THE - Impact Rankings 2025

6.4.2 Water Reuse Measurement:

Source of water

The source of raw water is Bore wells. 24 Bore wells are located at different areas of the campus. The water from bore wells are collected on to a tank and the water is filtered for bathing and drinking purposes. In addition, there are 12 rain water harvesting units located throughout the campus. This includes check dams, percolation ponds, bore and open well discharges etc. The land cover of KARE is 163 acres, hence an annual rainfall of approximately 5.4 lakh m^3/year of water recharges the borewell. We have replaced conventional water appliances instead; we are using water efficient appliances like water tap and toilet flush. By using these appliances wastage of water gets minimized and conservation of water is possible. Laundry facility in the campus is centralized and it is the most water efficient system within the campus where minimum water is utilized for washing purposes. Boilers are utilized in the hostel kitchen to reduce the wastage of water.

Water Reuse:

The section provides an overview of water management at KARE and provides a brief description of the whole process that is being done at the wastewater plant.

Table 1: Standards for drinking and domestic use

Sl. No	Type of Building	Domestic liters per head/day	Flushing liters per head/day	Total Consumption liters per head/day
1.	Schools/Educational institutions:			

	a) Without boarding facilities	25	20	45
	b) With boarding facilities	90	45	135

(Source: National Building Code 2016, BIS)

Estimation of Water requirements for Drinking and Domestic use at KARE Campus

Domestic Use:

Average daily population residing in the campus	=	8900 (Hostels – students and staff)
Average floating population	=	1843 (Day scholar students, staff and Visitors)
Average Water Consumption (Residing)	=	7057 x 135 litres/day = 9,62,550 litres/day
	=	9.52 lakh litres/day
Average water consumption (Floating)	=	
	=	**0.5 lakh litres/day**
Average Daily Domestic water consumption	**=**	**10.42 lakh litres/day**

University consumption

Average University consumption (Water used in the canteen and for washing vehicles)	=	2.0 lakh litres/day
Average total consumption	**=**	**12.42 lakh litres/day.**

Effluent generated by human

Avg. Daily Effluent generated	=	80% * Avg. Daily Domestic Water Consumption
	=	80% * 12.13 lakh litres/day

(Water used in the canteen and for washing vehicles)

Avg. Daily Effluent generated	=	**9.93 lakh litres/day**

Gardening

Average water consumption for gardening = 6 lakh litres/day

Treated Water used in Sprinklers for Gardening

Treated Water used in Sprinklers for Gardening

Total water Consumption:

The institution spends a whopping sum of money every year to recycle the wastewater. Two hi-tech sewage treatment plants with the capacity of 800kld are functioning on the campus to recycle the used water from various hostels, main blocks and canteens. The recycled water is used to maintain the green ambience of the campus and also to irrigate the coconut grove. The sewage treatment plant confirms to Pollution Control Board norms and enormously helps to protect the environment.

Sources of Wastewater

The main sources of wastewater generated are the various toilets, bathrooms, kitchen and dining halls in both the hostels and the canteen. The wastewater generated is directly pumped to STP through pipe lines. The STP is located near the University guest house.

Existing Sewage Treatment Facility

There are 2 STP plants inside the campus that are capable of processing 3 KLD and 5 KLD respectively. Both the plants are located adjacent to each other and the layout diagram of both the STP plants are shown in Figures 1a and 1b. Schematic diagram of Sequence Batch Reactor (SBR) used for waste water treatment is shown in Fig. 2. SBR Aerobic treatment is used for treating the effluent. It is followed by sand filtration, carbon filter and chlorination. After treatment the water is used for flushing and gardening.

Table 1: **Comparison of Conventional sewage treatment and SBR treatment**

Parameter	**Conventional Treatment**	**SBR Treatment**	**Reference**
Land Requirement	More	Less	A Kader (2009)
Operation	Continuous	Batch	
Ability to withstand shock	Lesser	Higher	
SVI (ml/g)	100-110	<60	
Relative Power consumption	More	Less	
TKN removal (%)	80	85	
TSS removal (%)	96	93	
BOD removal (%)	97	97	
Ammonia removal (%)	90	98	

STP - Engineering complex

Water received from the university premises is collected in the sewage collection tank. Fig.3-8 depicts the various steps involved in the treatment of sewage using the STP. The suspended solids are removed by a bar screen.

Figure 3: Wastewater Collection Tank (5 KLD)

After that it enters into the Equalization tank.

Figure 4: Equalization Tank (5 KLD)

From the equalization tank, it enters into the Sequence Batch Reactor tank (2 Nos). After treatment the sludge is allowed to settle. The treated water is transferred to the decant tank. The decant water is pumped to the chlorination tank. Sodium hypochlorite is used as a disinfector.

Figure 5: Sewage Treatment Plant 300 kld

Figure6: Aeration Basin of Sewage Treatment Plant

The sludge is pumped to the sludge digester cum drying beds.

Figure 7: Sludge Digestion and Sludge Drying Bed

After chlorination, the water is pumped to the polishing unit (DMF-ACF system).

Figure 8: Tertiary treatment of sewage water using rapid sand filter, activated charcoal, UV and Chlorine disinfection

Then the treated water is pumped to the holding tanks.

Figure 9: Storage Tank for Treated Water

We have replaced conventional water appliances instead; we are using water efficient appliances like water tap and toilet flush. By using these appliances wastage of water gets minimized and conservation of water is possible. Laundry facility in the campus is centralized and it is the most water efficient system within the campus where minimum water is utilized for washing purposes. Boilers are utilized in the hostel kitchen to reduce the wastage of water.

Water Efficient Appliances in the Laundry at KARE