Criterion 7 - Institutional Values and Best Practices

7.1.6 Quality Audits on Environment and Energy Regularly Undertaken by The Institution.

Index

ENERGY AUDIT

STUDY PERIOD (TWO YEARS) 2020-2021 AND 2021-2022

Sustainability study

AUDIT REPORT

Studied for

Pune District Education Association's

Shankarrao Ursal College of Pharmaceutical Sciences & Research Center

S. No. 15/2/A/1/1, Near Zensar I. T. Tower,
Kharadi, Taluka Haveli District Pune, Maharashtra 411014

Studied in the capacity of

An accredited & Certified Green Building Professional

Studied by

Greenvio Solutions

Valid till December 2023

Background reference image Janko Ferlic on pexels

Disclaimer

The Audit Team has prepared this report for the **Pune District Education Association's Shankarrao Ursal College of Pharmaceutical Sciences & Research Center** located at S. No. 15/2/A/1/1, Near Zensar I. T. Tower, Kharadi, Taluka Haveli District Pune, Maharashtra 411014 based on input data submitted by the College analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the Hon'ble Management and College. The warranty or undertaking, expressed 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.

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The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh as an Accredited and Certified Green Building Professional-Architect. Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

The Study is conducted in capacity of Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments
We are an Environmental and Architectural Design Consultancy firm
Sustainable Academe is our department for conducting Audits
Palghar District, Maharashtra- 401208
sustainableacademe@gmail.com

Acknowledgement

The Audit Assessment Team thanks the **Pune District Education Association's Shankarrao Ursal College of Pharmaceutical Sciences & Research Center, Pune, Maharashtra** for assigning this important work of Energy Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Hon. Ajit Anantrao Pawar**, President; **Mr. Rajendra Shankarrao Ghadge**, Vice President; **Mr. Sandeep Sudamrao Kadam**, Secretary; **Mr. Adv. Mohanrao B. Deshmukh**, Treasurer; **Mr. L. M. Pawar**, Dy. Secretary; **Mr. A. M. Jadhav**, Jt. Secretary and everyone from the Management.

Our heartfelt thanks to Chairperson of the entire process **Dr. Ashok Bhosale,** Principal for the valuable inputs.

We are also thankful to **College's Task force the faculty members** who have collected data required **Dr. Vijaya Barge**, Vice Principal & NAAC Coordinator; **Dr. Ravindra Patil**, IQAC Coordinator & HOD Pharmacognosy Dept.; **Mr. Vikram Veer**, HOD Pharmaceutical Chemistry Dept.; **Mr. Krunal Kansae**, HOD Pharmacology Dept.; **Mr. Sujit Kakade**, HOD Pharmaceutics Dept. and **Mr. Prashant Khade**, Academic Incharge (Special mention for the excellent coordination)

We highly appreciate the assistance of **Mr. Sachin Parkhi**, Administrative Staff; **Mr. Alauddin Pathan**, Non-teaching Staff and the **entire Teaching, Non-teaching and Admin staff** for their support while collecting the data.

Sustainable Academe
Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About the Institution

Shankarrao Ursal College of Pharmaceutical Sciences & Research Center, Khardi, Pune was established with the motivation of Late Prof. Ramakrishna More, President of Pune District Education Association.

The College was established, keeping in view the fact that there was no college of higher education within the fast developing area of Sangvi, Aundh, Baner, Wakad, Kalewadi, Pimple Gurav, Pimple Nilakh, Thergaon, etc.

The major population in this area comes from middle class and is economically weak. There are four higher secondary schools in this area.

1.2 Statements prescribed by the Institute

1.2.1 Vision

The College proposes "To be the leading academic center for excellence in pharmacy education, innovative research, healthcare sector and service to the community of the nation."

1.2.2 Mission

The College adheres and focuses

- To educate, train and provide lifelong learning opportunities for students and faculty.
- To generate competent and skilled pharmacists with high degree of ethical standards, social and environmental concern.
- To encourage students by creating research environment for the betterment of healthcare profession.

1.2.3 Aim

The College has works "To create human resources, of global excellence in the field of Pharmaceutical Sciences, Research and Industry."

1.2.4 Program Educational Objectives (PEOs)

- ***Quality education:*** To integrate and apply quality education in pharmaceutical sciences to make the students proficient, knowledgeable and competent.
- ***Innovation:*** To promote students to gain knowledge through research projects and industrial training.
- ***Entrepreneurship:*** To engage the students in innovative activities by making them able to think clearly to envision professional goals by executing entrepreneurship qualities.
- ***Professionalism:*** To inculcate group work, team management and good communication skills with etiquettes to advance the pharmacists be professionally effective to the society.
- ***Ethical standards:*** To sensitize students towards professional ethics and practice of healthcare service to society.

The commitment of the Institute is towards continuous improvement and democratic functioning, as is reflected in its vision and mission statements, which in turns become the guiding principles for the governance of the Institute.

1.4 Assessment of the College

- Pharmacy Council of India - Since 2009
- All India Council for Technical Education - Since 2009
- Government of Maharashtra - Since 2009
- Directorate of Technical Education, Maharashtra - Since 2009
- Savitribai Phule Pune University - Since 2009
- All India Survey on Higher Education - Since 2020-2021

2. Institution overview

2.1 Populace analysis for Academic year 2021-2022

2.1.1 Students data

The student data (shared by the College) shows there were a total of **151 Boys and 191 Girl students,** thus there were **a total of 342 students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin staff	03	01	**04**
Teaching staff	12	10	**22**
Non-Teaching staff	07	04	**11**
Total Staff Members	**22**	**15**	**37**

Table 1: Staff data of the Institution for 2021-2022

The staff data shows the premises had a total of **37** Staff Members.

2.2 Populace analysis for Academic year 2020-2021

2.2.1 Students data

The student data (shared by the College) shows there were a total of **159 Boys and 183 Girl students,** thus there were **a total of 342 students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin staff	03	01	**04**
Teaching staff	12	10	**22**
Non-Teaching staff	07	04	**11**
Total Staff Members	**22**	**15**	**37**

Table 2: Staff data of the Institution for 2020-2021

The staff data shows the premises had a total of **37** Staff Members.

2.3 Total College Area & College Building Spread Area

The **total site area is 5 Acres** and the **total Built-up area of College is 54,146 sq. ft.** for **a total of 379 footfalls.**

2.4 College Infrastructure

2.4.1 Establishment

The College was established in 2008-2009. The college is located pretty close to nature and hence has very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building. **Overall the Infrastructure of the Building is excellent in terms of the Architecture Design and Green Building Design. The Premises covers quite a few of the requirements for a Green Habitat.**

2.4.2 Spatial Organisation

The overall ambience of the College is warm and inviting. The classrooms and other spaces have ample natural ventilation in the form of clear glass windows with fresh air ventilation. The architecture of the building is quite well designed. The colour palette not just helps the building to stand out but also provides an Institutional arena. It balances with the local architecture with the natural landscapes of huge trees all around. The design emphasis on providing calmness to the built form and gradually merges with the serene landscape.

The floor to floor height is more than 10 feet. There are amenities such as CCTV, Fire extinguishers, Library and first aid box.

2.4.3 Operation and maintenance of the premises

The interview session with the staff regarding the operation and working hours stated that the Institution is open from Monday to Friday from 9 am to 5 pm and on Saturdays from 9 am to 2 pm.

3. Green Building Study Audit

3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution sustainable and healthy premises for its inhabitants.

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the Lights, Fans, AC, Equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the premises

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Rainwater harvesting and Wastewater treatment on the premises.
- Waste Audit - Current waste produced, its segregation, and usage; Strategies to be adopted for waste management and awareness

Environmental Audit

- Analysis of the current landscape + hardscape of the premises
- Analysis of the flora and fauna of the premises
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

3.4 Activities undertaken for the Green Building Study Audit

- Allotment and Initiation by the Institute
- Induction Meeting
- Review Meeting
- Survey of students and staff completed
- Site visit at the Institute
- Submission of the Report

Discussion at the induction meeting and water testing

On-site review with the Team and Tree plantation

On-site discussion with the Team

4. Energy Audit

4.1 Sources of Energy consumption

The premise uses following sources of energy consumption.

4.1.1 Primary sources

- **Electrical (Metered) –** Light, Fans, Equipments, Pumps comprise these sources.
- **Renewable energy –** There are sources of renewable energy available.

4.1.2 Secondary sources

The sources are available in the form of 2 gas cylinders.

4.2 Site investigation analysis

The Site investigation observations and interviews with the Maintenance staff, Electrical department in charge are summarised below:

- All the **computers are shut-off after use** and also put on power saving mode.
- There are **display boards encouraging staff and students to save energy are put up in the classrooms and laboratories**.

4.3 Actual Electrical Consumption as per Bills

The admin department had shared the bills for Meter which is connected to the Building and is the main source of energy supply. The details of unit consumption meter wise are documented below:

Month	Year	Units consumed
June	2020	1,879
July	2020	100
August	2020	149
September	2020	140
October	2020	127
November	2020	126
December	2020	146
January	2021	241
February	2021	100

March	2021	95
April	2021	101
May	2021	88
June	2021	101
July	2021	107
August	2021	118
September	2021	113
October	2021	78
November	2021	0- Deduced in solar
December	2021	0- Deduced in solar
January	2022	0- Deduced in solar
February	2022	0- Deduced in solar
March	2022	0- Deduced in solar
April	2022	985
May	2022	170
June	2022	206
July	2022	132
August	2022	221

Table 3: Details of the electrical consumption

The summary of the above study shows the average consumption varies for each month.

4.4 Survey Results

An online survey was conducted to analyse the student and staff views about the Energy management practices adopted in College, following is the result received.

4.4.1 Participation

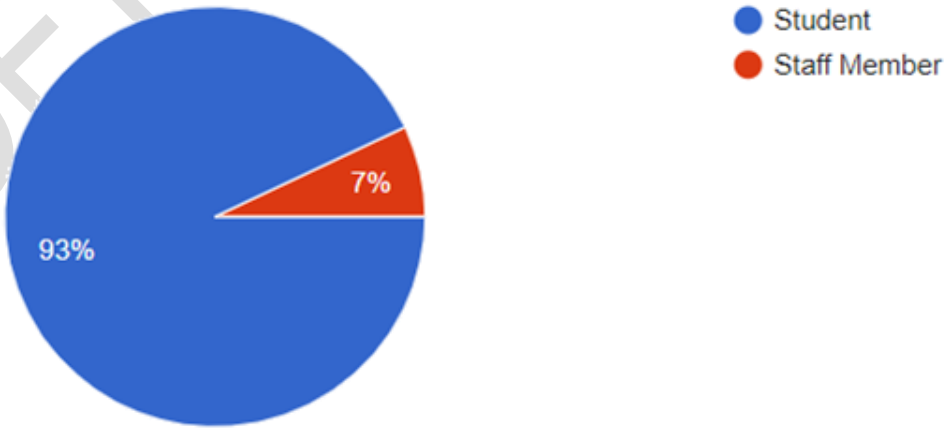

Figure 1: Participation analysis in the survey

A total of **228 responses** were received out of which 93% were students.

4.4.2 Review of the Energy management practices in the premises

Note: The Participants were asked to review the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor
- Scale 2 – Satisfactory
- Scale 3 – Good
- Scale 4 – Very good
- Scale 5 – Excellent

The figures in each of the columns of graph depict the Number of participants responses in numerical (Percentage of the participant response) – For example 101 responses (44.5%)

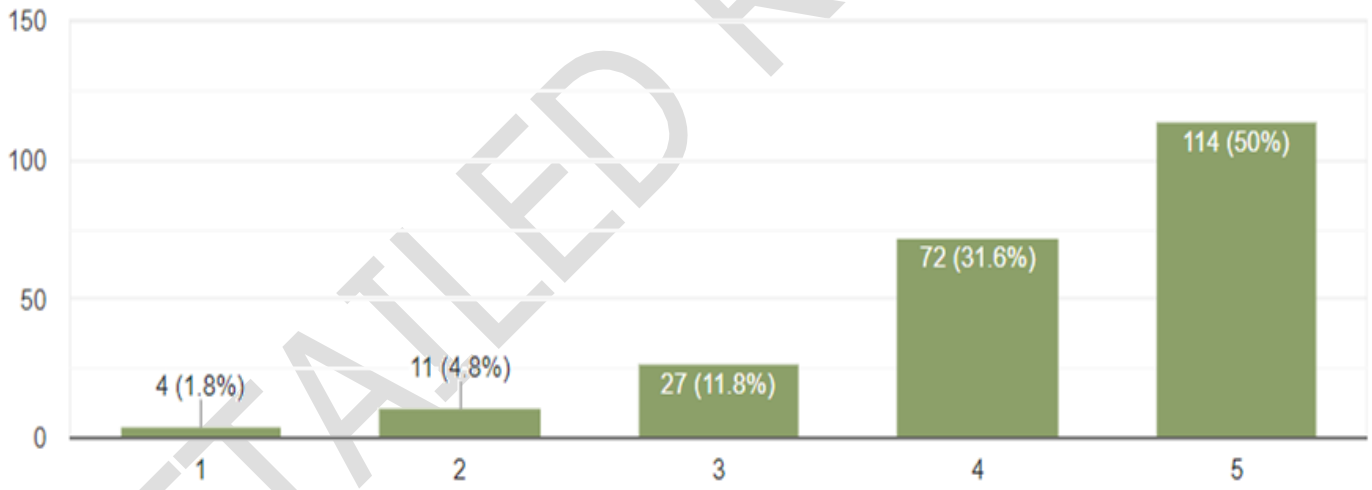

Figure 2: Energy management practices in college

The students, staff **(almost 50%) of the responses found the practices to be excellent (rating 5)** and **32% of the responses found practices to be very good (rating 4).**

4.5 Calculated Electrical Consumption as per inventory

The electricity bills provide actual consumption data. The following is the calculated consumption. It is done to understand the percentage of energy usage in the premises by various applications. It is based on the inventory collected and interviews with the staff.

The additional data such as wattage is taken from market research. In terms of electrical consumption, the main sources are lights, fans, air conditioner, and equipment.

The inventory and data collection for sources of energy consumed in the premise in summarised in the following sections.

Note: The following analysis is combined for entire premise taking into considerations the duration before pandemic to understand the consumption pattern as post pandemic the premise is used only for a few hours.

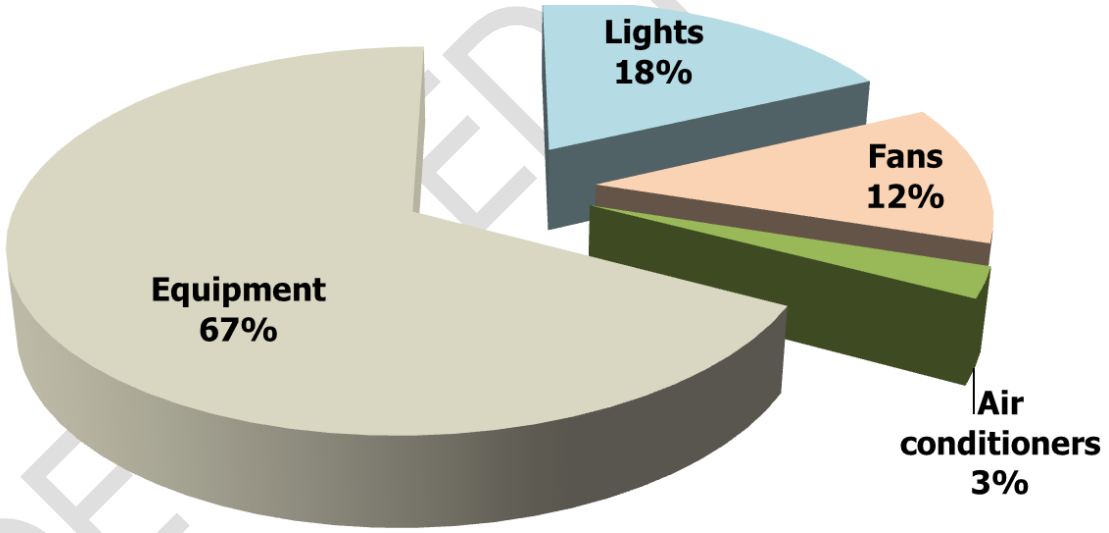

Figure 3: Summary of the calculated electrical consumption as per inventory

The above graph shows that Equipment consumes 67% followed by lights consuming 18% while the fans consume 12% and the air conditioners consume 3% of the total calculated electrical energy.

4.6 Lights

4.6.1 Types of lights based on the numbers

There are a total of **275 lights in the premises;** the following table shows the various types of lights in the premises.

S. No.	Type	Nos.
1	LED	125
2	Non-LED	150

Table 4: Summary of the types of lights in premise

4.6.2 Types of lights based on the power consumption

The energy consumption of Lights is **13,657 kWh** of energy; the following graph shows the type of lights.

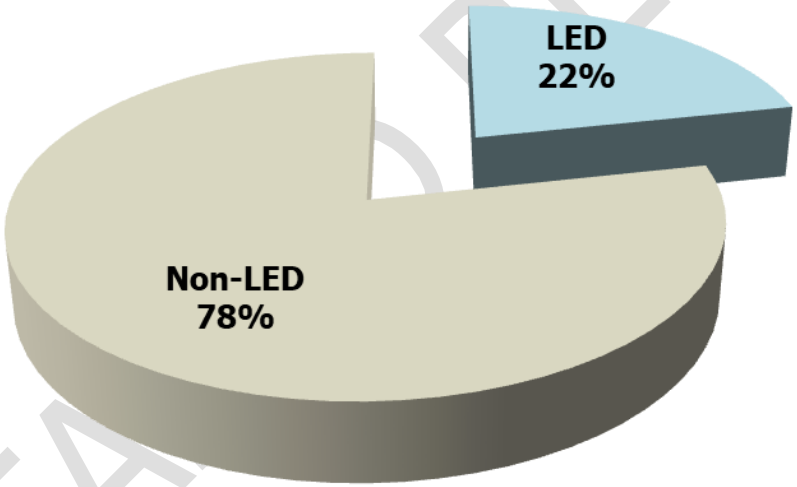

Figure 4: Energy consumed by types of lights in the premise based on the usage study

The analysis of the types of Lights in premises shows **Non-LED lights 78%** followed by **LED lights consuming 22%**

4.6.3 Requirement of NAAC

4.6.3.1 Alternative Energy Initiative

Percentage of power requirement met by renewable energy sources – There are solar panels available in the premises. The College utilizes 65-75% of the power generated by on grid solar system and rest of the energy is being given back to the grid.

4.6.3.2 Percentage of lighting power requirement met through LED bulbs

The premise has LED Lights contribute to 45% in terms of number and **22% of the power requirement** is met through the same. As per our study we could conclude that both of these numbers should improve.

4.6.4 Floor-wise consumption analysis

The following graph shows the floor wise consumption.

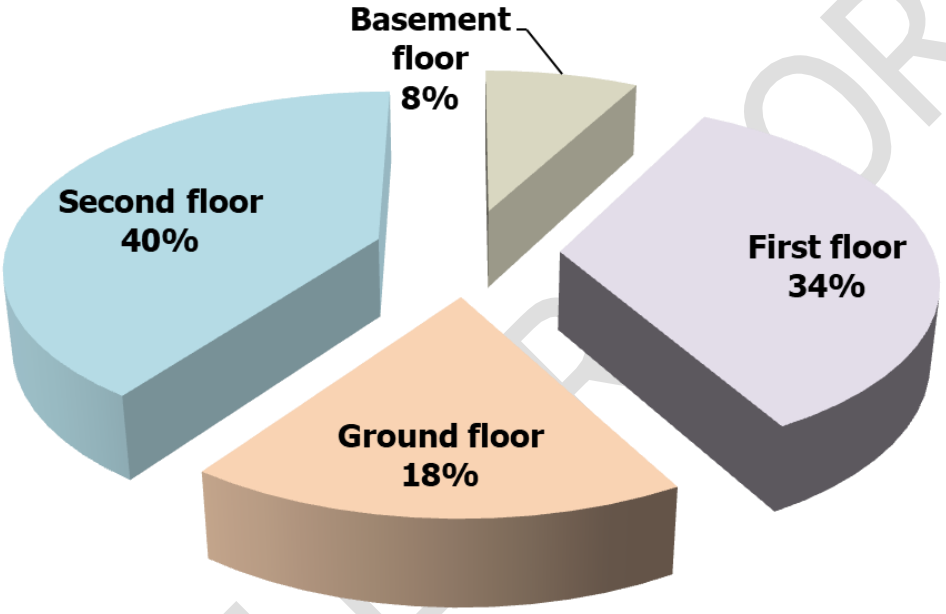

Figure 5: Energy consumed by lights floor wise

The above analysis shows the lights in the **second floor consume 40% whereas the ones in the first floor consume 34%; the ones in the ground floor consume 18% and the ones in the basement floor consume 8%** of the total power consumed by lights.

4.6.5 Site investigation observations

Some of the points noticed are as follows:

1. All lights are in working conditions
2. Daily monitoring and check is done by the maintenance staff.
3. There was no fuse defect observed.

4.7 Fans

4.7.1 Types of fans based on the numbers

There are a total of **160 fans** in the premises. The following table shows the various types of fans in the premises.

S. No.	Type	Nos.
1	Ceiling fan	144
2	Exhaust fan	14
3	Pedestal fan	2

Table 5: Summary of the types of fans in premise

4.7.2 Types of fans based on the power consumption

The energy consumption of fans is **9,100 kWh** of energy; The following graph shows the type of fans.

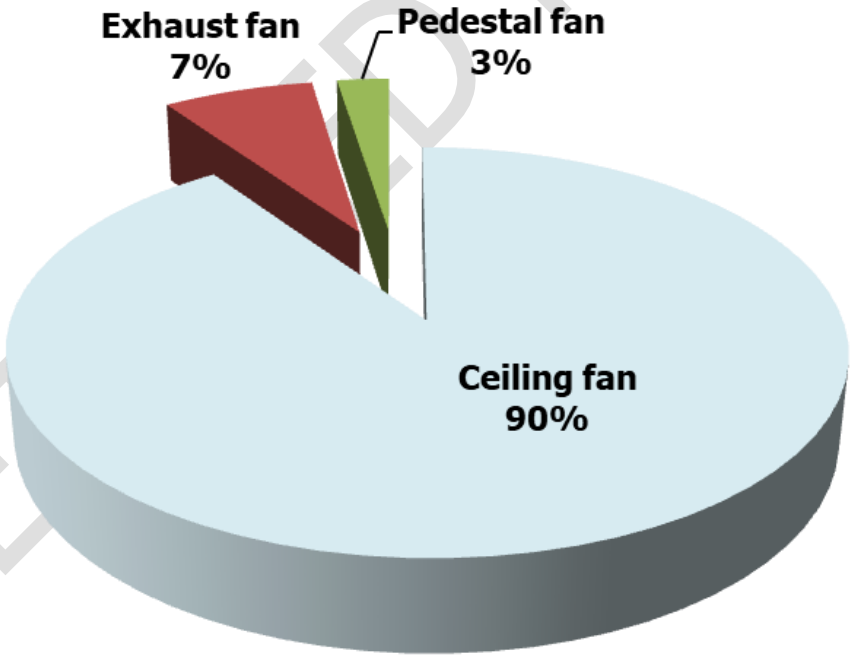

Figure 6: Energy consumed by types of fans in the premise based on the usage study

The analysis of the types of fans in premises shows **Ceiling fans consume 90%; whereas the Exhaust fans consume 7% and the Pedestal fans consume 3%** of the total power consumed by fans.

4.7.3 Floor-wise consumption analysis

The following graph shows the floor-wise consumption.

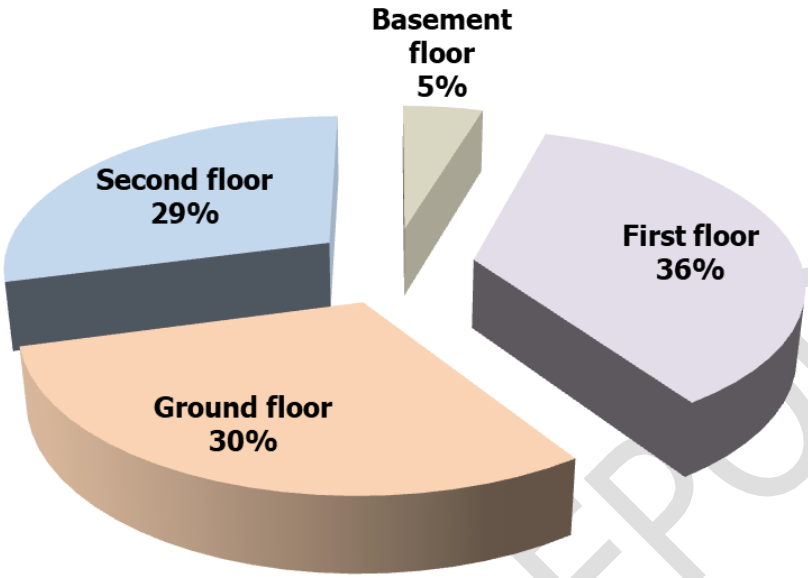

Figure 7: Energy consumed by fans floor-wise

The above analysis shows the fans in the **first floor consume 36% whereas the ones in the ground floor consume 30%; the ones in the second floor consume 29% and the ones in the basement floor consume 5%** of the total power consumed by fans.

4.7.4 Site investigation observations

Some of the points noticed are as follows:

1. All fans are in working conditions
2. Daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.

4.8 Air conditioners

4.8.1 Types of air conditioners based on the numbers

There are **2 air conditioners** on the entire premises**.**

4.8.2 Floor-wise consumption analysis

The energy consumption of air conditioners is **2,006 kWh** of energy; both of these are located on the first floor.

4.8.3 Site investigation observations

Some of the points noticed are as follows:

1. Daily monitoring and check are done by the maintenance staff skilfully.
2. The Outdoor units were not properly cleaned, maintained and had no dust collection problems.

4.8.4 About the replacement of current air conditioners

The current air conditioners are well maintained, though there is not an immediate requirement for replacement however, whenever the College undergoes redevelopment there can be provisions for replacement with energy-efficient appliances or new air conditioners that require less power consumption.

4.8 Equipment

4.8.1 Types of Equipment

There are **18 types of equipment totalling to 151** in the premises as follows:

S. No.	Name	Nos.
1	Biometric	1
2	CCTV	18
3	Deep freezer	1
4	Desktop computer	56
5	Distilled Water Machine	1
6	Internet Router	8
7	Microwave Oven	1
8	Mike	1
9	Oven	2
10	Printer	18
11	Projector	5
12	Red Lamp	2
13	Refrigerator	2
14	Sanitary napkin machine	1
15	Scientific instruments	29
16	Sound System	1
17	Water Jet Vacuum Pump	1
18	Water purifier machine	3

Table 6: Types of equipment in the premise as per the quantity

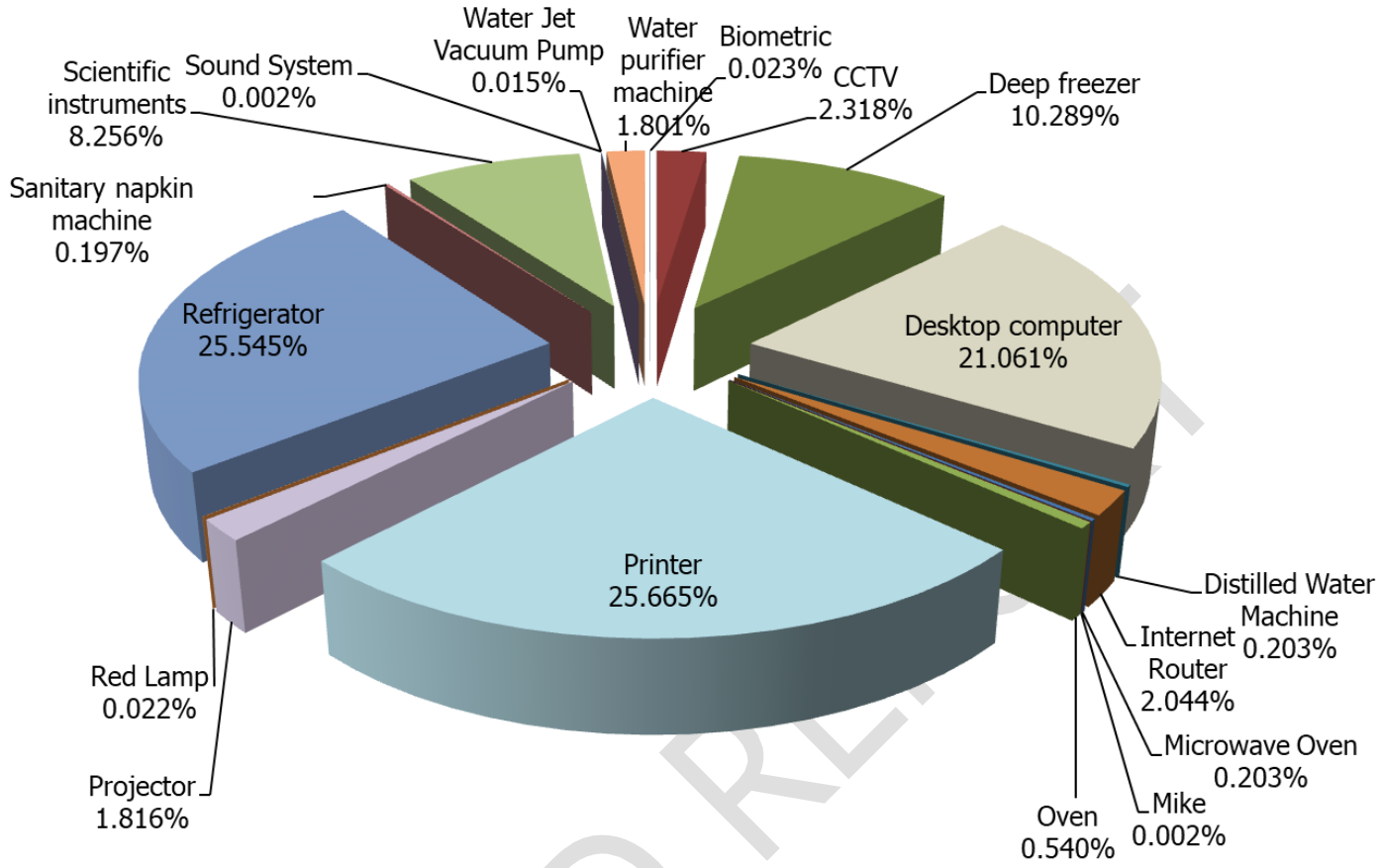

Figure 8: Summary of Energy consumed by equipment in the premises

The above summary shows that **printer consumes more energy at 25.665%** while **refrigerator consumes 25.545%** and the **desktop computer consumes 21.062%** these are maximum consumers as compared to other equipment.

4.8.2 Site investigation observations

Some of the points noticed are as follows:

1. All equipments are in working conditions and daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.
2. No defect was found in any equipment of electrical consumption.

4.9 Recommendations for a Sustainable Habitat

Over the time energy efficient appliances have been a boon not only to the energy saving parameters they adhere to but also the eco-friendly habits it helps to inculcate. The Institution such as Schools and Colleges are the best way to implement these initiatives. It creates awareness among the students at a young age. The Institutions also act as a symbol and representative of being an energy efficient premise.

The following suggestions are to be considered as a ***first priority*** for implementation. These **should be executed within the next 2 years from the date of the Report submission.** The Institute can execute a plan of action after discussion with Project Head.

Electromechanical systems - Electrical and Lighting

Section 1 - Lights

Non-LED lights

The current light analysis shows that CFL lights consume anywhere between 20W to 25W and even more when in use; these should be replaced with LED lights which consume on an average 12-16W when in use.

Our technical analysis shows that there would be a reduction of an average of **41% reduction** in energy consumption through lights specifically as a part of the electro - mechanical system if all **CFL lights on all floors** are replaced with an energy efficient appliance whenever the College undergoes renovation.

Section 2 - Fans

Ceiling fans

The current Fans are in proper working conditions and maintained well. The ceiling fans are in more quantity and consume at least 45W when in use. These should be replaced with energy efficient fans consuming 14W when in use. Our detailed study states that is all the **ceiling fans on all floors** if replaced with star rated appliance results in a reduction of average of **69% reduction** in energy consumption if replaced with energy efficient appliance. It will be suggested to either replace these now if college can have certain plans else the replacement can be done when fans get damaged or are not in working condition.

Section 3 - Equipment

Desktop computers to laptops

Among all equipment it suggested to replace the desktop computers with laptops as this would be energy efficient. A normal desktop computer consumes on an average 250W and it is to be connected all time when it has to be used. On the contrary a laptop consumes 40W and has a battery backup which lasts up to 4 hours. There is **an average 84% reduction** in energy consumption if replaced with energy efficient appliance which is a laptop in all the areas of Educational areas.

This replacement is however is dependent on a variety of factors as follows.

- Some of the senior staff members may be more convenient with computers, replacement with laptop might result in a change of the working patterns and hours which may affect the productivity.
- Laptops – in case are not handled with care such as if dropped unintentionally might result in data imbalance.
- Students who are not day scholars can use laptop as per their own convenience, whereas in common areas there can a monitoring about the usage hours hence computers may be a preferable option then laptop in certain spaces.
- Similarly depending on the pandemic situation in case it might be possible due to irregular usage the device might have issues while functioning.

Thus the College should analyse the above points and then devise a strategy about the replacement, essentially when the devices get damaged or are not in working condition they can surely be replaced.

As well as once they are not in working condition the proposed strategy should be linked towards e-waste management as well.


USHA
Mist Air Flo
TABLE FAN
400mm
SHRIRAM
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FLO LIGHT BLUE


DELTA
DANGER
खतरा


LG Electronics
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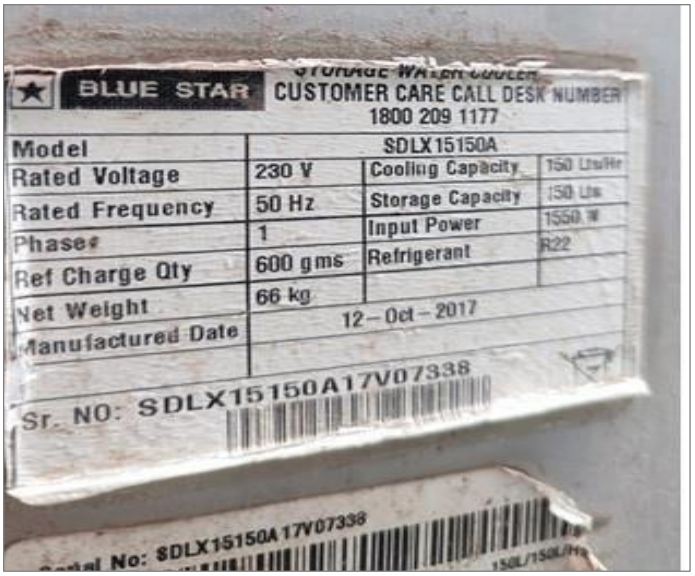
CYCLOPENTANE
CIRCUIT DIAGRAM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Storage Capacity
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Refrigerant
R22
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12-Oct-2017
Sr. NO: SDLX15150A17V07338

5. Towards a Healthy & Sustainable Institution

The following suggestions are to be considered as a ***last priority*** for implementation. These **should be executed within the next 3.5 years** **from the date of the Report submission.** The Institute can execute a plan of action after discussion with Project Head.

- **Cutlery in the Canteen –** The regular plastic and steel plates, and spoons used in Canteen can be replaced with eco-friendly and organic leaves, paper straws, disposable plates, edible spoons, and tables made out of sugarcane waste or bamboo. This will be the first of its kind initiative to be adopted and practiced thus also inculcating healthy practices in students.

- **Terrace farming (Applicable only for the buildings with a flat roof) -** There can be the provision of terrace farming in a designated area of the open space this would enhance the biodiversity and be useful in training students and staff about the healthy practices and food grown which would be used in Canteen.

- **Waste vio –** University can tie-up with our organization and students can be encouraged to collect dry waste and electronic waste such as newspapers, old laptops, and others and hand them over on a weekly or monthly basis thereby making a waste reduction approach in the community. This has benefits such as awareness, and eco-friendly habits in becoming a responsible citizen.

- **Signages –** In addition to the signages being in regular language there can be additional signages in braille language for the specially-abled students.

6. References

The study is based on the data collected, analysed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below.

However, no direct references have been used anywhere. These are used as a base to analyse and study the data collected.

- Uniform Plumbing Code – India, 2008
- IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- IGBC Green Landscape Rating system, March 2013
- BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
- Used only for understanding Universal design - Universal accessibility Guidelines for Pedestrian, Non-motorizes vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National centre for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation.

Environment Audit

Study Period (Two Years) 2020-2021 and 2021-2022

Sustainability study

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Studied for

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The Audit Team has prepared this report for the **Pune District Education Association's Shankarrao Ursal College of Pharmaceutical Sciences & Research Center** located at S. No. 15/2/A/1/1, Near Zensar I. T. Tower, Kharadi, Taluka Haveli District Pune, Maharashtra 411014 based on input data submitted by the College analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the Hon"ble Management and College. The warranty or undertaking, expressed 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.

The audit is a thorough study based on the inspection and investigation of data collected over a period of time and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied or regenerated in any form.

The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh as an Accredited and Certified Green Building Professional-Architect. Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

The Study is conducted in capacity of Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments
We are an Environmental and Architectural Design Consultancy firm
Sustainable Academe is our department for conducting Audits
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Acknowledgement

The Audit Assessment Team thanks the **Pune District Education Association's Shankarrao Ursal College of Pharmaceutical Sciences & Research Center, Pune, Maharashtra** for assigning this important work of Environment Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Hon. Ajit Anantrao Pawar**, President; **Mr. Rajendra Shankarrao Ghadge**, Vice President; **Mr. Sandeep Sudamrao Kadam**, Secretary; **Mr. Adv. Mohanrao B. Deshmukh**, Treasurer; **Mr. L. M. Pawar**, Dy. Secretary; **Mr. A. M. Jadhav**, Jt. Secretary and everyone from the Management.

Our heartfelt thanks to Chairperson of the entire process **Dr. Ashok Bhosale,** Principal for the valuable inputs.

We are also thankful to **College's Task force the faculty members** who have collected data required **Dr. Vijaya Barge**, Vice Principal & NAAC Coordinator; **Dr. Ravindra Patil**, IQAC Coordinator & HOD Pharmacognosy Dept.; **Mr. Vikram Veer**, HOD Pharmaceutical Chemistry Dept.; **Mr. Krunal Kansae**, HOD Pharmacology Dept.; **Mr. Sujit Kakade**, HOD Pharmaceutics Dept. and **Mr. Prashant Khade**, Academic Incharge (Special mention for the excellent coordination)

We highly appreciate the assistance of **Mr. Sachin Parkhi**, Administrative Staff; **Mr. Alauddin Pathan**, Non-teaching Staff and the **entire Teaching, Non-teaching and Admin staff** for their support while collecting the data.

Sustainable Academe
Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About the Institution

Shankarrao Ursal College of Pharmaceutical Sciences & Research Center, Khardi, Pune was established with the motivation of Late Prof. Ramakrishna More, President of Pune District Education Association.

The College was established, keeping in view the fact that there was no college of higher education within the fast developing area of Sangvi, Aundh, Baner, Wakad, Kalewadi, Pimple Gurav, Pimple Nilakh, Thergaon, etc.

The major population in this area comes from middle class and is economically weak. There are four higher secondary schools in this area.

1.2 Statements prescribed by the Institute

1.2.1 Vision

The College proposes "To be the leading academic center for excellence in pharmacy education, innovative research, healthcare sector and service to the community of the nation."

1.2.2 Mission

The College adheres and focuses

- To educate, train and provide lifelong learning opportunities for students and faculty.
- To generate competent and skilled pharmacists with high degree of ethical standards, social and environmental concern.
- To encourage students by creating research environment for the betterment of healthcare profession.

1.2.3 Aim

The College has works "To create human resources, of global excellence in the field of Pharmaceutical Sciences, Research and Industry."

1.2.4 Program Educational Objectives (PEOs)

- ***Quality education:*** To integrate and apply quality education in pharmaceutical sciences to make the students proficient, knowledgeable and competent.
- ***Innovation:*** To promote students to gain knowledge through research projects and industrial training.
- ***Entrepreneurship:*** To engage the students in innovative activities by making them able to think clearly to envision professional goals by executing entrepreneurship qualities.
- ***Professionalism:*** To inculcate group work, team management and good communication skills with etiquettes to advance the pharmacists be professionally effective to the society.
- ***Ethical standards:*** To sensitize students towards professional ethics and practice of healthcare service to society.

The commitment of the Institute is towards continuous improvement and democratic functioning, as is reflected in its vision and mission statements, which in turns become the guiding principles for the governance of the Institute.

1.4 Assessment of the College

- Pharmacy Council of India - Since 2009
- All India Council for Technical Education - Since 2009
- Government of Maharashtra - Since 2009
- Directorate of Technical Education, Maharashtra - Since 2009
- Savitribai Phule Pune University - Since 2009
- All India Survey on Higher Education - Since 2020-2021

2. Institution overview

2.1 Populace analysis for Academic year 2021-2022

2.1.1 Students data

The student data (shared by the College) shows there were a total of **151 Boys and 191 Girl students,** thus there were **a total of 342 students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin staff	03	01	**04**
Teaching staff	12	10	**22**
Non-Teaching staff	07	04	**11**
Total Staff Members	**22**	**15**	**37**

Table 1: Staff data of the Institution for 2021-2022

The staff data shows the premises had a total of **37** Staff Members.

2.2 Populace analysis for Academic year 2020-2021

2.2.1 Students data

The student data (shared by the College) shows there were a total of **159 Boys and 183 Girl students,** thus there were **a total of 342 students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin staff	03	01	**04**
Teaching staff	12	10	**22**
Non-Teaching staff	07	04	**11**
Total Staff Members	**22**	**15**	**37**

Table 2: Staff data of the Institution for 2020-2021

The staff data shows the premises had a total of **37** Staff Members.

2.3 Total College Area & College Building Spread Area

The **total site area is 5 Acres** and the **total Built-up area of College is 54,146 sq. ft.** for **a total of 379 footfalls.**

2.4 College Infrastructure

2.4.1 Establishment

The College was established in 2008-2009. The college is located pretty close to nature and hence has very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building. **Overall the Infrastructure of the Building is excellent in terms of the Architecture Design and Green Building Design. The Premises covers quite a few of the requirements for a Green Habitat.**

2.4.2 Spatial Organisation

The overall ambience of the College is warm and inviting. The classrooms and other spaces have ample natural ventilation in the form of clear glass windows with fresh air ventilation. The architecture of the building is quite well designed. The colour palette not just helps the building to stand out but also provides an Institutional arena. It balances with the local architecture with the natural landscapes of huge trees all around. The design emphasis on providing calmness to the built form and gradually merges with the serene landscape.

The floor to floor height is more than 10 feet. There are amenities such as CCTV, Fire extinguishers, Library and first aid box.

2.4.3 Operation and maintenance of the premises

The interview session with the staff regarding the operation and working hours stated that the Institution is open from Monday to Friday from 9 am to 5 pm and on Saturdays from 9 am to 2 pm.

3. Green Building Study Audit

3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution sustainable and healthy premises for its inhabitants.

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the Lights, Fans, AC, Equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the premises

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Rainwater harvesting and Wastewater treatment on the premises.
- Waste Audit - Current waste produced, its segregation, and usage; Strategies to be adopted for waste management and awareness

Environmental Audit

- Analysis of the current landscape + hardscape of the premises
- Analysis of the flora and fauna of the premises
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

3.4 Activities undertaken for the Green Building Study Audit

- Allotment and Initiation by the Institute
- Induction Meeting
- Review Meeting
- Survey of students and staff completed
- Site visit at the Institute
- Submission of the Report

Discussion at the induction meeting and water testing

On-site review with the Team and Tree plantation

On-site discussion with the Team

4. Site Study

The following listed are some of the positive site elements which are beneficial to the College in terms of tangible and intangible benefits.

- **Location -** The Pune District Education Association's Shankarrao Ursal College of Pharmaceutical Sciences & Research Center located at S. No. 15/2/A/1/1, Near Zensar I. T. Tower, Kharadi, Taluka Haveli District Pune, Maharashtra 411014 and falls under the Pune Municipal Corporation.

- **Neighbourhood context -** The premises is surrounding by open spaces and Residential areas on the immediate surroundings of the site.

- **Natural physical features –** The premises includes a rich biodiversity and huge number of plants in the open space. The site does not have major difference in the land levels (contours).

- **Manmade features –** The premises is situated in an urban area amidst residential areas and open spaces with appropriate proximity to necessary amenities. There is sufficient appreciation space for entrance. The materials used for construction are RCC and the landscaping includes innumerable natural trees as well as potted plants.

- **Circulation –** There is a smooth transition of pedestrian traffic inside the premises due to the large entrance gate and an adequate open space where vehicles of students and staff are parked.

- **Climate** – Pune has a tropical climate. In winter, there is much less rainfall in Pune than in summer. According to Köppen and Geiger, this climate is classified as Aw. The average annual temperature in Pune is 24.3 °C | 75.7 °F. The annual rainfall is 1200 mm | 47.2 inch.

(Source: https://en.climate-data.org/asia/india/maharashtra/pune-31/)

Ecological (Environment) Audit

Background reference image Yugal Shrivastava on pexels

5. Ecological (Environmental) Audit

Environment is an essential part for human survival. We co-exist with the environment and it cannot be termed as a separate entity. The Ecological audit helps to understand the flora, fauna that exists and steps that can be taken to improve the same. To denote if there are problems related to sound in and around the surrounding.

In terms of the carbon footprint it helps in keeping a tab on the eco-friendly habits incorporated by the inhabitants of the premises. Health today is the topmost priority, a general understanding of the initiatives undertaken along with sufficient hygiene practices adopted. Universal design is applicable to all built and unbuilt spaces.

As part of our study we could state that the Institution has developed eco-friendly practices and sustainable solutions which are well reflected in the rich biodiversity of the Premises. Being situated near the city the appreciation space towards the main entrance provides a welcoming approach to the College.

The College has huge open space used by all. The students use it as a leisure place for study and College ground is used for sports activities. There are ample resting spaces as part of building design which provide a resting and warm welcoming approach in the premises.

5.1 Open Spaces

There is an open space in the premises used by students at present for sports and cultural gatherings. **There are provisions for natural plantations which have enhanced the beauty of the space.**

5.2 Flora and fauna audit

5.2.1 Flora Audit

A flora survey was carried out to identify the total numbers of plants and trees. The landscape area has a variety of plantations constituting hundreds of surveyed trees in premises in the last few years as follows with detail description of each.

S. No.	Plant name	Type	Nos.	Planted / Grown naturally
1	Bottle Palm (Hyophorbe Lagenicaulis)	Tree	39	Planted
2	Neem (Azadirachta Indica)	Tree	5	Naturally grown
3	Coconut (Cocos Nucifera)	Tree	14	Planted
4	Peepal (Ficus Religiosa)	Tree	6	Planted
5	Banayan (Ficus Bengalesis)	Tree	4	Planted
6	Gulmohar(Delonix Regia)	Tree	5	Planted
7	Plumeria (Plumeria Rubra) Chafa	Tree	2	Planted
8	Guava (Psidium Guajava)	Tree	3	Planted
9	Tamrind(Tamarindus Indica)	Tree	7	Planted
10	Platycladus(Platycladusorientalis)	Shrub	10	Planted
11	Christmas (Araucaria Columnaris)	Tree	3	Planted
12	Night-Flowering Jasmine Parijatak (Nyctanthes Arbor-Tristis)	Tree	4	Planted
13	Bel (Aegle Marmelos	Tree	3	Planted
14	Karanja (Millettia Pinnata (L.) Panigrahi)	Tree	1	Planted
15	Mango (Mangifera Indica)	Tree	4	Planted
16	Indian Sandalwood,Santalum Album,	Tree	4	Planted
17	Rakt Chandan(Pterocarpus Santalinus)	Tree	2	Planted
18	Sitaphal (Annona Squamosa)	Tree	2	Planted
19	Amla (Emblica Officinali)	Tree	4	Planted
20	Umbhar (Ficus Racemosa)	Tree	2	Planted
21	Shevaga (Moringa Oleifera)	Tree	2	Planted
22	Bhakula (Mimusops Elengi)	Tree	2	Planterd
23	Tulsi (Ocimum Sanctum)	Herb	10	Planted

24	Ginkgo Biloba,	Herb	1	Planted
25	Jackfruit (Artocarpus Heterophyllus	Tree	1	Planted
26	Guggul (Commiphora Wightii)	Herb	1	Planted
27	Myrobalum (Terminalia Chebula)	Tree	1	Planted
28	Citrus Plants	Herb	4	Planted
29	Bahera (Terminalia Bellirica)	Tree	1	Planted
30	Multivitamin (Sauropus Androgynus)	Herb	1	Planted
31	Weeping Fig (Ficus Benjamina,)	Herb	7	Planted
32	Silva Manso (Tabebuia Aurea)	Tree	9	Planted
33	Hibiscus Rosa-Sinensis	Herb	3	Planted
34	Apta (Bauhinia Racemosa)	Tree	5	Planted
35	Sububul (Leucaena Leucocephala)	Tree	4	Naturally grown
36	Rose Plants	Shrub	5	Planted
37	Lemon Grass	Shrub	2	Planted
38	Sonchafa (Magnolia Champaca)	Tree	1	Planted
39	Matura Tea Tree (Senna Auriculata)	Tree	2	Planted
40	Graptophyllum Pictum	Shrub	15	Planted
41	Aglaonema	Shrub	10	Planted
42	Rodocactus Grandifolium	Shrub	14	Planted
43	Crotan Codiaum	Shrub	5	Planted
44	Cabbage Palm Tango	Shrub	12	Planted
45	Eurica Palm	Shrub	25	Planted

Table 3: Details of the Flora in the premises

At present there are 45 types and 267 numbers of plantations comprising of plants, trees, shrubs. Timely maintenance with sufficient care has resulted in positive benefits for the surroundings.

5.2.2 Fauna Audit

It is a beautiful site to have the birds chirping around the College premises. It highlights the ecological co-existence concept in the most beautiful way.

5.3 Noise Audit

5.3.1 Macro level

On a macro level the College being an educational institute falls under silent zone and thus **there is no negative effect related to noise felt by the students / staff in the premises.**

5.3.2 Micro level

The College has ample vegetation trees. These act as a noise barriers. There are no particular equipments which cause any noise effect. **Overall the noise levels inside the premises are low that is a good approach.**

5.4 Carbon Footprint Audit

5.4.1 Eco-friendly Commuting Practices

Based on data collection and discussion with staff the following points were noted:

Ease of commuting – Owing to close proximity to public transport the access is very feasible and walk able.

List of places students and staff are coming from	
Within 5 km radius	**Beyond 5 km radius.**
Kharadi, Pune	Hadapsar, Pune
Vadgaon Sheri, Pune	Fursungi, Pune
Chandannagar, Pune	Vadki, Pune
Ubalenagar, Pune	Saswad, Pune
Vimannagar, Pune	Shewale Wadi, Pune

Mundhwa, Pune	Loni Kalbhor, Pune
Keshav Nagar, Pune	Urali Kanchan, Pune
	Yavat, Pune
	Theur, Pune
	Wagholi, Pune
	Awhalwadi, Pune
	Manjari, Pune
	Kesnand, Pune
	Lonikand, Pune
	Shikharapur, Pune
	Lohagaon, Pune
	Vishrantwadi, Pune
	Dighi, Pune
	Yerwada, Pune
	Pune city
	Pimpri –Chincwad
	Dehu, Pune
	Nangaon, Pune
	Katraj, Pune

Table 4: Details of the places students and staff members are commuting from

5.4.2 Heat Island Reduction

The Institution is geographically located in a semi-urban area with appropriate climatic and architectural design parameters in place; the Institute does not face any 'Urban heat island effect'

5.4.3 Outdoor Light Pollution Study

The College compound lights are not upward looking thus, these do not cause light pollution.

5.5 Universally accessible premises

As per World Report on Disability, 2011 there are 180 million approx. Persons with Disabilities make it 15% of the total population of India. The following facilities are available for the specially-abled as part of universally accessible premises initiatives.

- **Ramps at the entrance area.**
- **Handrails along the staircase and Low height risers in the staircases.**
- **Availability of wheelchair.**

The design of the premises is appropriate for access with passages and corridors being wide enough in size and naturally ventilated and are safe from the fire safety aspect.

5.6 Fire Safety

Our observation states that the current measures are adequate however, an additional fire extinguisher in every space that has an air-conditioner will be beneficial.

5.7 Positive site features

5.7.1 Based on our study

a) Paperless technologies

The college has gone technology-friendly and paperless in the functioning of the Premises.

b) Avoid using plastic in premise

There are provisions for a ban on the use of plastic bags or products on the Premise.

c) Ample greenery

There are provisions for the garden and plenty of traditional trees on the premises.

d) Universal toilet

There is availability of a universal toilet for the physically abled.

5.7.2 Based on survey study

An online survey was conducted to analyse the student and staff views about the Energy management practices adopted in College, following is the result received.

5.7.2.1 Survey participation

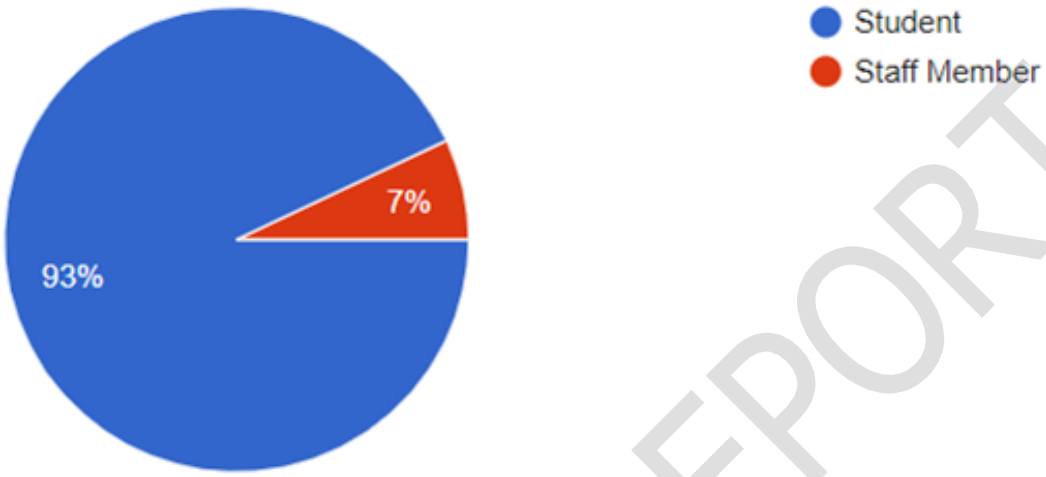

Figure 1: Participation analysis in the survey

A total of **228 responses** were received out of which 93% were students.

5.7.2.2 Survey review

Some of the key reviews as per the responses received are listed below.

- Awareness program, seminars, carrying out different activities such Swacchha Bharat Abhiyan.
- Tree plantation, Swacchha Bharat Abhiyan, plastic management, rainwater harvesting, medicinal garden, etc.
- Plastic collection, tree plantation, rain water harvesting, cleanliness, medicinal garden.
- Daily cleaning, plant implantation, waste water disposal maintain in college
- We planted lots of trees in our premises and maintain them by regular watering, culturing new plants etc.
- Growing medicinal plants in the garden as well as in college premises
- Cleaning environment and managing hygiene
- The institute is planting more and more trees keeping premises green, various new methods are adopted for waste management and maintenance.

5.9 Section-wise suggestions related to premises

The following suggestions are to be considered as a ***first priority*** for implementation. These **should be executed within the next 2.5 years** **from the date of the Report submission or as and when the appliance is not functioning and a replacement is required.** The Institute can execute a plan of action after discussion with Project Head.

Site beautification

a) Additional facilities for birds

There can be provision for drinking water and food facility for birds visiting the College premise.

b) Nutrition pits

Certain pits can be demarcated as „Nutrition pits" where the organic food from the kitchen and Canteen fruit peels and fruits or vegetables can be degraded for making nutrition-rich soil.

c) Garden development

The existing open space should be designed as an Architectural landscape.

- The roofs of the buildings should be turned into **Green roofs** (By introducing terrace or vertical gardens) or **Cool roofs** (By painting the same with Cooltop material for solar reflectivity).
- **Introduce various types of gardens** inside the premises such as Flower gardens, Woodland gardens, Rock gardens, Water gardens, Vegetable and herb gardens, Roof gardens, Scented gardens, Medicinal gardens and Botanical gardens.

Universally accessible premises

Resting places

There should be increased provision for resting places on-premises outdoor and indoors.

Pollution Control

a) Promote the use of Eco-friendly vehicles

There can be provision for battery-operated vehicles/ low emission vehicles such as electrically driven vehicles parking in open spaces along with battery charge points, this

would inspire students to change their mode of transportation and adopt sustainable practices.

b) Bicycles as a gift

As an appreciation gesture maybe the student's toppers/ staff best performers can be awarded a bicycle occasionally.

c) Plant more carbon dioxide absorbing plants

The following plantations should be planted as they will help in Carbon neutralisation.

- Pine – It is known for its ability to sequester carbon.
  (https://www.single.earth/blog/which-trees-absorb-the-most-carbon#:~:text=Pine%20trees%20as%20carbon%20sinks,their%20ability%20to%20sequester%20carbon.&text=These%20trees%20are%20found%20in,also%20make%20good%20landscape%20plants)
- Neem – It helps to reduce greenhouse gases through photosynthesis absorbing large quantities of CO_2 and producing oxygen.
  (https://neemfoundation.org/greening-india-with-neem/#:~:text=The%20planting%20of%20Neem%20trees,of%20CO2%20and%20producing%20oxygen)
- Peepal – It can uptake CO_2 during the night as well because of its ability to perform a type of photosynthesis called Crassulacean Acid Metabolism (CAM)
  (https://nurserylive.com/blogs/sustainable-living/do-you-know-plants-that-give-oxygen-24-hours#:~:text=2.-,Peepal,Crassulacean%20Acid%20Metabolism%20(CAM))
- Bamboo - It can absorb as much as 12 tonnes of carbon dioxide per hectare per year, giving the plant a potentially crucial role in stabilising our planet's atmosphere.
  (https://www.theguardian.com/environment/2003/mar/20/research.science#:~:text=Research%20in%20Japan%20and%20elsewhere,in%20stabilising%20our%20planet's%20atmosphere) and https://www.nelda.org.in/15-indian-trees-that-produce-the-most-oxygen
- Teak – It has the highest capacity for carbon sequestration among trees in India. This is the finding of a study conducted by the Gujarat Ecological Education and Research (GEER).
  (https://timesofindia.indiatimes.com/city/ahmedabad/teak-absorbs-max-co2-from-air-helps-check-global-warming/articleshow/51721842.cms)



Parking, universal toilet and wheelchair


Open spaces and Plantations in the premises

Open spaces and gardens

6. Towards a Healthy & Sustainable Institution

The following suggestions are to be considered as a ***last priority*** for implementation. These **should be executed within the next 3.5 years** **from the date of the Report submission.** The Institute can execute a plan of action after discussion with Project Head.

- **Cutlery in the Canteen –** The regular plastic and steel plates, and spoons used in Canteen can be replaced with eco-friendly and organic leaves, paper straws, disposable plates, edible spoons, and tables made out of sugarcane waste or bamboo. This will be the first of its kind initiative to be adopted and practiced thus also inculcating healthy practices in students.

- **Terrace farming (Applicable only for the buildings with a flat roof) -** There can be the provision of terrace farming in a designated area of the open space this would enhance the biodiversity and be useful in training students and staff about the healthy practices and food grown which would be used in Canteen.

- **Waste vio –** University can tie-up with our organization and students can be encouraged to collect dry waste and electronic waste such as newspapers, old laptops, and others and hand them over on a weekly or monthly basis thereby making a waste reduction approach in the community. This has benefits such as awareness, and eco-friendly habits in becoming a responsible citizen.

- **Signages –** In addition to the signages being in regular language there can be additional signages in braille language for the specially-abled students.

7. References

The study is based on the data collected, analysed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below.

However, no direct references have been used anywhere. These are used as a base to analyse and study the data collected.

- Uniform Plumbing Code – India, 2008
- IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- IGBC Green Landscape Rating system, March 2013
- BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
- Used only for understanding Universal design - Universal accessibility Guidelines for Pedestrian, Non-motorizes vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National centre for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation.
- Climate data https://en.climate-data.org/asia/india/maharashtra/pune-31/

GREEN AUDIT

STUDY PERIOD (TWO YEARS) 2020-2021 AND 2021-2022

Sustainability study

AUDIT REPORT

Studied for

Pune District Education Association's

Shankarrao Ursal College of Pharmaceutical Sciences & Research Center

S. No. 15/2/A/1/1, Near Zensar I. T. Tower,
Kharadi, Taluka Haveli District Pune, Maharashtra 411014

Studied in the capacity of

An accredited & Certified Green Building Professional

Studied by

Greenvio Solutions

Valid till December 2023

Disclaimer

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Acknowledgement

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Our special thanks are due to **Hon. Ajit Anantrao Pawar**, President; **Mr. Rajendra Shankarrao Ghadge**, Vice President; **Mr. Sandeep Sudamrao Kadam**, Secretary; **Mr. Adv. Mohanrao B. Deshmukh**, Treasurer; **Mr. L. M. Pawar**, Dy. Secretary; **Mr. A. M. Jadhav**, Jt. Secretary and everyone from the Management.

Our heartfelt thanks to Chairperson of the entire process **Dr. Ashok Bhosale,** Principal for the valuable inputs.

We are also thankful to **College's Task force the faculty members** who have collected data required **Dr. Vijaya Barge**, Vice Principal & NAAC Coordinator; **Dr. Ravindra Patil**, IQAC Coordinator & HOD Pharmacognosy Dept.; **Mr. Vikram Veer**, HOD Pharmaceutical Chemistry Dept.; **Mr. Krunal Kansae**, HOD Pharmacology Dept.; **Mr. Sujit Kakade**, HOD Pharmaceutics Dept. and **Mr. Prashant Khade**, Academic Incharge (Special mention for the excellent coordination)

We highly appreciate the assistance of **Mr. Sachin Parkhi**, Administrative Staff; **Mr. Alauddin Pathan**, Non-teaching Staff and the **entire Teaching, Non-teaching and Admin staff** for their support while collecting the data.

Sustainable Academe
Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About the Institution

Shankarrao Ursal College of Pharmaceutical Sciences & Research Center, Khardi, Pune was established with the motivation of Late Prof. Ramakrishna More, President of Pune District Education Association.

The College was established, keeping in view the fact that there was no college of higher education within the fast developing area of Sangvi, Aundh, Baner, Wakad, Kalewadi, Pimple Gurav, Pimple Nilakh, Thergaon, etc.

The major population in this area comes from middle class and is economically weak. There are four higher secondary schools in this area.

1.2 Statements prescribed by the Institute

1.2.1 Vision

The College proposes "To be the leading academic center for excellence in pharmacy education, innovative research, healthcare sector and service to the community of the nation."

1.2.2 Mission

The College adheres and focuses

- To educate, train and provide lifelong learning opportunities for students and faculty.
- To generate competent and skilled pharmacists with high degree of ethical standards, social and environmental concern.
- To encourage students by creating research environment for the betterment of healthcare profession.

1.2.3 Aim

The College has works "To create human resources, of global excellence in the field of Pharmaceutical Sciences, Research and Industry."

1.2.4 Program Educational Objectives (PEOs)

- ***Quality education:*** To integrate and apply quality education in pharmaceutical sciences to make the students proficient, knowledgeable and competent.
- ***Innovation:*** To promote students to gain knowledge through research projects and industrial training.
- ***Entrepreneurship:*** To engage the students in innovative activities by making them able to think clearly to envision professional goals by executing entrepreneurship qualities.
- ***Professionalism:*** To inculcate group work, team management and good communication skills with etiquettes to advance the pharmacists be professionally effective to the society.
- ***Ethical standards:*** To sensitize students towards professional ethics and practice of healthcare service to society.

The commitment of the Institute is towards continuous improvement and democratic functioning, as is reflected in its vision and mission statements, which in turns become the guiding principles for the governance of the Institute.

1.4 Assessment of the College

- Pharmacy Council of India - Since 2009
- All India Council for Technical Education - Since 2009
- Government of Maharashtra - Since 2009
- Directorate of Technical Education, Maharashtra - Since 2009
- Savitribai Phule Pune University - Since 2009
- All India Survey on Higher Education - Since 2020-2021

2. Institution overview

2.1 Populace analysis for Academic year 2021-2022

2.1.1 Students data

The student data (shared by the College) shows there were a total of **151 Boys and 191 Girl students,** thus there were **a total of 342 students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin staff	03	01	**04**
Teaching staff	12	10	**22**
Non-Teaching staff	07	04	**11**
Total Staff Members	**22**	**15**	**37**

Table 1: Staff data of the Institution for 2021-2022

The staff data shows the premises had a total of **37** Staff Members.

2.2 Populace analysis for Academic year 2020-2021

2.2.1 Students data

The student data (shared by the College) shows there were a total of **159 Boys and 183 Girl students,** thus there were **a total of 342 students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin staff	03	01	**04**
Teaching staff	12	10	**22**
Non-Teaching staff	07	04	**11**
Total Staff Members	**22**	**15**	**37**

Table 2: Staff data of the Institution for 2020-2021

The staff data shows the premises had a total of **37** Staff Members.

2.3 Total College Area & College Building Spread Area

The **total site area is 5 Acres** and the **total Built-up area of College is 54,146 sq. ft.** for **a total of 379 footfalls.**

2.4 College Infrastructure

2.4.1 Establishment

The College was established in 2008-2009. The college is located pretty close to nature and hence has very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building. **Overall the Infrastructure of the Building is excellent in terms of the Architecture Design and Green Building Design. The Premises covers quite a few of the requirements for a Green Habitat.**

2.4.2 Spatial Organisation

The overall ambience of the College is warm and inviting. The classrooms and other spaces have ample natural ventilation in the form of clear glass windows with fresh air ventilation. The architecture of the building is quite well designed. The colour palette not just helps the building to stand out but also provides an Institutional arena. It balances with the local architecture with the natural landscapes of huge trees all around. The design emphasis on providing calmness to the built form and gradually merges with the serene landscape.

The floor to floor height is more than 10 feet. There are amenities such as CCTV, Fire extinguishers, Library and first aid box.

2.4.3 Operation and maintenance of the premises

The interview session with the staff regarding the operation and working hours stated that the Institution is open from Monday to Friday from 9 am to 5 pm and on Saturdays from 9 am to 2 pm.

3. Green Building Study Audit

3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution sustainable and healthy premises for its inhabitants.

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the Lights, Fans, AC, Equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the premises

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Rainwater harvesting and Wastewater treatment on the premises.
- Waste Audit - Current waste produced, its segregation, and usage; Strategies to be adopted for waste management and awareness

Environmental Audit

- Analysis of the current landscape + hardscape of the premises
- Analysis of the flora and fauna of the premises
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

3.4 Activities undertaken for the Green Building Study Audit

- Allotment and Initiation by the Institute
- Induction Meeting
- Review Meeting
- Survey of students and staff completed
- Site visit at the Institute
- Submission of the Report

Discussion at the induction meeting and water testing

On-site review with the Team and Tree plantation

On-site discussion with the Team

Green practices

Background reference image Free photos on pixabay

4. Green Practices Audit

The increasing global warming and climate change have made us realise that apart from the enormous strategies the individual small efforts need to be taken by individuals and Educational Institutes as the younger generations are the future of the world and once they are taught about these practices only then can we assume a better future.

4.1 Green practices

We observed the following points during the Site investigation and data verification of the premises; these are common for all the Buildings in the premises.

- **Social awareness** - The College has taken up awareness drives on various social issues for rural upliftment and regeneration in the college and surrounding villages.
- **Cleanliness Campaign -** The Swachha Bharat Abhiyan is carried out on college premises as well as off-premises.
- **Fresh environment** – The College provides an eco-friendly ambience with fresh air and soothing environment which helps to maintain a physical and mental balance. This kind of a space it a must for an educational specially technical institute which is inviting and gives the stakeholders an opportunity to explore indoor and outdoor learning to a great extent.
- **Team work** – The best quality of the College which sets it apart from other institutes is its coordinating and cooperative staff members, as for a building the foundation plays the most important role for its future similarly for an educational institute its staff members do.
- **Universal design** – The College premises has special provisions such as ramps, toilets for the specially abled.

4.2 Community Development

The NSS Unit of the College is involved in multiple community development programs which include**, Blood Donation Camp, Food Kit Distribution Program to the neighbourhood community, Relief fund programs.**

4.3 Survey Results

An online survey was conducted to analyse the student and staff views about the Energy management practices adopted in College, following is the result received.

4.3.1 Participation

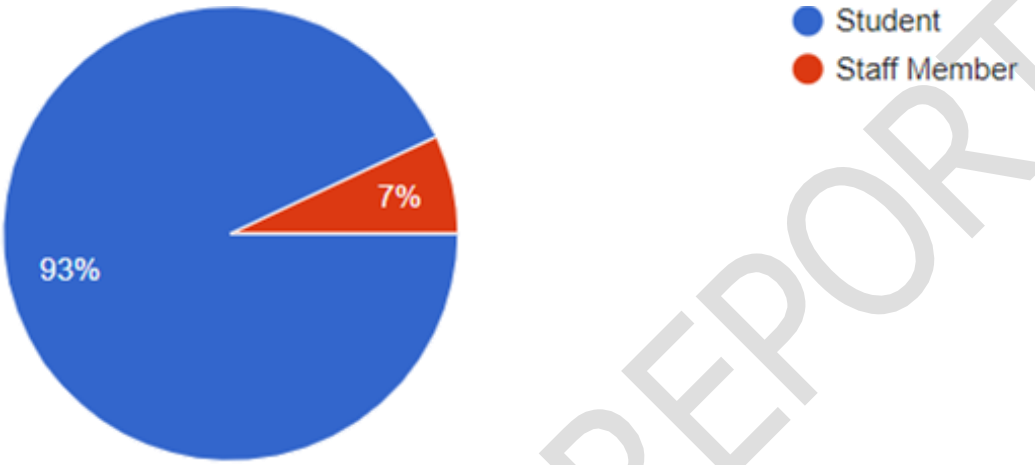

Figure 1: Participation analysis in the survey

A total of **228 responses** were received out of which 93% were students.

Note about the review-rating survey

The Participants were asked to review (Though an online mode) the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor
- Scale 2 – Satisfactory
- Scale 3 – Good
- Scale 4 – Very good
- Scale 5 – Excellent

The figures in each of the columns of graph depict the Number of participants responses in numerical (Percentage of the participant response) – For example 101 responses (44.5%)

4.3.2 Rate the Green awareness practices in College

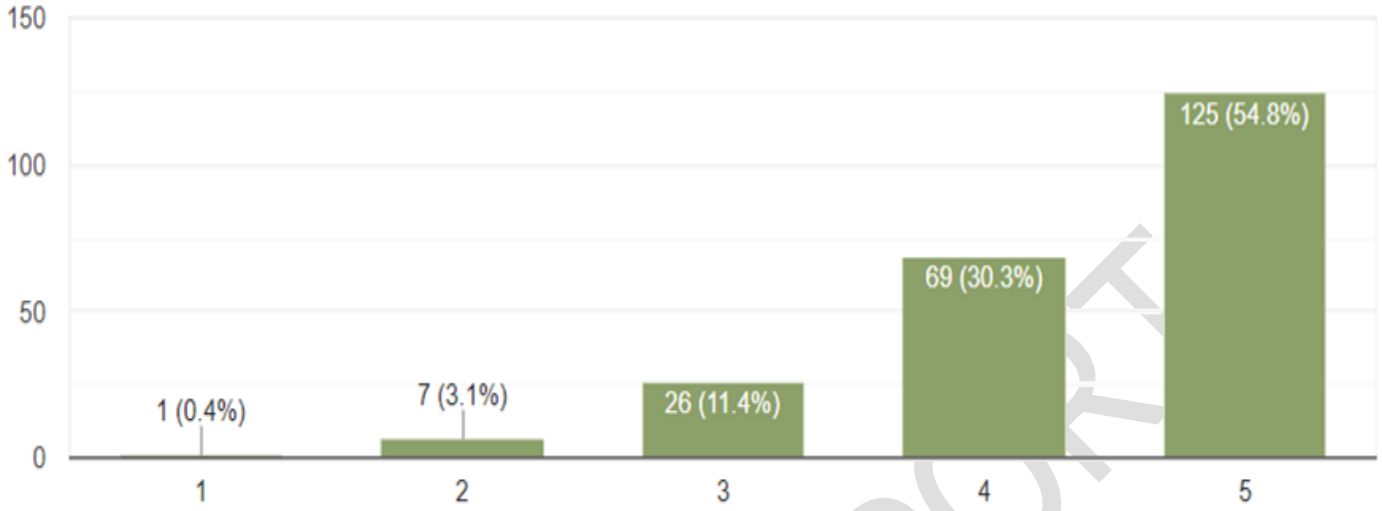

Figure 2: Green awareness practices in College

There were mixed responses received the highest was for **rating 5 (Excellent) at 55%** followed by **30% for rating 4 (Very good).**

4.3.3 Does your College conduct environment awareness programs/ webinars/ plantations/ cleanliness or similar programs?

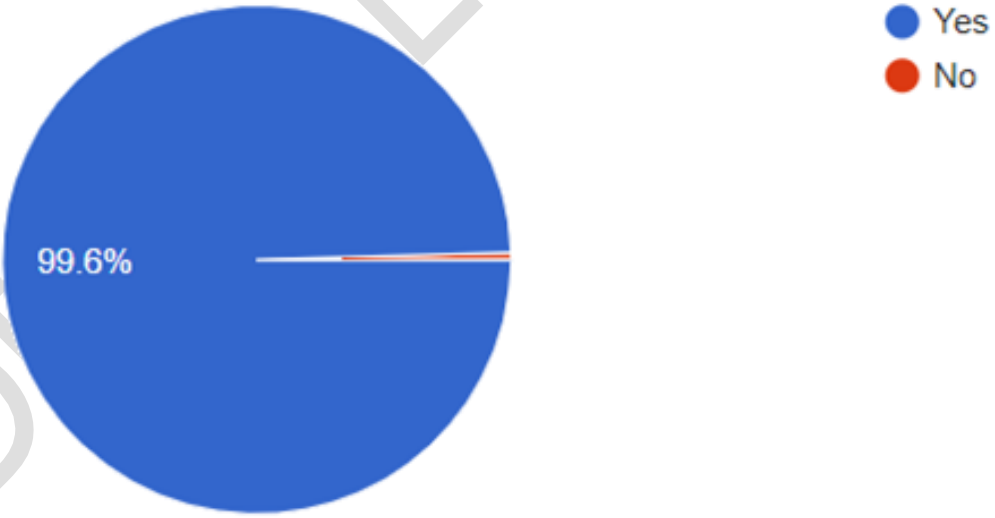

Figure 3: Confirmation of the environment awareness programs/ webinars/ plantations/ cleanliness or similar programs conducted by the College

The students, staff **100%** of responses confirmed that the activities are conducted this is excellent.

4.3.4 Do you participate is such events?

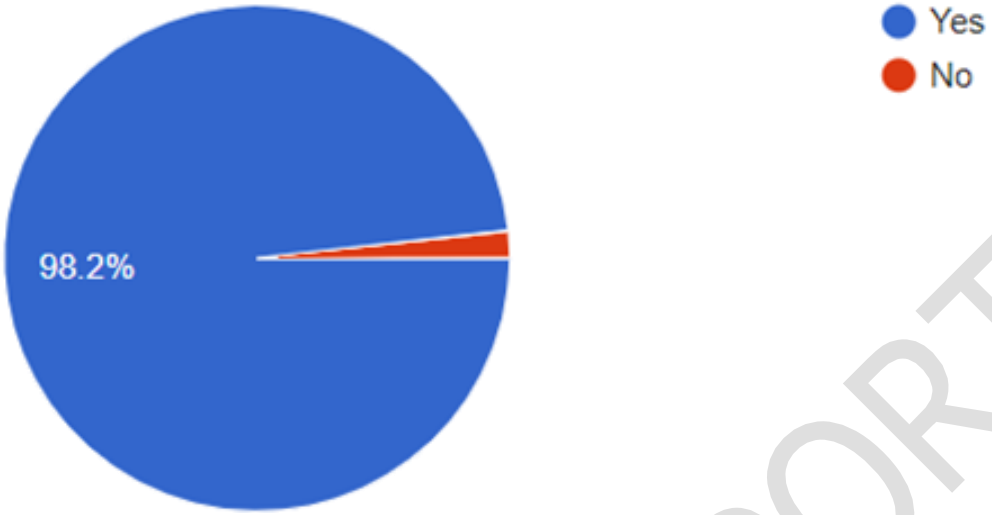

Figure 4: Participation in the environment awareness programs/ webinars/ plantations/ cleanliness or similar programs conducted by the College

The students, staff **almost 98%** of the responses confirmed their participation, **this is an excellent response.**

4.4 Suggestions related to section 'Green practices audit'

The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

a) Plant as a gift

As a kind gesture, the guests visiting the premise can be asked to plant a small plant on the premise itself and they can be even given plants/bouquets from the flowers of the plants on the premise as a gift.

b) Environmental awareness

There can be various artworks on the compound wall giving the message of saving the environment through the joint efforts of the students and staff thereby making the student socially and environmentally responsible citizens.

c) Signages on the plants mentioning scientific names

The practice of having the names of each plant and tree will provide awareness among the staff and students.

Waste Audit

Background reference image Polina Tankilevitch on pexels

5. Waste Audit

Waste is an inevitable part of our lives. Over the years as the awareness about waste management techniques has given a rise to rethink how the waste can be avoided form being sent to the landfills. The audit provides an approximation of the types of waste generated, location of waste collections, disposal techniques used, waste segregation methodologies adopted, waste management strategies that are and implemented in addition to the newer ways the can be adopted aiming to make the premise clean and sustainable. Here sustainable refers to a broader aspect to analyse whether the current techniques are having positive or negative effect on the stakeholders of the premises.

5.1 Waste produced

Types and disposal of waste in Premises

The college has established Compost /Vermicompost at garden having 96 sq. ft. of area with 2 tanks prepared compost utilized routinely for herbs in college, the 22nd of every month is celebrated as plastic collection drive which is further given to a local vendor.

S. No.	Type of waste	Source and quantity	Current Disposal method	Can be treated/ recycled?	Methodology
1	Solid waste	Toilets–Biodegradable waste	TREATED – Organic composting undertaken	Yes	CONTINUE - with the current practice
2	Paper waste	Newspaper and other paper	Given to vendor	Yes	TREATED – Adopt a Paper recycling unit
3	E-waste	Computers - Non-biodegradable waste as per the annual year usage	Given to vendor	Yes	CONTINUE - with the current practice
4	Dry waste in form of leaves	Open space & plantations, papers - Non biodegradable waste	TREATED – Organic composting undertaken	Yes	TREATED – Organic composting can be undertaken
5	Liquid waste	Toilets, washbasins – Around 100 – 120 litres per week during general times and 50 litres at present	TREATED - Sewage treatment plant	Yes	CONTINUE - with the current practice
6	Organic regular waste	Dust, dirt usually dry waste from Canteen and all sources	TREATED – Organic composting undertaken	Yes	CONTINUE - with the current practice

Table 3: Summary of the types of waste produced in the premises

5.2 Waste management

There are Small-sized, medium-sized and large-sized dustbins made of plastic material available at present.

5.3 Survey Results

Note about the review-rating survey

The Participants were asked to review (Though an online mode) the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor
- Scale 2 – Satisfactory
- Scale 3 – Good
- Scale 4 – Very good
- Scale 5 – Excellent

The figures in each of the columns of graph depict the Number of participants responses in numerical (Percentage of the participant response) – For example 101 responses (44.5%)

Rating for the views regarding the Waste management practices adopted in College, following is the result received.

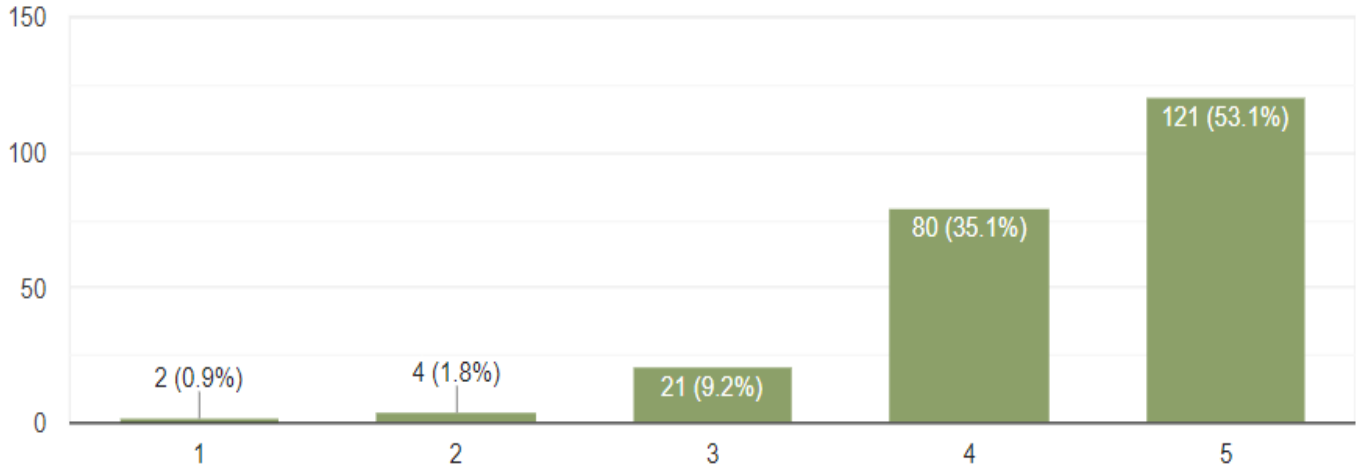

Figure 5: Waste management practices in College

There were mixed responses received the highest was for **rating 5 (Excellent) at 53%** followed by **35% for rating 4 (Very good).**

5.4 Suggestions related to section 'Waste Audit'

The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

- **Twin Dual Litter Dustbin Bins**

There should be more number of dual litter dustbins at various locations in areas such as Canteen, and open spaces. This would inculcate the awareness of waste segregation among students.

- **Dustbins at every 100m**

There should be a dustbin at every 50-100 in the open spaces

- **Material of the dustbin**

The current plastic dustbins should be replaced with eco-friendly material.

Water Audit

Background reference image Vlad Chetan on pexels

6. Water Audit

Water is one of the basic needs. Pure drinking water is a resource which needs to be preserved efficiently. Water audit helps to identify the sources of water consumption, the water requirement by the campus met by these sources. The points and effective usage of without any wastage. Understanding the techniques which are best suited to the site to increase water conservation in terms of awareness and practice.

6.1 Water availability and consumption

6.1.1 Sources of Primary water supply

The primary water supply refers to the drinking water. The main source of water is the Local Municipality. The water received is stored in water tanks at various locations. These are periodically cleaned and well maintained for hygiene purpose. **At present there are 14 overhead tanks; their capacities total up to 73,500 litres.**

6.1.2 Sources of Tertiary water supply

The tertiary source of water is the additional source of water harvesting. **At present there is natural rain water harvesting practiced to increase recharge of groundwater by capturing, by rainwater harvesting from rooftop run-offs. collected water from rooftop was discharge in bore well.**

6.2 Water requirement

The main areas of water requirement and type of usage is as follows

- **Drinking water –** Consumption of around 850-950 litres of water through Aquaguard like system available in the premise, the taps and water cooler.
- **Toilet blocks**– General usage by occupants in toilets, urinals, bathrooms, wash basins using approx. 400-600 litres of water daily.
- **Cleaning of the premises –** The entire Institution is very well maintained with respect to hygiene and cleaning is one of the major uses of water requirement. The toilet areas are cleaned twice on a daily basis.
- **Garden and surrounding open space** – Cleaning, watering the plants requires approximately 500 litres of water.

6.3 Areas of water usage

Based on the inventory done and data shared by the staff it was found that the premise has the following facilities:

- Urinals – 28 Nos.
- Toilets – 23 Nos.
- Wash basins – 140 Nos.
- Taps (Indoors) – 510 Nos.
- Taps (Outdoors) – 02 Nos.

As per the data shared by the College and on site observation, it was noted that there is no water wastage of water in the form of Cleanliness of toilets.

6.4 Site investigation about water management.

The College has an excellent management system which is very appreciable. We have observed the following points.

- There is **no water leakage in the entire premise;** the pipes are well maintained with adequate hygiene.
- **The premise has an efficient water management in terms of operations and maintenance.** The toilets are kept very tidy and are cleaned every day.
- The **waste water does not mix with ground water and gets directed to storm water drains.** There are sufficient numbers of taps in the premise.

6.5 Survey Results

Note about the review-rating survey

The Participants were asked to review (Though an online mode) the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor
- Scale 2 – Satisfactory
- Scale 3 – Good

- Scale 4 – Very good
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The figures in each of the columns of graph depict the Number of participants responses in numerical (Percentage of the participant response) – For example 101 responses (44.5%)

Rating for the views regarding the Water management practices adopted in College, following is the result received.

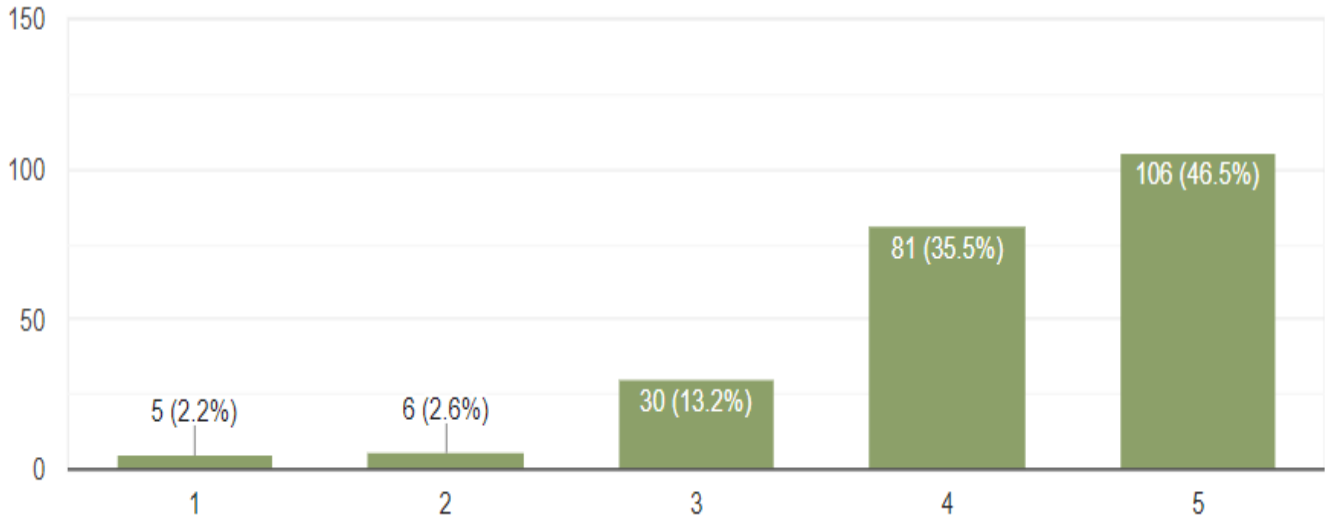


Figure 6: Water management practices in College

There were mixed responses received the highest was for **rating 5 (Excellent) at 47%** followed by **36% for rating 4 (Very good).**

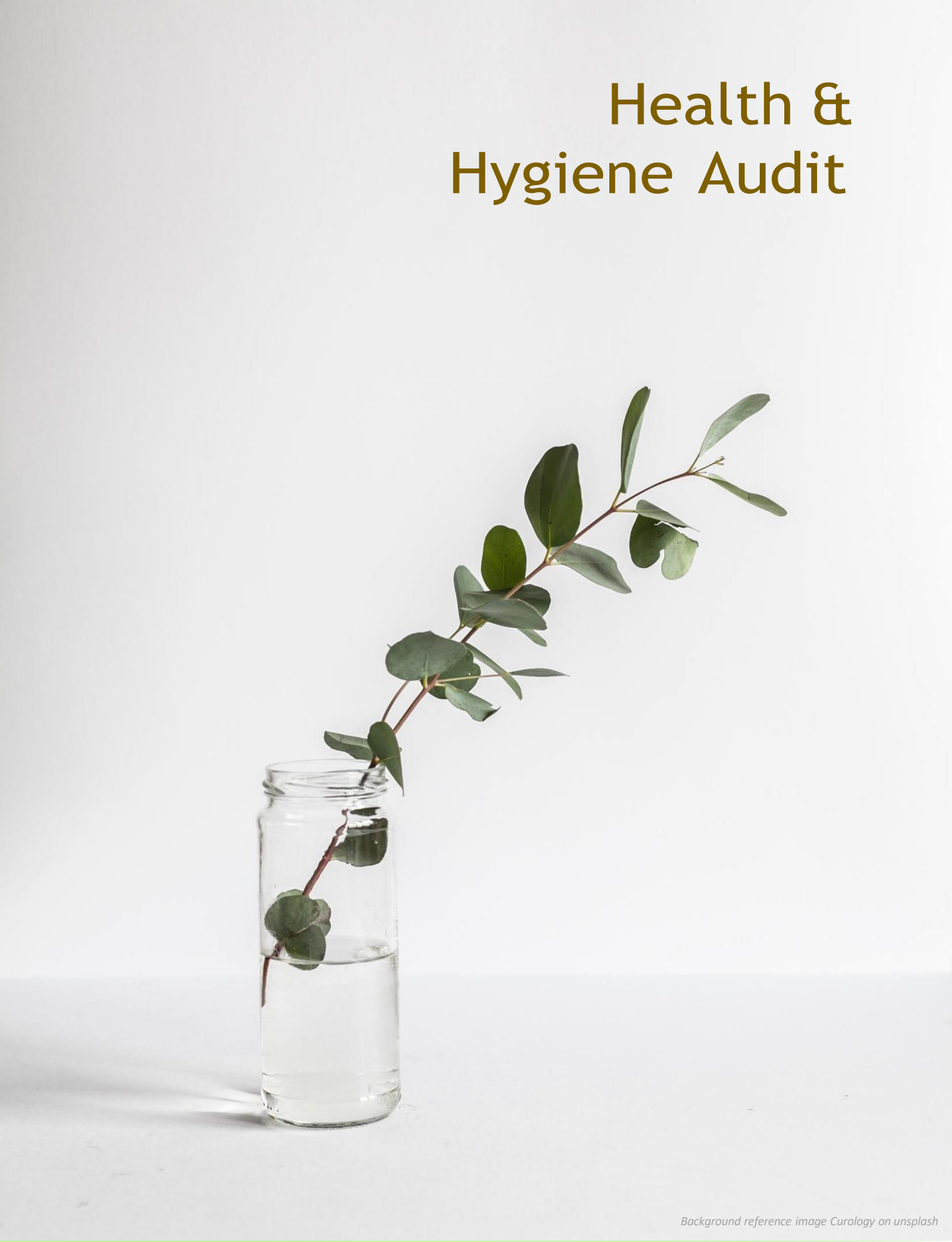
6.6 Suggestions related to section Water audit'

The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

➲ Waterless urinals

There can be the provision of waterless urinals as a Green Building initiative in the premise, either the existing ones can be replaced with such a facility or new toilets can be constructed in this manner.

Health & Hygiene Audit



Background reference image Curology on unsplash

7. Health and Hygiene Audit

The hygiene is a part and parcel of our daily life. It is extremely essential to keep the surroundings clean in the same manner as we would want our houses to be. Educational Institutes have a bigger role to play in order to affect the young minds in the positive manner through better hygienic practices.

7.1 Facilities available

The Institution has the following facilities as part of the premise.

- Washroom facility in each of the Building.
- Hand wash facility
- Drinking water facility in the form of Water coolers and taps
- Ample number of dustbins in the premise

7.2 Smoke Exposure

As per the Site visit the following analysis **has a positive impact on premises.**

- The College has No Smoking on its compound wall as part of the awareness.
- The Institution is a tobacco and smoke free campus which helps in adapting to a Healthy Institution

7.3 Hygiene

As per the Site visit the following analysis **has a positive impact on premises.**

- For overall hygiene of the students and staff there are facilities such as Washroom facility on ground floor, hand wash. The hygiene of toilet areas is well maintained**.**
- The staffs keep a regular check about the operation and maintenance of the equipments each floor.
- Water management initiative with appropriate hygiene is undertaken. The areas of water tanks in site on ground floor are clean and no mosquito breeding spots are there.

7.4 On-site investigation

During the physical verification of the site, the following points were noted.

- All the facilities are cleaned on a daily basis.
- The Maintenance staffs are allotted the responsibility of the washroom hygiene and they do a very commendable and excellent job to maintain hygiene of the premise.

7.5 Suggestions related to section 'Health and Hygiene'

The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

a) Pest control program

The college should practice pest control programs with appropriate sanitation facilities through an appropriate agency.

b) Designated staff for maintenance

There should be a designated Hygiene specialist and Maintenance staff who can keep a regular check on the operation and maintenance of the toilet areas and the equipment, lights, and all facilities.


Bella


Vermi Compost

8. Towards a Healthy & Sustainable Institution

The following suggestions are to be considered as a ***last priority*** for implementation. These **should be executed within the next 3.5 years** **from the date of the Report submission.** The Institute can execute a plan of action after discussion with Project Head.

- **Cutlery in the Canteen –** The regular plastic and steel plates, and spoons used in Canteen can be replaced with eco-friendly and organic leaves, paper straws, disposable plates, edible spoons, and tables made out of sugarcane waste or bamboo. This will be the first of its kind initiative to be adopted and practiced thus also inculcating healthy practices in students.

- **Terrace farming (Applicable only for the buildings with a flat roof) -** There can be the provision of terrace farming in a designated area of the open space this would enhance the biodiversity and be useful in training students and staff about the healthy practices and food grown which would be used in Canteen.

- **Waste vio –** University can tie-up with our organization and students can be encouraged to collect dry waste and electronic waste such as newspapers, old laptops, and others and hand them over on a weekly or monthly basis thereby making a waste reduction approach in the community. This has benefits such as awareness, and eco-friendly habits in becoming a responsible citizen.

- **Signages –** In addition to the signages being in regular language there can be additional signages in braille language for the specially-abled students.

9. References

The study is based on the data collected, analysed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below.

However, no direct references have been used anywhere. These are used as a base to analyse and study the data collected.

- Uniform Plumbing Code – India, 2008
- IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- IGBC Green Landscape Rating system, March 2013
- BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
- Used only for understanding Universal design - Universal accessibility Guidelines for Pedestrian, Non-motorizes vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National centre for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation.