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DEPARTMENT OF CIVIL ENGINEERING

A Report on “Industrial Visit to Sewage Treatment Plant”

A field trip was organized by the Department of Civil Engineering on 21/08/2026 to the Sewage Treatment Plant (STP), Nagole, Hyderabad, to provide students with practical exposure to sewage treatment processes and plant operations. II, III and IV Year Civil Engineering students participated in the field visit and were accompanied by Mr. M. Karthik Kumar Reddy, Assistant Professor, Department of Civil Engineering.

AIM

The main aim of the Nagole Sewage Treatment Plant (STP), Hyderabad, is to collect and treat sewage generated from the surrounding urban areas before its discharge or reuse. The plant helps in reducing water pollution, protecting the Musi River and surrounding water bodies, and producing treated wastewater suitable for safe reuse.

The existing Nagole STP has a capacity of 172 MLD (Million Litres per Day), while a newer 320 MLD STP at Nagole has also been developed as part of Hyderabad's programme to increase sewage-treatment capacity.

The site visit offered practical insights into large-scale wastewater management. The facility is being developed by the Hyderabad Metropolitan Water Supply and Sewerage Board (HMWS&SB) as part of a major ₹1,297 crore initiative targeting a total treatment capacity of 320 million liters per day (MLD). Once completed, the project will process all 320 MLD of sewage generated daily by the city, making Hyderabad the first city in South Asia to achieve 100% sewage treatment.

Spread over 15 acres, the Nagole STP utilizes advanced Sequential Batch Reactor (SBR) technology for efficient wastewater treatment. The facility includes a pump house, primary

treatment unit, SBR basins and a chlorine contact tank. It operates as part of a five-STP cluster along the Musi River, developed under a combined 1,297 crore investment.

OBJECTIVES OF THE VISIT

1. To gain an understanding of the scale and operation of modern sewage treatment infrastructure.
2. To observe key preliminary and disinfection processes, including the screen chamber, grit chamber, and chlorination system.
3. To study the implementation and functioning of advanced Sequencing Batch Reactor (SBR) technology.

STEP-BY-STEP FLOW

- **Screening (Screen Chamber):** Incoming raw sewage passes through automated mechanical screens to filter out large solids (rags, plastics, sticks). Collected debris is raked into disposal units, safeguarding downstream pumps and valves against blockages and mechanical stress.
- **Grit Removal (Grit Chamber):** Screened effluent proceeds to the grit chamber. Flow velocity is maintained to allow heavy inorganic solids (sand, gravel, shells) to settle to the bottom via gravity while keeping organic matter in suspension. Settled grit is periodically extracted to prevent pipeline siltation and equipment erosion.

Chlorination Process

Following biological treatment, the water undergoes disinfection through chlorination—the final stage before discharge or reuse. Chlorine is dosed in carefully controlled amounts within a dedicated contact tank, where it mixes thoroughly with the treated effluent. Sufficient contact time (typically at least 30 minutes at design flow) is provided to inactivate pathogenic microorganisms, including harmful bacteria and viruses. This critical step ensures that the final effluent released into the environment is microbiologically safe, thereby protecting public health and aquatic ecosystems.

Sequencing Batch Reactor (SBR) Technology

The Nagole Sewage Treatment Plant (STP) employs advanced Sequencing Batch Reactor (SBR) technology, a modern biological treatment method that carries out all key treatment phases—

filling, reacting (aeration), settling, decanting, and idle—within a single tank through timed cycles. Unlike conventional continuous-flow systems that require multiple tanks for each stage, SBR technology offers greater operational flexibility, a smaller footprint, lower energy consumption, and consistently high-quality treated water.

Educational Significance of the Industrial Visit

The industrial visit to the Nagole STP was highly educational, effectively bridging theoretical knowledge with real-world application. Observing operations from initial screening and primary treatment through biological processing in SBR basins to final chlorination provided a profound appreciation for the complexity of urban water management. The plant represents a landmark achievement in India's wastewater infrastructure, demonstrating how advanced engineering and technology can address critical environmental challenges and paving the way for a cleaner, more sustainable Hyderabad.

During the visit, the students were guided by the STP engineers, **Mr. Vasanth and Mrs. Devika**, who explained the various stages of sewage treatment in detail. They explained the functioning of the treatment units, including preliminary treatment, primary treatment, biological treatment, clarification, sludge management, the final treatment and disposal processes. The engineers also explained the importance of maintaining treatment efficiency, environmental standards, and proper operation of the plant.

The field visit provided the students with valuable practical knowledge about the functioning and management of a sewage treatment plant. It helped them relate their classroom learning to real-world civil and environmental engineering practices and enhanced their understanding of wastewater treatment and sustainable water management.



During the industrial visit, the Sewerage Treatment Plant In-Charge, Mr. Avinash; Engineer, Mr. Vasanth; Lab In-Charge, Mrs. Devika; Civil Engineering faculty member, Mr. M. Karthik Kumar Reddy; and the students actively participated in the program



Plant Engineer, Mr. Vasanth, explaining the operation of mechanical screens used to remove large solids such as rags, plastics, sticks, and other debris



Lab In-Charge, Mrs. Devika explaining the analysis and design of influent and effluent treatment processes

OUTPUT

The output of the Nagole Sewage Treatment Plant (STP) complex in Hyderabad encompasses volumetric processing capacity, treated water quality standards, and solid/gaseous by-products.

Volumetric Output & Capacity

The Nagole facility consists of two primary operational units:

Unit	Processing Capacity	Core Technology
New Main Unit	320 MLD (Million Litres per Day)	Sequential Batch Reactor (SBR)
Legacy Unit	172 MLD	Upflow Anaerobic Sludge Blanket (UASB) + Aeration
Total Site Processing	492 MLD	Dual-technology system

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