

Case Study

Hospital Engineers Discharge Cleaner Water Philippine Heart Center

GGHH Agenda Goals

- WATER
- WASTE

Hospital Goal

- Water recycling
- Wastewater treatment for safe discharge

Progress Achieved

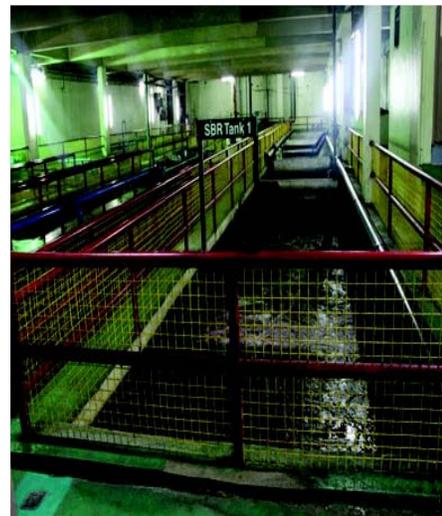
- All wastewater produced by the hospital is treated, disinfected, and tested to be safe before discharge into the city sewer system
- Treated wastewater is recycled and used to irrigate hospital grounds.

The Issue

The Philippine Heart Center is the premier cardiac facility in the Philippines. Since 2005 the number of annual patients at the hospital has grown dramatically to close to 15,000 in 2011. Along with the increase in patients has come an increase in water consumption and wastewater production at the facility. The Philippine Heart Center has an average discharge of 540 cubic meters of wastewater per day.

The implementation of the Philippine Clean Water Act of 2004 required large-scale facilities such as the Philippine Heart Center to implement wastewater treatment plans and apply for wastewater discharge permits. The country's Department of Health, then in the process of drafting and deliberating the 2011 revision of its Health Care Waste Management Manual, also began to highlight the importance of health care waste facilities managing their own wastewater.

The Philippine Heart Center was appointed as a member of the technical working group tasked with the revision of the health care waste manual of the DOH. As a member of that working group, the Philippine Heart Center saw the importance of minimizing its own impact on the water supply and updating its own facilities to support the hospital's mission of environmental stewardship and responsibility.



Sustainability Strategy Implemented

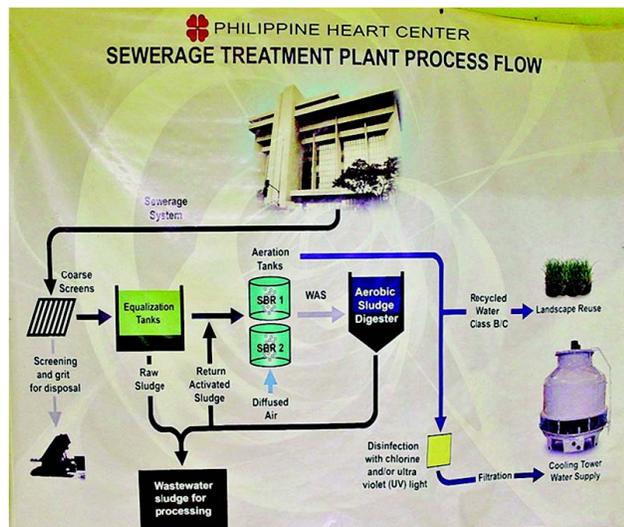
The Philippine Heart Center, in order to meet regulations and better manage its wastewater, decided to build its own on-site wastewater treatment plant. The water effluent generated by the hospital is now treated prior to discharge to the city sewer system. Treated wastewater is also utilized to irrigate the hospital ground. The hospital is also planning to further utilize treated wastewater for its urinals and toilets.

Implementation process

The sewage treatment plant (sequencing batch reactor technology) was a project conceptualized and proposed by the hospitals' Engineering and Maintenance Division headed by Engineer Joe Barsaga and was funded by the Philippine Heart Center for PHP10 million (US\$205,000) in 2009.

From project conceptualization to actual operation of the sewage treatment plant, it took the hospital two years to implement the project.

Much of time during pre-construction was dedicated to researching the appropriate plant design for the needs and size of the facility, as well as the capability to ensure a safe discharge. A series of best practices for proper treatment throughout all phases of the process was agreed upon: preliminary treatment, primary treatment, secondary treatment, and disinfection.



- **Preliminary treatment:** raw influent which may contain materials such as sand, broken glass or sticks passes through a pre-treatment area containing coarse screens to separate the wastewater. The purpose of preliminary treatment is to protect plant equipment by removing large materials which may cause clogs, jams or excessive wear.
- **Primary treatment:** the main process of primary treatment entails the settling or sedimentation of other solids as raw sludge.
- **Secondary treatment section:** the wastewater goes through a biological process in sequential batch reactors (SBRs). Air is pumped through the wastewater, stimulating aerobic bacteria and other microorganisms. These digest organic materials in the wastewater. After sufficient reaction time has elapsed, the microorganisms are allowed so settle out as sludge and are combined with the raw sludge from the primary treatment stage and disposed of.
- **Disinfection:** treated sewage from the SBRs is treated with sodium hypochlorite, followed by filtration before being discharged into the city's sewer system.

The hospital hired four additional staff members to monitor and ensure the smooth flow of the wastewater treatment around the clock. The hospital is spending around PHP 90,000.00 (USD 2,000) quarterly in electricity for the operation of the sewage treatment plant.

Tracking Progress

The wastewater treatment plant maintenance crew is trained to test the water's alkalinity every day. This is to ensure that during the secondary treatment process, the alkalinity of the water environment is maintained between 6.5 and 8.0, which is suitable for denitrification.

The sewage treatment plant also undergoes a monthly water examination conducted by an independent water analysis laboratory accredited both by the Department of Health (DOH) and the Department of Environment and Natural Resources (DENR) to ensure that water quality standards¹ are met. The hospital's wastewater discharge is tested monthly by an independent laboratory accredited by the DENR for biological oxygen demand, chemical oxygen demand, total suspended solids, settleable solids, oil and grease, surfactants, pH, and total coliforms.

Demographic information

The Philippine Heart Center is a 354-bed tertiary care center. There are twenty-one nursing units, including 53 Intensive Care Unit (ICU) beds, 24 suites, 56 private rooms, a presidential suite, 74 semi-private rooms, 3 adult service wards, and a pediatric service ward.

Quotes:

"For a proper wastewater treatment facility to work properly, adequate manpower plus an experienced, knowledgeable and passionate team should be working on this facility full time." - Engineer Joe Barsaga, Head, Engineering and Maintenance Division, Philippine Heart Center

¹¹ Water quality standards are set out in DENR Administrative Order No. 35 of 1990 and apply to all industrial and municipal wastewaters. <http://www.emb.gov.ph/laws/water%20quality%20management/dao90-35.html>.