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NABCB Accredited – Type A – Inspection Body

Green Audit of

CHRIST (Deemed to be University) Bangalore

Is conducted as per directives of NAAC

for the scope of

Energy, Water, Waste Management, Green Cover, Environment and Sustainability in line with National Building Code 2016 – Part 11 Approach to Sustainability

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QUALITY AUDIT REPORT

ON

WATER AUDIT, ENERGY AUDIT,

WASTE MANAGEMENT AUDIT,

GREEN CAMPUS MANAGEMENT AUDIT

AND ENVIRONMENT AUDIT

OF

CHRIST (DEEMED TO BE UNIVERSITY)

BANGALORE CENTRAL CAMPUS

HOSUR ROAD, NEAR DAIRY CIRCLE,

BENGALURU

KARNATAKA-560029

CHRIST

(DEEMED TO BE UNIVERSITY)

BANGALORE · INDIA

ECO ENERGIME ENGINEERS LLP

ENHANCING RESOURCE EFFICIENCY

QUALITY AUDIT REPORT

OF

CHRIST (DEEMED TO BE UNIVERSITY)

BANGALORE CENTRAL CAMPUS

HOSUR ROAD, NEAR DAIRY CIRCLE,

BENGALURU

KARNATAKA-560029



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We would be happy to provide any further clarifications, if required, to facilitate the implementation of the recommendations.

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Director, IQAC – CHRIST (Deemed to be University) Bangalore Central Campus, Bengaluru

And other Staff in personnel who have given full co-operation and support. They took a keen interest and gave valuable inputs during the course of study.

Eco Energime Engineers LLP
NABCB Accredited Type A Inspection Body for
Green Audit | Electrical Safety Audit | Occupational Health and Safety Audit
Bureau of Energy Efficiency Accredited Energy Audit Firm (AEA)

EEELLP ACKNOWLEDGEMENT

EEELLP team thanks the management of ""**CHRIST (DEEMED TO BE UNIVERSITY), BANGALORE CENTRAL CAMPUS, HOSUR ROAD, NEAR DAIRY CIRCLE, BENGALURU, KARNATAKA"** for assigning this interesting work to us. We appreciate the cooperation extended to our team during the entire process.

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For Eco Energime Engineers LLP

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DISCLAIMER

The Audit Team has prepared this report for CHRIST (DEEMED TO BE UNIVERSITY), BANGALORE CENTRAL CAMPUS, HOSUR ROAD, NEAR DAIRY CIRCLE, BENGALURU, KARNATAKA, based on the input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the recommendations are arrived following best judgments and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report

For Eco Energime Engineers LLP

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Green Audit | Electrical Safety Audit | Occupational Health and Safety Audit
Bureau of Energy Efficiency Accredited Energy Audit Firm (AEA)

Certificate

This is to certify that M/s. Eco Energime Engineers LLP, Bengaluru has conducted **Quality Audit** of **"CHRIST (DEEMED TO BE UNIVERSITY), BANGALORE CENTRAL CAMPUS, HOSUR ROAD, NEAR DAIRY CIRCLE, BENGALURU, KARNATAKA".** The Audit includes water audit, energy audit, waste management audit, green campus management audit and aspects of environment audit.

The audit involves field visit, measurements and observations, verification of bills, log books, data base, maintenance registers and interview with staffs, and this gives an overview of the existing system. In an opinion and to the best of our information and according to the information given to us, said Quality Audit gives a true and fair view in conformity with auditing principles.

For Eco Energime Engineers LLP

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ABBREVIATION AND ACRONYMS

1.	A	:	Amperes
2.	AC	:	Air Conditioner
3.	BESCOM	:	Bangalore Electricity Supply Company
4.	DG	:	Diesel Generators
5.	E-Waste	:	Electronic Waste
6.	IQAC	:	Internal Quality Assurance Cell
7.	kLD	:	Kilo Litre Per Day
8.	kWp	:	kilo Watt peak
9.	LCD	:	Liquid Crystal Display
10.	LED	:	Light Emitting Diode
11.	PV	:	Photo Voltaic
12.	Rs.	:	Rupees
13.	RO	:	Reverse Osmosis
14.	S. No.	:	Serial Number
15.	SRTPV	:	Solar Roof Top Photo Voltaic
16.	V	:	Volts
17.	W	:	Watts
18.	Wp	:	Watt peak
19.	#	:	Number

EXECUTIVE SUMMARY

Conducting Quality Audit covering areas such as water audit, energy audit, waste management audit, green campus management audit and environment conservation activities, in university helps to increase the awareness levels of stakeholders, staffs and students, to understand its advantages towards impact on sustainable future.

The CHRIST (Deemed to be University) Bangalore Central Campus is very **well maintained, clean and neat**, which emphasis the resource allocation (man power, finance and support) by management and importance given for **clean and hygiene environment for students, staffs and stakeholders**.

The environmental awareness initiatives are **substantial**. The installation of solar PV systems, solar hot water systems, STP treated water for gardening purposes, and rain water harvesting system are **noteworthy**. Besides, environmental awareness programmes initiated by the management and administration shows how the campus is going green.

As part of Quality Audit of campus, we carried out campus monitoring, including Illumination and Ventilation of the class room. It was observed that Illumination and Ventilation is **adequate** considering natural light and fresh air circulation.

From the Quality Audit study, it was observed the university had taken various initiatives and implemented best practices in conserving natural resources that include:

A. Best Practices Implemented for Water Conservation

- Aerators for taps
- RO plant for drinking water
- Heat Pump for hot water provision
- Sewage Treatment Plant
- Treated STP water for garden / floor cleaning
- Maintenance team

B. Best Practices Implemented for Energy Conservation

- Day light integration in class rooms, staff rooms, hostels and common areas
- Use of LED lights
- Use of heat pump & Solar water heater for hot water generation
- DG sets
- Use of LED/ LCD monitors
- ARD (Auto Rescue Device) for lift

C. Best Practices Implemented for Waste Management

- Color code bins for waste collection
- Organic Waste Composting
- Sewage Treatment Plant

D. Best Practices Implemented for Green Campus Management

- Green landscaping
- Paperless office
- Organic manure for plants
- Regular maintenance of greeneries

E. Best Practices Implemented for Environment Conservation

- Usage of LED fixtures
- Use of heat pump & Solar water heater for hot water generation
- Sewage Treatment Plant
- Waste Segregation/storage
- Segregation at source level (Dry & Wet waste bins)
- Daylight integration & ventilation
- Plantations in the campus
- Usage of electric vehicle
- Transport facility for students

Quality Audit will be a valuable tool in the management and monitoring of environmental and sustainable development programs of the university.

1. INTRODUCTION

VISION

Excellence and Service.

MISSION

CHRIST (Deemed to be University) is a nurturing ground for an individual's holistic development to make effective contribution to the society in a dynamic environment.

Committee and Cells

- **Centre for Academic and Professional Support**
- **Centre for Neurodiversity Research and Innovation**
- **Centre for Artificial Intelligence**
- **Centre for Case Research and Development**
- **Centre for Counselling & Health Services**
- **Centre for Digital Innovation**
- **Centre for East Asian Studies**
- **Centre for Education Beyond Curriculum**
- **Centre for Indian and Foreign Languages**
- **Centre for Korean Studies**
- **Centre for Placement and Career Guidance**
- **Center for Publications**
- **Centre for Quantum Technologies and Complex Systems**
- **Centre for Research**
- **Centre for Services Learning**
- **Centre for Social Action**
- **Centre for Social and Policy Research**
- **Christ Consulting**
- **Christ Nodal Office**
- **Christ University Higher Education Leadership Institute**
- **Christies for Climate Action**
- **Corporate Engagements**
- **CU – Academic Staff College**
- **Cultural Studies Cell**
- **Digital Mission**
- **DREAMS**

- **Human Resource Development Centre**
- **Intellectual Property Rights Cell**
- **IQAC**
- **IT new**
- **Kannda Sangha**
- **National Cadet Corps**
- **Office of Alumni Engagement**
- **Office of International Affairs**
- **Praveen Kenneth Chair on Leadership**
- **Research and Development Cell**
- **Scholarship and Fellowship Support Cell**
- **Office of Strategic Planning**
- **Sports and Games**
- **Student Welfare Office**
- **Sustainable Development Cell**
- **The Teaching Enhancement Cell**
- **Vignette Windows: Campus Narratives**

IQAC Members

The list of IQAC members is given in figure 1.1

CHRIST
(DEEMED TO BE UNIVERSITY)
BANGALORE · INDIA

Internal Quality Assurance Cell (IQAC) Council, as on 01 August 2023

S.N.	Rule	Category	Name
1.	2.D.1.a	Vice Chancellor (Chairperson)	Dr Fr Joseph C C Vice Chancellor
2.	2.D.1.b	Up to eight members from Teaching Faculty	Dr Kennedy Andrew Thomas Professor, School of Education, Bangalore Central Campus
			Dr Fr Jossy P George Professor, Department of Statistics and Data Science, Delhi NCR Off-Campus
			Dr Anitha Suseelan Professor, School of Architecture, Bangalore Kengeri Campus
			Dr Fr Lijo Thomas Associate Professor, Department of Psychology, Pune Lavasa Off-Campus
			Dr Veerta Tantia Associate Professor, Department of Commerce, Bangalore Central Campus
			Dr Bhavani S Assistant Professor, Department of English and Cultural Studies, Bangalore Central Campus
3.	2.D.1.c	Up to three members from Administration	Dr Anil Joseph Pinto, Registrar
			Dr Johny Joseph, Controller of Examinations
			Mr Joseph Saibi C T, Chief Accounts Officer
4.	2.D.1.d	One member representing Board of Management	To be appointed
5.	2.D.1.e	One nominee each from the local Society/Trust, Students, and Alumni	Dr Fr Viju P D Member, CHRIST Trust
			Mr Jugnu Uberoi, President, Christ University Alumni Foundation
			Ms Ritu P Raj, Student, V Sem, BA LLB, CHRIST (Deemed to be University)
6.	2.D.1.f	One nominee each representing Employer, Industrialist, and other Stakeholders	Mr Venu Rajamony Officer on Special Duty, External Relations, Govt of Kerala, Former Ambassador of India to Netherlands
			Mr Vijayan M S Managing Director, RESIL Chemicals Pvt Ltd, Bengaluru
			Mr Tanvir Singh, Director, Human Resources, Prodapt Solutions Pvt Ltd.
7.	2.D.1.g	Directors of IQAC, Secretary of the Council	Dr Alex P Joseph Director, IQAC

(Dr Anil Joseph Pinto)
Registrar
Registrar
CHRIST (Deemed to be University)
Bengaluru - 560 029

Hosur Road, Bengaluru - 560 029, Karnataka, India. www.christuniversity.in
Tel: +91 80 4012 9600 Fax: +91 80 4012 9000 email: mail@christuniversity.in

Figure1-1: IQAC Team Members

Campus Area and Built-up area

The area of the campus (built up and total) is given in table 1-1.

S. No.	Description	Units	Details
1	Campus total area	Acres	46.28
2	Built up area	Sq Mts	247110.17

Table 1-1: University Area

Facilities available for physical wellness

The management has provided courts for sports activities. Pictures of the courts are given in figure 1.2.



Figure1-2: Facilities inside the campus for sports

Overview of Quality Audit:

Quality Audit helps university / facility to:

- Understand the usage of electricity, water and other natural resources
- Identify opportunities to conserve various natural resources
- Identify various technological improvements
- Evaluate the techno-commercial of identified conservative measures
- Create awareness among the students and staff
- Disseminate the commitment of management towards saving nature
- Develop a culture among students, staff and management to be socially responsible

2. PRE – AUDIT PHASE

A pre-audit meeting is a prerequisite for the Audit; it helps to meet and discuss about the schedule and documents required during the audit. The pre-audit meeting was conducted at CHRIST (Deemed to be University), Bangalore Central Campus, Bengaluru during the meeting, introduction of team members, scope and objectives of the audit were discussed.

Management Commitment

The Management of the university has shown significant commitment towards Quality Auditing during the pre-audit meeting. They were ready to encourage all green activities. It is decided to promote all activities that are environment friendly such as awareness programmes on the environment, farming, planting more trees on the campus etc., after the Quality Auditing.

University administration is vital to the process of realizing campus sustainability, and the policy is an essential instrument for any substantial change in the campus environment.

Scope and goals of Quality Auditing

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Quality Auditing is one among them for educational university.

Once a baseline is established, the data can serve as a point of departure for further action in campus greening. Existing data will allow the university to compare its programs and operations with those of peer university, identify areas in need of improvement, and prioritize the implementation of future projects.

This data will also provide a basis for calculating the economic benefits of resource conservation projects by establishing the current rates of resource use and their associated costs. This audit initiative focused initially on educating university and universities through workshops, guidebooks, fact sheets and ensuring compliance through inspections and self-audits.

3. ON-SITE AUDIT PHASE

3.1. Scope / Target Areas of Quality Auditing

3.1.1. Water Audit

Water Audit addresses water consumption, water sources, appliances and fixtures. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible university should examine its water use practices.

3.1.2. Energy Audit

Energy Audit addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability.

3.1.3. Waste Management Audit

Waste Audit addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Municipal solid waste has a number of adverse environmental impacts, most of which are well known and not in need of elaboration.

3.1.4. Green Campus Management Audit

Green campus initiatives are becoming an integral part of modern day's university systems. Green campus Audit helps in maintaining the air and water clean. It regulates the climatic conditions and provides a healthy and comfortable environment for living.

3.1.5. Environment Audit

Environment Audit addresses the usage of fossil fuels (coal, diesel, petrol and gas). The mode of commute to and from university each day has an impact on the environment through the emission of greenhouse gases into the atmosphere by the burning of fossil fuels.

3.2. Audit Methodology and Approach

The methodology and approach adopted for the study involve various steps that include:

- Review of Document and records
- Review of Policies
- Review of MoU
- Review of various measures implemented
- Site Walkthrough
- Data Collection
- Interviews

3.2.1. Review of Document and Records

Electricity bills, equipment register, list of appliances, office registers, internal quality audit document, purchase document, were reviewed and relevant data and inputs required for analysis have been collected.

3.2.2. Review of Policies

University has various policies that include safety policy, environment policy, and Anti-ragging policy.

A. Safety Policy:

An organization's safety policy is a recognized, written statement of its commitment to protect the health and safety of the students and employees, as well as the surrounding community.

Teaching and non-teaching staff, maintenance and house-keeping staff have been selected and given training to use fire extinguishers in emergency situations of fire and explosion. Fire extinguishing cylinders have been installed in each floor and in laboratory areas. The fire hydrant pump room is available and the same is shown in the figure 3-1. The fire extinguishers and fire hydrant systems are shown in 3-2 to 3-4.

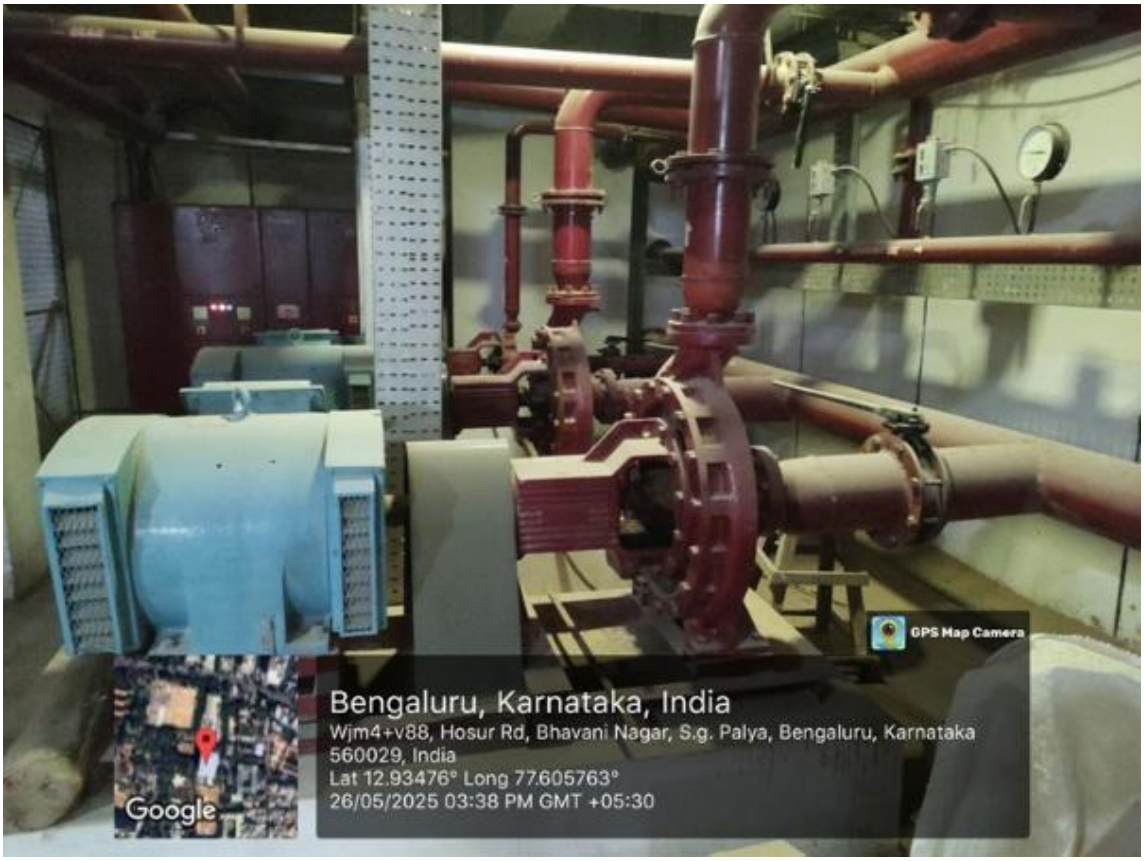


Figure 3-1: Fire pump room



Figure 3-2: Fire Extinguisher in Panel room



Figure 3-3: Fire Extinguisher installed in the floors

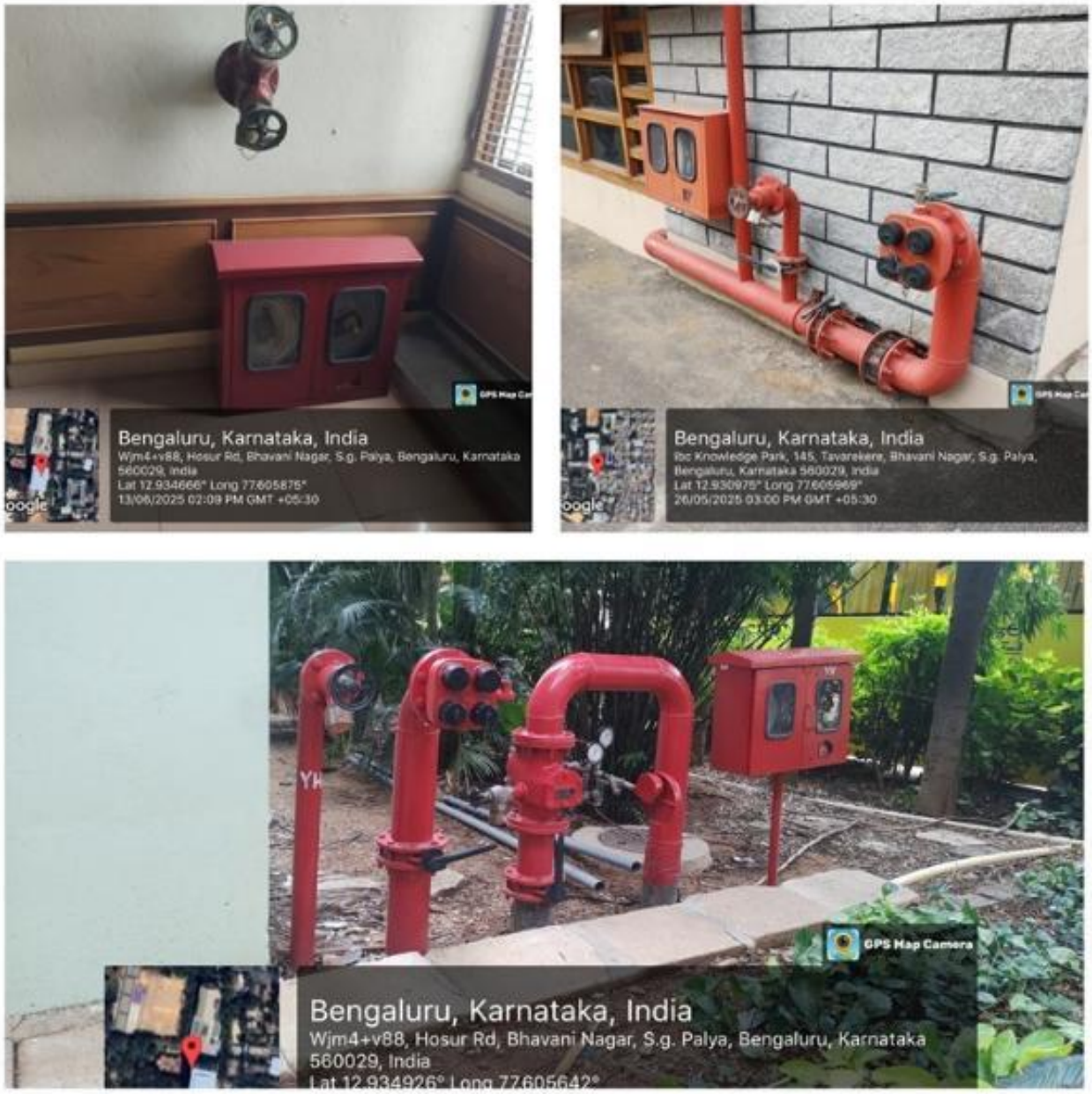


Figure 3-4: Fire hydrant system

3.2.3. Review of various measures implemented

During the Quality Audit study, it was observed the university management has taken various initiatives in conserving natural resources that include:

- Quality Audit team including Management and Staffs
- Installation of Solar Roof Top Photo Voltaic (SRTPV) system for power generation
- Installation of LED tube lights to reduce electricity consumption
- Sewage treatment and using the treated final water for gardening and cleaning purposes
- Installation of dust bins at all the rooms
- Installation of LCD/LED monitors to conserve electricity
- Food waste is collected separately and given to organic waste digester.

3.2.4. Site Walk through

Site walk through was conducted with staff members and audit team members. Staffs have shown very keen interest in the data collection process and methods to be followed in field data collection. The staffs have given inputs and suggestions for resource conservation as well.

University Infrastructure

University campus has various blocks and departments. Each floor has state of the art class rooms, staff rooms, laboratories libraries and many more. Details of infrastructure are as follows:

- Gymnasium
- Sports and Games
- Cafeteria
- Auditorium
- Class room
- RO Water Plant
- Transport
- Stationery & Reprography
- Sewage treatment plant
- Hostel
- 24/7 Security
- Library
- Digital Library
- Staff Room

All the classrooms and staff rooms are well ventilated and the integration of day-light is well utilized. This has helped in optimized usage of electricity for lights and fans during day time.

3.2.5. Interviews

To collect the various data, information and operating patterns, interviews were conducted with university staffs. The consolidated information from the interviews is given in the following sub-sections.

3.2.5.1. List of Holidays:

The lists of holidays were collected during the study and the same is given in figure 3-5.

Date	Festival	Location
15/01/2024	Maha Shivaratri	Bengaluru
26/01/2024	Republic Day	Bengaluru
08/03/2024	Maha Shivaratri	Bengaluru
29/03/2024	Good Friday	Bengaluru
09/04/2024	Chandramana Ugadi	Bengaluru
11/04/2024	Qutub-e-Ramzan	Bengaluru
26/04/2024	Lok Sabha Election	Bengaluru
01/05/2024	May Day	Bengaluru
10/05/2024	Basava Jayanti	Bengaluru
17/06/2024	Bakrid	Bengaluru
17/07/2024	Muharram	Bengaluru
20/07/2024	3 Saturday	Bengaluru
15/08/2024	Independence Day	Bengaluru
17/08/2024	Third Saturday	Bengaluru
07/09/2024	Ganesh Chaturthi	Bengaluru
16/09/2024	Id-Meelad	Bengaluru
21/09/2024	Third Saturday	Bengaluru
02/10/2024	Gandhi Jayanti	Bengaluru
11/10/2024	Ayudha Pooja	Bengaluru
12/10/2024	Vijaya Dashani	Bengaluru
17/10/2024	Valmiki Jayanti	Bengaluru
19/10/2024	Third Saturday	Bengaluru
31/10/2024	Naraka Chaturdashi	Bengaluru
01/11/2024	Rajyotsava Day	Bengaluru
02/11/2024	Balipadyami	Bengaluru
18/11/2024	Kanakadasa Jayanti	Bengaluru
11/12/2024	Govt. Declared holiday	Bengaluru
21/12/2024	Third Saturday	Bengaluru
25/12/2024	Christmas	Bengaluru
27/12/2024	Holiday	Bengaluru
14/01/2025	Maha Shivaratri	Bengaluru
18/01/2025	Third Saturday	Bengaluru
15/02/2025	Third Saturday	Bengaluru
26/02/2025	Maha Shivaratri	Bengaluru
15/03/2025	Third Saturday	Bengaluru
31/03/2025	Qutub-e-Ramzan	Bengaluru
10/04/2025	Mahaveer Jayanti	Bengaluru
14/04/2025	Ambedkar's Jayanti	Bengaluru
18/04/2025	Good Friday	Bengaluru
19/04/2025	Third Saturday	Bengaluru
30/04/2025	Basava Jayanti	Bengaluru
01/05/2025	May Day	Bengaluru
17/05/2025	Third Saturday	Bengaluru

Figure 3-5: List of Holidays

3.2.5.2. Tentative Schedule of University:

The tentative schedule of the university is 07.30 AM to 4:45 PM. The details of the sessions are given below

The sample image of the time table is given in figure 3.6.



CHRIST UNIVERSITY, BANGALORE

TIME TABLE 2025-26 (ODD SEMESTER)

Note:It is a common Time Table Template and please add the details as per your Department Approved Schedule only.

CLASS:

HOD/COORDINATOR NAME:

SEMESTER:

DAYS		PERIOD8AM	PERIOD7.30_9AM(2HRS)	PERIOD9.45AM	PERIOD10.45AM	PERIOD11.45AM	PERIOD12.45 PM(LUNCH)	PERIOD13.45PM	PERIOD14.45PM	PERIOD15.45PM	PERIOD16.45PM
MON	COURSE CODE		BBA203-3	HOL281-4	BBA241A	ENG201					
	COURSE NAME		Business Analytics	HED (Pratical)	Arthashastra Principles for Modern Management	Business Communication I					
	FACULTY NAME		Dr GAGAN KUMAR B R BATCH 1 (2420201- 2420245)		Dr. ANNAPURNA R	Dr Arya					
	BATCH/GROUP DETAILS IF ANY		Prof. Deepak Joy BATCH 2 (2420246-2420282)								
	Mention Theory /Practical					Theory					
TUE	COURSE CODE		BBA202-3	BBA201-3		ENG201					
	COURSE NAME		Human Resource Management	Cost Accounting		Business Communication I					
	FACULTY NAME		Dr SMITHA S BATCH 1 (2420201-2420245)	Dr KOMALA		Dr Arya					
	BATCH/GROUP DETAILS IF ANY		Dr SHANMUGAM SUBRAMAIAN BATCH 2 (2420246-2420282)								
	Mention Theory /Practical					Theory					
WED	COURSE CODE		BBA201-3	BBA203-3	BBA241A						
	COURSE NAME		Cost Accounting	Business Analytics	Arthashastra Principles for Modern Management						
	FACULTY NAME		Dr KOMALA	Dr GAGAN KUMAR	Dr. ANNAPURNA R	ACTIVITY					
	BATCH/GROUP DETAILS IF ANY										
	Mention Theory /Practical										
THU	COURSE CODE		BBA204F-3								
	COURSE NAME		Digital Banking & Fintech		BBA241A	BBA202-3					
	FACULTY NAME		Dr NIJUMON K JOHN		Arthashastra Principles for Modern Management	Human Resource Management					
	BATCH/GROUP DETAILS IF ANY				Dr. ANNAPURNA R	Dr SMITHA S					
	Mention Theory /Practical										
FRI	COURSE CODE		BBA204F-3	BBA261-3	BBA261-3						
	COURSE NAME		Digital Banking & Fintech	Relational Database Management System (Pratical & Theory)	Relational Database Management System (Pratical & Theory)	MENTORING					
	FACULTY NAME		Dr NIJUMON K JOHN	Dr. PUNNIYAMOORTHY R	Dr. PUNNIYAMOORTHY R						

Figure 3-6: Sample time table with university timing

3.2.5.3. Staff and Students of University:

The number of staff includes teaching, non-teaching, and house-keeping is given in the table 3-2. The number of students includes both boys and girls.

S. No.	Staff	Students
1	1330	19650

Table 3-1: Number of staff and students

4. WATER AUDIT

4.1. Facility description

The water audit study involved carrying out various observations and analysis, to realistically assess usage of water and potential for water conservation.

Borewell water is the only source of water, for facilitating the water supply requirement of the entire campus.

The images of borewell are shown in figure 4-1, and the images of sumps are show in figure 4-2.



Figure 4-1: Borewell Pump



Figure 4-2: Sumps in Campus

The image of the overhead tanks is shown in figure 4-3.



Figure 4-3: RCC Overhead tanks installed at the terrace

The borewell water is pumped through submersible pump to the raw water sump. The borewell motor control panel with water level controller switch is shown in figure 4-4.



Figure 4-4: Borewell motor control panel with water level switch

Based on the source, usage, type and recycling, water is classified as following types in the university campus that include:

- Raw Water
- Drinking Water
- Hot Water
- Rain Water
- Sewage Water
- Treated Water (from Sewage Treatment Plant)
- RO Reject Water

Details of the various types of water usages are discussed in detail, in the following sections.

4.1.1. Raw Water System

The raw water is consumed in the following areas:

- RO Input
- Hostel – Bathrooms
- Washrooms
- Cleaning
- Laboratories
- Garden
- Kitchen

4.1.2. Drinking Water System

The drinking water requirement of the entire campus is met by RO water system installed the campus.

The input water for RO plant is given from overhead tank. The RO units are installed and drinking water is stored in drinking water dispensers. The drinking water dispenser are installed in every floor. Figure 4.5 depicts one of the RO plant installed in the university campus.

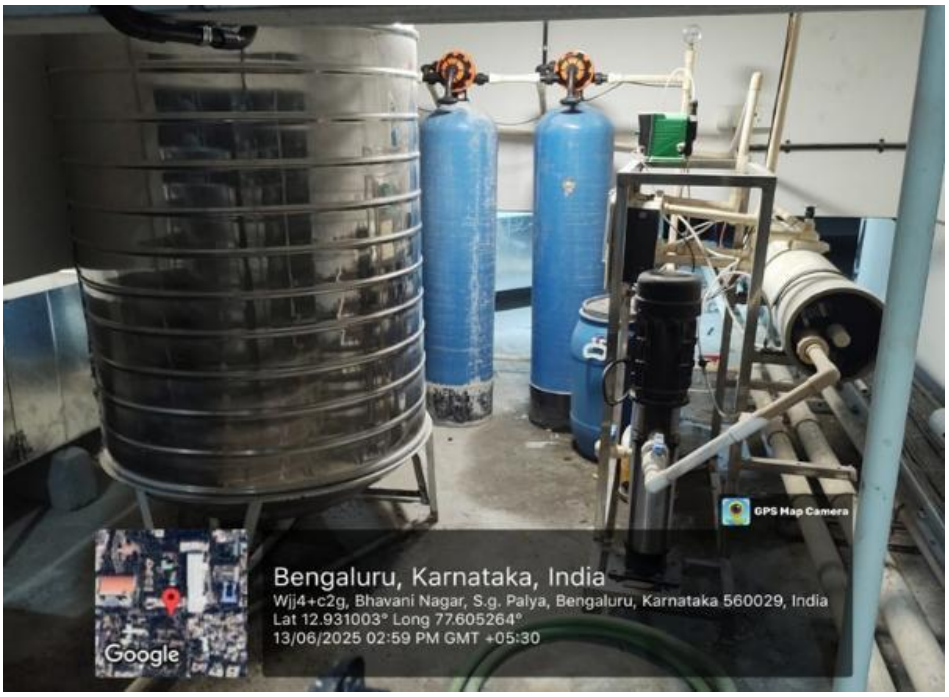


Figure 4-5: RO plant for drinking water

4.1.3. Hot Water System

The hot water is mainly consumed in hostels for bathing purposes. The hot water requirement for bathing is met by integrated solar water heater system and heat pump system installed on the terrace.

The pictures of solar water heater installed on the terrace are given in figure 4-6.

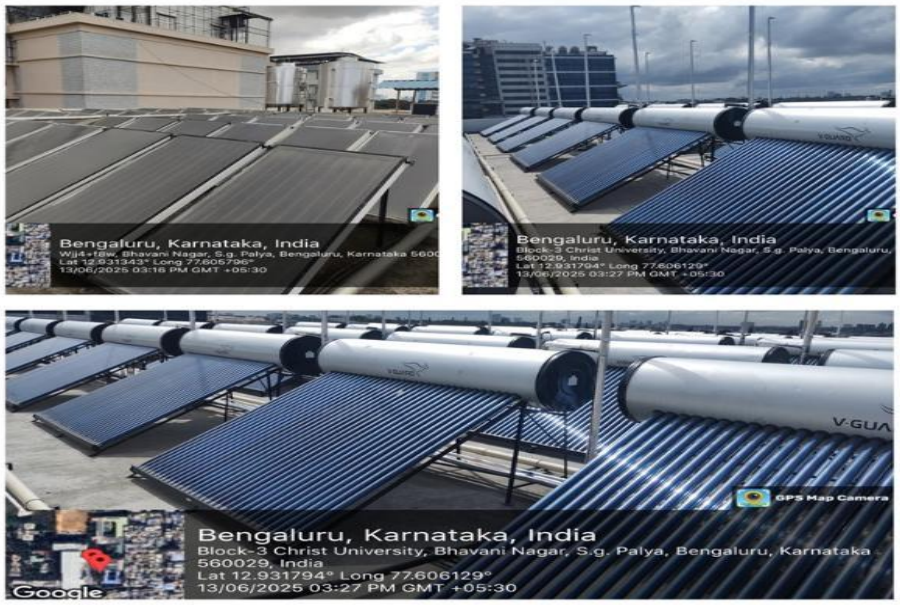


Figure 4-6: Solar water heater installed at the terrace

The picture of heat pump system installed in the hostel are given in figure 4-7.



Figure 4-7: Heat Pump system installed on terrace

4.1.4. Rain Water Harvesting System

Rain water harvesting system is available in the campus. Provisions for rain water to drain from terrace is provided. The rain water from terrace of building is collected in rain water storage tank and used for flushing in building. Apart from this, the management is building a new rain water harvesting storage system, that is work in progress.

The rain water storage tank is shown in figure 4-8.



Figure 4-8: Rainwater storage tank

4.1.5. Sewage Water System

- The sources of waste water in the university campus of all blocks are as follows
    - Washrooms
    - Toilets
    - Hostel
    - Canteen

- Waste water from the above-mentioned sources is collected and treated at sewage treatment plant (STP). The capacity of STP is 300 kLD (kilo Litres Per Day)
- The plumbing system (waste water collection, waste water transfer to STP, STP treated water storage and STP treated water to land scaping) is very well designed, the pipes are laid underground, and access / chambers are provided to regulate and control the flow of water.
- The treated water from the STP is distributed via underground pipes to the entire campus for cleaning and gardening purposes.

The schematic of Sewage Treatment Plant (STP) is shown in figure 4-9.



Figure 4-9: STP Schematic

The STP area is shown in figure 4-10.

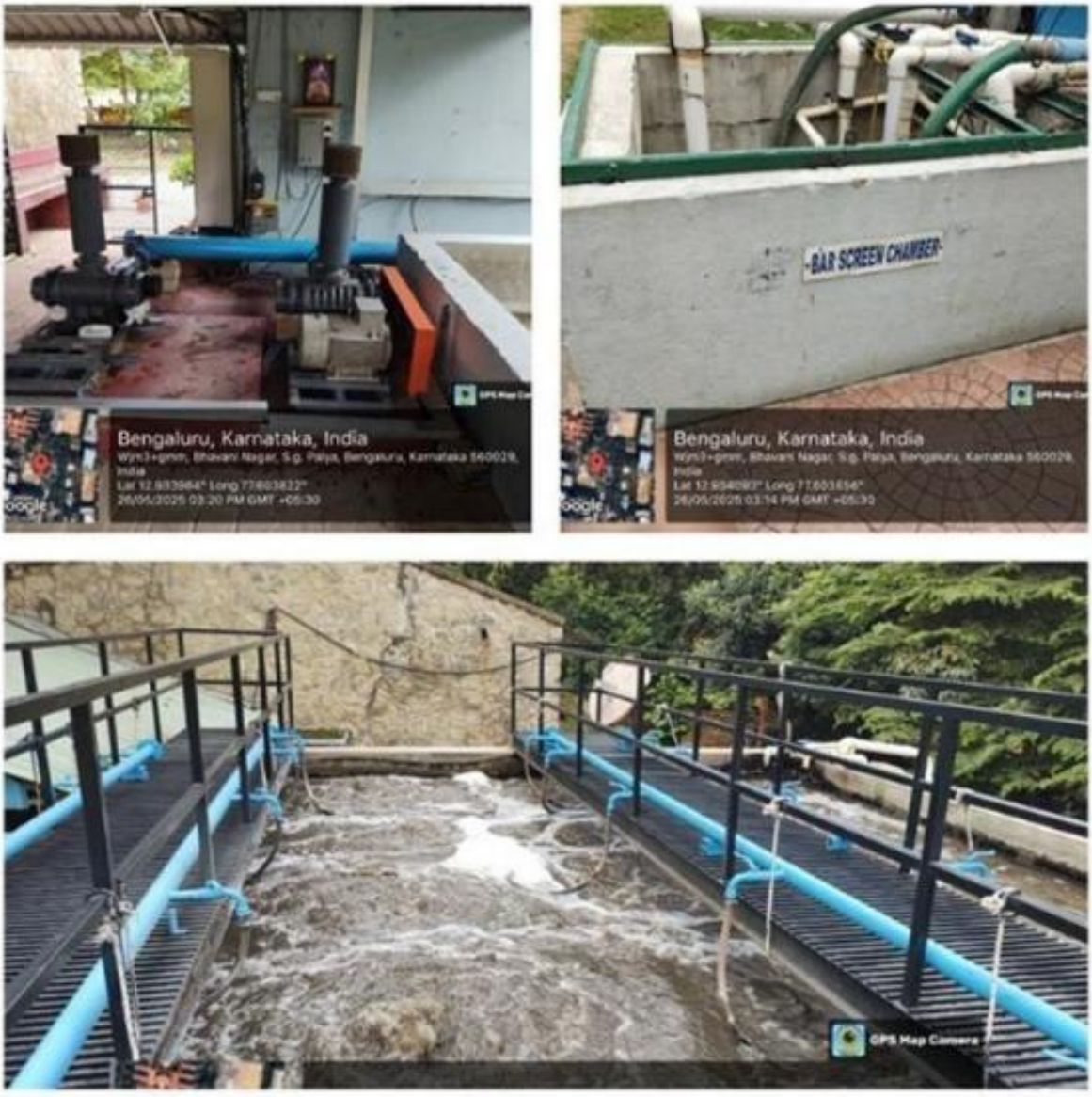


Figure 4-10: Sewage Treatment Plant

4.2. Best Practices Implemented for Water Conservation

4.2.1. Installation of water flow meters

Water is pumped from the bore wells and distributed through overhead tanks available in terrace. With the presence of flow meters, it is possible to measure quantity of water used per day. Water flow meter is installed at the STP treated water outlet point. The picture of water flow meter installed in the STP area is shown in figure 4.11.



Figure 4-11: Water flow meter

4.2.2. STP treated water for garden use

The treated STP water is used for watering the trees and garden. For this purpose, dedicated pipeline is provided. Taps are provided at various locations to facilitate the watering of garden.

The tap provided for watering the garden is shown in figure 4-12.



Figure 4-12: STP treated water tap for garden use

4.2.3. Sewage Treatment Plant

The procedure for removing contaminants from the wastewater basically from the household sewage is called sewage treatment. It has to undergo the chemical, physical and biological procedure to remove these contaminants and give out an environmentally safe treated effluent. A semi-solid slurry called the sewage sludge is the by-product of the sewage treatment. This sludge is further processed before it is suitable for land application.

The university has installed STP. The STP is shown in figure 4-13.

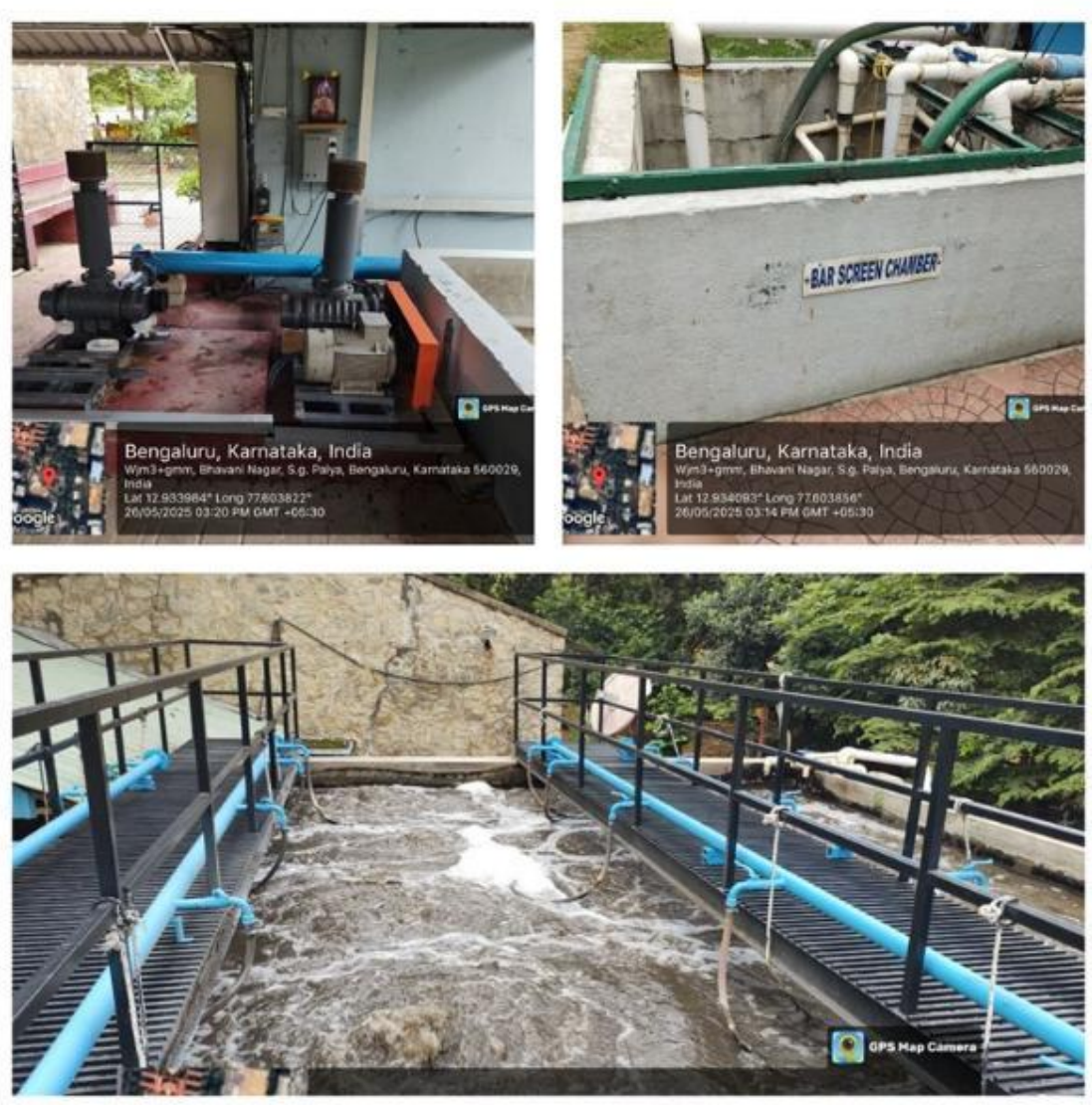


Figure 4-13: STP Area

4.2.4. Ground Water Recharge System

The rain water from the surface run through is collected in the pond, which is available inside the university. The water stored in the pond acts as a ground water recharge system. This helps the water to percolate inside and improve the ground water level. The pond is area is completely barricaded and locked, to avoid unauthorized access. The image of water pond is shown in figure 4.14.



Figure 4-14: Water Pond

4.2.5. Low flow taps

Low flow taps perform better with less water usage when compared to regular taps. These taps compensate the water pressure and give defined water flow rate, therefore less water wastage & more savings on water bills. The advantages of low flow taps are as follows:

- Saves water with optimized flow rate
- Reduced water bill
- Different flow patterns (shower/Foam)
- Annual Savings up-to 10,000 litres/Year/tap

Features of Aerator for taps:

- The aerator is a small attachment that either fits onto the end of the tap or can be inserted inside of the existing spout. These water saving devices will control the amount of water that flows through the tap without affecting the water pressure as they mix the water with air which will save water and money.
- The aerators will separate a single flow of water into many tiny streams which introduces the air in to the water flow. Also, as there is less space for the water to flow through, the water flow is reduced, resulting in water savings.
- As the water pressure is maintained, most people don't notice a difference in the amount of water coming out of an aerated faucet yet benefit from the water efficiency
- Tap aerators are of most use to those with older taps which run on average around 15 litres of water per minute. Adding an aerator to an older tap can reduce this to as little as 6 litres of water per minute.
- The biggest water saving benefit is achieved in the bathroom / hand wash / kitchen sinks where we are often turning the taps on and off to wash our hands and for other uses.

The picture of taps with aerators used in the university is shown in figure 4-15.



Figure 4-15: Sample photos of taps with aerators in the wash rooms

5. ENERGY AUDIT

5.1. Facility Description

CHRIST (Deemed to be University), Bangalore Central Campus, Bengaluru receives power supply from the state electricity board (BESCOM – Bangalore Electricity Supply Company Limited) at HT 11 kV. The 11kV rated HT power supply is stepped down to LT 433V, by two numbers of transformer (1 x 2000 kVA and 1 x 750 kVA). CHRIST (Deemed to be University), Bangalore Central Campus, Bengaluru has availed power supply, with connection – S4HT153 with HT-2(C)-(ii) tariff. Transformer units installed inside university premises is as shown in the figure 5-1.

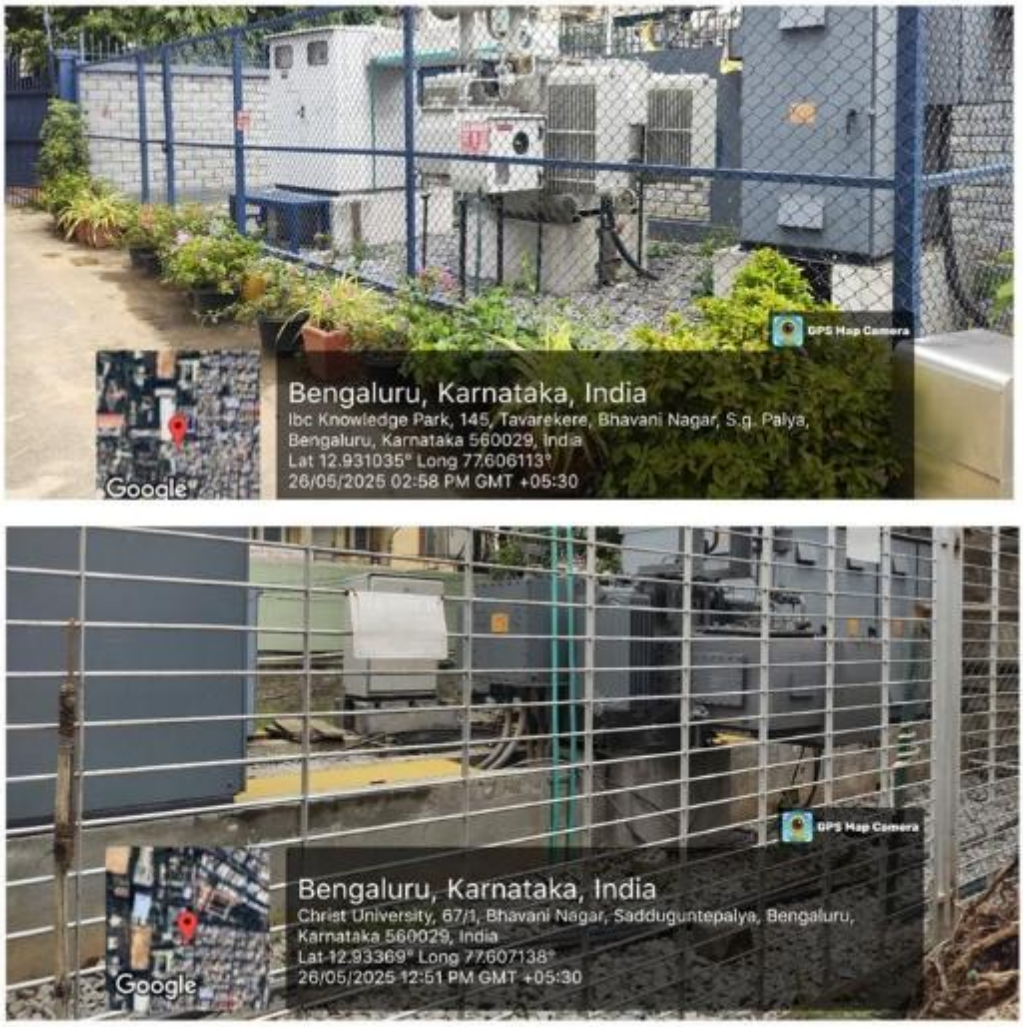


Figure 5-1: Transformer Yard

The name plate details of transformer are given in table 5-1.

S. No.	Description	Units	Transformer # 1	Transformer # 2
1	Rated Capacity	kVA	2000	1000
2	Rated Voltage Prim/Sec	kV	11/0.433	11/0.433
3	Rated Current Prim/Sec	A	105/2686.70	52.4/1333.30
4	Type of Cooling	-	ONAN	ONAN
5	Frequency	Hz	50	50
6	Impedance	-	5%	5%
7	Phase	-	3	3
8	Make	-	Unimag Power Transformers	Universal Transformers

Table 5-1: Name plate details of transformer

The LT supply from the transformer is taken to the main distribution panel located inside the Electrical panel room via power cables.

Power supply cables from the electrical panel room is distributed to the various distribuition panels placed inside the campus. From the main electrical LT panel room, power supply is catered to individual areas.

Electrical panel room is as shown in the figure 5-2.



Figure 5-2: Electrical Panel room

DG Sets:

Five numbers of DG (Diesel Generator) sets are used for backup power supply, during power failure from BESCOM. The DG sets are operated in auto synchronization mode. After the power failure the DG sets get started in one minute. DG sets installed at the university premises is shown in the figure 5-3.



Figure 5-3: Diesel Generator (DG) sets

The name plate details of the DG sets are shown in the table 5-2.

S. No	Description	Unit	DG #1	DG #2, #3, & #5	DG #4
1	Rated Capacity	kVA	320	500	250
2	AC Volt	V	415	415	415
3	AC Amp	A	556.8	870.0	347.8
4	Power Factor		0.8	0.8	0.8
5	Phase		3	3	3
6	Ambient	°C	40	40	40
7	Frequency	Hz	50	50	50
8	RPM		1500	1500	1500
9	Connection		Star	Star	Star

Table 5-2: DG Set –Specifications

5.1.1. Tariff Structure

The sanctioned contract demand of the campus is 1990 kVA at specified voltage of 11 kV. Electricity supply from BESCOM is billed under HT-2(C)-(ii) schedule of tariffs. The tariff includes demand charges of Rs. 290 per kVA, and energy charges of Rs.8.25 per kWh.

The kVA demand charges @ Rs. 290/kVA of maximum demand recorded during the month or 85% of the contract demand, whichever is higher

5.1.2. Electricity Consumption Data

Details of electricity consumption for the last one year have been collected and Salient features of electrical energy details are given in table 5-3.

S. No.	Description	Unit	Details
1	Contract Demand	kVA	1990
2	Demand Charges	Rs./kVA	290
3	Maximum Demand Recorded during last one year	kVA	1203
4	Average Monthly Energy Consumption during last one year	kWh	303550
5	Average System Power Factor		0.99
6	Average Energy Charges considered for savings calculations	Rs./ kWh	8.25

Table 5-3: Electricity Bill Parameters

Figure 5-4 indicates the month wise recorded maximum demand and month wise energy consumption of the college campus for 8 months (Mar. 2024 to Oct. 2024).

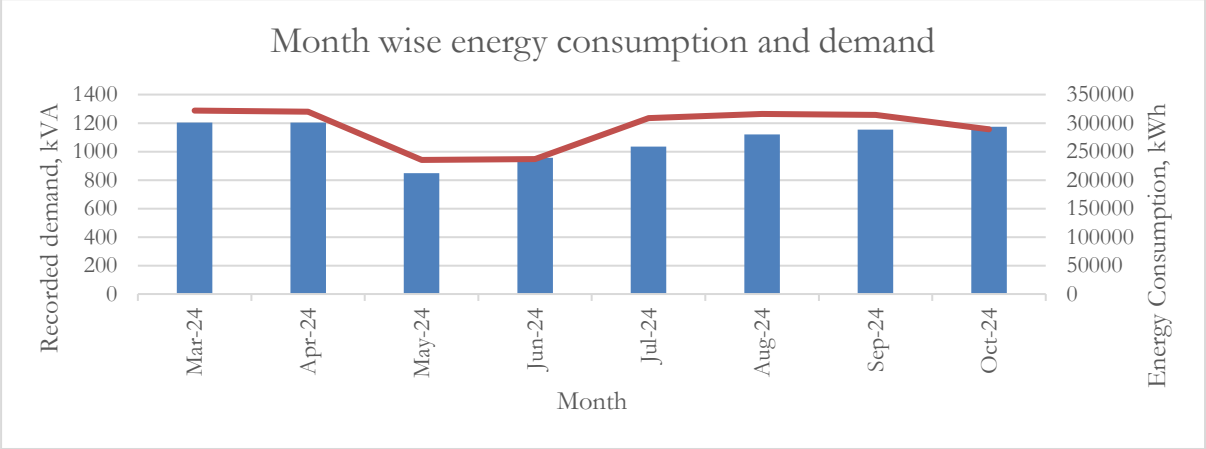


Figure 5-4: Month wise Maximum Demand and Energy Consumption

From the maximum demand curve, it was observed that maximum demand registered during the month of March and April 2024 was found to be 1203 kVA and is the peak demand during the last 8 months of billing period. Average of registered maximum demand during March 2024 to October 2024 is 1086 kVA.

From the month wise energy consumption profile, it was observed maximum energy consumption was registered during October 2024. Average monthly energy consumption is **3,03,551** kWh.

5.2. Best Practices Implemented for Energy Conservation

During the study, observations were carried out on the usage of the inventories in the building premises of the university campus. In the intension of saving the electricity, various measures have been adopted in the facility. Computers and AC units are used only during the working hours, after completion of class hours – fans, lights, computers and AC units are found to be turned OFF. This practice is followed across the university premises (class rooms, labs, staff rooms, office rooms, library and auditoriums).

5.2.1. Day-light Integration

During the audit phase classrooms, Staff-rooms, computer lab, UPS room and library areas were surveyed for illumination levels and fresh air-circulation. It was observed most of the rooms are well ventilated and day-light integrated; sample photos are shown in figure 5-4.



Figure 5-5: Well-ventilated and day-light integrated class room and Laboratory

5.2.2. Installation of LED lights

In the campus, LED fixtures are used to conserve energy. LED fixtures are used in the class rooms, staff-rooms, seminar hall corridors, hostel, dining area, etc. Sample photo of LED lamp used in the some of the locations of the university campus area are shown in figure 5-5.

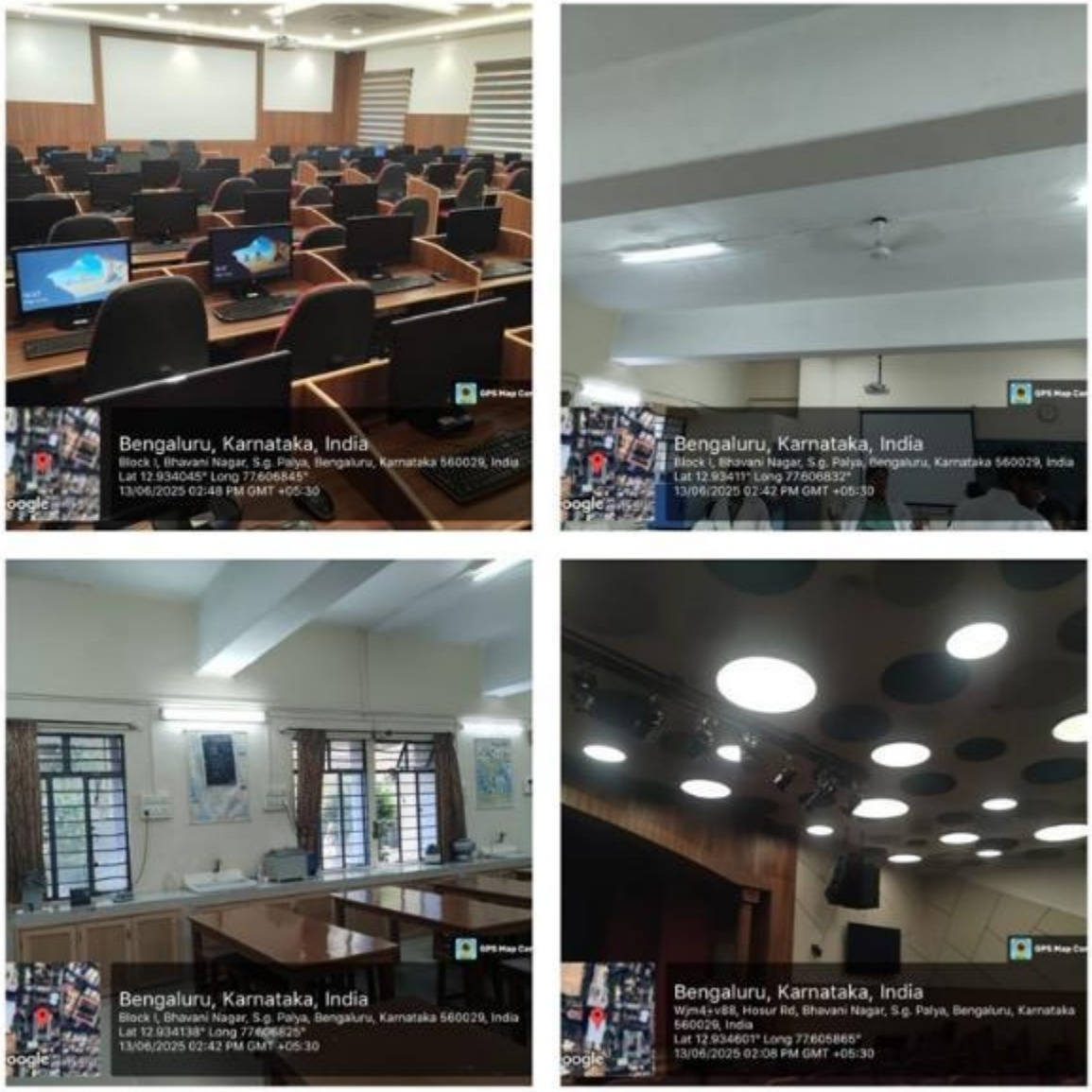


Figure 5-6: LED lights installed in Campus

5.2.3. Installation of Digital LED Display

Management have installed digital panels to reduce the marketing waste such as banners and flexes. Sample photo of Digital LED display used in the university campus are shown in figure 5-6.



Figure 5-7: Digital LED Display

5.2.4. Installation of SRTPV system

SRTPV (Solar Roof Top Photo Voltaic) system was installed at the terrace. The capacity of SRTPV installed is of **200 kWp** rated. The SRTPV is on-grid system type. During the audit, photo of SRTPV systems is collected and is shown in figure 5-7.



Figure 5-8: SRTPV installed at university

Energy generation and cost savings of 200 kWp is estimated and the same is given in the table 5-3.

S. No.	Description	Unit	Values
1	Rated Capacity of SRTPV system	kWp	200
2	Average units generated per day	kWh/day/kWp	3
3	No. of working hours per annum	Days	250
4	No. of years in operation	Years	1
5	Annual energy generation from SRTPV	kWh/ annum	150,000
6	Average energy cost	Rs./kWh	8.25
7	Total cost savings due to installation of SRTPV	Rs. Lakh / annum	12.3

Table 5-4: Cost savings from SRTPV system

5.2.5. Installation of Heat Pump

Heat pump technology has been used for the hot water availability in girls hostel and is integrated with the solar water heater. The integrated hot water system is shown in figure 5-8.



Figure 5-9: Integrated recirculation type -Hot water system

5.2.6. Installation of Solar Water Heater

Solar water heaters are installed in girls and boys hostel for generating hot water. It is integrated with heat pump system. Sample photo of solar water heater used in the campus are shown in figure 5-9.



Figure 5-10: Use of Solar Water Heater

Annual energy savings by heat pump technology is as shown in table 5-4.

S. No.	Description	Unit	Values
1	Solar water heater installed	L	31000
2	Total amount of heat produced	kCal/hr	90000
3	Electricity equivalent	kW	105
4	Input Power required for heat pump	kW	50
5	Difference in electrical power	kW	55
6	Energy savings per heat pump per day (Considering 4 hours of working)	kWh	55
7	Total number of heat pumps installed	no.	2
8	Total energy savings from 2 numbers of heat pumps	kWh	110
9	No. of working days per year	days	350
10	Annual electricity savings	kWh	38500
11	Average electricity cost	Rs./kWh	8
12	Annual cost savings achieved per year	Rs. lakh/year	3

Table 5-5: Cost savings from Solar Hot water system

5.2.7. Procurement of LED/LCD monitors

LED/LCD monitors are used for all the desktop computers in staff rooms and in computer labs. Sample photos of the computer labs are as shown in the figure 5-10.

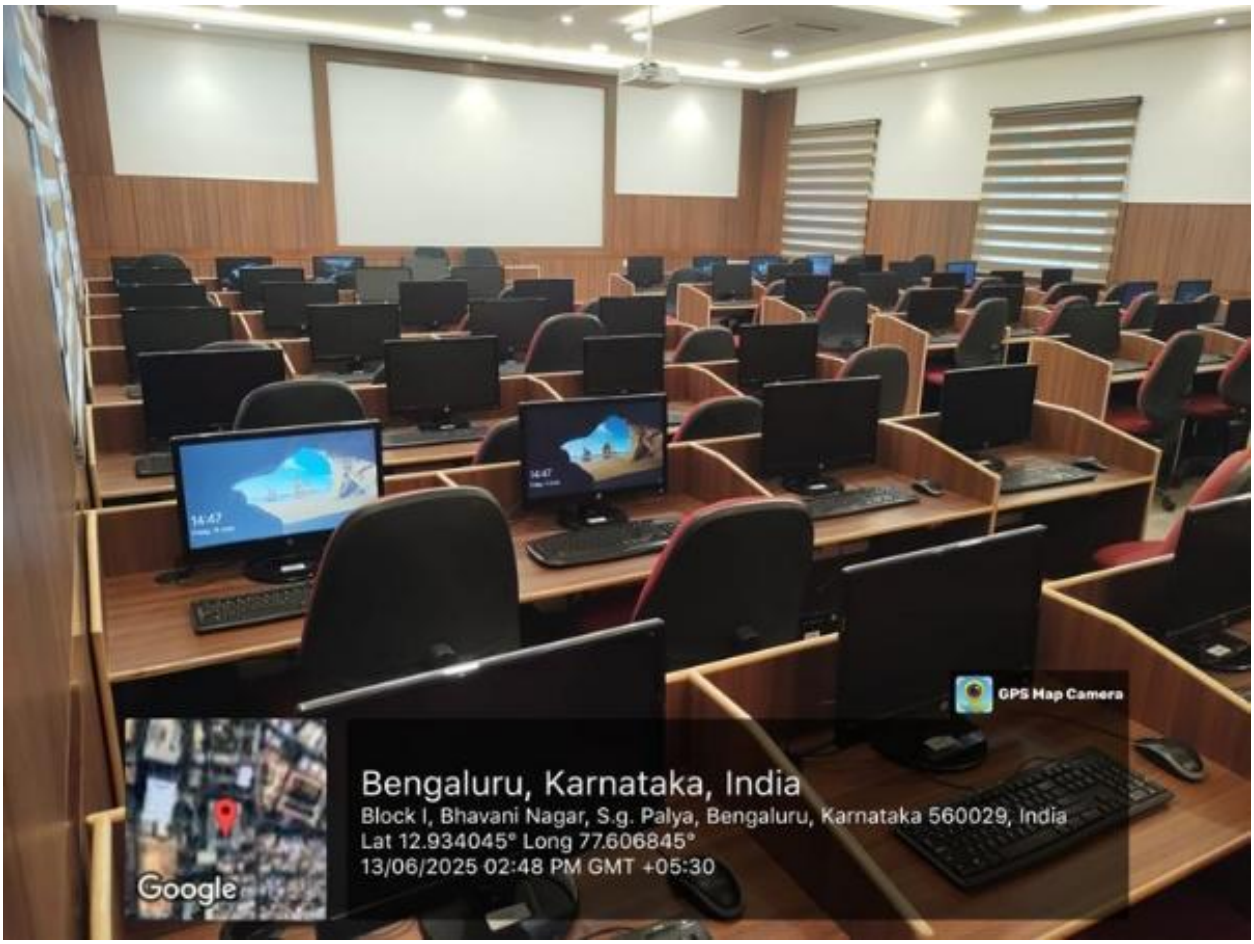


Figure 5-11: Use of LED monitors in the computer labs

5.2.8. Use of Electrical Safety Mats

Electrical safety mats were used placed near each electrical panel to avoid electrical shock risk. The image of the electrical safety mats used is shown in figure 5-11.

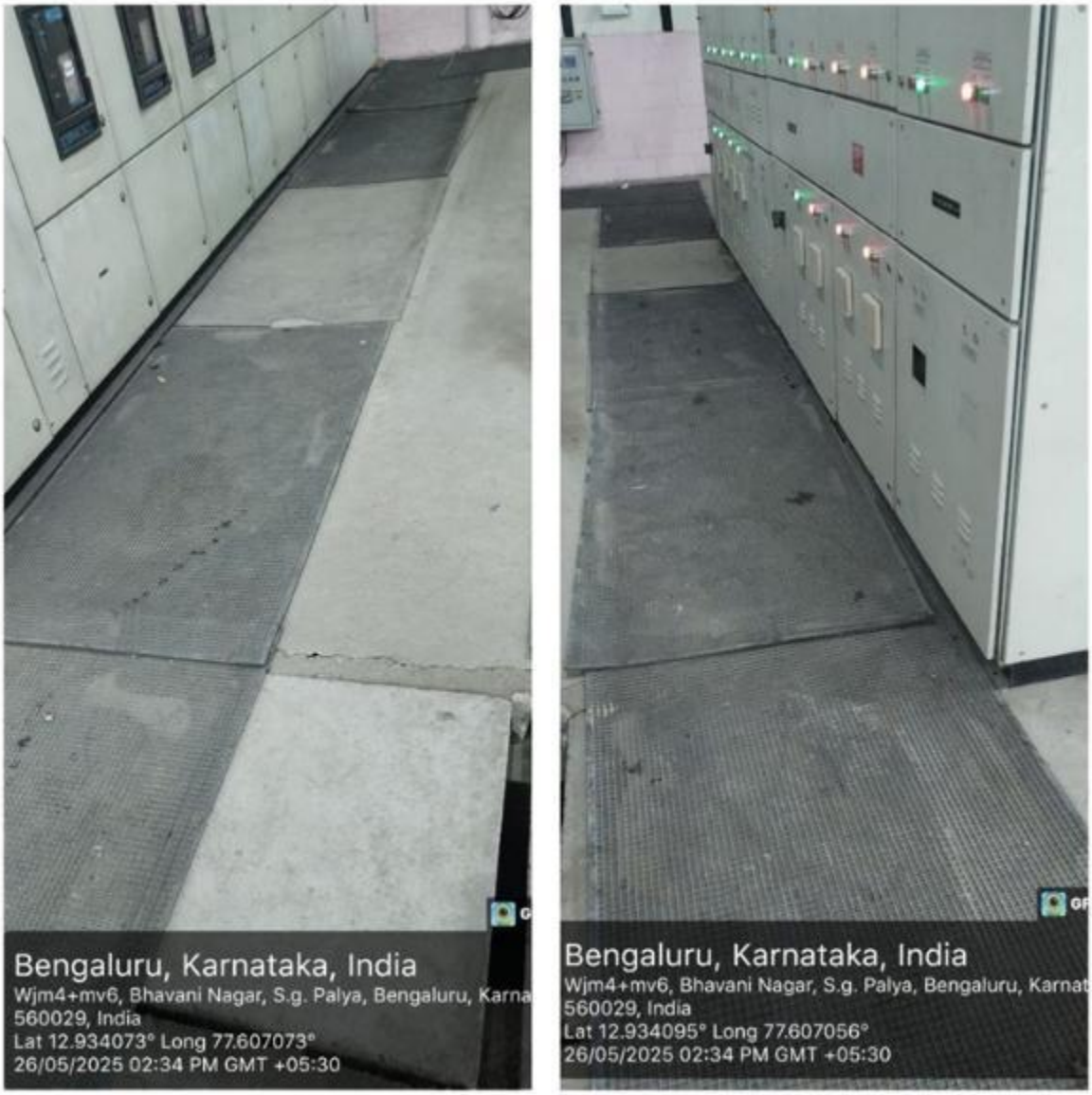


Figure 5-12: Electrical safety mats near electrical panel

5.2.9. Automatic Rescue Device for Lifts

Automatic Rescue Device (ARD) is a device installed for an elevator which is only used in case of a power failure in a building. An ARD is extremely useful for preventing passengers from becoming trapped inside an Elevator during a power failure.

ARD is installed for the lifts in university premises. The image of lift at university is shown in figure 5-12.



Figure 5-13: Lift with ARD

6. WASTE MANAGEMENT AUDIT

6.1. Facility Description

The study involved carrying out various analyses to realistically assess waste generation.

There are different types of waste generated in the university and explained below.

S. No.	Description	Yes / No	Details
1	E-Waste	Yes	External Agency
2	Hazardous / Chemical Waste	No	NA
3	Solid Waste	Yes	Parivardhana
4	Dry Leaves	Yes	Compost Unit
5	Food Waste	Yes	Biogas Unit
6	Waste Water	Yes	STP
7	Glass Waste	No	NA
8	Unused Materials	No	External Agency
10	Plastic Waste	Yes	External Agency

Table 6-1: Types of Waste Generated in the university

6.1.1. Types Of Waste

WET WASTE: Wet waste is all the kitchen waste that we produce. These are the waste which is collected on a daily basis in the canteen, cafeteria etc.

Example: fruit peels, vegetable peels, used tea leaves etc.

DRY WASTE: Dry Waste refers to all waste items that are not considered wet/soiled items.

These are the wastes which are found in classrooms, stationery store etc.

Example: Papers, plastic, bottles etc.

BIO MEDICAL WASTE: Bio medical waste is produced during the diagnosis or treatment of patients.

Example: Sanitary dispenser, incinerator etc.

CHEMICAL WASTE: A chemical waste is any solid, liquid, or gaseous waste material that, if improperly managed or disposed of, may pose substantial hazards to human health and the environment.

Example: phenol, acids, Dettol which is used for cleaning.

WASTE WATER: Waste water is defined as that water which has lost its potential to be used for domestic purpose.

Example: Grey water and back water which generated from washrooms and kitchens.

HAZARDOUS WASTE: It is a waste which has potential threat to students and teacher's health in the campus.

Example: Chemistry lab i.e., the concentrated chemicals.

E-WASTE: It is a generic term used to describe all types of old, end-of-life or discarded electrical and electronic equipment.

Example: Used keyboards, monitors, batteries, damaged bulbs etc.

SCRAP WASTE: Scrap consists of recyclable materials, usually metals, left over from product manufacturing and consumption.

Example: Cardboards, newspaper, aluminum roofing sheets, and other metallic things etc.

6.1.2. Dry Waste Management

Separate bins are used across the campus for waste collection. Each room (Staff, class rooms, corridors, office, restrooms, and library) is provided with the separate dustbin to segregate waste.

6.1.3. Wet Waste Management

To manage the wet waste, from kitchens of canteens inside the campus, from the remains of the tiffin boxes brought by the students, teachers, & staff of the university, separate bins were placed.

The image of wet waste bin is shown in figure 6-1.

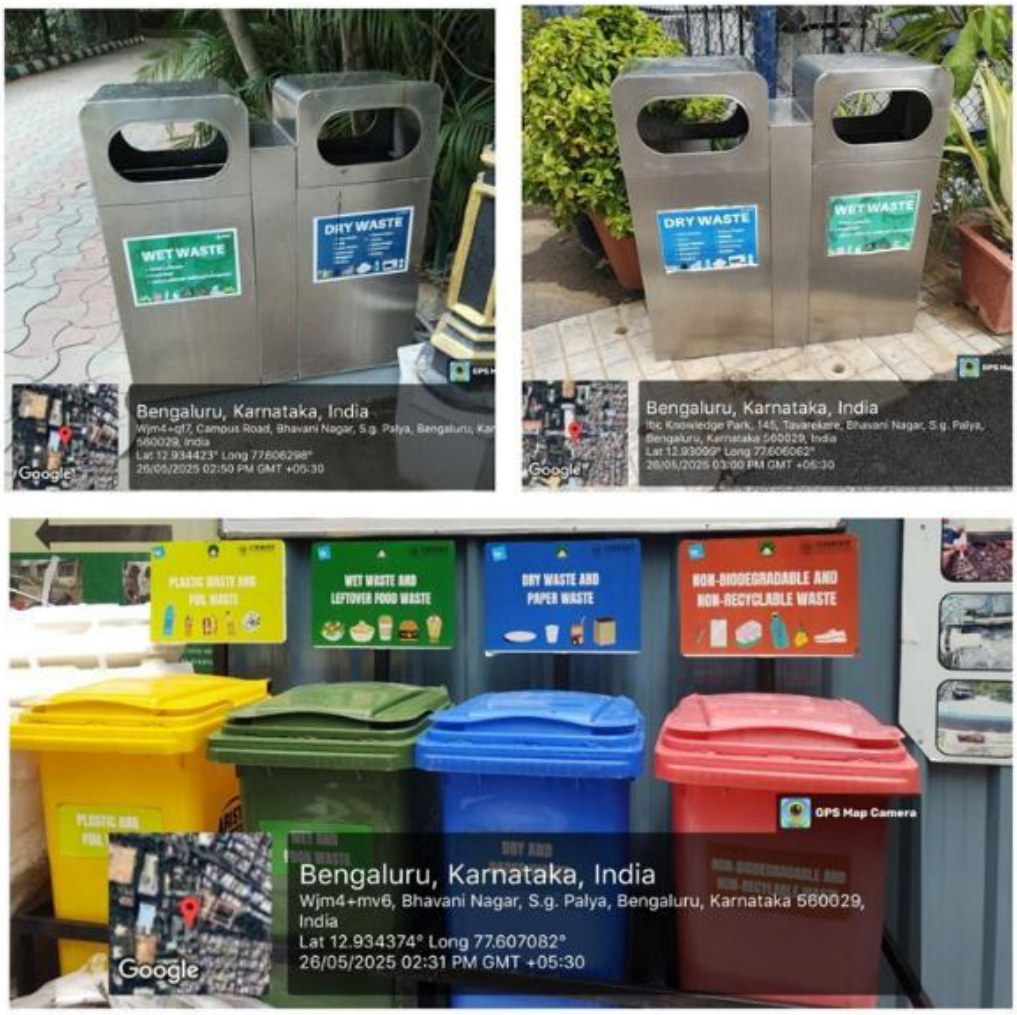


Figure 6-1: Wet and dry waste collection bins

6.1.4. Bio- Waste Management

As part of maintaining hygienic environment for the girl's, the management has provided the sanitary napkin dispenser in the girl's toilet. The pictures of the same are given in figure 6-2.



Figure 6-2: Sanitary napkin dispenser and incinerator at girls rest room

6.2. Best Practices Implemented for Waste management

6.2.1. Bio gas plant

A biogas plant is a facility that converts organic waste materials into biogas and biofertilizer through the process of anaerobic digestion. The picture of biogas plant installed in the university campus, is shown in figure 6.3.

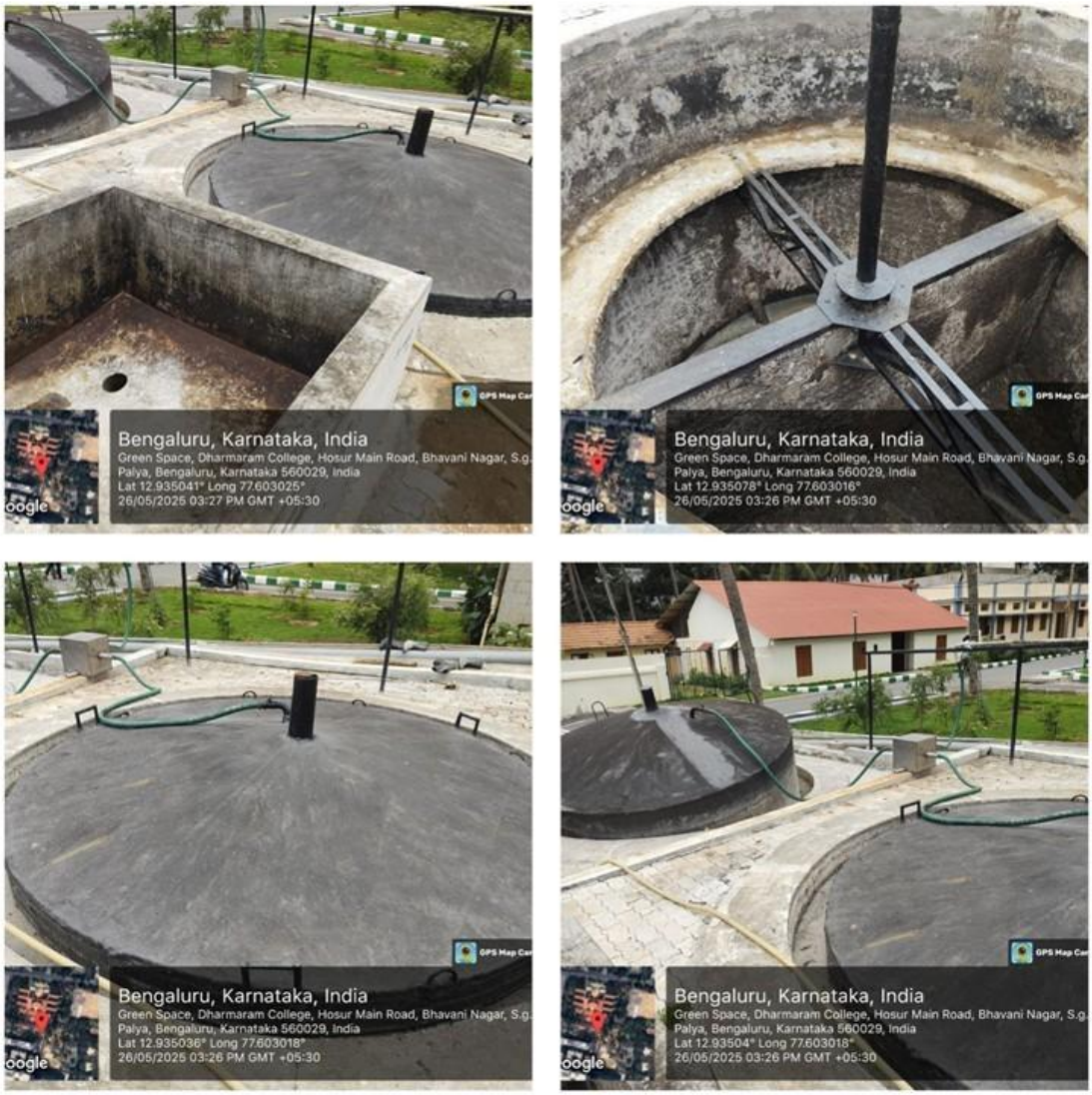


Figure 6-3: Biogas Plant

6.2.2. STP Plant

The procedure for removing contaminants from the wastewater basically from the household sewage is called sewage treatment. It has to undergo the chemical, physical and biological procedure to remove these contaminants and give out an environmentally safe treated effluent. A semi-solid slurry called the sewage sludge is the by-product of the sewage treatment. This sludge is further processed before it is suitable for land application.

There is a Sewage Treatment Plant (STP) in the campus which collects grey and black water from the building and treats it. Further the filtered water is used for garden and cleaning purpose. The STP plant is shown in figure 6-4.

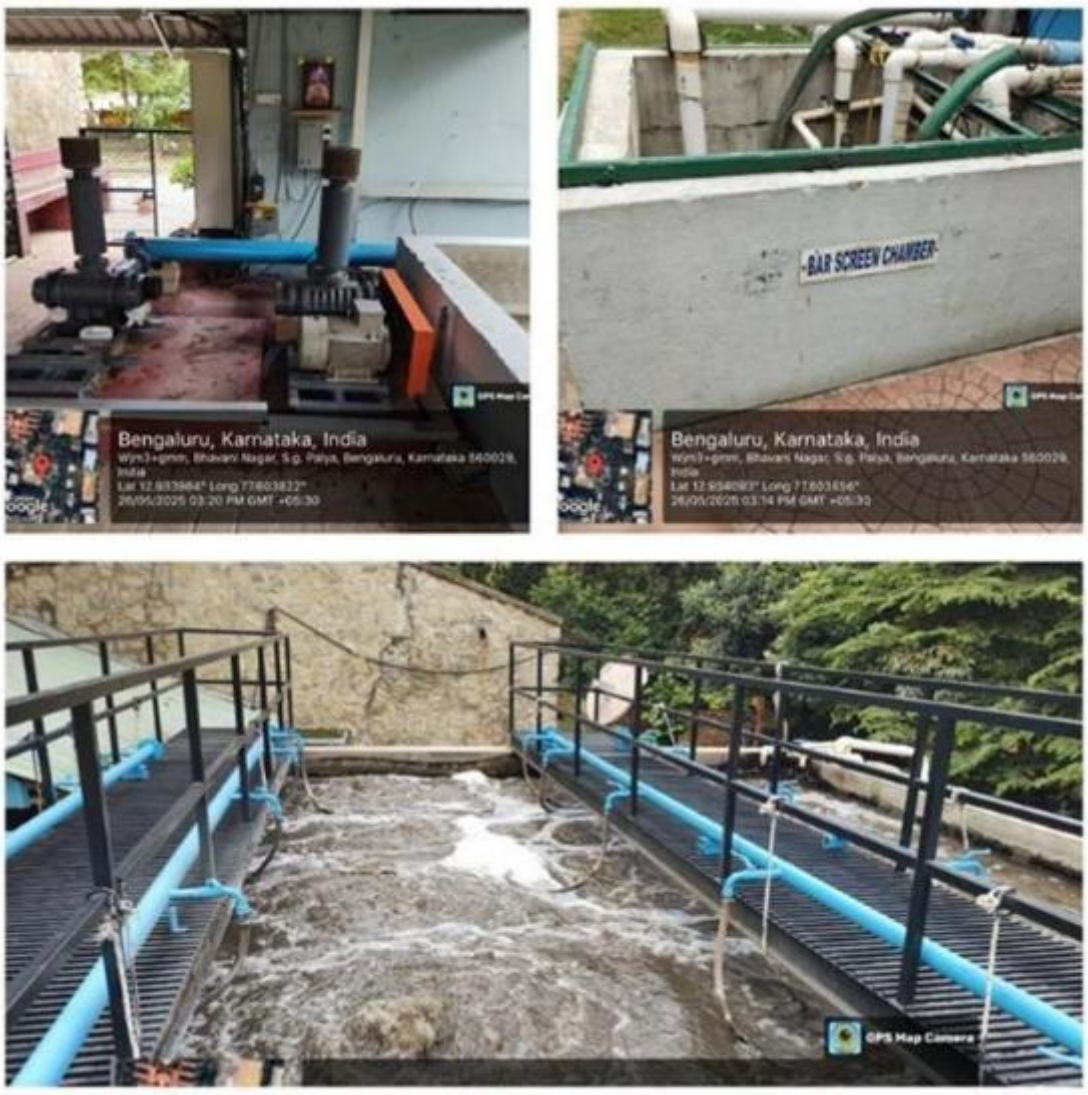


Figure 6-4: STP Plant

6.2.3. Color Code Bins

Different color code bins for the waste segregation (Dry, Wet) at the source itself will make the segregation easy. At the university campus premises color coded bins are used to make the segregation easier.

The sample image of color-coded bins is shown in figure 6-5.



Figure 6-5: Color Coded Waste bins

6.2.4. Purchase of housekeeping materials

To keep the university campus clean and hygiene, the housekeeping materials like scrub, all-purpose cleaner spray, phenyls, acids, mops, garbage bags, chemical disinfectants, broom sticks, and waste bins are purchased regularly.

The purchased housekeeping materials are distributed to housekeeping staffs to carry out the cleaning activity. The sample image of procured housekeeping materials is shown in figure 6-6.



Figure 6-6: Procured Housekeeping Materials

7. GREEN CAMPUS MANAGEMENT AUDIT

7.1. Facility Description

The institute is a green campus, lavish, serene atmosphere with variety of plants and trees. The students and faculty are encouraged to adopt cleanliness, making the campus garbage and plastic free zone. Tree plantation programs help in encouraging eco-friendly environment, which provides pure oxygen within the institute.

The maintenance team takes care of the up-keeping of the environment and ensures to keep the surroundings clean. They maintain all the plantations by employing the cleanliness and watering regularly.

There are more variety of trees and well-maintained landscaping of lawns. It was observed different types of herbs, shrubs and also, some medicinal plantations in the garden area.

7.1.1. Landscaping with Trees and Plants

Landscaping of the university is worth seeing and reflects aesthetic sense. The institute has a canopy of trees and plants to make the environment pollution free to safeguard the health of all the inmates. The trees provide shade and beautiful ambience. Utmost care is taken to develop and maintain green landscaping by trained gardeners and supervisor. The construction and maintenance team constituted in the university looks after the development and maintenance of the greenery in the campus. Photos taken during the visit are shown in figures 7-1.





Figure 7-1: Greenery in campus

7.2. Best Practices Implemented for Green Campus Management

The maintenance staff members do periodic checks. Many initiatives are taken by the management to inculcate the eco-friendly culture among the student community. The green campus provides the facilities such as rain water harvesting, well grown plantations and lawn all around the campus.

- Green landscaping with trees, plants like vegetable, fruits and medicinal plants; lawns
- Paperless office: All communication regarding academics and administration are sent as e-mails and messages to faculty members and students that contributes paperless communication

8. ENVIRONMENT AUDIT

8.1.1. Encouraging for usage of electric vehicles

The university management is recommending and encouraging the staff and students to use the public transport and electric vehicles, to reduce the carbon foot prints.

Some of the students coming to university by electric bikes. Battery operated electric vehicles are available for movement inside the campus. During audit pictures of electric bikes are taken and the same is given in figure 8-1.



Figure 8-1: Students using Electric Bikes

8.1.2. Ramp for wheel chair movement

Wheelchair ramps enable differently disabled as well as elderly people to enjoy complete freedom, as they allow users to move in and around the campus safely. The ramp facility available in university is shown in figure 8-2.



Figure 8-2: Ramp facility at university

8.1.3. Washrooms for differently abled persons

Differently abled friendly washrooms are an essential facility that cater to the needs of the differently abled and elderly individuals, providing them with a safe and comfortable access to sanitation. These washrooms are equipped with necessary support features to ensure ease of use. The facility provided in the university is shown in the figure 8-3.



Figure 8-3: Disabled friendly washroom in university

8.1.4. Transport facility for students

CHRIST (Deemed to be University), Bangalore Central Campus, Bengaluru provides safe and reliable transportation to students. The university operates a fleet of buses which are well connected with the city and provide students, faculty, and staff with the best transportation facilities. Students are picked up and dropped off by the buses on different routes throughout the city.

To ensure the safety and security of all commuters, buses are regularly inspected, checked, and cleaned.

The sample image of transport facility is shown in figure 8-5.



Figure 8-4: Transport facility for students

8.1.5. Color Code Bins

Different color code bins for the waste segregation (Dry, Wet) at the source itself will make the segregation easy. At the university premises color coded bins are used to make the segregation easier.



Figure 8-5: Color Coded Waste bins

8.1.6. Usage of LED lights

In the campus, LED fixtures are used to conserve energy. LED fixtures are used in the class rooms, staff-rooms, seminar hall corridors, hostel, dining area, etc. Sample photo of LED lamp used in the some of the locations of the campus area are shown in figure 8-7.

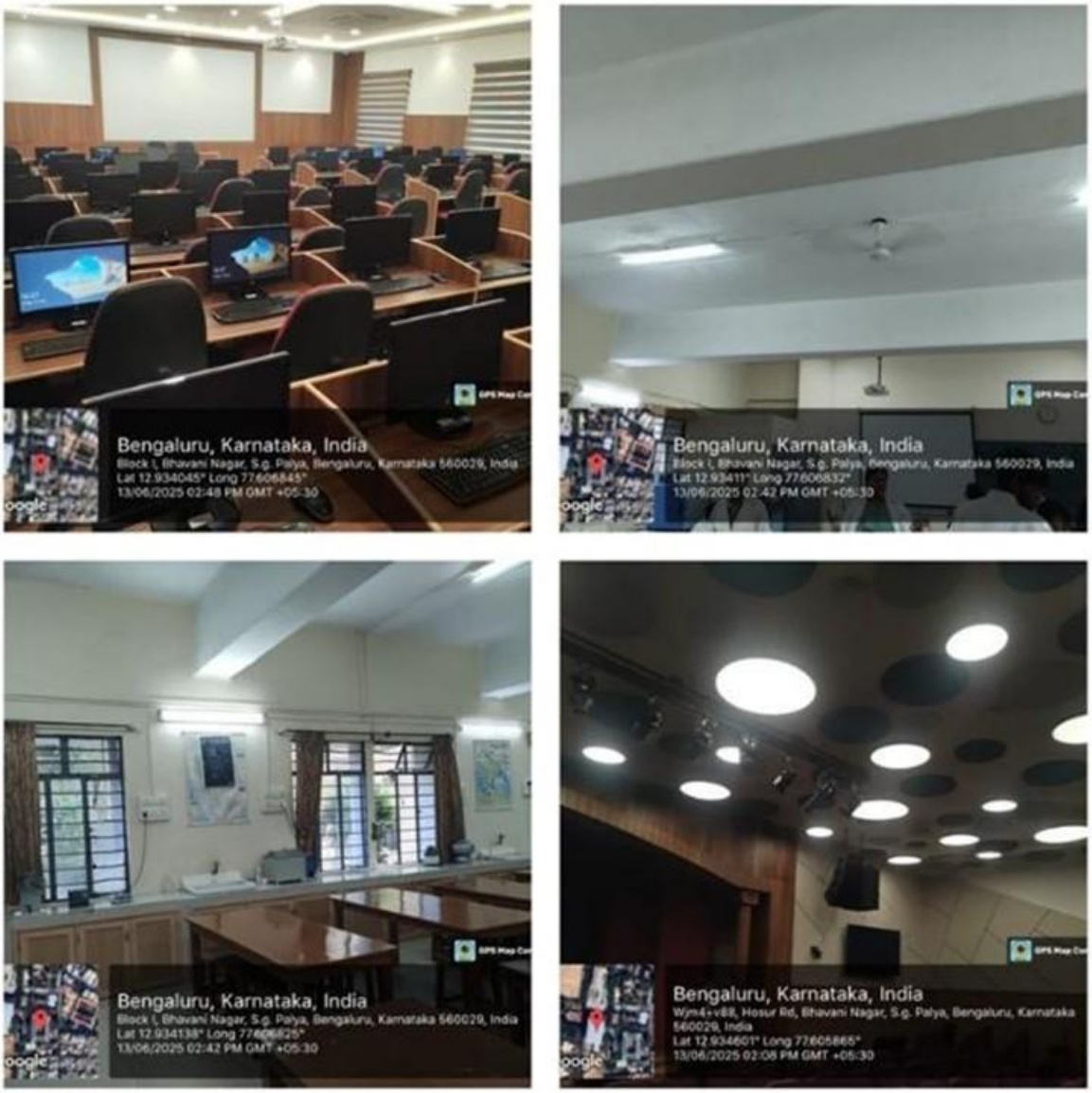


Figure 8-6: LED lights installed in Campus

8.1.7. Installation of Heat Pump

Heat pump technology has been used for the hot water availability in girls hostel and is integrated with the solar water heater. The heat pump system installed is as shown in figure 8-8.



Figure 8-7: Integrated recirculation type -Hot water system

8.1.8. Installation of Solar Water Heater

Solar water heaters are installed in university for generating hot water. It is integrated with heat pump system. Sample photo of solar water heater used in the campus are shown in figure 8-9.

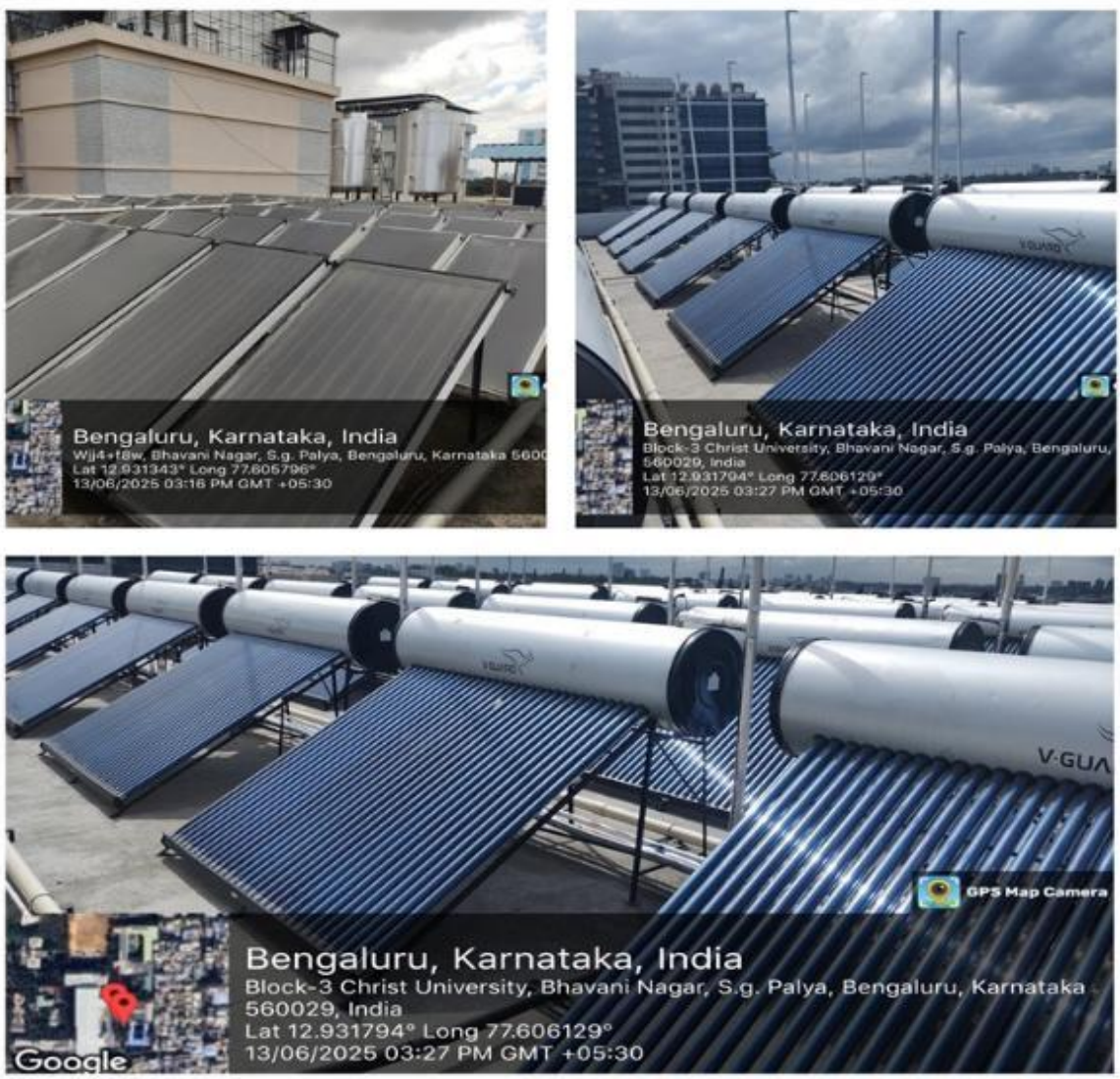


Figure 8-8: Use of Solar Water Heater

8.1.9. Day-light Integration

During the audit phase classrooms, Staff-rooms, computer lab, UPS and library areas were surveyed for illumination levels and fresh air-circulation. It was observed most of the rooms are well ventilated and day-light integrated; sample photos are shown in figure 8-10.



Figure 8-9: Well-ventilated and day-light integrated class rooms

8.1.10. Landscaping with Trees and Plants

Landscaping of the university is worth seeing and reflects aesthetic sense. The institute has a canopy of trees and plants to make the environment pollution free to safeguard the health of all the inmates. The trees provide shade and beautiful ambience. Utmost care is taken to develop and maintain green landscaping by trained gardeners and supervisor. The construction and maintenance team constituted in the university looks after the development and maintenance of the greenery in the campus. Photos taken during the audit are shown in figures 8-11.



Figure 8-10: Greeneries in the campus

9. ANNEXURES

9.1. Data Collection Questionnaire

A questionnaire is a checklist used as the primary tool for the collection of data / information in a systematic manner that enables to perform the audit.

9.1.1. General information of the university:

General information of the university needs to be collected to get an overview of the campus for the walk-through purpose. It includes a set of questionnaires as given below.

1. Previous NAAC Grading's:

Previous NAAC Grading's of the university was collected from table 9-1.

S. No.	Phase	Grade	CGPA/Percentage	Year of Acc.	Acc. Period
1	I				
2	II				
3	III				

Table 9-1: NAAC grading's Table

2. Internal Quality Audit Team : 2020 – 2021

Table 9-2 depicts the format for the collection of Internal Quality Audit team.

S. No.	Name	Designation	Role
1			
2			
3			

Table 9-2: Internal Quality Audit team

3. General Information of the university

General information of the university includes an address of university and head office, contact person details, year of establishment etc., as given in table 9-3.

S. No.	Description	Details
1.	Name of the University and address:	

S. No.	Description	Details
1.a	Head office address:	
2.	Telephone/Fax No	
3.	Co-ordinating officer:	Name: Mob: Email:
4.	Year of Establishment:	
5.	Hostel (Available/Not Available)	
6.	No. of Working days/year	
7.	Brief description of Campus	

Table 9-3: General information of the university

4. University Infrastructure

Infrastructure details of the university were gathered from table 9-4.

S. No.	Description	Details
1	Block Name	Class rooms
		Labs
		Staff rooms
		Wash rooms
2		
3		

Table 9-4: Detail Infrastructure of the university

5. Details of Student clubs
6. Details of cells that support students
7. Tentative Schedule of a working day:

a. No. of working days per year:

b. List of holidays:

8. Total area of the campus

9. Details of List of Departments and Courses (Faculty wise)

The total number of department, laboratories, conference hall, Libraries, Auditorium, and Cafeteria are obtained from table 9-5.

S. No.	Description	Details
1	Department	
2	Laboratories	
3	Conference Hall	
4	Libraries	
5	Auditorium	
6	Cafeteria	

Table 9-5: Details of the departments

10. Number of staff

Teaching, non-teaching, supporting staff with a male and female breakup is obtained from table 9-6

S. No.	Teaching Staff		Non-teaching Staff		Support Staff (Security, House Keeping)	
	Male	Female	Male	Female	Male	Female

Table 9-6: Details of the Staff

11. Number of Students

Number of students is collected from table 9-7.

S. No.	Boys	Girls
1		

Table 9-7: Details of the Students

12. Additional infrastructure details have been collected from table 9-8.

S. No.	Description	Details	
1.	Number of blocks available for boys hostel	Nos.	
2.	Number of rooms available for boys hostel	Nos.	
3.	Number of blocks available for girls hostel	Nos.	
4.	Number of rooms available for girls hostel	Nos.	
5.	Whether Laundry is available in the hostel	Yes / No	
6.	If Yes List the Electrical Equipment in Laundry Section of the hostel (like Washing machine, Dry Cleaning Machine, Iron)		
7.	Whether gym/ indoor sports hall is available in hostel	Yes / No	
8.	Whether Solar PV based Power Generation is available in campus (academic or hostel block)	Yes / No	
9.	Whether lifts available in academic block	Yes / No	
10.	Whether Kitchen is available in the academic block	Yes / No	
11.	Whether any food counter (outside caterers) available in academic block	Yes / No	
12.	Whether any commercial shops available in academic block	Yes / No	
13.	Any more information or additional details of academic block you would like to share – kindly elaborate here		

Table 9-8: Details of the departments

9.1.2. Water Audit details:

1. General information

General information required for water management analysis is collected from table 9-9.

S. No.	Description	Details
1	Source of water	
2	Types of water	
3	No of Wells	
4	No of motors used	
5	No of bore wells	
6	Rating of the motors in HP	
7	Depth of each bore-well	
8	Water level of bore well	
9	Number of water tanks (overhead & underground tanks)	
10	Capacity of overhead tank	
11	Capacity of underground tank	
12	Quantity of water pumped every day	
13	Any water wastage of water /why?	
14	Water usage for gardening	
15	Waste water sources	
16	Use of waste water	
17	Faith of waste water from labs	
18	Whether waste water from labs mixed with ground water?	
19	Any treatment method available for lab water?	
20	Whether any green chemistry method practiced in labs?	
21	Total number of water coolers	
22	Whether Rain water harvesting system available?	
23	Whether Sewage Treatment Plant (STP) is available?	
24	List of equipment installed in STP (If S.No.23 is Yes)	
25	Whether Solar Hot Water System is available in the campus	
26	Number of units and amount of water harvested	

S. No.	Description	Details
27	Any leaky taps in the campus	
28	Amount of water lost per day	
29	Any water management plan used?	
30	Any water-saving techniques followed?	
31	Are there any signs reminding peoples to turn off the water?	
32	No. of water flow meters available	
33	Method of water consumption monitoring	
34	Breakup of daily water consumption	
35	Attach Month wise water bill for last 2 years	
36	Please attach recent water quality test reports for Bore well water, Drinking Water and STP processed water.	
37	What are the sources of hot water	
38	What are the usage areas of hot water	

Table 9-9: Water management details

2. STP information

STP details are collected from table 9-10

S. No.	Description	Details
1.	Number of STP plants installed	
2.	Capacity of STP	
3.	Technology of STP	
4.	Year of Installation	
5.	Schematic / Layout of STP	
6.	Water flow meters installed	
7.	Quantity of Sludge	
8.	Disposal of Sludge	

Table 9-10: Details of STP

3. RO Plant information

RO Plant details are obtained from table 9-11.

S. No.	Location	Quantity	Capacity
1.			
2.			
3.			

Table 9-11: Details of RO Plant

9.1.3. Energy consumption details:

1. Energy consumption details:

The energy consumption details required for the audit is collected, the brief format of the same is given in table 9-12.

S. No.	Type	Units		Value	Cost in Rs.
1	Electricity	kWh	2019		
			2020		
2	LPG	Cylinders			
3	Diesel	Litres (Month wise consumption for the last two years)			
4	Others resources (Please specify)				
5	Total connected load	kW			
6	Contract demand	kVA			
7	Maximum demand recorded	kVA			
8	Average power factor				
9	Energy charges	Rs./kWh			
10	Demand charges	Rs./kVA			
	*** Attach Electricity Bill Copy of last 2 years**				

Table 9-12: Details of Energy consumption

2. Solar Energy details:

The solar energy details required are collected from table 9-13.

S. No.	Building No./ Name	Solar water Heater			Solar PV System		
		Capacity	Working / Not working	Year of Installation	Capacity	Working / Not working	Year of Installation

Table 9-13: Details of Solar Energy

3. Solar Street lights details:

a. Quantity -
b. Capacity -
c. Year of Installation –

4. Electrical Equipment details:

Electrical Equipment like transformers DGs UPS Capacitor Bank, AC, Computers, water coolers, fans, exhaust fans are obtained from the table 9-14.

S. No.	Description	Details	
1.	Number of Transformers Installed	Nos.	
2.	Number of Electrical Panels / Electrical Panel Rooms	Nos.	
3.	Whether Diesel Generator Set Backup Power is Available	Yes / No	
4..	How many number of DG Sets available in the campus (If S.No.3 is Yes)	Nos.	
5.	Whether UPS is available for labs, computers and/or any equipment	Yes / No	
6.	Number of UPS installed with location and capacity (If S.No.5 is Yes)	Nos.	
7.	Whether Capacitor Banks is installed in the electrical panel rooms	Yes / No	
8..	Whether Air Conditioning Units have been installed in the campus	Yes / No	
9.	Type of AC units (split, cassette or packaged) available, capacity and installed location (If S.No.8 is	Nos.	

S. No.	Description	Details	
	Yes)		
10.	Total number of computers available in the campus	Nos.	
11.	Type of computer monitors available (CRT, LCD, LED)	Nos.	
12.	Whether water coolers are installed in the academic blocks	Yes/No	
13.	Type of lamps (Fluorescent Tube Light, CFL, LED, Incandescent, Sodium / Mercury lamps, etc.,) installed in the campus	Nos.	
14.	Type of fans (ceiling, wall mount, standing, exhaust, etc.,) installed in the campus	Nos.	
15.	Whether exhaust fans are installed in hostel / kitchen.(If Yes, share the quantity and installed location)	Yes /No	
16.	Any other electrical equipment's in university buildings.		

Table 9-14: Details of Electrical Equipment

5. List of energy saving initiatives implemented
6. List of energy saving initiatives in plan for future

9.1.4. Waste management details:

Waste management includes the activities and actions required to manage waste from its inception to its final disposal. The various data/ information required for the assessment of waste management is as collected from the following set of questionnaires.

1. Basic information

Basic information for waste management is collected from table 9-15.

S. No.	Description	Yes/ No
1	Whether wet and dry garbage segregation is done inside the campus?	
2	Whether garbage is given to external agencies / municipal agencies?	

Table 9-15: Basic details of waste management

2. Types of Waste generated

Types of waste generated in the university are obtained from table 9-16.

S. No.	Description	Yes / No	Remarks
1	E-Waste (Computers, electrical and electronic parts)		
2	Hazardous / Chemical Waste		
3	Solid Waste (Damaged furniture, paper waste, paper plates)		
4	Dry Leaves		
5	Food Waste		
6	Waste Water (Washing, urinals, bathrooms)		
7	Glass Waste (Broken glass wares from the labs)		
8	Unused Materials		
9	Plastic Waste (Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc.)		

Table 9-16: Types of waste generated

3. Segregation of waste

Segregation of waste information at different locations with quantity is gathered from table 9-17.

S. No.	Location	Bio-degradable	Non-Biodegradable	E-waste	Quantity, kgs/month
1	Office				
2	Labs				
3	Cafeteria / Kitchen				
4	University				

Table 9-17: Segregation of waste

4. Waste generation management

Waste generation management of the university was collected from table 9-18

S. No.	Description	Yes / No	Remarks
1	Composting / Vermicomposting		
2	Recycling		
3	Reusing		
4	Other ways		

Table 9-18: Waste Disposal methods

9.1.5. Green campus management details:

1. Total number of plants and trees

The total number of plantations, garden area, and many more are collected as per the set of questionnaires given in table 9-19

S. No	Description	Details
1	Total number of plant species identified	
2	Total number of plants on the campus	
3	Total number of Trees on the campus	
4	Garden area inside the university –	
5	Total number of medicinal plants /trees on the campus	

6	Total number of vegetables and fruits plantation in the campus	
7	Whether display boards are given to plants and trees for identification	
8	Does Institute celebrate World environment day?	
9	Does Institute celebrate World water day?	
10	Does Institute celebrate World ozone day?	
11	Does Institute celebrate World Earth day?	
12	Total number of aquatic water plants	

Table 9-19: List of plantation details

2. List of plants/ trees

List of plants/ trees with their scientific names obtained from table 9-20.

S. No.	Common/Local Name	Scientific name	No. of Trees/Plants

Table 9-20: List of plants/trees in campus

9.1.6. Photos required for Audit:

1. General Photos

In various sections, different types of photos are required to validate the existence of things, and hence they are collected from table 9-22.

S. No	Description		Details
1	Photos of student's NSS activities		
2	Photos of Safety policy		
3	Photos of the training program on the use of fire extinguishers		
4	Photos of environmental policies adopted by university		
5	Photos of MoUs for Waste management		
6	Photos of any other policies adopted by university		
7	Photos of water test report	Drinking Water	
		STP processed water	
		Bore-well water	
		Other water Sources (Like Tanker water and any other)	
8	Photos of use of Energy efficient devices like fan, bulbs etc.		
9	Photos of LCD/LED monitors used in Labs		
10	Photos of dry and wet waste collection bins		
11	Photos of celebrating World Environment Day		
12	Photos of celebrating World Water Day		
13	Photos of celebrating World Earth Day		
14	Photos of celebrating World Ozone Day		

Table 9-21: List of photos