

Full Circle – Liquid Waste Management

Liquid waste includes effluents of industries, fertiliser and pesticide solutions from agricultural fields, leachate from landfills, urban run-off of untreated waste water and garbage, mining wastes etc. Tata Consulting Engineers provided consultancy solutions to the Bangalore Water Supply and Sewerage Board (BWSSB). Typically, about 1100 MLD of sewage is generated daily in Bangalore city. BWSSB had existing sewage treatment plants (STP) capacities of about 730 MLD capacity and about 330 MLD additional STP was added on under JICA-BWSSP (II) project.

The Vrishabhavathi Valley (V Valley) STPs were upgraded periodically and the capacity was augmented over time. Under separate project, V Valley STP capacity augmentation is taken up by BWSSB yet again, with Tata Consulting Engineers providing sustainable solutions in managing liquid waste.

Brownfield confines, Greenfield value engineering

As consultants for the V Valley project, TCE had the challenge of working in Brownfield conditions. Along with the sewage treatment process, the capacities were increased with available limited footprint, that is, within the given plant area confines. TCE had the task of also evaluating the best technology for liquid waste treatment and solid stream treatment. The liquid waste contains both toxic and non-toxic substances and treatment releases green house gases.

TCE team proposed a conventional Activated Sludge Process (ASP) secondary and Tertiary treatment of new 150 MLD STP capacity with biological nutrient removal (BNR) facility to meet new Central Pollution Control Board / Karnataka State Pollution Control Board treated sewage discharge norms for Bangalore. Using the anaerobic digestion process, the sludge from the STP is designed to generate energy from the biogas. Through value engineering solutions, the sludge handling system is designed to handle increased capacities (Sludge from 300 MLD plant capacity including existing plant of 150 MLD capacity) such that sludge from the new and existing STP could be processed using advanced technology. The solutions planned will also reduce the volume of dewatered sludge by about 40-45% compared to conventional sludge treatment. The process also ensures better quality of sludge product (Class A biosolids) which is a sustainable solution and is very environmental friendly.

The sludge generated from the plant is proposed to be treated with Advanced Sludge Treatment to achieve United State Environmental Protection Agency (USEPA) Class A Biosolids treatment and disposal standards. The USEPA Class A Biosolids reduce the level of pathogens to below detectable levels (i.e. Fecal coliform 1,000 MPN/gm of DS) compared to Fecal coliform 2,000,000 MPN/gm of DS of Class B bio solids standards. This is a hygienic and healthy option as there is no risk of infectious disease transmission through casual contact or indigestion, no site restrictions are required for storage of Class A biosolids and there is less odour from solids which ensures hygienic transporting and disposing of Class B Biosolids, etc.

Energy recovery from the sludge helps reduce green house gas emissions. The waste to energy solution, is designed to contribute to about 35% of the total energy requirement for the operation of sewage treatment plant.

For achieving USEPA Class A Biosolids in the STP solids output, Thermal Hydrolysis Process (THP) is recommended. It is pre-treatment technology before anaerobic digestion of sludge. It optimizes digestion and dewatering (30-33% dry solids compared to typically 20% DS), reduces digester volume (about 30-