SMART WATER & WASTE WORLD

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TOP 30

MUNICIPAL CASE STUDIES

EDITOR'S CHOICE - 30 CASE STUDIES ON MUNICIPAL WATER, WASTEWATER, AND WASTE

Wastewater Treatment - Decentralized Sewerage System at Mira Bhayandar

Due to close proximity to Mumbai, the Mira Bhayandar Municipal Corporation (MBMC) is experiencing rapid urban growth with low and middle income households are shifting to the Mira Bhayandar due to high property cost and rent in Mumbai.

By Subhash Sethi

11 MLD Decentralized Sewage Treatment Plant at Mira Bhayander

WITH JUST HAVING 4% of the world's water resources to feed 16% of the global population and 15% of livestock, clean water availability in India is an important issue. India ranks a dismal 120 out of 122 nations for its water quality and 133 out of 180 nations for its water availability. World Health Organization (WHO) estimates that about 38 million people in the country are affected by waterborne diseases each year of which over 75% are children. It is estimated that about one-third of rural households in India is connected with piped water supplies; the rest remains living without it and mostly dependent on contaminated groundwater sources.

The major challenge is in urban India, where estimated 80% of water supplied to the household is coming back as wastewater to be treated and reused. But in reality, only a fraction of it is treated due to insufficient treatment facilities and the treated water is not being reused due to lack of infrastructure support. This leaves a big gap of almost 80% of generated wastewater is not being treated and untreated sewage is released to water bodies contaminating the already depleting and polluted groundwater sources. The untreated municipal and industrial wastewater is mostly discharged directly into water bodies, polluting almost three-fourth of India's surface water resources and underground water. The estimate suggests that 75% to 80% of water pollution is from domestic sewage, discharged untreated into local water bodies. There is an ardent need to think deeply and adopt a new perspective towards wastewater for not only to counter the water scarcity but for the sustenance of the ever-increasing water demands from exploding population.

Wastewater as Renewable Resource

Most wastewater is renewable and a good resource in its own right with thermal, chemical, and hydraulic energy embedded in it. Wastewater sector has the potential to generate trillions of unit of energy each year enough for running the treatment plants and also to provide surplus energy to households.

There are good examples around the world of how wastewater is being treated as a renewable resource. Singapore derives 40% of its water supply from reuse water, including drinking water.

Perth, Australia is recycling about 10% of the city's 134 billion liters wastewater into drinking water supplies. Namibia is using some of its treated wastewater as drinking water. China has developed a wastewater reuse network across Beijing and almost 20% of the total water supplied in the city is reclaimed water. European countries have been collecting more wastewater and treating it to a higher quality. Efficient treatment and use of wastewater reduces groundwater usage for agriculture and also helps our rivers, dams and other water bodies become less polluted. It has advantages for both - quantity and quality of water.

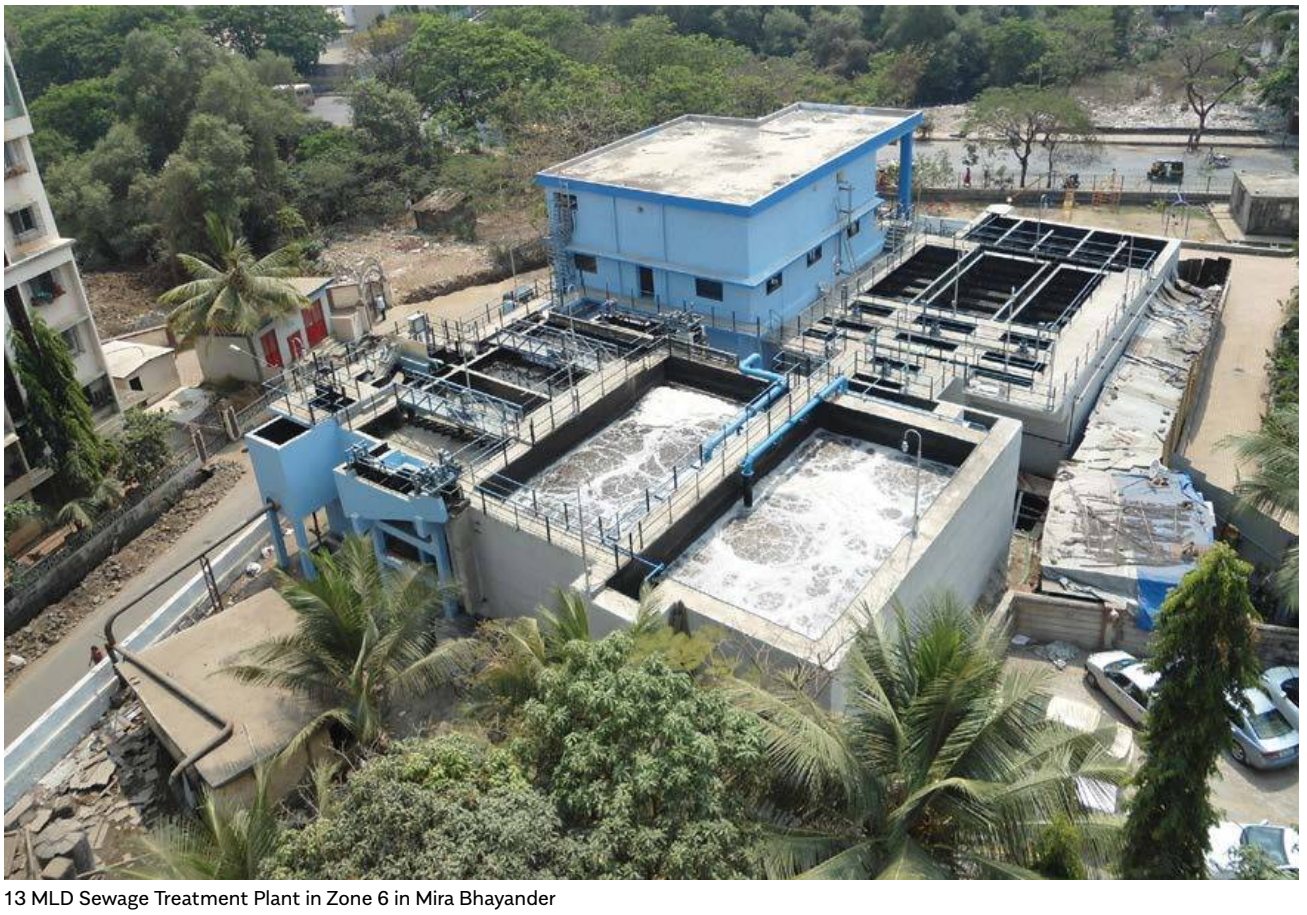
In India, Chennai is the first metro city that has implemented 100% sewage collection and formulated a set of service standards for accelerated wastewater reuse and the "Zero Water Discharge in Chennai" program. In harmony with the CMWSSB water reuse plan, the Greater Chennai Corporation also introduced a by-law that sets the rules for mandatory wastewater recycling. It has achieved around 15% of the city's water demand through water recycling. Around 8% of the treated wastewater is sold to industries and up to 41% of domestic water needs in newly built houses are secured from wastewater reuse. A growing number of wastewater facilities around the world have taken steps to install novel wastewater treatment technology by adopting a number of innovative measures in its sewage treatment projects.

Decentralized Sewerage System at Mira Bhayandar

SPML Infra has contributed immensely and established a leading position in the treatment of wastewater from design to the application of technology, construction to management and operation of sewage treatment plants, common effluent treatment plants, tertiary and water reuse treatment plants, sludge treatment, biogas and power generation.

Among the important project executed by SPML Infra is the Integrated Sewerage Systems in Mira Bhayandar, a satellite city of Mumbai.

Mira-Bhayandar which is part of Thane district is located at the northern threshold of Greater Mumbai. Being a satellite town of Mumbai, this area has been identified as one of the growth centers around Mumbai which is well connected with the metropolis by suburban railway and Mumbai Ahmadabad national highway. Due to close proximity to Mumbai, the Mira Bhayandar Municipal Corporation is experiencing rapid urban



13 MLD Sewage Treatment Plant in Zone 6 in Mira Bhayander

growth with low and middle income households are shifting to the Mira Bhayandar due to high property cost and rent in Mumbai.

Conditions Prior to Project Execution

The septic tank toilets were used throughout the city. The main roads of the city had open gutters of almost 165 kilometers long for collecting and carrying sewage from individual houses and there were no sewerage scheme or sewage collection and treatment plants for over a million populations. The existing system of disposal comprised of septic tanks and effluent disposal in surface gutters and nallas leading to pollution and unhealthy conditions. The direct discharge into inland water bodies led to widespread water pollution and also destroyed the aquatic flora and fauna of the area. The sewage used to flow in the pipes for stormwater and was prone to combined sewer overflows during the rainy seasons and caused water logging on interior and city roads.

The Sewerage Project

Mira Bahayandar Municipal Corporation (MBMC) has awarded the contract for Design-Build, Operate and Maintain of Underground Sewerage Scheme for the entire city to SPML Infra Ltd. The project is designed completely as a decentralized system having 10 zones across Mira Bahayandar. The new sewerage system implies closure of existing septic tanks and drainage through stormwater drains improving overall hygiene and living standards.

Scope of Project

The comprehensive underground sewerage facilities in the 24 sq km area comprises of design, supply, laying, and

17 MLD STP at Zone 5 in Mira Bhayander

Chlorine Contact Tank at Mira Bhayandar

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commissioning of 113 km Sewer lines; 10 Pumping Stations and 10 Sewerage Treatment Plants one each of 8, 11, 14 and 17 MLD and two each of 7,12 and 13 MLD with total capacity of 115 MLD with latest Moving Bed Biofilm Reactor (MBBR) processes that improve reliability, simplify operation, and require less space than traditional wastewater treatment systems.

SPML also provided necessary pressurized rising mains for distribution and disposal of recycled water. The best global safety measures have been followed in project execution due to shallow soil conditions.

PROJECT FILE
Customer: Mira Bhayandar Municipal Corporation (MBMC)
Location: Mira-Bhayandar, Thane, Maharashtra, India
Service Provider: SPML Infra Ltd.
Products/Technology Involved: Sewer lines, Pumping Stations, Sewerage Treatment Plants, Moving Bed Biofilm Reactor (MBBR) Processes, Pressurized Rising Mains

Social Benefits

- Environmental pollution will be under control.
- Planned disposal of treated wastewater has reduced stagnation of water in stormwater drains.
- Septic tank systems are completely eliminated which will, in turn, reduce soil and sub-soil water pollution.
- Breeding of mosquitos and other insects has reduced drastically.
- The outbreak of epidemics and viral diseases has reduced effectively.
- Better sanitation and cleanliness in the streets and roads.
- Better health and overall clean environment.

Technical Benefits of Project (Using MBBR Technology)

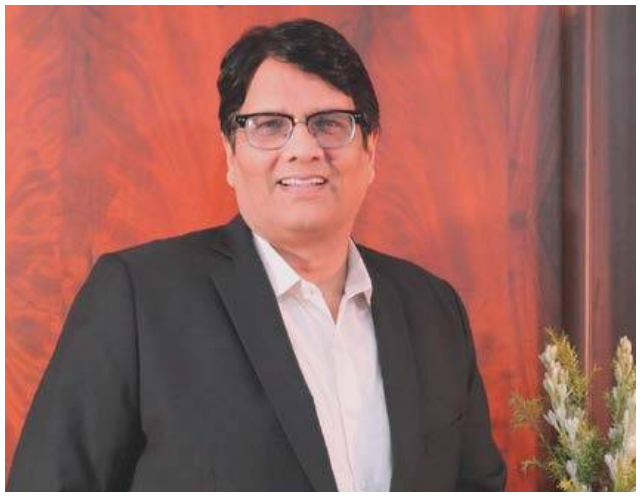
- Requires no backwashing.
- Has low head loss.
- Has high specific biofilm surface area.
- It makes the plant compact.
- Sludge recycle is not required.
- Shock load acceptance is better than for plants with the suspended growth process.

Salient Features of Project

- First time in India, a decentralized sewerage scheme is executed, sewage is being treated at the point of generation
- All the sewage treatment plants are in residential areas with MBBR technology
- The advanced MBBR technology requires less power consumption and lesser space than any conventional sewage treatment plants
- All the STPs are SCADA-based, with operation and control from a master control room.
- The treated sewage will be reused for gardening, construction and industrial purposes by the municipal corporation
- The project is executed with specialized shoring with higher safety precautions.

Parameter	Influent	Treated Discharge
TSS, mg/l	500	< 20
BOD at 20 Deg C (mg/l)	250	< 10
COD, mg/l	450	<100

BOD and COD Parameters



About the Author

Subhash Sethi is the Chairman of *SPML Infra Ltd, a listed infrastructure development company in India. In the past three decades, he has worked relentlessly with his mission to create enduring value and wealth for the country and organization. Under his leadership, SPML Infra went on to establish itself as a leading engineering and infrastructure development organization in India with over 600 completed projects in the domains of water, power, sanitation, environment, and civil Infrastructure.*