AMITY UNIVERSITY
HARYANA

(Accredited with Grade 'A' by NAAC)

Waste Water Management Process and Report

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Capacity of STP/ETP Plants for Treating Water.

There are 2 STP Plants in the Campus as under:-

1. **Capacity of STP Plant No.1 : 4.5 Lacs ltrs. per day**
2. **Capacity of ST P Plant No 2 : 4.5 Lacs ltrs. per day**

   Total : 9 Lacs ltr. per day
3. **Capacity of ETP Plant : .5 Lac Ltrs. per day**

   Kitchen - .3 Lac Ltrs Per day
   Laundry - .2 Lac Ltrs per day

On routine full working day flow of treated water from STP Plant 1 and 2 is 7 to7.5 Lac ltrs, monitored by meter reading on daily basis and summarized monthly.

Utilization of Treated Water.

STP Treated Water is being utilized as under:-

(a) **Flushing in Hostel Blocks**
Flushing in Academic Blocks } **Approx 4 Lac Ltrs per day**
Flushing in Faculty Flats.

(b) **For gardening including Sprinkler System** } **1-.5 – 2 Lac Ltrs per day**

(c) **For AC Chiller Plant Tower - 1 Lac ltrs. Per day**

(d) **Excess water during April-Oct - .5 lac Ltrs per day**

(e) **Excess water during Nov. – March- 1.5 lac ltrs per day**

The utilization of excess STP treated water has been discussed with Project Department and Estate Officer for its utilization for farm, AIMC, ADA and MTC. Pipelines will have to be laid for input and output and if required booster pumps installed.

Rain water harvesting structure and utilization in the Campus.

Rainwater Harvesting facility consists of an elaborate network of rainwater harvesting wells spread all over the Campus.

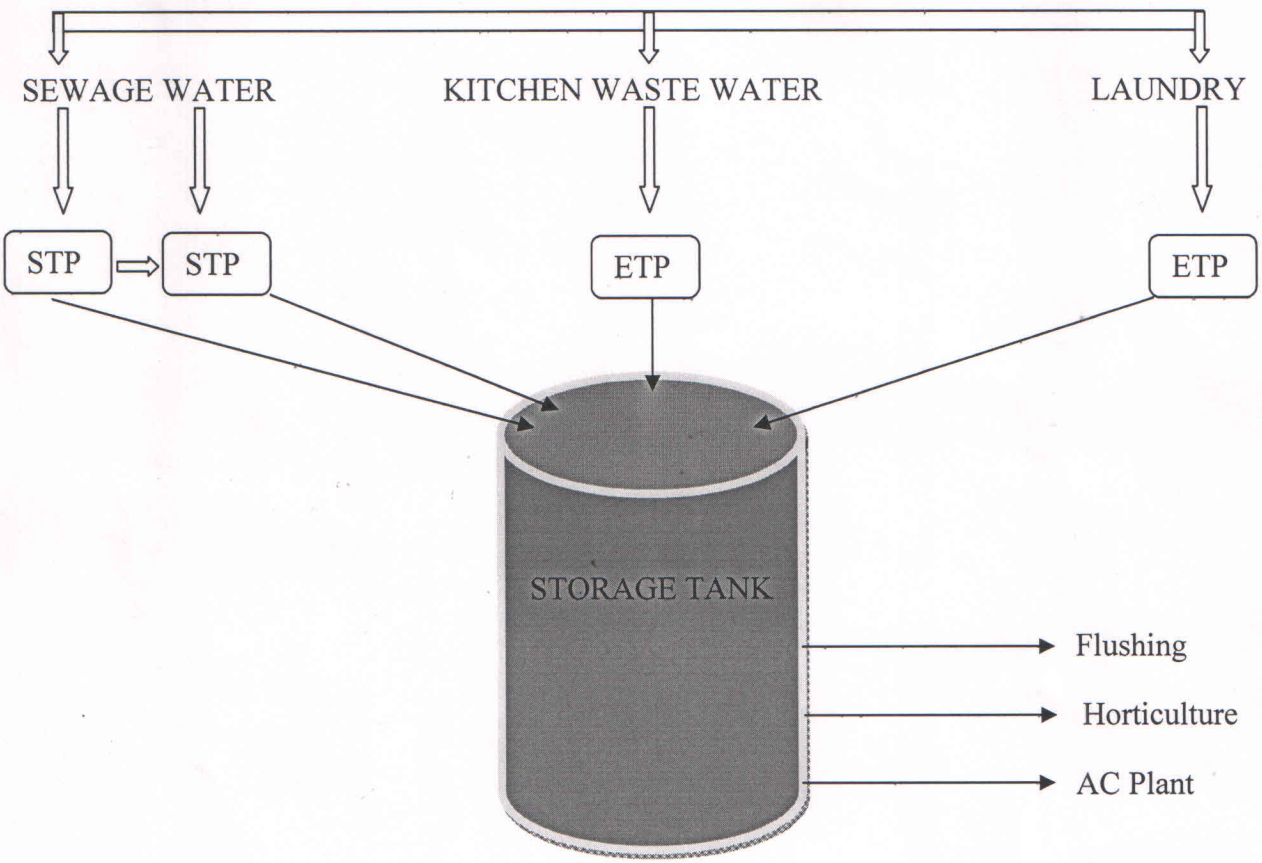
- Number of Wells : 43
- No of Bores : 112

Water Conservation Measures: The AUH campuses are zero water discharge campuses, which mean that no water is discharged outside the campus and all the water is treated and recycled for reuse for horticultural activities and flushing the toilets etc. This saves potable groundwater and supply of plant treated water by government agency. The STPs, RO Water Plants and Effluent Treatment Plants are audited every year during the internal audit conducted by the University. University strives towards developing water conservation and water efficiency through following strategies:

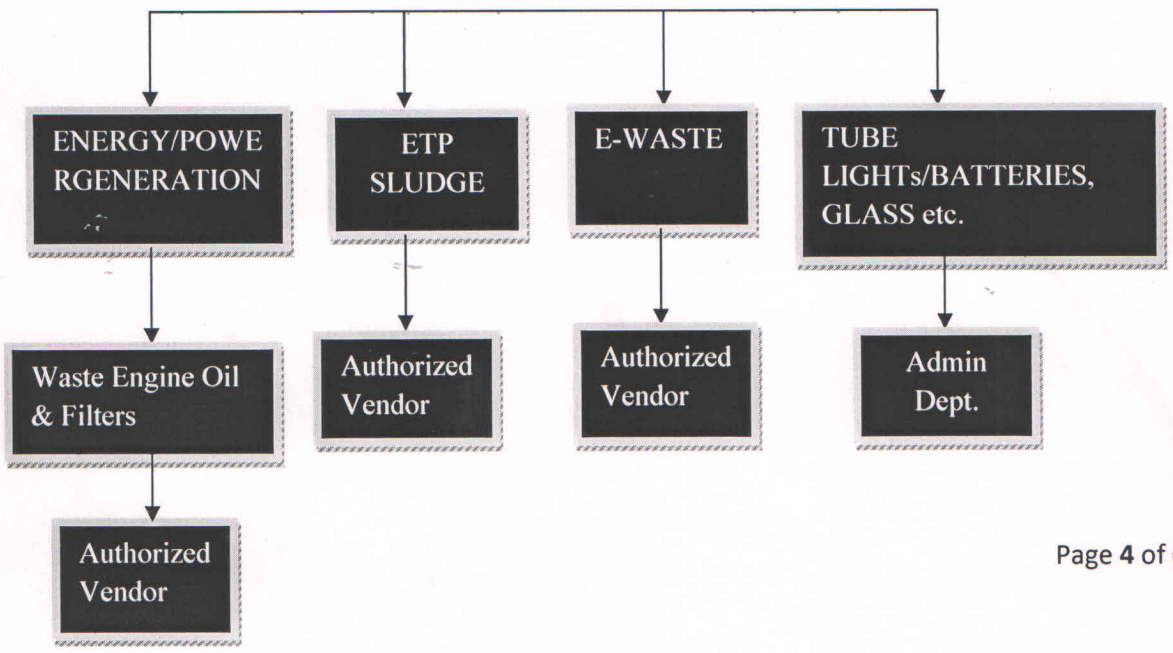
1. Promote water efficiency practices to all the University's stakeholders.
2. Monitor and minimize the University's water consumption.
3. Plants indigenous flora to reduce water usage.
4. Promotes planting indigenous trees in and around the University to reduce water usage.
5. Regularly reviews opportunities to install alternative water systems on campus wherever feasible.
6. Sustain implementation of innovative water-efficient technologies such as rainwater harvesting, reuse of water etc.

Campus also maintains efforts of students, faculty and staff to implement sustainable water consumption system through the above mentioned interventions.

Liquid Waste Disposal Flow Chart



SOLID WASTE DISPOSAL



GreenEnviroTech

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Date: 23rd July 2019

M/s Ritnand Education Foundation,
Project: Amity University, Manesar,
Defence Colony, New Delhi.

Sub: Feasibility Report on Sewage Treatment being carried out at Amity University, Manesar

Dear Sir,
We are detailing below a write up detailing the various sources of waste water discharge along with its treatment and usage:

Sewage:

S.No.	Type of user	No. of users	Discharge/user Ltrs. per day	Total Discharge Ltrs per day
1	Faculty residents	1000	180	1,80,000
2	Hostel Students	2000	180	3,60,000
3	Day Students	5000	40	2,00,000
			Total for sewage	**7,40,000**

Kitchen waste water:

S.No.	Type of user	No. of users	Discharge/user Ltrs. per day	Total Discharge Ltrs per day
1	Hostel Students	2000	15	30,000
2	Day Students + Faculty etc.	6000	5	30,000
		Total for Kitchen Discharge		**60,000**

Laundry waste water:

S.No.	Type of user	No. of users	Discharge/user Ltrs. per day	Total Discharge Ltrs per day
1	Hostel Students	2000	10	20,000
		Total for Laundry Discharge		**20,000**

Thus the total waste water received is approx.
7,40,000 + 60,000 + 20,000 = **8,20,000** ltrs. per day

The Approximate reuse is as below:

1) Flushing toilets - 2,75,000 ltrs per day
2) Gardening - 4,25,000 ltrs per day
3) For Air Conditioning - 1,20,000 ltrs per day

Total - 8,20,000 ltrs per day

H.O.: 2nd floor, B – 477 Sushant Lok - 1, Gurgaon - 122009, Haryana.
Tel: 0124 4047759, + 91 9818034910, + 91 9535367220; email: getgreentech@gmail.com

The **Methods of Treatment** being followed currently:

1)	Fermentative Baffle Reactor	– capacity	2,50,000 ltrs/day;
2)	MBBR Reactor	– capacity	4,00,000 ltrs per day
		Total capacity	6,50,000 ltrs/day

All the waste water from the toilets is collected in sumps near the respective buildings. From here the sewage is pumped to the Equalization Sump near the **Fermentative Baffle Reactor (FABR)**. From the sump the sewage is pumped at fixed equal flows to the **FABR and the MBBR Reactor.**

1. The **FABR** is made up of 4 baffle walls dividing the Bio Reactor into 5 chambers. Each chamber performs a specific function which is explained as under. The total volume of the FABR is 1350 cum and retention time is 5.4 days.

1.1	Scum Block & Primary Settler	- This blocks the scum from flowing to the other chambers.
1.2	Secondary Settler	- Here settleable solids are allowed to settle to the base of the tank.
1.3	Fermentation Chamber 1	- 1st Bio Reactor tank
1.4	Fermentation Chamber 2	- 2nd Bio Reactor tank
1.5	Outlet Chamber	- From here the treated water flows into the Gravel Filter.

1000 ltrs of An Bac bacterial solution is added daily in the **FABR**. This assists degradation of the waste water in the following ways:

a) Build up of microbial population in the FABR (STP).
b) Promotes low temperature fermentation
c) Faster break down of organic load
d) Reduction of settled organic solids by way of autolysis
e) Reduction in foul odour due to reduction in pathogens

After the **FABR** the sewage water enters the **Planted Gravel Filter**. Here the water passes through a bed of canna plants which absorb the excess nutrients thus protecting the oxidation pond from eutrophication. The total volume of the Planted Gravel Filter is 300 cum, i.e. approx 24 hours.

From the **Planted filter** the water enters the **Oxidation Pond**. Here the water is oxidized through air blowers. The treated water is used for gardening. The volume of the oxidation pond is 160 cum, i.e. approx 15 hours.

The treated water characteristics are as below:

BOD3	< 30	mgs/ltr
COD	< 100	mgs/ltr
TSS	< 100	mgs/ltr
pH	6.5 - 7.5	
Oil & Grease	< 5	mgs/ltr

2. A second flow from the Equalization sum enters the MBBR aeration chamber. Here Air is added using twin lobe blowers along with special Aer Bac microbes. The microbes stabilize the BOD load. The stabilized water enters the Settler where the bacterial sludge is settled and pumped into a Filter Press where it is dried and sent as compost to the gardens. The overflow goes to the Filter Feed tank from where it is pumped through a series of filters to a treated water tank and is finally used for Flushing toilets and for air conditioning.

2.1 The MBBR consists of an aeration tank of capacity 133 cum. Retention time = 8.20 hours. Here the waste water is fed oxygen through 2 Twin Lobe Roots Type Air Blowers of 200 cum per hour. Aer bac bacteria is added @ 1000 ppm i.e. 400 ltrs per day to enhance degradation and faster settling. MBBR media is present in the aeration tank which assists in attached growth of bacteria bio mass. This Bio Mass is kept in suspension due to the air from the Blowers. The waste water comes in contact with this Bio mass and the BOD gets reduced.

2.2 From the Aeration tank the waste water flows into the Tube Settler where PVC Tube Settler Media is placed at 60° angle which assists in faster settling of sludge. The sludge is pumped through a Filter Press where it is dried and sent as compost to the gardens.

2.3 The treated water then flows into a Filter Feed cum Chlorine contact Tank from where it is pumped through a Pressure Sand Filter and a carbon filter to the Flushing Feed tank.

2.4 The Treated water is then sent to the Flushing Tanks on the Terraces of the Buildings and to the Softening Plant for use in the Chiller Plants.

The treated water is further treated before using for Flushing Toilets and for Air Conditioning.

BOD3	< 20	mgs/ltr
COD	< 100	mgs/ltr
TSS	< 100	mgs/ltr
pH	6.5 - 7.5	
Oil & Grease	< 3	mgs/ltr

Method of treatment for Air conditioning use:

The Filtered water is pumped through a softening plant which brings the hardness to below 50 ppm. This softened water is pumped into the Chiller Plants for use.

Thanking you,
Yours faithfully,
For Green Envirotech

Navin Chopra