

# WATER AUDIT



## ST. EDMUND'S COLLEGE SHILLONG



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## Water Audit Report

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## **WATER AUDIT**

Water “the Elixir of life” is an important valuable resource that not only supports life but also essential for the human society. Water covers 71% of the earth’s surface. Although water is abundant on this earth, yet it is very precious. Out of the total water reserves of the world, about 97.4% is salty water (marine) and only 2.6% is fresh water. Even this small fraction of fresh water is not available to us as most of it is locked up in polar ice caps (1.98%) and just 0.6% is readily available to us in the form of groundwater and surface water (rivers and lakes), water in atmosphere and in the living organisms.

Over the years rapid increase in population and urbanization has put a stress on provision of clean drinking water and the overall quality of water has deteriorated. Overexploitation of water and excessive pollution of surface water caused by the discharge of untreated waste, dumping of industrial effluents and the runoff from agricultural fields, puts even more pressure on water resources.

To meet the needs of the growing demands of the increasing population, there is a need for rational use of the existing water and its resources in the most efficient way. There is a need to monitor the use and consumption of water at all levels.

Water Audit also known as “water evaluation” or “assessment” is an effective management tool that provides a comprehensive analysis that categorizes all water use in a system. A water audit is an on-site survey and assessment of water-using hardware, fixtures, equipment, landscaping, and management practices to determine the efficiency of water use and to develop recommendations for improving water-use efficiency (Newcomb, 2008). It provides a way to inventory all water uses in a system or facility and identify ways to increase water use efficiency.

Water audit that is carried out comprehensively can go a long way in providing a detailed profile of the water supply system and water use, including sanitation, maintenance, mechanical system etc. which in turn allows easier management of water resources and

improved reliability. It is also an important management tool for effective conservation of water and help to reduce the demand on freshwater resources.

Water audit critically examines the point where water enters the premises and goes up to the point where the waste water is discharged, and all aspects of use. It establishes the quantity/volume of water being used, identifies wastage and existing leakages, excess use, and areas where consumption can be reduced. It also assesses the existing treatment systems and practices and recommends changes to improve efficiency and reduce usage.

### **IMPORTANCE OF WATER AUDIT**

Water Audit imparts knowledge and helps us to understand the water distribution in a system. Understanding the water consumption and use pattern will give us a better understanding of not only the role of water in our day to day lives but will also help to enhance our techniques for conservation of the same. Identification of any leakages and water wastage in any form will help us to deal with these minor problems before they become major ones. Water audit will also help to give recommendations on steps that can be taken to reduce wastage as well as consumption of water, to improve water treatment practices and methods along with cost benefit analyses. Through water auditing, a record of the amount of water entering a system and tracking of water distributed and use can be maintained from time to time.

It will also help us to cut down repair costs, resources and energy required for its management. This also allows one to efficiently reduce water losses in the system.

This also serves as a tool to create awareness among water users to understand and to take proactive steps to manage wasted water and save for the future. It thus, serves as is an effective educational and public relations tool for the water system.

### **OBJECTIVES:**

1. To provide an inventory of all the water use points in St. Edmund's College
2. To identify the points of entry, distribution and discharge of water in the college campus premises.

3. To analyse the water consumption and wastewater generation pattern
4. To identify inefficiencies and leakages in the water distribution system in the campus.
5. To suggest steps to reduce water wastage and use.
6. To investigate the water conservation opportunities and improvise methods of rain water harvesting.
7. To find out the existing water treatment or filtration system in the campus.
8. To analyse the chemical quality of water distributed.

#### **WATER AUDITING IN ST. EDMUND'S COLLEGE CAMPUS, SHILLONG.**

Water Auditing was carried out in St. Edmund's College Shillong and observations were made on the water distribution and its uses in the campus. Data was collected with regards to the point where water enters the college premises and goes up to the point where water is being discharged and all aspects of its use were examined. Observations were also made to inspect any existing leakages; excess usage of water etc. and the areas where consumption can be reduced were also identified. The existing treatment system and practices were also identified and changes to improve efficiency and reduce usage and wastage of water are to be recommended.

The primary sources of water in St. Edmund's college are Municipal source, Public Health Engineering (PHE) department and the Bore well located in the college field. Rain water serves as the secondary source of water in the college especially during the dry season.

**Table 1: Sources, Distribution and Capacity of water in St. Edmund's College.**

<b>Sl no.</b>	<b>Location</b>	<b>Source</b>	<b>No. of Tanks</b>	<b>Capacity (litres)</b>	<b>No. of Tap connection</b>	<b>Inlet</b>	<b>Outlet</b>
1	Near boy's toilet	PHE	4	1x5000 2 x 2000 1x 1500	24	1	1 (boy's toilet)
2	Behind the College canteen and boy's common room	Bore well + Municipal + PHE	4	2x5000 2x 2000	24	1	1 (boy's toilet) 1 (sports room) 1 (canteen)
3	College field	Bore well	4	3x5000 1x1500	2	1	5
4	College Canteen	Bore well	1	1x1500	5 1 Aqua guard	1	2 (kitchen) 2 (Student's sink) 1 (Staff sink)
5	Near IQAC Co-ordinator Room	PHE	1	1x2000	4(gardening)+ 4(student's wash basin)	1	1 (gardening) 1 (hand washing Basin)
6	Behind girl's toilet	PHE	5	5x2000	4 (ladies staff toilet) + 3 (Men's Staff toilet) + 1(infirmery) +7 (girls toilet)	1	1 (Principal's chamber) 1 (Vice Principal's chamber) 1 (Staff's toilet) 1 (Infirmery) 1 (Girl's toilet)
7	Roof top near Bio	PHE + Bore well	5	1x1000 3x1000	9 (Biotech) +27(Chemistry)	1	1 (Biotechnology) 1 (Chemistry)

	technology department			1x1000	+11 (Biochemistry) 3 (Aqua guard)		1 (Biochemistry)
8	Underground tank near Badminton court	PHE + Bore well	1	1x20000 (approx)	21 +23 + 2 + 3 (taps) 4 Aqua guard (Zoology, Botany, Geography, Physics).	2	1 (Zoology) 1 (Botany) 1 (Geography) 1 (Physics) 1 (Electronics) 1 (Cleaner room- near Botany Department)
9	Underground tank near Chemistry laboratory	PHE + Bore well	1	1x20000 (approx)	27 (chemistry) + 11 (Biochemistry)+ 9 ( Biotechnology) 3 aqua guard ( Chem, Biochem, Biotech)	2	1 (Biotechnology) 1 (Biochemistry) 1 (Chemistry) 1 (Staff's toilet- Examination room) 1 (Girls Toilet) 1 (Computer)
10	Behind Vice Principal's chamber	PHE	3	1x2000 2x1500	4(Ladies staff toilets)+ 4 (Gents staff toilets) + 2 (Principal's chamber) +2 (VP)	1	1 (Staff toilet) 1(principal chamber) 1 (VP chamber)
11	Roof top of girl's hostel	PHE + Municipal	6	3x2000 3x1500	15(EVS)+ (Commerce) + 1 (BSW)+13(Girls toilet)+1 (MSW)+ 1(BCA) 1(Staff quarter) + 42 (girls hostel) + 1 (Dean's office) 6 Aquaguard (EVS, BSW,	1	1 (EVS) 1 (Commerce) 1 (BSW) 1 (MSW) 1 (girls toilet near BSW) 1 (Staff Quarter)

					MSW, BCA Commerce, Dean's office)		1 (Girl's hostel) 1 (Dean's office)
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BR. JN. Foley Students Residence-

12.	Above kitchen	PHE + Municipal	5	5X2000	Kitchen(2)+  Solar Hot water (1)+  Hand Wash (near dining hall) (3)+  Geyser (1)+  Staff qtrs. (2)+  Hand Wash (wash room) (4)	1	
13	On the backyard NEW platform	PHE + Municipal	4	2X2000+2X1000	Warden's Qtrs (6)+  Outside toilet (2)+  Staff qtrs. (2)	1	
14	Placed On Ground)	PHE + Municipal	5	5X1000	OUTSIDE USE (1)		
15	Underground tank (front side)	PHE + Municipal	1	17,725L approx.	NIL		
16.	Under Ground tank ( back yard)	PHE + Municipal 1		11,955L	NIL		
17		Bore well/ Rainwater	1	2000L (SYNTEX)	3 in dining hall hand wash+2( one each in staff toilets)		
18		Bore well/ Rainwater	1	400L (SYNTEX)	6 in boys toilets		



19	Underground tank	Bore well/ Rainwater	1	13824 L	NIL		
20	Front Open tank	Bore well/ Rainwater	1	4962 L	NIL		
21	Front Open tank)	Bore well/ Rainwater	1	5132 L	NIL		
Total water capacity in the Campus - 1,91,998 Litres							

#### Rainwater harvested

22	Pond near the Geography Department	Rainwater( primary source)			2	1	Nil
		Bore well (secondary source)					
23	Pond near the EVS Department	Rainwater( primary source)			2	1	Nil
		Bore well (secondary source)					

**N.B. Data collected for Water Audit in St. Edmund's College Campus for the year 2023 showed no significant changes as to compared to the one collected during the year 2022.**

**The water distribution pattern, entry and exits points of water, storage capacity still remains the same with no significant additions or changes.**

### **RESULTS & FINDINGS:**

The water samples from three (3) identified sources within the college campus namely Shillong Municipal Board (SMB), Public Health Engineering (PHE) and Borewell were collected in a sterile 1-liter bottle, sealed, and send to Meghalaya Pollution Control Board (MPCB) laboratory for testing on eight (8) different parameters with sample ID: G/18/22/1-3. The chosen parameters are

- (i) pH
- (ii) Conductivity
- (iii) Turbidity
- (iv) Chloride %
- (v) Total alkalinity as  $\text{CaCO}_3$
- (vi) Total Hardness
- (vii) Nitrate Content
- (viii) Iron content

The samples were coded accordingly along with the sampling locations. The test method used was ADHA:23<sup>rd</sup> with different Ed no's marked in the test report (report enclosed as Annexure 1). From the test report, it was observed that the water sample from borewell (G/18/22/1) is more turbid and has more Iron (Fe) mg/l content when compared with Indian standard (IS10500-2012). Also, the water from PHE source (G18/22/3) is more alkaline in comparison to other two water samples. In general, the test report of all the three water samples were satisfactory (all parameters within permissible limits).

The college caters to roughly 3000 students and staff(s) along with two (2) functional hostels. There are six (6) wet laboratories (Chemistry, Botany, Zoology, Biochemistry, Biotechnology & EVS) along with one (1) Advanced Biotechnology research Laboratories which requires ample water, when session is in place. The boys and the girl's washroom used adequate amount of water and in garden/plants/college field are watered during the dry season. The total storage capacity of water in the campus is roughly around 191998 liters.

The dedicated associated staff (s) take care of any leakage in the pipes to minimize leakage. Rainwater harvesting is an important step within the campus and necessary underground storage facility is in place. Also, water treatment plant using charcoal, alum and lime are in place which can treat the water pumped from the

borewell. Water pumps at different locations are well maintained that is used to pump water in overhead water tanks placed at the roof of the building for supply of water at different points of usage.

### **SUGGESTIONS**

- Σ The campus may create more water bodies of different dimensions at different locations using rainwater as its primary source.
- Σ A water treatment plant may be fabricated so that water from the laboratories is recycled and used for watering of plants/gardens.
- Σ Water flow regulators may be installed in the Boys & Girls washrooms to minimize the wastage of water.

## ANNEXURE I



**MEGHALAYA STATE POLLUTION CONTROL BOARD**  
**CENTRAL LABORATORY**  
**"Arden", Lumpyngngad, Shillong -793014**  
**TEST REPORT**

Report No: WQ/2022/13


1 Issue Date : 14.3.2022  
2 Name of the Project : Drinking water source  
3 Sample matrix : Water  
4 Date of sample collection : 7.3.2022  
5 Date of sample receipt : 7.3.2022  
6 Samples collected by : Client  
7 Date of sample analysis : 8.3.2022-11.3.2022  
8 Sample Registration No. : G/18/22/1-3  
9 Sample plan reference : -  
10 Report sent to (Name & Address) : Principal, St. Edmund College, Laitumkhrach, Shillong  
11 Deviation, if any : -  
12 Remarks if any : -


Parameters	Test Method: APHA: 23 <sup>rd</sup> Ed. No.	Limits	Sample code/Sampling location		
		Indian Standard for drinking water (IS : 10500- 2012)	G/18/22/1 Borewell College Campus (Raw water)	G/18/22/2 Tap water Municipal Source (Treated Water)	G/18/22/3 Tap water PHE Source (Treated water)
pH	4500-H <sup>+</sup> B	6.5-8.5	6.8	6.8	6.8
Conductivity ( $\mu\text{mho}/\text{cm}$ )	2510 A	*	65.0	29.0	56.0
Turbidity (NTU)	2130 B	1.0	49.8	1.0	3.5
Chloride (mg/l)	4500-Cl <sup>-</sup> B	250.0	5.0	5.0	5.0
Total Alkalinity as CaCO <sub>3</sub> (mg/l)	2320 B	200.0	16.0	14.0	50.0
Total Hardness as CaCO <sub>3</sub> (mg/l)	2340 C	200.0	12.0	10.0	16.0
Nitrate-N (mg/l)	4500-NO <sub>3</sub> <sup>-</sup> D	45.0	0.52	0.59	0.58
Iron (mg/l)	3500-Fe B	0.3	0.44	0.31	0.22

\*Not Prescribed

**Statement:**

1. The results are reported based on the materials received
2. Sample will be destroyed after one month from the date of issue of the report.
3. The report shall not be reproduced except in full without the written approval of the laboratory

  
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