

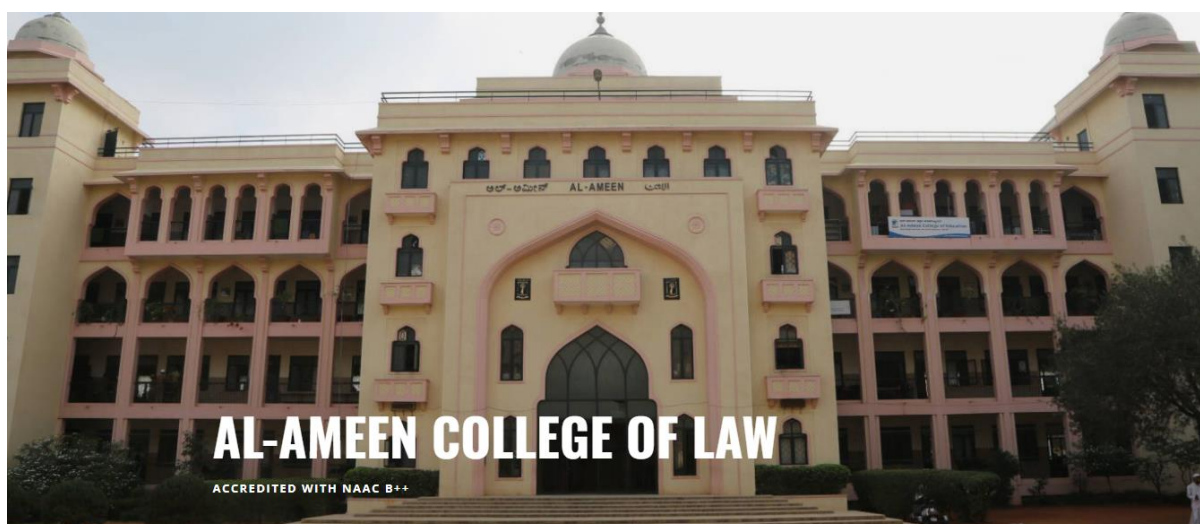
QUALITY AUDIT REPORT
ON
WATER AUDIT, ENERGY AUDIT,
WASTE MANAGEMENT AUDIT,
GREEN CAMPUS MANAGEMENT AUDIT
AND ENVIRONMENT AUDIT
OF
AL-AMEEN COLLEGE OF LAW
BEHIND AL-AMEEN TOWERS,
HOSUR ROAD,
BENGALURU-560 027.



ECO ENERGI ME ENGINEERS LLP

ENHANCING RESOURCE EFFICIENCY

QUALITY AUDIT REPORT
OF
AL-AMEEN COLLEGE OF LAW
BANGALORE
2020 – 2021



© ECO ENERGIME ENGINEERS LLP

FOR MORE INFORMATION

Eco Energime Engineers LLP
14, S-1, 3rd Main, 14th Cross
AECS Layout, B – Block
Singasandra
Bangalore–560 068

Mobile: +91 9449 777 000
+91 8050 387 500
Email: info@eeellp.com
Web: www.eeellp.com

PROJECT TEAM

- Mr A Govindaraj
- Mr R Arasa Kumar

PROJECT ADVISOR

- Mr Prabu Das
- Ms Aparna Reddy

ACKNOWLEDGEMENTS

We are thankful to the Honorary Chairman, Principal and entire team of Al-Ameen College of Law, Bangalore, for the support, guidance and, giving us the opportunity to be involved in this very interesting and challenging assignment.

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

We received full co-operation and support from the principal and staff members of the college. They took key interest and gave valuable inputs during the course of study.



Smart Solutions for
Sustainable Tomorrow


Eco Energime Engineers LLP

Certificate

This is to certify that M/s. Eco Energime Engineers LLP, Bengaluru has conducted **Green Audit and Quality Audit** of "**Al-Ameen College of Law, Hosur Road, Bengaluru**" during the February 2021 to March 2021. 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


Authorized Signatory

No.14, S-1, 3rd Main, 14th Cross, AECS Layout, B-Block, Singasandra, Bangalore - 560 068, Karnataka

☎ 80503 87500

🌐 www.eeellp.com

✉ info@eeellp.com



Smart Solutions for
Sustainable Tomorrow


Eco Energime Engineers LLP

EEELLP ACKNOWLEDGEMENT

EEELLP team thanks the management of "Al-Ameen College of Law, Bengaluru" for assigning this interesting work to us. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to Principal & Team of colleagues for giving us necessary inputs to carry out this very vital exercise. We would like to thank all the head of the departments and staff members who were actively involved while collecting the data and conducting field measurements.

For Eco Energime Engineers LLP


Authorized Signatory

No.14, S-1, 3rd Main, 14th Cross, AECS Layout, B-Block, Singasandra, Bangalore - 560 068, Karnataka

☎ 80503 87500

🌐 www.eeellp.com

✉ info@eeellp.com



Smart Solutions for
Sustainable Tomorrow

Eco Energime Engineers LLP


DISCLAIMER

The Audit Team has prepared this report for Al-Amèen College of Law, Bengaluru 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


Authorized Signatory

No.14, S-1, 3rd Main, 14th Cross, AECS Layout, B-Block, Singasandra, Bangalore - 560 068, Karnataka

☎ 80503 87500

🌐 www.eeellp.com

✉ info@eeellp.com

TABLE OF CONTENTS

1.	Introduction	1
2.	Pre – Audit Phase.....	4
2.1.	Audit Schedule	5
3.	On-Site Audit Phase	6
3.1.	Scope / Target Areas of Quality Auditing.....	6
3.1.1.	Water Audit	6
3.1.2.	Energy Audit	6
3.1.3.	Waste Management Audit	6
3.1.4.	Green Campus Management Audit	6
3.1.5.	Environment Audit	6
3.2.	Audit Methodology and Approach.....	7
3.2.1.	Review of Document and Records	7
3.2.2.	Review of Policies.....	7
3.2.3.	Review of best practices implemented	9
3.2.4.	Site Walk through	9
3.2.5.	Inventory Collection.....	9
3.2.6.	Interviews.....	10
4.	Water Audit.....	11
4.1.	Facility description	11
4.1.1.	Raw Water System	14
4.1.2.	Drinking Water System.....	15
4.1.3.	Rain Water System.....	16
4.1.4.	Sewage Water System	17

4.2.	Best Practices Implemented for Water Conservation.....	19
4.2.1.	Rain water recharge pits.....	19
4.2.2.	Usage of Aerators	20
4.2.3.	Awareness posters on water conservation	21
4.3.	Recommendations.....	22
4.3.1.	Water conservation opportunities	22
5.	Energy Audit.....	23
5.1.	Facility Description	23
5.2.	Best Practices for Conservation of Energy.....	27
5.2.1.	Day light integration.....	27
5.2.2.	Usage of LED fixtures	29
5.2.3.	Usage of LED/LCD monitors:.....	31
5.2.4.	Awareness posters on Energy conservation	32
5.2.5.	Use of sensor-based lights	33
5.2.6.	Use of Solar LED lamps for pathway.....	34
5.2.7.	Usage of LCD Projectors	35
5.3.	Recommendations.....	36
5.3.1.	Replacing existing FTL by LED Fixtures	36
5.3.2.	Replacing existing Conventional Fans by Energy Efficient (EE) Fans:	37
5.3.3.	Other Recommendations	38
6.	Waste Management Audit.....	39
6.1.	Facility Description	39
6.1.1.	Dry Waste Management	39
6.1.2.	Wet Waste Management.....	39

6.1.3.	E- Waste Management	40
6.1.4.	Liquid Water Management	40
6.1.5.	Bio- Waste Management.....	41
6.2.	Best Practices for Waste management	42
6.2.1.	Waste Collection Bins	42
6.2.2.	Cleaning Materials and Purchase bills	43
6.2.3.	Solid Waste Incinerator.....	44
6.2.4.	Cleaning program.....	45
6.3.	Recommendations	46
7.	Green Campus Management Audit.....	47
7.1.	Facility Description	47
7.1.1.	Plantations and Lawn	47
7.2.	Best practices for Green Campus Management	50
7.2.1.	Plantation Activities.....	50
7.3.	Recommendations	51
8.	Environment Audit (Carbon footprint Analysis)	52
8.1.	Facility Description	52
8.2.	Best Practices for Environment Conservation	53
8.2.1.	Use of Digital Display	53
8.2.2.	Ban of Smoking, alcohol and drugs	54
8.2.3.	Usage of Automatic sanitizer dispenser	55
8.2.4.	Usage of LED fixtures	56
8.2.5.	Rain water recharge pits.....	57
8.2.6.	Other Environment conservation practices implemented	58

8.3.	Recommendations.....	59
9.	Annexures.....	60
9.1.	Data Collection Questionnaire	60
9.1.1.	General information of the college:	60
9.1.2.	Water Audit details:	63
9.1.3.	Energy consumption details:.....	65
9.1.4.	Waste management details:.....	68
9.1.5.	Green campus management details:.....	69
9.1.6.	Carbon footprint management details:	71
9.1.7.	Photos required for Audit:	71

Table of Tables

Table 1-1: College Campus & Built-up area.....	2
Table 1-2: IQAC members list 2020-2021	2
Table 2-1: Audit Schedule.....	5
Table 3-1: Consolidated list of Inventories	10
Table 3-2: Number of staff and students	10
Table 5-1: UPS details	26
Table 5-2: Cost savings achieved per year due to 20 W LED fixtures	30
Table 5-3: Calculations for replacement of FTL with LED fixtures	36
Table 5-4: Calculations for replacement of Conventional Fans with EE Fans	37
Table 6-1: Types of Waste Generated in the college	39
Table 8-1: Cost savings achieved per year due to 20 W LED fixtures	56
Table 9-1: Internal Quality Audit team.....	60
Table 9-2: General information of the college	61
Table 9-3: Detail Infrastructure of the college	61
Table 9-4: Details of the departments	62
Table 9-5: Details of the Staff.....	62
Table 9-6: Details of the Students	62
Table 9-7: Details of the departments	63
Table 9-8: Water management details.....	64
Table 9-9: Details of STP.....	65
Table 9-10: Details of RO Plant	65
Table 9-11: Details of Energy consumption.....	66
Table 9-12: Details of Solar Energy	66

Table 9-13: Details of Electrical Equipment	67
Table 9-14: Basic details of waste management	68
Table 9-15: Types of waste generated.....	68
Table 9-16: Segregation of waste	69
Table 9-17: Waste Disposal methods.....	69
Table 9-18: List of plantation details.....	70
Table 9-19: List of plants/trees in campus	70
Table 9-20: Details of Carbon footprint management.....	71
Table 9-21: List of photos	72

Table of Figures

Figure 3-1: Fire Extinguisher at college premises	7
Figure 3-2: Anti-Ragging Posters.....	8
Figure 4-1: Borewell point	11
Figure 4-2: Borewell motor starter panel.....	11
Figure 4-3: Raw water sump.....	12
Figure 4-4: RCC and PVC overhead tanks	12
Figure 4-5: Schematic of raw water system.....	14
Figure 4-6: Schematic of Drinking water system	15
Figure 4-7: RO purifiers installed in the college.....	15
Figure 4-8: Rain water outlet pipelines	16
Figure 4-9: Rain water recharge pit	16
Figure 4-10: Schematic of sewage water system.....	17
Figure 4-11: Waste water pipeline	17
Figure 4-12: Waste water chamber.....	18
Figure 4-13: Rain water recharge pits.....	19
Figure 4-14: Aerator taps used in canteen.....	20
Figure 4-15: Awareness posters on water conservation	21
Figure 5-1: Transformer unit.....	23
Figure 5-2: Main distribution panel.....	24
Figure 5-3: Floor wise distribution panel	24
Figure 5-4: Diesel Generator (DG) Set	25
Figure 5-5: DG changeover switch	25
Figure 5-6: UPS in the college.....	26

Figure 5-7: Well-ventilated and day-light integrated class room.....	27
Figure 5-8: Well-ventilated and day-light integrated sample photo of staffroom	27
Figure 5-9: Well-ventilated and day-light integrated canteen	28
Figure 5-10: Well-ventilated and day-light integrated premises	28
Figure 5-11: Use of LED fixtures in moot court hall.....	29
Figure 5-12: Use of LED fixtures in seminar hall.....	29
Figure 5-13: Sample Photo of LCD monitors in the computer lab	31
Figure 5-14: Sample photo of awareness poster on energy conservation	32
Figure 5-15: Sensor-based lights at college premises	33
Figure 5-16: Solar LED light at college premises.....	34
Figure 5-17: Use of LCD Projectors in the class rooms	35
Figure 6-1:Sanitary hygiene napkin dispenser at 4 th Floor Girls rest room.....	41
Figure 6-2:Napkin Incinerator at 4 th floor girl’s rest room.....	41
Figure 6-3: Waste bins at staff and class room.....	42
Figure 6-4: Larger waste collection bins at corridors.....	42
Figure 6-5: Waste disposal point.....	43
Figure 6-6: Sample photos of cleaning materials.....	43
Figure 6-7: Solid waste incinerator	44
Figure 6-8: Lal bagh cleaning – Eco club students	45
Figure 6-9: NSS students during Swatch Bharat Abhiyan	45
Figure 7-1: Sample photos of pot plantations	47
Figure 7-2: Sample photos of landscaping	48
Figure 7-3: Sample photos of plantations	49
Figure 7-4: Sample photos of planting activity by students.....	50

Figure 8-1: Use of digital display	53
Figure 8-2: No smoking zone signage	54
Figure 8-3: Automatic sanitizer dispenser	55
Figure 8-4: Use of LED fixtures in moot court hall.....	56
Figure 8-5: Rain water recharge pits.....	57

ABBREVIATION AND ACRONYMS

1.	A	:	Amperes
2.	AC	:	Air Conditioner
3.	BBMP	:	Bruhat Bengaluru Mahanagara Palike
4.	AACL	:	Al-Ameen College of Law
5.	BESCOM	:	Bangalore Electricity Supply Company
6.	BWSSB	:	Bangalore Water Supply and Sewerage Board
7.	CC Camera	:	Closed Circuit Camera
8.	DG	:	Diesel Generators
9.	EE Fan	:	Energy Efficient Fan
10.	E-Waste	:	Electronic Waste
11.	etc	:	Etcetera
12.	FTL	:	Fluorescent Tube Light
13.	GHG	:	Green House Gas
14.	Hz	:	Hertz
15.	HP	:	Horse Power
16.	HT	:	High Tension
17.	I	:	Current
18.	ICT	:	Information and Communications Technology
19.	IQAC	:	Internal Quality Assurance Cell
20.	ISO	:	International Organization for Standardization
21.	kgs	:	Kilograms
22.	kL	:	Kilo Liters
23.	kV	:	kilo volt
24.	kVA	:	kilo volt ampere
25.	kVAr	:	Reactive kilo volt ampere
26.	kW	:	Kilo Watt
27.	kWh	:	kilo Watt hour
28.	kWp	:	kilo Watt peak
29.	Lab	:	Laboratory
30.	LCD	:	Liquid Crystal Display
31.	LED	:	Light Emitting Diode
32.	LT	:	Low Tension
33.	mA	:	Milli Amperes
34.	MoU	:	Memorandum of Understanding
35.	NA	:	Not Applicable
36.	NAAC	:	National Assessment and Accreditation Council
37.	Nos.	:	Numbers
38.	NSS	:	National Service Scheme
39.	Prim/Sec	:	Primary/Secondary
40.	PF	:	Power factor

41.	PG	:	Post Graduate
42.	Rs.	:	Rupees
43.	RO	:	Reverse Osmosis
44.	RR. No.	:	Revenue Register Number.
45.	S. No.	:	Serial Number
46.	Sq. Ft.	:	Square Feet
47.	Sq. m.	:	Square Meter
48.	TL	:	Tube Light
49.	TR	:	Ton of Refrigeration
50.	TV	:	Television
51.	UG	:	Under Graduate
52.	V	:	Volts
53.	W	:	Watts
54.	Wi-Fi	:	Wireless Fidelity
55.	#	:	Number

1. INTRODUCTION

The prestigious Al-Ameen is an educational Society with international standard education established in the year 1966, under the leadership of Dr. Mumtaz Ahmed Khan, Founder of Al-Ameen Movement. It is registered under the Societies Registration Act, 1860. Al-Ameen College of Law was established in the year 1991 with a motive to serve the society and educate the people in the Field of Law.

Al-Ameen College of Law has occupied pride of place among the flagship institutions of Al-Ameen. Al-Ameen College of Law stands for a Global Leadership in Legal Education. It embodies the essence of “Rabbi Zidni Ilma” which means Oh God Give Me More Knowledge. This institute has the only purpose to provide the quality Legal Education to the aspirants of law. Further, it has networked with the government, judiciary, community, society, industry, and the profession, for mutual benefit.

During its long journey, it has created various milestones in the teaching and learning process. The students consist of defense, Leading Advocates, and corporate personnel. Its 100% dedication towards the legal education set it apart from other law colleges in the city and the region.

VISION

To create awareness in concerning to socio-economic and legal needs of the society and country and to encourage the role of law as an instrument of social change to develop the vision of a better world, where people can live in an atmosphere of dignity and honour.

MISSION

To help the youth to develop their knowledge to become good lawyers and legal advisers and to remain a true human being perpetually with true spirit of humanity and to devote himself to the cause of social service through protection of law.

Internal Quality Assurance Cell (IQAC):

The institution has active Quality Advisory cell (QAC) and Internal Quality Assurance Cell (IQAC) to frame the policy for the academic and administrative growth of the institution. IQAC is playing a major role in designing and maintaining quality assurance within academic system of the college.

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 area	Acres	3.7
2	Built up area (AACL)	Sq.ft	38000

Table 1-1: College Campus & Built-up area

Internal Quality Assurance Cell – 2020 – 2021

The college management constitutes the Internal Quality Assurance Cell including management representative, staff and students every year. Table 1-2 shows the list of Internal Quality Assurance Cell members of the college.

S.No.	Name	Designation/Role
1	Dr.Subhan Sheriff	Management Member
2	Dr.Waseem Khan	Chairman IQAC
3	Mrs.Yasmeen Tabassum	Co-ordinator IQAC
4	Prof. Mohan Ram	External Member
5	Prof. Bhaskar	External Member
6	Mr.Oam Prakash	External Member
7	Mr.Shazib	Student
8	Ms. Harshita	Student

Table 1-2: IQAC members list 2020-2021

Overview of Quality Audit:

Quality Audit helps college / 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 the schedule and documents required during the audit. The pre-audit meeting was conducted at Al-Ameen College of Law, Bengaluru in January 2021. During the meeting, introduction of team members, scope and objectives of the audit were discussed.

Management Commitment

The Management of the college 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 which are environment friendly such as awareness programmes on the environment, campus farming, planting more trees on the campus etc., after the Quality Auditing.

The college administration is vital to the process of realizing campus sustainability and college 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 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 institutions.

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 college to compare its programs and operations with those of peer institutions, 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 colleges and universities through workshops, guidebooks, fact sheets and ensuring compliance through inspections and self-audits.

2.1. Audit Schedule

Quality Audit schedule includes the pre-audit phase, on-site / audit phase and post audit phase. Table 2-1 details the complete Quality Audit schedule.

S. No	Description	Timeline
1.	Pre-audit Phase	09 Feb 21 to 11 Feb 21
2.	Onsite-audit Phase	23 Feb 21 to 25 Feb 21
3.	Post-audit Phase	09 Mar 21 to 11 Mar 21
4.	Report Submission	19 Mar 21

Table 2-1: Audit Schedule

3. ON-SITE AUDIT PHASE

3.1. Scope / Target Areas of Quality Auditing

3.1.1. Water Audit

Water Audit addresses water sources, water consumption, appliances and fixtures. Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution 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 college 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, Water 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

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

A. Safety Policy:

The organization's safety policy is recognized to protect the health and safety of the staff and students as well as the surrounding community. Fire extinguishing cylinders have been installed in accessible locations for approach and use; sample picture of Fire extinguisher is as shown in the figure 3-1.



Figure 3-1: Fire Extinguisher at college premises

B. Anti-Ragging policy:

Ragging in any form is strictly forbidden by law. The students should not be found involved in ragging. Ragging within or outside any educational institution is prohibited. Whosoever, directly or indirectly commits, participates in, abets or propagates ragging within or outside any educational institution shall, on conviction be punished with imprisonment for a term up to 2 years and/or penalty which may extend to ten thousand rupees. Any student convicted of an offence of ragging shall be dismissed from the educational institution for a period of five years from the date of order of such dismissal.

Anti-Ragging posters at college premises is shown in figure 3-2.



Figure 3-2: Anti-Ragging Posters

3.2.3. Review of best practices implemented

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

- Quality Audit team including Management, Staff and Students
- Rain water harvest pit is available
- Use of aerators in taps to reduce water consumption
- Installation of LED tube lights to reduce electricity consumption
- Usage of LED/LCD monitors in all the computer labs.
- Switching OFF lights and fans whenever not in use to save electricity
- Integration of Daylight in campus to reduce the need for energy
- Installation of sanitary napkin dispensers
- Installation of Napkin incinerators
- Usage of solid waste incinerators
- Disposal of e-waste to the vendors
- Many Indoor pot plantations were found to keep the campus green
- Use of Digital display boards to reduce the plastic banners
- Usage sensor-based lightings
- Provision of RO purifiers for drinking water

3.2.4. Site Walk through

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

3.2.5. Inventory Collection

To understand the types of appliances used, inventory collection was carried out by the audit team members. The various types of appliances used are lights, fans, computers, printers. The consolidated list of inventories is given in table 3-1.

S. No.	Type of Fixture	Quantity, Nos.
1	1x20W LED	32
2	1x36W-FTL	165
3	65W Fan	45
4	50W Fan	43
5	1x14W CFL	96
6	1x11W CFL	30
7	AC Units	5
8	Computer	20

9	1x9W LED	10
10	1x36W CFL	24
11	15W LED	16
12	Sanitizer dispenser	3
13	LED Screen	2

Table 3-1: Consolidated list of Inventories

3.2.6. Interviews

To collect the various data, information and operating patterns, interviews were conducted with college staff (Principal, teaching staff, non-teaching staff) and students. The consolidated information from the interviews is given in the following sub-section

3.2.6.1. Tentative Schedule of College:

1. The tentative schedule of the college:

Monday to Saturday : 9.00 AM to 01:30 PM

3.2.6.2. Staff and Students of College:

The number of staffs 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	27	700

Table 3-2: Number of staff and students

4. WATER AUDIT

The study involved carrying out various data collections, observations, analysis to realistically assess water wastage and potential for water conservation.

4.1. Facility description

Borewell is the only source of water, for facilitating the water requirement of the entire campus. In the campus, one number of borewell is available. The borewell is covered by lid. The borewell point is shown in figure 4-1.



Figure 4-1: Borewell point

The borewell water is pumped to the raw water sump. The pump is controlled manually. The borewell motor starter panel is shown in figure 4-2.



Figure 4-2: Borewell motor starter panel

Borewell water is collected in the raw water sump. The raw sump is shown in figure 4-3.



Figure 4-3: Raw water sump

The water in the sump is pumped to the overhead tanks. There two RCC overhead tanks and 2 PVC overhead tanks available at terrace. The image of overhead tanks is shown in figure 4-4.



Figure 4-4: RCC and PVC overhead tanks

Four number of rain water harvesting – ground water recharge pits are available in the campus. From the pits the water gets filtered and reaches raw water sump through underground pipe. The rain water is mixed with borewell water and used.

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

- Raw Water
- Drinking Water
- Rain Water
- Sewage Water
- 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 Purifier
- Toilets & Handwash
- Gardening

The schematic of raw water distribution system is shown in figure 4-5.

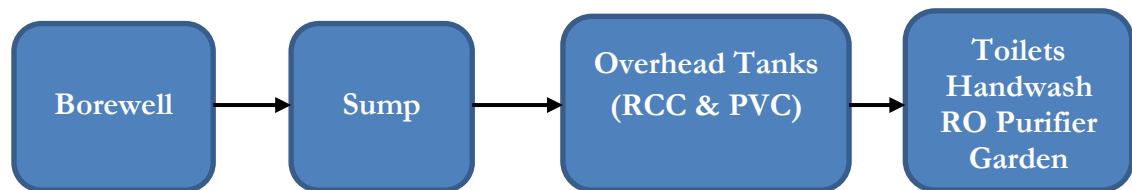


Figure 4-5: Schematic of raw water system

Water from the borewell is collected to the sump. The water collected in sump, is pumped to overhead tanks (RCC-2No.s and PVC OHT- 2No.s). From the overhead tanks the raw water is distributed to consumption points i.e., toilets, handwash, RO purifier and gardening.

4.1.2. Drinking Water System

To provide drinking water facility, RO purifier is installed in the campus. The schematic of drinking water system of the college is shown in figure 4-6.



Figure 4-6: Schematic of Drinking water system

Sample photos of the RO purifier at college premises is shown in figure 4-7.



Figure 4-7: RO purifiers installed in the college

4.1.3. Rain Water System

The rain water from terrace is brought to ground level using a dedicated pipeline. The rain water is let in to the ground water recharge pits. There are four numbers of rain water recharge pits.

The rainwater from terrace is made to drain using PVC pipes. The image of rain water pipes is shown in figure 4-8.



Figure 4-8: Rain water outlet pipelines

The sample image of ground water recharge pit is shown in figure 4-9.



Figure 4-9: Rain water recharge pit

The rain water gets filtered in the rain water recharge pits. The filtered water is filled in raw water sump through underground pipe connection. The rain water is mixed with raw water and used.

4.1.4. Sewage Water System

The sources of waste water in the college campus are as follows

- Handwash
- Toilets
- RO reject water

Waste water from the handwash and toilets are connected to the waste water chamber through dedicated pipeline. Then, from waste water chamber it is sent out to the BWSSB drainage.

Schematic of sewage water system is shown in figure 4-10.

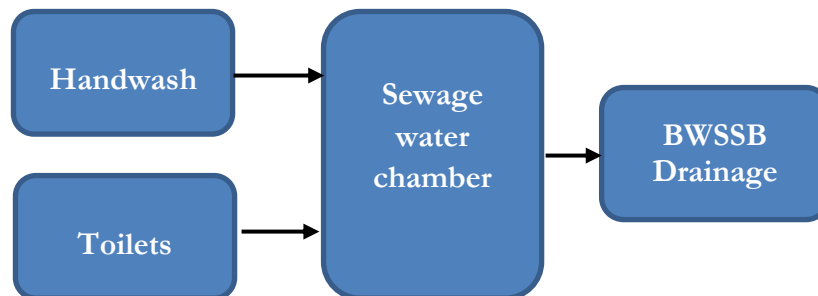


Figure 4-10: Schematic of sewage water system

The waste water pipeline is shown in figure 4-11.



Figure 4-11: Waste water pipeline

The waste water chamber is shown in figure 4-12.



Figure 4-12: Waste water chamber

4.2. Best Practices Implemented for Water Conservation

4.2.1. Rain water recharge pits

The rain water from terrace is brought to ground level using a dedicated pipeline. The rain water is let in to the ground water recharge pits. There are four numbers of rain water recharge pits.

The ground water recharge pits are shown in figure 4-13.



Figure 4-13: Rain water recharge pits

4.2.2. Usage of Aerators

Aerators are small attachments that are fitted at the end of water taps to reduce water usage. Aerators taps are used at canteen.

Features of Aerators:

- 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 college canteen is shown in figure 4-14.



Figure 4-14: Aerator taps used in canteen

4.2.3. Awareness posters on water conservation

In order to create awareness regarding water conservation, sign boards / posters indicating save water, conserve water were made available at appropriate locations like handwash area, drinking water tap points.

The sample images of awareness poster regarding water conservation at canteen is shown in figure 4-15.



Figure 4-15: Awareness posters on water conservation

4.3. Recommendations

4.3.1. Water conservation opportunities

- Conducting training and awareness programs for new joining students and staff on water conservation
- Regular testing of drinking water and bore well water for quality parameters
- Water flow meter can to be installed for the borewell and logbook to be maintained
- Conducting Seminars and Workshops for staff and students to create awareness

5. ENERGY AUDIT

5.1. Facility Description

Al-Ameen College of Law receives power supply from the state electricity board (BESCOM - Bangalore Electricity Supply Company) S1-substation as HT supply. Al-Ameen College of Law has availed power supply, with 1HT2B1 tariff structure.

Transformer

Incoming power supply from BESCOM is received at the transformer yard near the college entrance. The 11 kV rated HT power supply is stepped down to LT 433V, by one number of transformer. Transformer unit installed inside college premises is as shown in the figure 5-1.



Figure 5-1: Transformer unit

The incoming power supply is received at metering panel. Then, it is distributed to the college via main distribution panel located at basement area. The main distribution panel is shown in figure 5-2.



Figure 5-2: Main distribution panel

The power supply for each floor controlled using distribution panels. The distribution panels are isolated with proper protection. In each floor, centralized control is provided using MCBs. The sample image of distribution panel at fourth floor is shown in figure 5-3.



Figure 5-3: Floor wise distribution panel

DG Set

One DG set has been installed in the basement area. DG set (Diesel Generator set) is used as standby source of power supply, during power failure from BESCOM. The capacity of DG set is 1x250 kVA is shown in figure 5-4.



Figure 5-4: Diesel Generator (DG) Set

The changeover is done manually. The DG changeover switch is shown in figure 5-5.



Figure 5-5: DG changeover switch

UPS System:

UPS system is made available for the critical loads. A sample photo of the UPS at fourth floor is shown in figure 5-6.



Figure 5-6: UPS in the college

Details of UPS available in the college is given in table 5-1.

S. No.	Description	Capacity, VA	Quantity
1	Exide Inverterz	850	1
2	Exide Inverterz	1450	1

Table 5-1: UPS details

5.2. Best Practices for Conservation of Energy

5.2.1. Day light integration

During the audit phase classrooms, staff-rooms, computer lab, seminar hall, canteen dining hall, moot court 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 of daylight integrated and ventilated areas are shown in figure 5-7 to figure 5-10.



Figure 5-7: Well-ventilated and day-light integrated class room



Figure 5-8: Well-ventilated and day-light integrated sample photo of staffroom



Figure 5-9: Well-ventilated and day-light integrated canteen



Figure 5-10: Well-ventilated and day-light integrated premises

5.2.2. Usage of LED fixtures

In order to save the electricity various measures have been adopted in the college. Usage of energy saving LED fixtures are used within the campus at various locations. Sample photos of LED fixtures used in the class room, moot court hall, seminar hall is shown in figure 5-11 and 5-12.



Figure 5-11: Use of LED fixtures in moot court hall



Figure 5-12: Use of LED fixtures in seminar hall

Energy savings due to LED fixtures:

The practice of using LED fixtures is incorporated in the campus to conserve energy. The LED helps to reduce the energy consumption and leads to cost saving. The calculations for annual cost savings due to the usage of LED fixtures and CO₂ mitigations per year are given below in table 5-2.

S. No.	Description	Unit	Values
1	Rated Wattage of LED lamps installed	W	20
2	Quantity of LED lamps installed	Nos	32
3	Rated wattage of lamps used earlier	W	40
4	Savings per lamp by installation of LED lamps	W	20
5	Total savings	kW	0.64
6	Working hours per day	hours	9
7	No. of working days per year	days	200
8	Annual electricity savings	kWh	1152
9	Average electricity cost	Rs./kWh	8
10	Annual cost savings achieved per year	Rs. lakh/year	0.09
11	CO ₂ mitigations per year	Tons/year	0.98

Table 5-2: Cost savings achieved per year due to 20 W LED fixtures

5.2.3. Usage of LED/LCD monitors:

LED/LCD monitors are used instead of all the desktop computers in computer labs, office room and staff rooms. Sample photos of the computer lab with LED/LCD monitors are as shown in the figure 5-13.



Figure 5-13: Sample Photo of LCD monitors in the computer lab

5.2.4. Awareness posters on Energy conservation

Sign boards on energy conservation are kept in the campus to create awareness among the staff and students to conserve electricity. Posters stating - 'Save Energy', 'Switch off light and fan when not in use' were placed at the college.

The sample images of awareness poster on energy conservation is shown in figure 5-14.



Figure 5-14: Sample photo of awareness poster on energy conservation

5.2.5. Use of sensor-based lights

Occupancy sensors activate lighting once an occupant is identified. Once the occupant has left, the sensors automatically turn the light off. When leaving a room occupant may forget to turn the lights off. This will end up in increase of energy consumption.

The benefit of occupancy sensors is their ability to reduce waste from lights left on in unoccupied space.

Occupancy sensors were installed at principal room and corridors. The sample images of occupancy sensors installed at college is shown in figure 5-15.



Figure 5-15: Sensor-based lights at college premises

5.2.6. Use of Solar LED lamps for pathway

Solar based LEDs for pathway is used. The solar energy is stored during daytime and it is used during night. The sample image of solar LED lamp is shown in figure 5-16.



Figure 5-16: Solar LED light at college premises

5.2.7. Usage of LCD Projectors

LCD projectors are used in the class rooms and seminar hall. Sample photos of the class room with LCD projector is shown in the figure 5-17.



Figure 5-17: Use of LCD Projectors in the class rooms

5.3. Recommendations

5.3.1. Replacing existing FTL by LED Fixtures

The existing FTL fixtures can be replaced with LED fixtures to reduce the energy consumption. The cost savings, investment cost and payback are given in the table 5-3.

S. No.	Description	Unit	Details
1	Total no. of FTL rated 36W	No.s	165
2	Power consumption by 1x36W FTL	kW	5.94
3	% of savings if all FTL replaced by LED fixtures	%	50
4	% of savings in kW if replaced by LED fixtures (Considering all fixtures)	kW	2.97
5	%of Lights found to be ON during working hours	%	75
6	Energy savings for fixtures in ON condition (4 x 5%)	kW	2.23
7	Total working hours per day	hours	9.0
8	Annual savings (6 x 7 x 200 days)	kWh/Annum	4009.5
9	Average energy cost per kWh	Rs./kWh	8.00
10	Annual cost savings	Rs. lakh	0.3
11	Cost of LED per fixture	Rs.	500.0
12	Total Investment cost for 165 LED fixtures	Rs.lakh	0.8
13	Simple payback period (12 / 10)	Years	2.57
14	CO2 mitigations per year	Tons/year	3.41

Table 5-3: Calculations for replacement of FTL with LED fixtures

5.3.2. Replacing existing Conventional Fans by Energy Efficient (EE) Fans:

The existing conventional fans can be replaced with energy efficient fans to reduce the energy consumption. The cost savings, investment cost and payback are given in the table 5-4.

S. No.	Description	Unit	Details
1	Total no. of 1x65W Fans	No	45
2	Power consumption by 1x65W Fans	kW	3.15
3	% of savings if all fans replaced by EE fans	%	45
4	% of savings in kW if replaced by EE fans (Considering all fans)	kW	1.41
5	%of fans found to be ON during working hours	%	80
6	Energy savings for fans in ON condition (4 x 5%)	kW	1.13
7	Total working hours per day	hours	9.0
8	Annual savings (6 x 7 x 200days)	kWh/Annum	2041.2
9	Average energy cost per kWh	Rs./kWh	8.0
10	Annual cost savings	Rs. lakh	0.2
11	Cost of fan	Rs.	2500.0
12	Total Investment cost for 1825 fans	Rs. lakh	1.1
13	Simple payback period (12 / 10)	Years	6.89
14	CO2 mitigations per year	Tons/year	1.74

Table 5-4: Calculations for replacement of Conventional Fans with EE Fans

5.3.3. Other Recommendations

- Conducting training and awareness programs on energy conservation
- Replacement of conventional fans with energy efficient fans in phased manner, as part of procurement practice.
- Replacement of existing FTL fixtures with LED fixtures can be done in phased manner.
- Installation of Solar Roof Top PV (SRTPV) system can be considered

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 college and is tabulated in table 6-1.

S. No.	Description	Yes / No	Details
1	E-Waste	Yes	Vendors
2	Hazardous / Chemical Waste	No	NA
3	Solid Waste	Yes	NA
4	Dry Leaves	Yes	BBMP
5	Food Waste	Yes	BBMP
6	Waste Water	Yes	BWSSB Drainage
7	Glass Waste	No	NA
8	Unused Materials	No	NA
10	Plastic Waste	Yes	BBMP

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

6.1.1. Dry Waste Management

Waste collection bins are placed in the campus for waste collection. Waste from each room (Staff, class rooms, office, restrooms, labs and library) is collected during the regular cleaning activity. The housekeeping staffs clean and collect the wastes generated inside the campus and dispose it through the BBMP collection vehicle. Waste collection / dust bins are placed in all class rooms, staff rooms and common areas.

6.1.2. Wet Waste Management

To manage the wet waste in the college (very less in quantity), which is produced from the remains of the tiffin boxes brought by the students, teachers & non-teaching staff of the college, are collected and dispose through the BBMP collection vehicle.

6.1.3. E- Waste Management

Computer monitor, keyboard, mouse, CPU boxes, inverters and batteries are the E- waste generated in the college. This e-waste is disposed through private e-waste disposal vendors.

6.1.4. Liquid Water Management

The sources of waste water in the college campus are as follows

- Handwash
- Toilets
- RO reject water

Waste water from the handwash and toilets are connected to the waste water chamber through dedicated pipeline. Then, from waste water chamber it is sent out to the BWSSB drainage.

6.1.5. Bio- Waste Management

As part of maintaining hygienic environment for the girl's, the management has provided the sanitary napkin dispenser and sanitary napkin incinerator in the girl's toilet. The pictures of the same are given in figure 6-1 and figure 6-2.



Figure 6-1:Sanitary hygiene napkin dispenser at 4th Floor Girls rest room



Figure 6-2:Napkin Incinerator at 4th floor girl's rest room

6.2. Best Practices for Waste management

6.2.1. Waste Collection Bins

Waste collection is done from all the facilities of the campus. So, the bins are kept at appropriate locations of the campus. This helps to maintain the college premises clean & hygiene. Figure 6-3 shows the waste collection at staff room and class room.



Figure 6-3: Waste bins at staff and class room

Larger waste bins kept at corridors is shown in figure 6-4.



Figure 6-4: Larger waste collection bins at corridors

The waste collected using larger bins were brought to common disposal point. From common disposal point the waste is cleared by BBMP. The image of common disposal point is shown in figure 6-5.



Figure 6-5: Waste disposal point

6.2.2. Cleaning Materials and Purchase bills

The college campus is cleaned regularly. Sample photos of cleaning materials are shown in figure 6-6.



Figure 6-6: Sample photos of cleaning materials

6.2.3. Solid Waste Incinerator

The solid waste collected in the campus is destroyed using solid waste incinerator. The solid waste incinerator installed at the campus is shown in figure 6-7.



Figure 6-7: Solid waste incinerator

6.2.4. Cleaning program

Lal-bagh cleaning program was conducted by Eco watch on march 2020. Student members from eco club actively participated and performed cleaning activity.

Sample photos of the activities are shown in figure 6-8.



Figure 6-8: Lal bagh cleaning – Eco club students

Students of NSS were also involved in Swachh Bharat mission. The sample image of the activity is shown in figure 6-9.



Figure 6-9: NSS students during Swachh Bharat Abhiyan

6.3. Recommendations

- Use of more Sign boards to create awareness for better waste management like Use of dustbins, ban of plastic, Reduce Reuse and Recycle, etc. at each floor.
- Separate bins for dry waste, wet waste, plastic waste can be used. So that, waste segregation occurs at source level.
- For the wet waste management, compost pit can be used. The manure can be used for the plantations.
- Conducting training and awareness programs for new students and staff on waste management

7. GREEN CAMPUS MANAGEMENT AUDIT

7.1. Facility Description

The college maintains clean and green pot plantations within the campus. The maintenance team takes care of the environment and ensures to keep the surroundings clean. They maintain all the plantations by employing the cleanliness and watering regularly.

Plants, trees and lawns were available at college campus.

7.1.1. Plantations and Lawn

Sample photos of the pot plantations of the campus are shown in the figure 7-1.



Figure 7-1: Sample photos of pot plantations

Sample photos of landscaping inside the campus are shown in the figure 7-2.



Figure 7-2: Sample photos of landscaping

The images of various plantations and trees taken during the audit are shown in the following figures.



Figure 7-3: Sample photos of plantations

7.2. Best practices for Green Campus Management

The maintenance team do periodic checks and maintain the plantations. 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 and well grown pot plantations all around the campus.

7.2.1. Plantation Activities

Every year college has celebrated world environment day, students were reminded to celebrate safety and this is the time in which nature is sending us a message to take care of ourselves and care for nature.

Staff and students planted saplings with a belief that one small step goes a long way to protect nature and reverse its degradation.

Sample photo of plantation activity by students is shown in figure 7-4.



Figure 7-4: Sample photos of planting activity by students

7.3. Recommendations

- Encouraging students to recommend creative ideas for making campus more greenery.
- Paperless office can be adopted.
- Awareness programs and trainings for the new joining students.
- Conducting Seminars and Workshops regularly to make the campus green.
- Conducting competition among departments to promote student's ideas in sustainability initiatives

8. ENVIRONMENT AUDIT (CARBON FOOTPRINT ANALYSIS)

8.1. Facility Description

The carbon footprint is "the total amount of greenhouse gas (GHG) emissions caused by an organization, event or product". Global warming and climate change are the foremost environmental challenges facing the world today. It is our responsibility to minimize the consumption of energy and hence reduce the emissions of greenhouse gases.

To analysis the carbon footprint, transportation details of students and staff are collected as below:

1. Whether college provides transport facility for staff and students (Yes/No)? No,
2. Number (or Percentage) of Staff using public transport: 81%
3. Number (or Percentage) of Staff using Bike and car: 14%
4. Number (or Percentage) of Staff coming by walk: 5%

5. Number (or Percentage) of students using public transport: 81%
6. Number (or Percentage) of students using Bike: 18%
7. Number (or Percentage) of students using Electric vehicle and Bicycles: 1%

8.2. Best Practices for Environment Conservation

Management has taken steps to create awareness among students and staff regarding environment conservation.

8.2.1. Use of Digital Display

Plastic and paper posters are banned and digital displays are used in the college. Sample photo are shown in figure 8-1.



Figure 8-1: Use of digital display

8.2.2. Ban of Smoking, alcohol and drugs

Use of drugs is banned within the campus. The image of drug free zone is shown in figure 8-2.



Figure 8-2: No smoking zone signage

8.2.3. Usage of Automatic sanitizer dispenser

To ensure safe and hygiene atmosphere, automatic sanitizer dispensers were installed at the college premises. The image sanitizer dispenser is shown in figure 8-3.



Figure 8-3: Automatic sanitizer dispenser

8.2.4. Usage of LED fixtures

In order to save the electricity various measures have been adopted in the college. Usage of energy saving LED fixtures are used within the campus at various locations. Sample photos of LED fixtures used in the class room, moot court hall, seminar hall is shown in figure 8-4.



Figure 8-4: Use of LED fixtures in moot court hall

Energy savings due to LED fixtures:

The practice of using LED fixtures is incorporated in the campus to conserve energy. The LED helps to reduce the energy consumption and leads to cost saving. The calculations for annual cost savings due to the usage of LED fixtures and CO₂ mitigations per year are given below in table 8-1.

S. No.	Description	Unit	Values
1	Rated Wattage of LED lamps installed	W	20
2	Quantity of LED lamps installed	Nos	32
3	Rated wattage of lamps used earlier	W	40
4	Savings per lamp by installation of LED lamps	W	20
5	Total savings	kW	0.64
6	Working hours per day	hours	9
7	No. of working days per year	days	200
8	Annual electricity savings	kWh	1152
9	Average electricity cost	Rs./kWh	8
10	Annual cost savings achieved per year	Rs. lakh/year	0.09
11	CO ₂ mitigations per year	Tons/year	0.98

Table 8-1: Cost savings achieved per year due to 20 W LED fixtures

8.2.5. Rain water recharge pits

The rain water from terrace is brought to ground level using a dedicated pipeline. The rain water is let in to the ground water recharge pits. There are four numbers of rain water recharge pits.

The ground water recharge pits are shown in figure 8-5.



Figure 8-5: Rain water recharge pits

8.2.6. Other Environment conservation practices implemented

- Use of LED tube lights, lamps for lighting system
- Use of LED/LCD monitors for the computers to reduce energy consumption
- All the classrooms are day light integrated.
- Use of aerators type taps in canteen to reduce water consumption

8.3. Recommendations

During the study, there was continuous interaction between the audit team and staff members to ensure that the suggestions made are realistic, practical and implementable.

- Recommend students and staff to use public transport system
- Recommend students and staff to use bicycle
- Recommend staff and students to use electric vehicles
- Provision of charging stations for electric vehicles
- Use of Display Boards to conserve fuel and the use of bicycle.
- To replace all the FTL fixtures with the LED Fixtures to reduce energy consumption and CO₂ mitigation
- Usage of Aerators for all the taps to reduce water consumption
- Posters need to be placed at appropriate places to create awareness about water and energy consumption

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 college:

General information of the college 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. Internal Quality Audit Team: 2020 – 2021

Table 9-1 depicts the format for the collection of Internal Quality Audit team.

S. No.	Name	Designation	Role
1			
2			
3			

Table 9-1: Internal Quality Audit team

2. General Information of the college

General information of the college includes an address of college and head office, contact person details, year of establishment etc., as given in table 9-2.

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

S. No.	Description	Details
7.	Brief description of Campus	

Table 9-2: General information of the college

3. College Infrastructure

Infrastructure details of the college were gathered from table 9-3.

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

Table 9-3: Detail Infrastructure of the college

4. Details of Student clubs
5. Details of cells that support students
6. Tentative Schedule of a working day:
 - a. No. of working days per year:
 - b. List of holidays:
7. Total area of the campus
8. Details of List of Departments and Courses (Faculty wise)

The total number of departments, laboratories, conference hall, Libraries, Auditorium, and Cafeteria are obtained from table 9-4

S. No.	Description	Details
1	Department	
2	Laboratories	

3	Conference Hall	
4	Libraries	
5	Auditorium	
6	Cafeteria	

Table 9-4: Details of the departments

9. Number of staff

Teaching, non-teaching, supporting staff with a male and female breakup is obtained from table 9-5

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

Table 9-5: Details of the Staff

10. Number of Students

Number of students is collected from table 9-6.

S. No.	Boys	Girls
1		

Table 9-6: Details of the Students

11. Additional infrastructure details have been collected from table 9-7.

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 9-7: Details of the departments

9.1.2. Water Audit details:

1. General information

General information required for water management analysis is collected from table 9-8.

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	

S. No.	Description	Details
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	
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 9-8: Water management details

2. STP information

STP details are collected from table 9-9

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 9-9: Details of STP

3. RO Plant information

RO Plant details are obtained from table 9-10

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

Table 9-10: 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 9-11.

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 9-11: Details of Energy consumption

2. Solar Energy details:

The solar energy details required are collected from table 9-12.

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 9-12: 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 9-13.

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	

S. No.	Description	Details	
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 Yes)	Nos.	
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 college buildings.		

Table 9-13: 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:

C. 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 9-14.

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 9-14: Basic details of waste management

2. Types of Waste generated

Types of waste generated in the college are obtained from table 9-15.

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 9-15: Types of waste generated

3. Segregation of waste

Segregation of waste information at different locations with quantity is gathered from table 9-16.

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

Table 9-16: Segregation of waste

4. Waste generation management

Waste generation management of the college was collected from table 9-17

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

Table 9-17: Waste Disposal methods

9.1.5. Green campus management details:

1. Total number of plants and trees

D. The total number of plantations, garden area, and many more are collected as per the set of questionnaires given in table 9-18

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 college –	
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 9-18: List of plantation details

2. List of plants/ trees

E. List of plants/ trees with their scientific names obtained from table 9-19.

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

Table 9-19: List of plants/trees in campus

9.1.6. Carbon footprint management details:

F. The carbon emission from various activities such as transport, diesel generator usage, LPG consumption, and electricity consumption were collected, as per table 9-20.

S. No	Description	Details
1	Whether college provides transport facility for staff and students (Yes/No)	
2	Number (or Percentage) of staff using transport services provided by college	
3	Number (or Percentage) of students using transport services provided by college	
4	Number (or Percentage) of Staff using public transport	
5	Number (or Percentage) of Staff using Bike	
6	Number (or Percentage) of Staff using Car	
7	Number (or Percentage) of students using Public transport	
8	Number (or Percentage) of students using Car	
9	Number (or Percentage) of students using Bike	
10	Number (or Percentage) of students using Bicycles	
11	Average consumption of diesel per month	
12	Average electricity consumption per month	
13	Average LPG consumption per month	

Table 9-20: Details of Carbon footprint management

9.1.7. 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 9-21.

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 college	
5	Photos of MoUs for Waste management	
6	Photos of any other policies adopted by college	

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