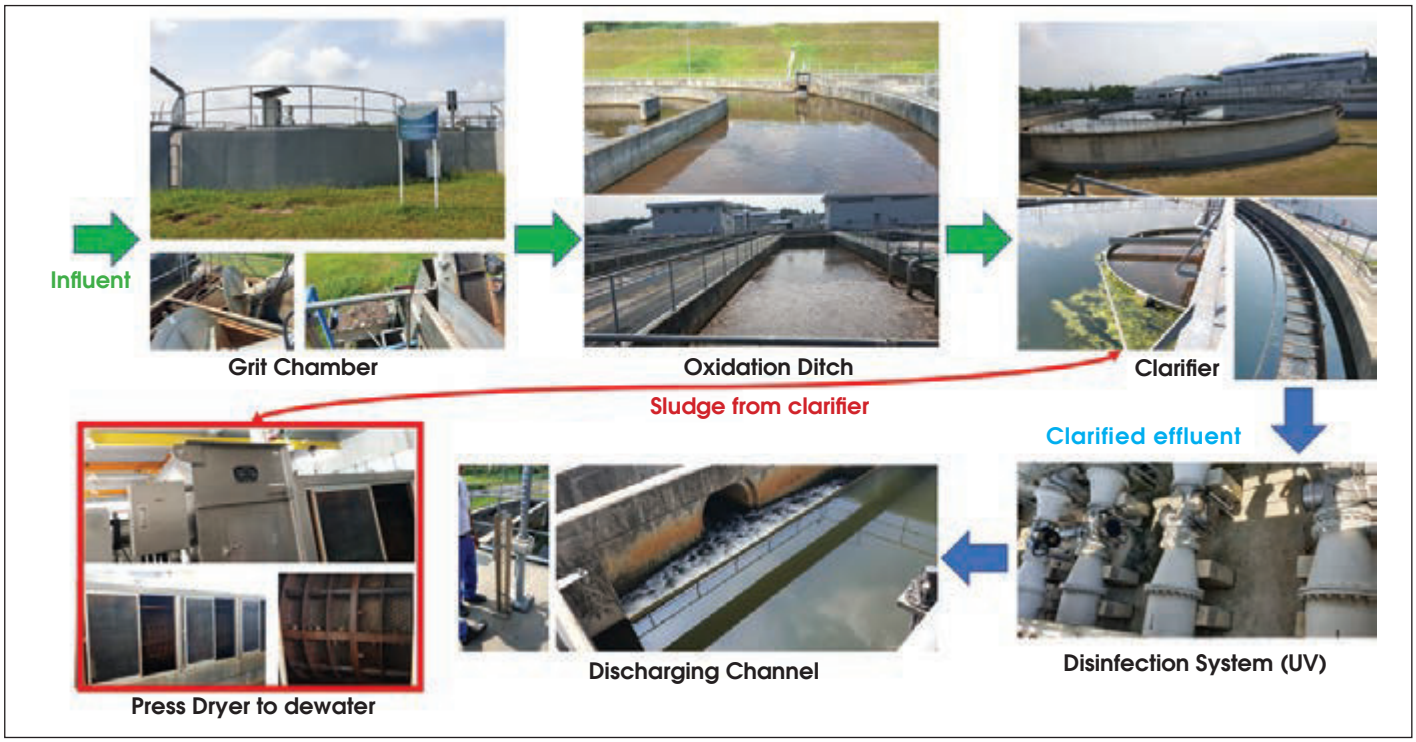
Table 1: Catchment Areas

No.	Area	Catchment Area (h.a)
1.	Kayu Ara	738
2.	Mantin	919
3.	Kepayang	1,312
4.	Rasah	338
5.	Temiang	1,320
6.	Temiang Diversion	712
7.	Simpo	604
8.	Batang Benar	448
9.	Paroi	1,463
10.	Rahang	268
11.	Senawang	815
12.	Loop Road	293
13.	Anak Garam	521
14.	Outside	849
	TOTAL	10,600



Sewage Treatment Process Flow

grit chamber, Oxidation Ditch (OD), clarifier, disinfection system and press dryer to perform the cleaning processes of incoming sewage flow. The figure above illustrates the process flow.

Grit Chamber: The influent flow is slowed down to allow solid substances such as sand or non-organic particles to settle down and be removed by mechanical scrappers and oil scoopers. This is actually a physical filtering process to segregate solid substances as well as to protect the pumps before sewage flow is being pumped to the next treatment process.

Oxidation Ditch (OD): A 5.5m deep horse-shoe shaped basin fitted with air blowers and air diffusers. Submersible mixers generate circulation flow in order to keep activated sludge in suspension. Blowers are operated intermittently by timer control to encourage anoxic and aerobic condition. It is actually a kind of biological filtering using air and micro-organisms to biologically oxidise organic pollutants, producing waste sludge containing the oxidised material. The combination of biological mass and raw sewage is called mixed liquor. The concentration of suspended solid in mixed liquor is known as Mixed Liquor Suspended Solid or MLSS and is expressed in mg/litre. MLSS must be monitored to ensure organic pollutants are properly degraded. At RSTP Kuala Sawah oxidation ditch, MLSS is managed at 4000mg/litre with retention time of 24hrs.

Clarifier: Settling circular tank built with mechanical scrapper that continuously removes solid particulates or impurities deposited by sedimentation. Through this action, the influent is clarified to the desired level. Sedimented impurities are discharged at the bottom of tank as sludge while other particles float to surface. This is known as scum and is removed with a scum skimmer.

Disinfection System: After clarification, effluent is pumped into the disinfection system to neutralise harmful microorganisms such as bacteria, fungus and protozoa. At RSTP Kuala Sawah, ultra-violet (UV) is being used for the disinfection function. The disinfected effluent is discharged through the outlet channel before entering an underground pipe which carries it to Sg Linggi, 6 km away.

Press Dryer: Sludge removed from the clarifier still has a high water content and this is removed at the thickening machine and press dryer. The press dryer has a rotating screw that squeezes the sludge as it is being pushed through meshes. This action separates the water and the end product is solid sludge or sludge cake which still contains some nutrients. Encik Hafizal said the sludge cake can be processed into fertiliser.

At the end of the tour, we were ushered to the RSTP office lobby where Ir. Dr Oh thanked Encik Hafizal on behalf of the participants and there was an exchange of souvenirs. Ir. Dr Oh praised RSTP Kuala Sawah for its work in treating sewage and return effluent back to the eco system, a kind of green technology sustainability endeavour. There is no doubt that the job done by IWK really fits its slogan "We clean the unseen". ■

The 47 participants