4. RESOURCE UTILIZATION

4.3 Describe the measure and tracking mechanism to check optimum usage of water & ensure zero wastage

Hindusthan College of Engineering and Technology (HiCET) has implemented a comprehensive water management strategy. The institution sources its water supply from both municipal connections and self-extracted bore wells. Annually, 36,000 cubic meters of water are purchased through metered municipal connections, ensuring precise measurement and regulation. The campus also operates nine bore wells, which are regularly monitored and maintained to meet its daily water demand of 554.67 m^3 at full capacity. Bore well water is primarily used for irrigation, laboratory purposes, and sanitation.

To track and optimize water usage, HiCET employs water meters to monitor the daily consumption, enabling data-driven decision-making for conservation efforts. This monitoring allows the institution to identify usage patterns, detect variations, and implement corrective actions promptly. Periodic inspections are conducted to assess the effectiveness of these initiatives, and the collected data is analyzed to set benchmarks for reducing water consumption.

To ensure zero wastage, HiCET has adopted multiple measures. Efficient irrigation techniques, such as sprinkler and drip systems, are used to minimize water loss through evaporation and runoff. The campus has implemented leak prevention measures, including low-pressure fixtures, push-fit taps, and automatic water level controllers in overhead tanks. Additionally, rainwater harvesting systems collect and store rainwater, reducing dependence on traditional water sources and ensuring availability during dry seasons. To ensure clean drinking water, strategically placed water purifiers are installed across the campus, reducing reliance on bottled water and minimizing plastic waste.

The Civil Maintenance team plays a crucial role in maintaining the water supply systems, bore wells, and wastewater treatment systems. They conduct preventive, corrective, and predictive maintenance to ensure the infrastructure operates efficiently. Preventive maintenance involves regular inspections and servicing, while corrective maintenance addresses unexpected issues like leaks. Predictive maintenance uses data from monitoring systems to anticipate and resolve potential problems proactively.

4.4 Describe the Water treatment system in operation and rain-water harvesting system

Hindusthan College of Engineering and Technology (HiCET) operates a wastewater treatment plant with a daily capacity of 250,000 liters, utilizing Moving Bed Biofilm Reactor (MBBR) technology. This advanced system efficiently treats organic waste by employing biofilm carriers that facilitate microbial growth. These carriers continuously move within the reactor, maximizing contact between wastewater and biofilms, leading to effective pollutant degradation. The MBBR system integrates both aerobic and anaerobic treatment, ensuring high pollutant removal rates while maintaining energy efficiency. The treated water is repurposed for non-potable applications such as landscaping and irrigation, reducing reliance on freshwater sources and promoting sustainability.

In addition to wastewater treatment, the institution has implemented a rainwater harvesting system to optimize natural water resources. Rainwater is collected from rooftops and other surfaces, then stored in tanks or directed into recharge pits to replenish groundwater levels. This initiative enhances water security while minimizing the environmental impact of water consumption. The harvested rainwater is used for non-potable purposes, including flushing, landscaping, and campus maintenance.

To further enhance water conservation, HiCET employs efficient irrigation techniques such as sprinkler and drip irrigation. These methods deliver water directly to plant roots, reducing evaporation and runoff while promoting healthier plant growth. Drip irrigation, in particular, provides a slow and steady water supply, minimizing waste. By integrating wastewater treatment, rainwater harvesting, and advanced irrigation methods, the institution significantly reduces its water footprint, ensuring responsible and sustainable water management on campus.

4.5 Describe the application of technology to building standards to minimize energy usage and use-of-water, in particular.

Hindusthan College of Engineering and Technology (HiCET) integrates advanced technologies and sustainable practices into its infrastructure to optimize energy efficiency and minimize water consumption.

A 65kW solar power plant supplies clean electricity, significantly reducing dependence on conventional grid power. Solar thermal systems provide hot water in hostels, further lowering energy consumption from traditional heating methods. Additionally, a 35m^3 biogas plant converts organic food waste from the hostel into energy, serving as an eco-friendly alternative to conventional fuels.

To enhance overall energy efficiency, HiCET has implemented LED lighting systems, solar street lights, and energy-efficient HVAC systems across campus. Regular energy audits, conducted in collaboration with an energy consultancy firm, ensure continuous monitoring and improvement of energy conservation strategies. Furthermore, sustainable transportation is encouraged through the use of electric vehicles and bicycles, reducing carbon emissions. Sustainable building design, including insulation techniques, minimizes heating and cooling demands.

HiCET employs multiple strategies to reduce water consumption while maintaining efficiency. Rainwater harvesting systems help replenish groundwater and provide water for landscaping and cleaning purposes. A 250 KLD wastewater treatment plant ensures responsible wastewater management, with treated water reused for gardening and other secondary applications.

To enhance indoor water efficiency, low pressure fixtures, dual-flush toilets, automatic water level controllers for overhead water tanks and push-fit taps minimize wastage without compromising user convenience. Strategically placed water purifiers provide clean drinking water, reducing the reliance on bottled water. For outdoor water management, drip and sprinkler irrigation systems optimize water usage in landscaping, ensuring efficient delivery of water to plant roots while minimizing evaporation and runoff.

4.6 Describe the process to avoid polluted water reaching the institute's water inlet, including water pollution due to accidents/incidents at the University.

Hindusthan College of Engineering and Technology (HiCET) has implemented multiple measures to prevent water pollution and protect its water supply. These initiatives focus on wastewater treatment, conservation, responsible waste disposal, and pollution management in case of accidents or incidents.

A key preventive measure is the operation of a 250 KLD wastewater treatment plant, which treats wastewater before repurposing it for non-potable uses like gardening. This significantly reduces the risk of untreated sewage contaminating primary water sources. Additionally, the institution's rainwater harvesting system helps replenish groundwater while minimizing the risk of pollutants seeping into the water supply.

To prevent pollution from accidental spills, HiCET has adopted waste segregation and management systems using green and blue bins for biodegradable and non-biodegradable waste. Hazardous materials, including chemical waste from laboratories, are handled carefully and disposed to prevent contamination of the campus drainage system.

Regular monitoring protocols help to assess water safety and detect potential pollution risks. This enables early identification of vulnerabilities and allow for corrective measures to be implemented. Additionally, HiCET conducts community awareness programs to educate students, faculty, and staff about responsible water usage and pollution prevention strategies. In case of environmental accidents, the institution has an emergency response plan that includes isolating affected areas, redirecting polluted water away from the main supply, and coordinating with local environmental agencies for containment and remediation. HiCET also collaborates with NGOs and government bodies to address regional water pollution challenges and promote sustainability initiatives. Through these integrated efforts, the institution ensures safe water management, minimizes environmental impact, and strengthens its commitment to sustainability.

Fig. 4.1 Water Meter

Fig. 4.2 Rainwater Harvesting Pits

Fig. 4.3 Drip Irrigation

Fig. 4.4 Sprinkler Irrigation

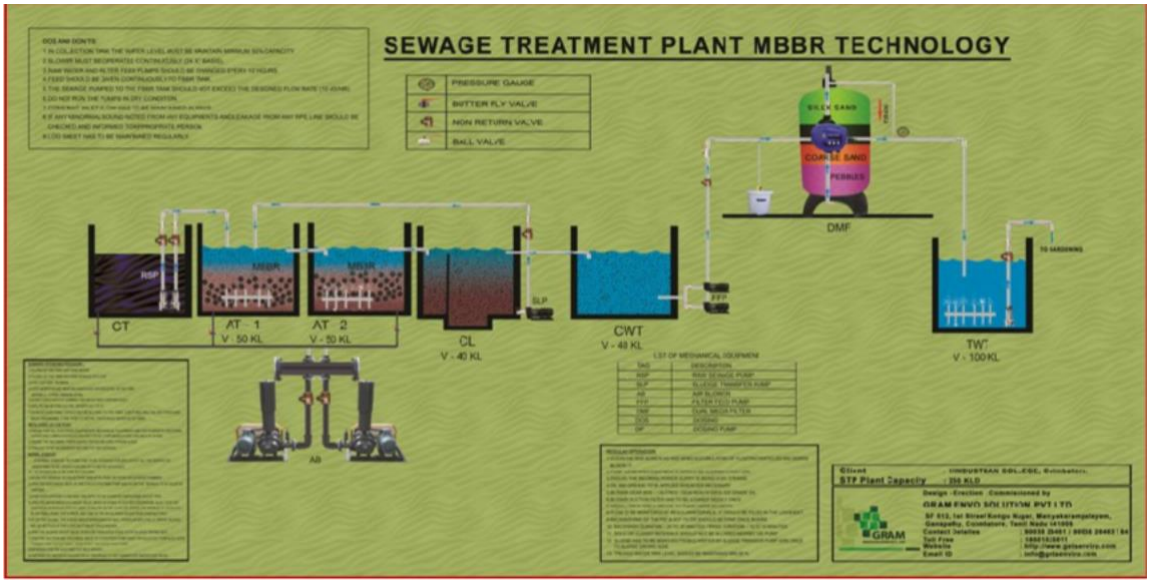

Fig. 4.5 Layout of Wastewater Treatment Plant

Fig. 4.6 Air Blowers for Aeration

Fig. 4.7 Filter Feed Tank (Capacity 40KL) and Filter Feed Pump

Fig. 4.8 Dual Media Filter