

GREEN AUDIT

STUDY PERIOD (TWO YEARS) 2022 – 2023 & 2023 - 2024

Sustainability study

AUDIT REPORT

Studied for

Marwadi Sammelan's

B. M. Ruia Girls' College

11 Krishna Kunj, Vachcha Gandhi Road,
Gamdevi, Mumbai, Maharashtra. 400007

Studied in the capacity of

Accredited and Certified GBP



Studied by

Website: <https://thegreenviosolutions.co.in/>

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Background reference image Sasin Tiachai on unsplash

Disclaimer

The Audit Team has prepared this report for **Marwadi Sammelan's B.M.Ruia Girls' College, Mumbai** located at 11 Krishna Kunj, Vachcha Gandhi Road, Gamdevi, Mumbai, Maharashtra. 400007 based on input data submitted by the Institute 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 internal team. 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 who is 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.


Ar. Nahida Abdulla

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

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1. Introduction

1.1 About the Institution

1.1.1 Vision

The Institute envisions "Empowerment and Enlightenment of women by envisaging their aspirations in the light of wisdom"

1.1.2 Mission

The Institute aspires "Empowerment of women through academic excellence, promotion of the national language Hindi, cultural awareness and contribution towards nation building."

2. Overview

2.1 Summarised Populace analysis

2.1.1 Students data

The data (shared by Institute) shows there were:

- 386 students in 2023-24
- 464 students in 2022-23

2.1.2 Staff data

The data (shared by Institute) shows there were:

- 30 staff members (Admin + Teaching + Non-teaching) in 2023-24
- 29 staff members (Admin + Teaching + Non-teaching) in 2022-23

For analytical purposes the populace of academic year 2023-24 shall be taken into consideration, which is 386 students + 30 staff members;

Thus, total populace stands at 416 nos.

3. Observation

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Evidence documents for Site visit of external audit team


Audit team headed by external expert - Ar. Nahida Abdulla
Accredited & Certified Green Building Professional, ISO IA (IMS)
Audit objective: Green Building up gradation of the premises

Audits covered: ☒ Green audit ☒ Energy audit ☒ Environment audit


Institute: Maswadi Sammelan's B.M. Ruia Girls' College, Mumbai Date: 23-11-2024


Document objective: Inferences of the Site visit

Observations (Positive aspects)	Suggestions (Improvement aspects)
Green Audit	
<ul style="list-style-type: none"> - Regular waste handover undertaken as per city government norms roughly 10 or 12 kg's 	<ul style="list-style-type: none"> - Documentation & display can be improved. - Waste management practices too can be improved
Energy Audit	
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Environment Audit	
<ul style="list-style-type: none"> - AQI was tested as per city levels, there is scope for improvement. 	<ul style="list-style-type: none"> - Introduce more campus beautification parameters.



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Plate 1: Evidence files related to inferences of the site visit

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Mumbai

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Meeting with the core team



Investigation of the systems

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Plate 2: Evidence files related to proof of the site visit

4. Investigation

The following results were carried out during visit on **23 November 2024**



Figure 1: Water testing investigation study

4.1 Drinking water testing

S. No.	Block	Filter specific location or floor location	Required level	Actual level	Inference
1.	Main	Third - (Inside toilet water cooler)	50	37	Excellent, no change
2.	Main	Third – (Staff room)	50	35	Excellent, no change

Table 1: Drinking water testing details

5. Documentation

5.1 Green Practices Audit

5.1.1 Green practices

The practices undertaken as an awareness/ sensitization activity with stakeholder involvement have been documented below:

S. No.	Initiative	Date
Academic year 2022-2023		
1.	Cleanliness Drive Program - Swachh Bharat Abhiyan	12 Aug. 2022
2.	NSS Unit organized an Awareness Program about "Say No Plastic" on the occasion of NSS Day.	24 Sept. 2022
3.	NSS Unit organized a Premises Cleaning Activity under 'Clean India Campaign'	15 Oct. 2022
Academic year 2023-2024		
4.	NSS Unit organized a Poster making on the topic 'Energy Consumption (Save Energy: Save Environment and Life) under the G20 3rd Energy Transition guidelines received from Government of India	15 May 2023
5.	NSS Unit organised a National Webinar on Lifestyle for Environment under G20, 3 rd Energy Transition	17 May 2023
6.	Under "Swachhata Hi Seva Campaign" - 45 volunteers of NSS Unit carried out a cleanliness campaign of the college premises under the "Swachhata Hi Seva Campaign"	23 Sept. 2023
7.	On the occasion of National Service Scheme (NSS) Day (24 th September) a program was organized on the topic 'Say No Plastic' by Program Officers of NSS Unit of the college under "Swachhata Hi Seva Abhiyaan"	25 Sept. 2023
8.	Under the "Swachhata Hi Seva Abhiyan", A cleanliness campaign program was carried at adopted village Umroli, Gram Panchayat located in Palghar (district)	30 Sept. 2023
9.	Awareness session on the occasion of World Water Day by NSS P.O.s	22 March 2024

Table 2: Details of the environmental initiatives undertaken by Institute

The study suggests that the nos. of practices should be increased.

5.1.2 Community development

The details of **extension initiatives** under various heads in Institute are documented below:

S. No.	Type	Since	Coordinator name
1	National Service Scheme (NSS)	2022-23	Dr. Hemlata Masiwal
2	National Cadet Corps (NCC)	2017-18	Dr. Beenu Singh
3	Employability Skills centre	2022-23	Dr. Anita Jacob

Table 3: Details of the extension initiatives by the Institute

5.2 Waste Audit

5.2.1 Waste management (Parameters adopted)

The following practices are common to entire campus.

S. No.	Type	Current practice	Proposed practice
1.	Solid waste (Toilets)	No information provided	It was observed waste shall be connected to storm water drain due to lack of any dedicated biogas plant, continue with the practice.
2.	Organic waste (Regular)	No information provided	Organic composting can be undertaken
3.	Liquid waste (Toilets, wash basins)	No information provided	It was observed waste shall be connected to storm water drain - Continue with the practice
4.	Chemical waste from laboratories	No information provided	Not applicable
5.	Toxic waste from laboratories	No information provided	
6.	E-waste	Annually collected	Continue with the practice
7.	Plastic waste	We do not generate much plastics.	Continue with the practice
8.	Furniture waste	No information provided	Tie-up with an appropriate vendor
9.	Paper waste	No information provided	Tie-up with an appropriate vendor
10.	Bio-waste (Sanitary)	Separate dustbins for Bio-waste	Continue with the practice

Table 4: Details of the waste management practices

5.2.2 Dustbins study

There are 26 dustbin in the indoor and 2 in outdoor areas.



Plate 3: Dustbins inside the premises and 80-100 litres bins in outdoor areas for campus waste

5.3 Water Audit

5.3.1 Water availability and consumption

5.3.1.1 Source of Primary water supply

The facilities are noted below:

S. No.	Type	Nos.	Capacity (litres)	Last cleaning date	Any water testing done externally? If yes details
1	Underground	1	Not provided	Not provided	No
2	Overhead	1	Not provided	Not provided	Not provided
Total		2			

Table 5: Water tanks in the premises

5.3.1.2 Source of Secondary water supply

The Institute uses water supply for secondary usages such as watering plants, toilets, and wash basins and other spaces. There are no such sources.

5.3.1.3 Source of Tertiary water supply

The tertiary source of water is the source of water harvesting; due to the geographical site constraint the local government does not permit practicing of rain water harvesting through underground pit; additionally having an overhead tank may not seem to be feasible due to lack of space availability.

5.3.1.4 Source of Reusing waste water

This initiative cannot be practiced due o lack of space.

5.3.1.5 Sensitization initiatives

There are no dedicated related to water conservation that have been undertaken.

5.3.1.6 Water proportion study

This section studies the total consumption of water and its proportion with the water recharged and saved on the premises.

- ➔ As per the Chapter 2 of the Report, total footfalls in premises were **416 nos.**
- ➔ As per NBC norms for Educational buildings with boarding facilities the water requirement is **90 litres per head for drinking water and 45 litres per head for flushing** (secondary) purposes thus making it 135 litres/ per day.
- ➔ However, in practical usage a stakeholder can use minimum of **0.5 to 1 litres for drinking and 6 to 8 litres for secondary purposes**, thus reframing the norm to actual requirement of $0.5 + 6 = 6.5$ litres
- ➔ Thus, $6.5 \text{ litres} \times 416 \text{ populace} \times 280 \text{ (Min. working nos. of days)} = \mathbf{7,57,120 \text{ litres is the total water requirement}}$ (Average assuming certain nos.)
- ➔ Bifurcating this study further we can assume **0.5 litres x 416 populace x 280 days = 58,240 litres for drinking** and primary purposes
- ➔ For primary and secondary purposes – The overhead and underground water tanks are available (Capacity not provided)
- ➔ However, team did not inform any kind of deficiency in availability of water supply.

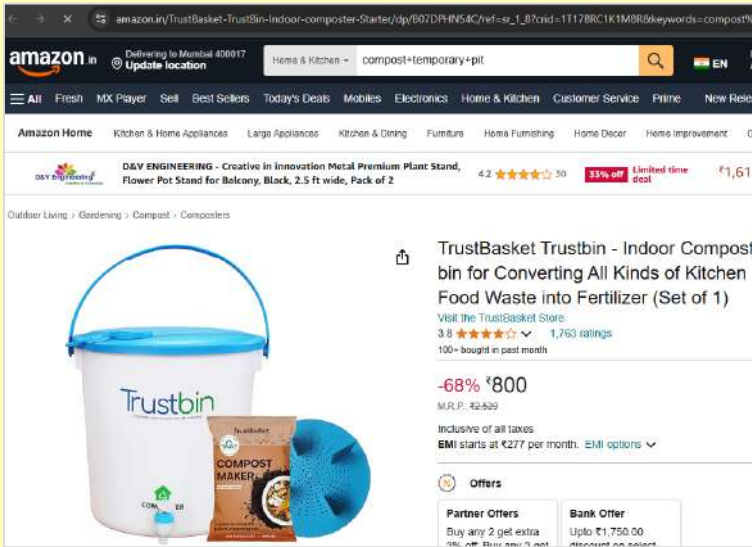
5.4 Health and Hygiene Audit

There are facilities such as dustbin and display of emergency contact nos. availability sanitary vending machine s informed by team.

6. Suggestion

The suggestion (inference) would act as a 'PLAN OF ACTION' to implement all the suggestions in a detailed manner.

- ➡ Conduct the 'Before' and 'After' study with photos
- ➡ Document the same in 'Action taken report'

S. No.	Aspect with evidence if any	Suggestion
1.	Green practices aspect <u>Aspect area:</u> Social initiatives	Undertake Unnat Bharat Abhiyan project
2.	Waste aspect <u>Aspect area:</u> Organic composting	Undertake composting on Institute level using Biocomposter 
3.	Water aspect <u>Aspect area:</u> Information display	Every water tank/ external pit/ water cooler should be painted with information as follows: <ul style="list-style-type: none"> ➡ Nos. ➡ Size (Diameter or L X B X H/ D) ➡ Capacity in cu. Litres or litres ➡ Usage – Primary (Drinking); Tertiary (Rain water) and Secondary (Cleaning, washing, flushing, watering etc.) ➡ Last cleaning maintenance date and by whom ➡ Name and logo of the Institute

4.	<p>Health & Hygiene aspect</p> <p>Aspect area:</p> <p>Zone demarcation through signages</p>	<p>Introduce zone boards (Optional through mention of state/ central govt. acts) at entrance of the premises in an enlarged A1 poster</p> <div data-bbox="624 331 1077 1010"> </div> <div data-bbox="1091 331 1528 1010"> </div> <p><i>Sample images for zones</i></p> <p>Image source: Compliance signs</p>
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Table 6: Observation based suggestion study of the campus

7. Compilation

The study is based on the data collected, analyzed, 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 analyze and study the data collected.

- ➔ IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- ➔ IGBC Green Landscape Rating system, March 2013

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Plate 2: Evidence files related to proof of the site visit

4. Investigation

The following results were carried out during visit on **23 November 2024**

4.1 Micro detail study

1. Library (2nd floor) @ 08:47

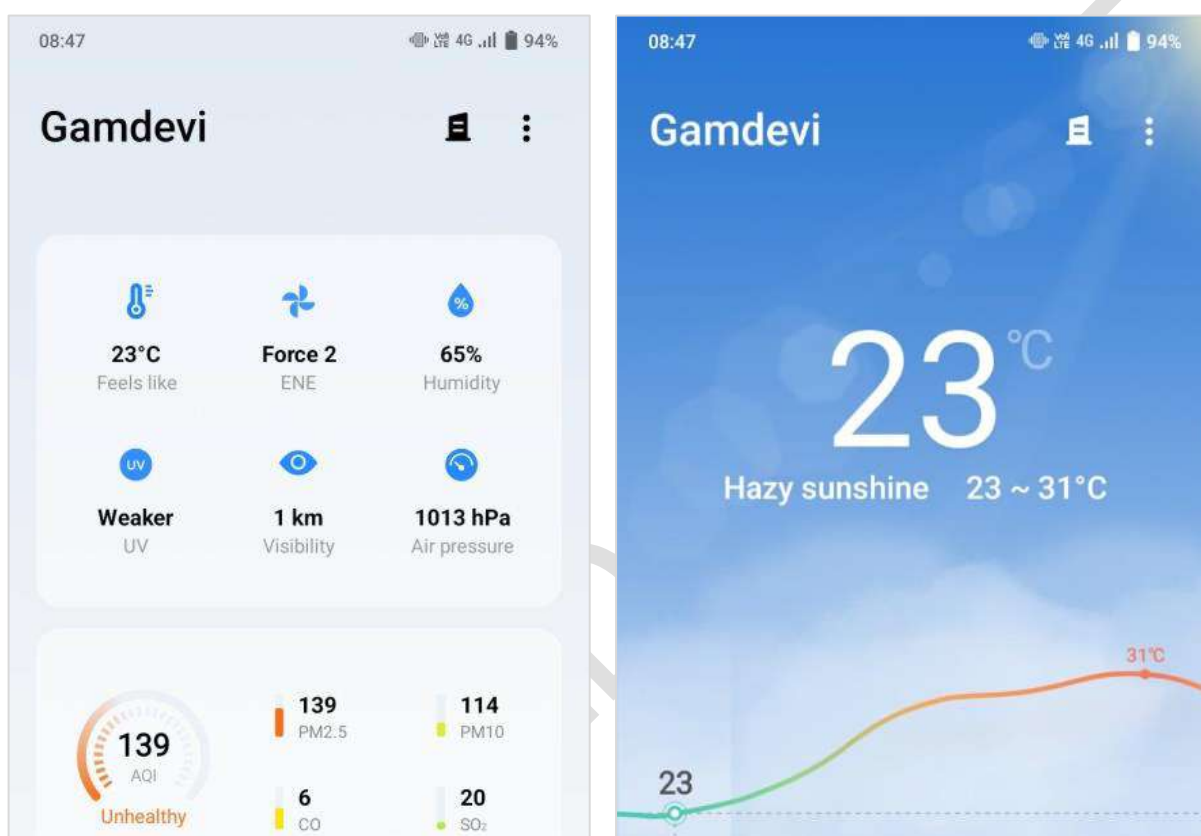


Figure 1: Study at Library (2nd floor)

The details are noted below:

- ➡ Micro-climate temperature of site in Degree Celsius – 23
- ➡ Particulate matter 2.5 micrometres or less in diameter (PM_{2.5}) – 139
- ➡ Particulate matter 10 micrometres or less in diameter (PM₁₀) – 114
- ➡ Carbon Monoxide (CO) – 6
- ➡ Sulphur dioxide (SO₂) – 20
- ➡ **As per the application the AQI was 139 and found to be 'Unhealthy'**

2. Auditorium (4th floor) @ 10:46

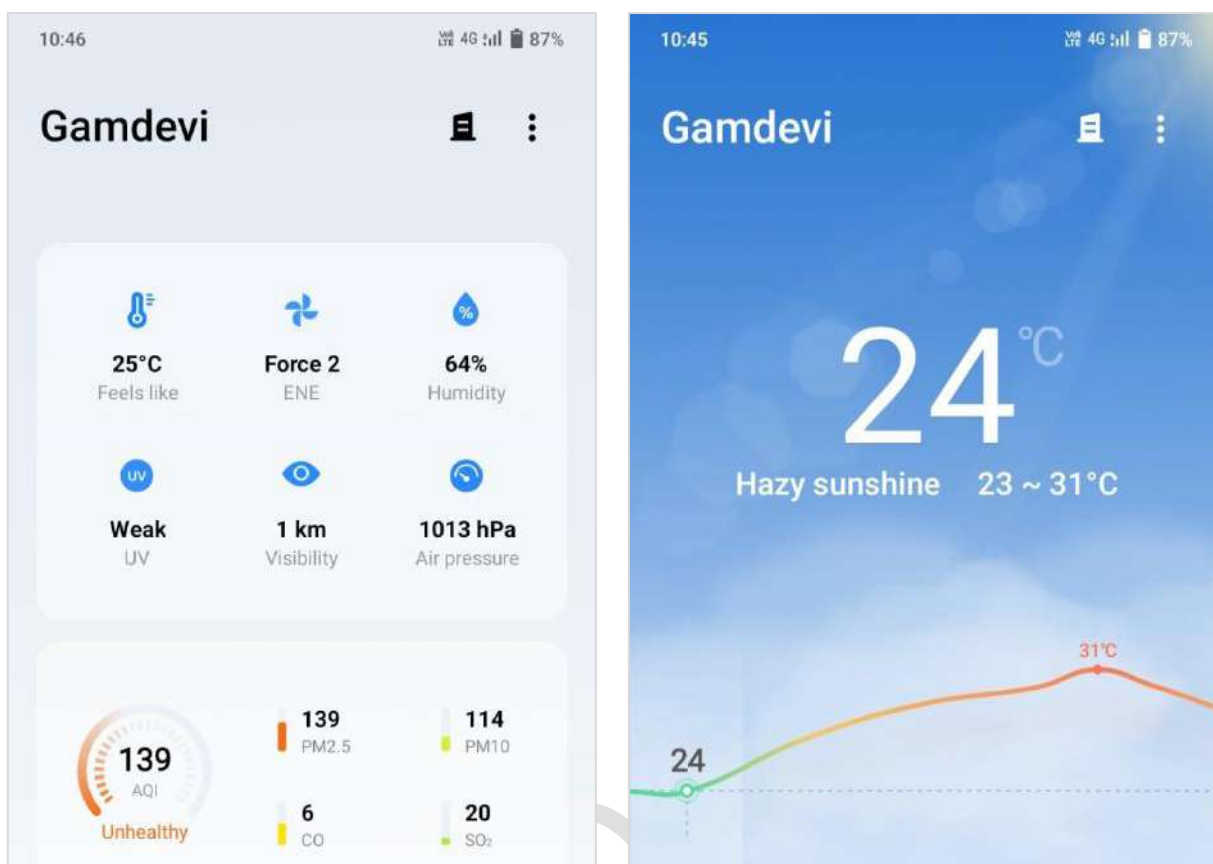


Figure 2: Study at Auditorium (4th floor)

The details are noted below:

- ➡ Micro-climate temperature of site in (degree Celsius) – 24
- ➡ Particulate matter 2.5 micrometres or less in diameter (PM_{2.5}) – 139
- ➡ Particulate matter 10 micrometres or less in diameter (PM₁₀) – 114
- ➡ Carbon Monoxide (CO) – 6
- ➡ Sulphur dioxide (SO₂) – 20
- ➡ **As per the application the AQI was 139 and found to be 'Unhealthy'**

4.2 Macro summary study

4.2.1 Institute level

This study is the combined study of all the micro-studies taken place in previous section to draw a specific conclusion of overall AQI.

S. No.	Space	AQI	Result	Requires improvement
1.	Library (2nd floor) @ 08:47	139	Unhealthy	Yes – To be improved
2.	Auditorium (4th floor) @ 10:46	139	Unhealthy	Yes – To be improved

Table 1: Macro level study of the site – AQI parameters

The above study was conducted using the HuaFeng Accuweather software.

As the above study shows the sampling carried in all areas following are major observations:

- ➔ The AQI is 'Unhealthy' on both floors
- ➔ The AQI remains constant even as one approaches the above floors

4.2.2 City level

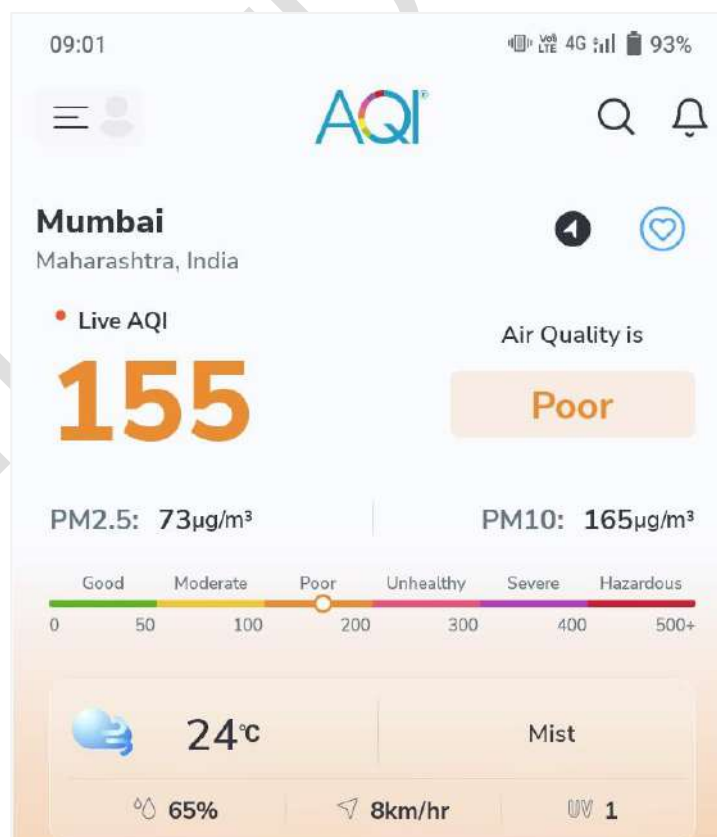


Plate 3: AQI study - Macro level from a carbon footprint aspect

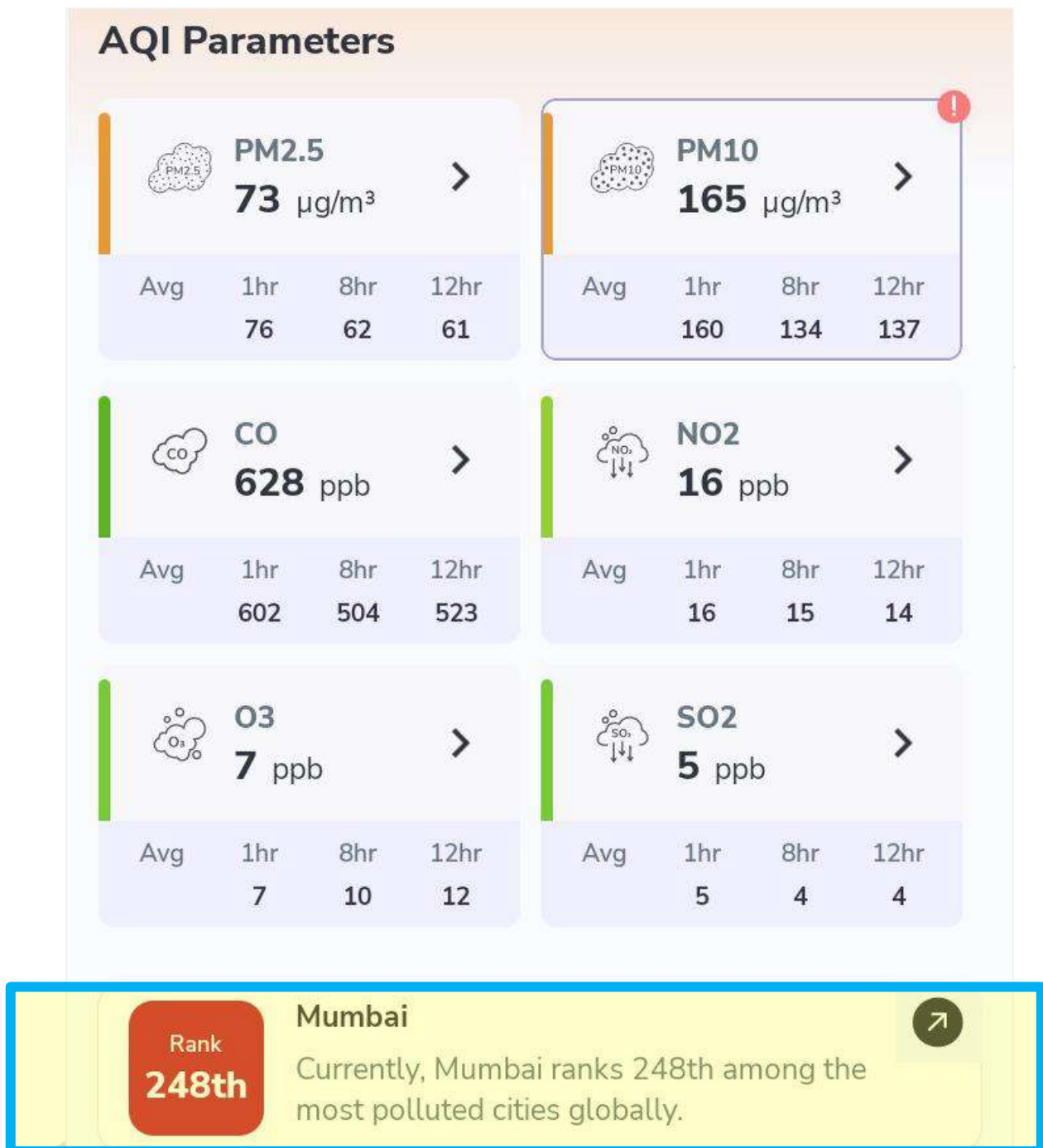


Plate 4: Macro level study continued

As per above study through the AQI software (Referring to the blue highlighted box) Mumbai is considered among polluted cities.

5. Documentation

5.1 Ecological audit

This refers to the land ecology focusing on green cover of the premises.

The Institute spread over 629.60 sq. m comprising a mixed use of residential and educational typology within a small site. There are no dedicated open grounds within site.

Land cover of the site includes - On a detail note, the green cover of the site is surrounded with trees on periphery of site and potted plants on terrace areas (Due to lack of space).



Plate 5: Potted plants within the building premises



Plate 6: Outdoor open ground (Green)

5.2 Biodiversity audit

5.2.1 Flora audit

The details of the flora are documented below.

S. No.	Plant name	Type	Nos.	Planted by
1	<i>Dracaen Marginata</i>	Plant	5	Purchased by College
2	<i>Hibicus</i>	Plant	2	Purchased by College
3	<i>Marigold</i>	Plant	1	Purchased by College
4	<i>Bamboo</i>	Plant	17	Purchased by College
5	<i>Papaya</i>	Plant	2	Purchased by College
6	<i>Money Plant</i>	Plant	2	Purchased by College
7	<i>Lime</i>	Plant	1	Purchased by College
8	<i>Yucaa</i>	Plant	4	Purchased by College
9	<i>Cowpea</i>	Plant	6	Purchased by College
10	<i>Water Crass</i>	Plant	1	Purchased by College
11	<i>Rose</i>	Plant	6	Purchased by College
12	<i>Garden Croton</i>	Plant	2	Purchased by College
13	<i>Seguine</i>	Plant	5	Purchased by College
14	<i>Cactus</i>	Plant	4	Purchased by College
15	<i>Aloevera</i>	Plant	2	Purchased by College
16	<i>Radiator</i>	Plant	1	Purchased by College
17	<i>Gale of the Wind</i>	Plant	4	Purchased by College
18	<i>Areca Palm</i>	Plant	3	Purchased by College
19	<i>Mikewood Pine</i>	Plant	1	Purchased by College
20	<i>Chambeyronia Macrocarpa</i>	Tree	1	Purchased by College
21	<i>Golden Camelia</i>	Tree	1	Purchased by College
22	<i>Red beed Tree</i>	Tree	1	Purchased by College
23	<i>Cuban Royal Palm</i>	Plant	7	Purchased by College
24	<i>Kadam</i>	Tree	1	Purchased by College
25	<i>Creeper</i>	Plant	1	Purchased by College
26	<i>Elm</i>	Plant	1	Purchased by College
27	<i>Birthwort</i>	Plant	1	Purchased by College
28	<i>Philodendorm</i>	Plant	1	Purchased by College

Table 2: Details of the plantations in the site

As per the above data there are 84 nos. of plantations within the premises.

5.2.2 Fauna audit

The fauna includes local birds such as crows, parrots etc.

5.3 Carbon Footprint Audit - Heat Island Reduction

5.3. Light pollution study

This type of pollution is not experienced within premises

5.3.2 Heat Island Reduction

The heat island effect refers to the study of micro climatic feature within a site. There are multiple factors that add on to the feature such as external temperature, internal temperatures, site context including available and site adjacent facilities. Observed features include:

- Shaded area within site keeps temperature cool due to trees and residential spaces around the premises
- Lack of natural ventilation due to old building construction
- Lack of open terrace space due to water tank, plantations and storage covered all over



Plate 7: Storage and plantations on terrace; Certain natural ventilation areas outside auditorium

5.4 Noise Audit

This study is conducted within site premises.

5.4.1 Micro-level detail inputs



Figure 3: Noise study at Library (second floor) and Auditorium at fourth floor

5.4.2 Macro level summary inputs

S. No.	Space	Actual Noise (dB)	Max. Noise (dB)	Requires improvement
1.	Library (2nd floor) @ 08:47	79.3	50	YES - To be improved
2.	Auditorium (4th floor) @ 10:46	83.3	50	YES - To be improved

Table 3: Summary study of the noise

The above study was conducted using the NoiseCapture software.

As the above study shows the sampling carried in all areas following are major observations:

- ➡ The noise levels are more than the limit on both floors.
- ➡ The lack of larger spaces for educational activities and unavailability of acoustical features add to the higher results

5.5 Site audit (Amenities perspective)

The following amenities were observed for stakeholder assistance in Main block.

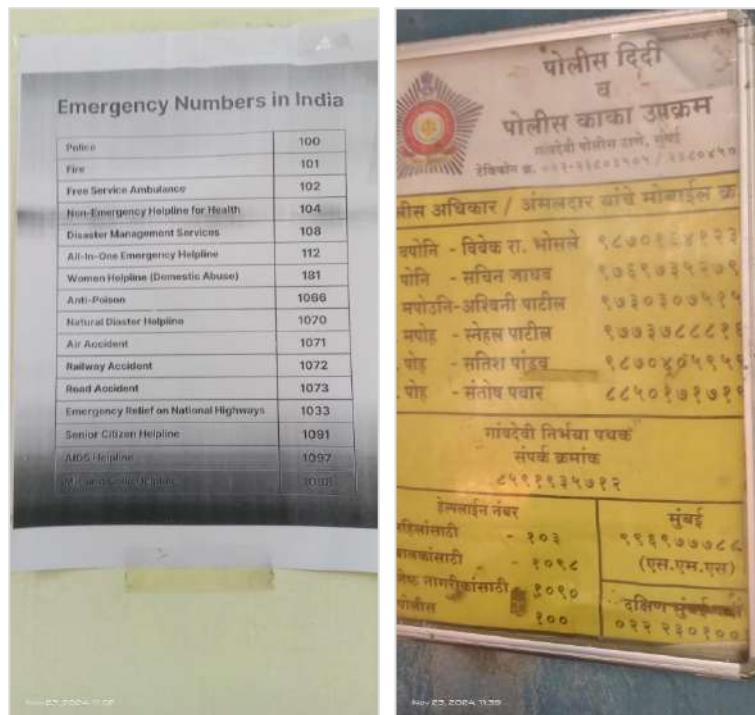


Plate 8: Display of emergency contact nos.



Plate 9: Wifi and outdoor seating benches

6. Suggestion

The suggestion (inference) would act as a 'PLAN OF ACTION' to implement all the suggestions in a detailed manner.

- ➔ Conduct the 'Before' and 'After' study with photos
- ➔ Document the same in 'Action taken report'

S. No.	Aspect with evidence if any	Suggestion
1.	Ecological aspect Aspect area: Improve green cover	There is scope to improve and increase the ecological cover through potted plants (light weight) and plastic bottle green walls.
2.	Biodiversity aspect Aspect area: Water and food feeders	<p>At appropriate locations there can be provisions for drinking water and some grains for birds as they visit the site much frequently.</p> <div data-bbox="662 1021 1021 1552" data-label="Image"> </div> <div data-bbox="1043 1021 1522 1552" data-label="Image"> </div> <p style="text-align: center;"><i>Food and water feeder</i></p> <p>Waste plastic bottles can be recycled & used as a student activity</p>
3.	Biodiversity aspect Aspect area: Numbering the plantations in the premises	<p>Make a list of all the plantations in the premises and start numbering the plantations in either of the ways:</p> <ol style="list-style-type: none"> 1. Paint the nos. on iron plates and nail the same 2. Print nos. on paper, laminate and paste the same 3. Paint the nos. directly



		<p>Sample image for 3 examples are noted below.</p>  <p><i>Options for numbering the plantations</i></p> <p>Care should be taken that the display should be visible.</p> <p>Uniform color palette should be identified and used.</p> <p>Measures should be taken to avoid withering during monsoon.</p> <p>This could be undertaken as a student activity.</p>
4.	<p>Carbon footprint aspect</p> <p>Aspect area: Environment monitoring</p>	<p>Install CO₂ monitor in public areas of indoor areas such as porch and AQI meter in outdoor areas near compound wall</p>
5.	<p>Noise aspect</p> <p>Aspect area: Demarc & display board about Silent zone</p>	<p>A signboard highlighting and 'No honking or Silent zone' should be displayed outside campus near all entrance gates; near roadside approach of site (Outdoor areas) and 'Quite zone' outside the library space (Indoor areas)</p> 

Table 4: Observation based suggestion study of the campus

7. Compilation

The study is based on the data collected, analyzed, 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 analyze and study the data collected.

National references

- ➔ IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- ➔ IGBC Green Landscape Rating system, March 2013

International references

- ➔ The city of Cheyenne, Streetscape/ Urban Design elements - Wyoming Planning Association, Gillette, Wyoming, United States
- ➔ Streetscape elements – Chapter 6 on San Francisco
- ➔ American lung association <https://www.lung.org/>
- ➔ Study related to air pollution <https://www.airgle.com/>
- ➔ Exploring the light pollution <https://education.nationalgeographic.org/>
- ➔ Urban heat island effect <https://www.epa.gov/heatislands/what-you-can-do-reduce-heat-islands>

ENERGY AUDIT

STUDY PERIOD (TWO YEARS) 2022 - 2023 & 2023 - 2024

Sustainability study

AUDIT REPORT

Studied for

Marwadi Sammelan's

B. M. Ruia Girls' College

11 Krishna Kunj, Vachcha Gandhi Road,
Gamdevi, Mumbai, Maharashtra. 400007

Studied in the capacity of

Accredited and Certified GBP



Studied by

Website: <https://thegreenviosolutions.co.in/>

Email: greenviosolutions@gmail.com

Disclaimer

The Audit Team has prepared this report for **Marwadi Sammelan's B.M.Ruia Girls' College, Mumbai** located at 11 Krishna Kunj, Vachcha Gandhi Road, Gamdevi, Mumbai, Maharashtra. 400007 based on input data submitted by the Institute 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 internal team. 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 who is 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.

Ar. Nahida Abdulla

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 extends its appreciation to **Marwadi Sammelan's B.M.Ruia Girls' College, Mumbai, 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 extended are due to everyone from the Management.

Our heartfelt thanks are extended to the Chairperson of the entire process - **Dr. Santosh Kaul Kak** (Principal) for the valuable inputs.

We are also thankful to Institute's Task force who have played a major role in data collection.

- ➔ Teaching staff member – **Dr. Usha Kiran Tiwari, Associate Professor and Head**
- ➔ Admin staff member – **Mrs. Sharmila Sharma, Ms. Poonam Shukla**
- ➔ Non-teaching staff member – **Mr. Marathe**

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1. Introduction

1.1 About the Institution

1.1.1 Vision

The Institute envisions "Empowerment and Enlightenment of women by envisaging their aspirations in the light of wisdom"

1.1.2 Mission

The Institute aspires "Empowerment of women through academic excellence, promotion of the national language Hindi, cultural awareness and contribution towards nation building."

2. Overview

2.1 Summarised Populace analysis

2.1.1 Students data

The data (shared by Institute) shows there were:

- 386 students in 2023-24
- 464 students in 2022-23

2.1.2 Staff data

The data (shared by Institute) shows there were:

- 30 staff members (Admin + Teaching + Non-teaching) in 2023-24
- 29 staff members (Admin + Teaching + Non-teaching) in 2022-23

For analytical purposes the populace of academic year 2023-24 shall be taken into consideration, which is 386 students + 30 staff members;

Thus, total populace stands at 416 nos.

3. Observation

1 | Page

Evidence documents for Site visit of external audit team


Audit team headed by external expert - Ar. Nahida Abdulla
Accredited & Certified Green Building Professional, ISO IA (IMS)
Audit objective: Green Building up gradation of the premises

Audits covered: ☒ Green audit ☒ Energy audit ☒ Environment audit


Institute: Maswadi Sammelan's B.M. Ruia Girls' College, Mumbai Date: 23-11-2024


Document objective: Inferences of the Site visit

Observations (Positive aspects)	Suggestions (Improvement aspects)
Green Audit	
<ul style="list-style-type: none"> - Regular waste handover undertaken as per city government norms roughly 10 or 12 kg's 	<ul style="list-style-type: none"> - Documentation & display can be improved. - Waste management practices too can be improved
Energy Audit	
<ul style="list-style-type: none"> - Fire related awareness programs undertaken as informed by - Fire extinguishers too are available 	<ul style="list-style-type: none"> - Fire & life safety aspects can be improved - Introduce renewable source (solar/wind)
Environment Audit	
<ul style="list-style-type: none"> - AQI was tested as per city levels, there is scope for improvement. 	<ul style="list-style-type: none"> - Introduce more campus beautification parameters.



Signature & round seal
Name: Dr. Nooruzia Qazi
Designation: IQAC coordinator
For the said Institute





Signature & round seal
Name: Mrs. Chalkin
Designation: Project Coordinator
For The Greenvio Solutions

Website: thegreenviosolutions.co.in Email: greenviosolutions@gmail.com




Plate 1: Evidence files related to inferences of the site visit

Evidence documents for Site visit of external audit team

Audit team headed by external expert - Ar. Nahida Abdulla
Accredited & Certified Green Building Professional, ISO IA (IMS)
Audit objective: Green Building up gradation of the premises

Audits covered: ☒ Green audit ☒ Energy audit ☒ Environment audit

Institute: Marwadi Sammelani B. M. Ruia Girls' College Date: 23-11-2024
Mumbai

Document objective: Proof of the Site visit



Meeting with the core team



Investigation of the systems

Signature & round seal
Name: Dr. Nooruzia Qazi
Designation: IQAC Coordinator
For the said Institute



Signature & round seal
Name: Mrs. Farheen Siddiqui
Designation: Project Coordinator
For The Greenvio Solutions



Website: thegreenviosolutions.co.in Email: greenviosolutions@gmail.com



Plate 2: Evidence files related to proof of the site visit

4. Investigation

The micro-climate temperatures of the site depends upon various factor including through evapotranspiration, trees and other vegetation cool the air around them. (Reference and further edited with details

from dnr.louisiana.gov) The base temperature for thermal comfort in India is 24°C (75°F) – Reference study

[https://www.researchgate.net/post/What_is_the_base_temperature_for_thermal_comfort_in_India#:~:text=The%20base%20tempera%20for%20thermal%20comfort%20in%20India%20is,C%20\(75%C2%B0F\).](https://www.researchgate.net/post/What_is_the_base_temperature_for_thermal_comfort_in_India#:~:text=The%20base%20tempera%20for%20thermal%20comfort%20in%20India%20is,C%20(75%C2%B0F).)

The following results were carried out during visit on **23 November 2024.**

S. No.	Space	Result (°C)	Required (°C)	Improvement required
1.	Library (2nd floor) @ 08:47	23	24	No
2.	Auditorium (4th floor) @ 10:46	24	24	No

Table 1: Results for the micro-climate temperature study

The above study was conducted using the HuaFeng Accuweather software.

As the above study shows the sampling carried in all areas following are major observations:

- As the floor rises the temperature rises.
- Almost all spaces have temperatures within limit

The reason for such good results can be:

- **Shaded site with residential buildings on almost all sides**
- **Shaded providing trees on periphery keeping the site protected from direct sunlight and allowing filtered sunlight**

5. Documentation

Section 1 - Fire and Life safety

5.1 Facilities study

As part as provisions are concerned only 'fire extinguishers' are available.



Plate 3: Evidence of the fire and life safety measures undertaken

Most of the extinguishers are refilled and in function.

Section 2 - Energy generation & expense incurred

5.2 Load distribution study

5.2.1 Categorization

Since the campus is an Educational Institute WITH residential (Tenants) within site; thus the type of load can be stated as 'Commercial + Residential' as 'Mixed use'

5.2.2 Primary sources of energy consumption

- **Electrical (Metered)** – Light, Fans, Equipments, Pumps comprise these sources.
- **Alternate sources of energy consumption** – The facilities are 'NOT' available.

5.2.3 Secondary sources of energy consumption

Only gas cylinders were observed as secondary source in canteen area.

5.3 Technical payload study

The data related to electricity bills is documented below.

Sr. No.	Month	Year	Amount	(A) Total units consumed	(B) Solar units generated	(C = A-B) Gross units consumed after deduction
Academic year between 2023-2024						
1	June	2023	29,540	2,690	0	2,690
2	July	2023	28,400	2,446	0	2,446
3	August	2023	56,460	2,542	0	2,542
4	September	2023	34,337	2,989	0	2,989
5	October	2023	31,941	2,504	0	2,504
6	November	2023	36,160	3,171	0	3,171
7	December	2023	22,610	1,861	0	1,861
8	January	2024	24,520	2,039	0	2,039
9	February	2024	25,980	2,166	0	2,166
10	March	2024	24,720	2,313	0	2,313
11	April	2024	28,220	3,155	0	3,155
12	May	2024	35,600	2,768	0	2,768
Academic year between 2022-2023						
13	June	2022	17,750	1,911	0	1,911
14	July	2022	23,730	2,682	0	2,682
15	August	2022	28,320	2,628	0	2,628
16	September	2022	28,400	2,848	0	2,848
17	October	2022	28,710	2,899	0	2,899
18	November	2022	22,250	2,449	0	2,449
19	December	2022	18,550	2,103	0	2,103
20	January	2023	17,000	1,922	0	1,922
21	February	2023	16,520	1,845	0	1,845
22	March	2023	18,190	2,235	0	2,235
23	April	2023	24,730	2,756	0	2,756
24	May	2023	25,980	2,990	0	2,990

Table 2: Details of the electrical consumption

The observation related to above information states:

- Alternate source of energy is 'NOT' available
- Percentage of energy met by alternate source (Renewable – Solar or wind) is ZERO.

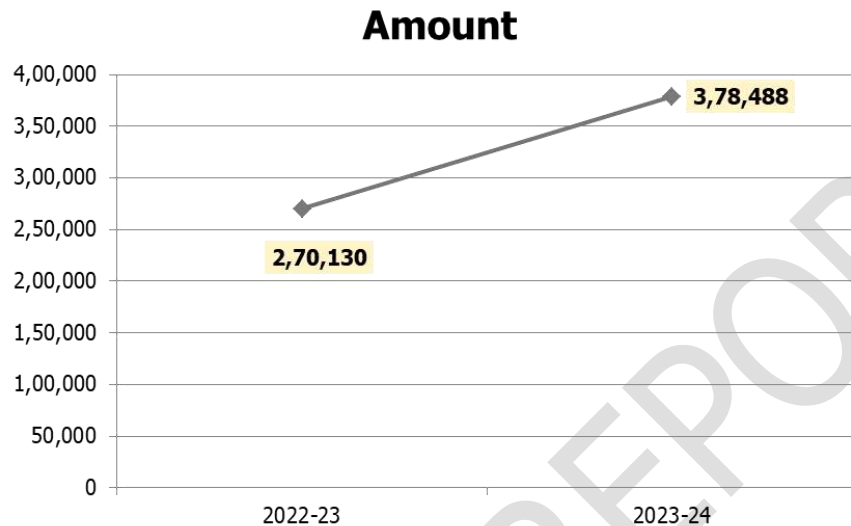


Plate 4: Amount study

- There has been an increase of Rs. 1,08,358 towards electrical expenses.
- Total **amount** spent is **Rs. 6,48,618/-**
- Average amount spent for every unit consumed in 2022-23 is Rs.9/-
- Average amount spent for every unit consumed in 2023-24 is Rs. 12/-

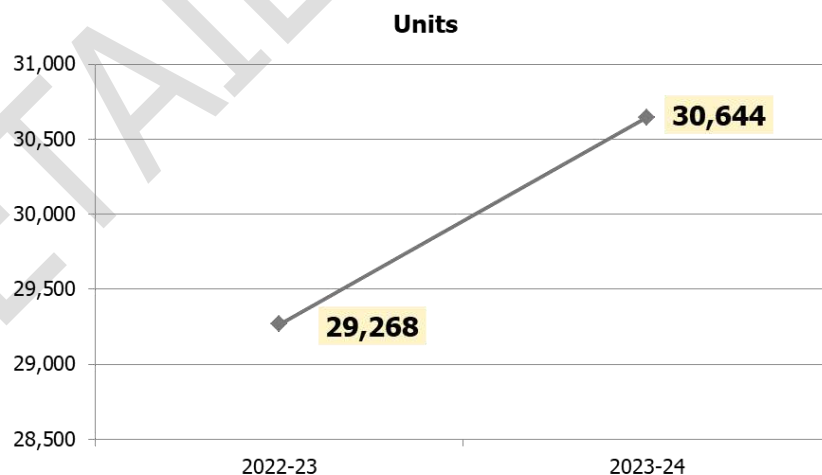


Plate 5: Electrical study

- **There has been an increase of 1,376 units in consumption.**
- **Total units consumed ~ 59,912 units (Electrical)**

Section 3 – Energy consumption

5.4 Calculated electrical consumption study

(Energy consumption by the electrical appliances study)

The following documentation is based on the consumption practice on a regular working day.

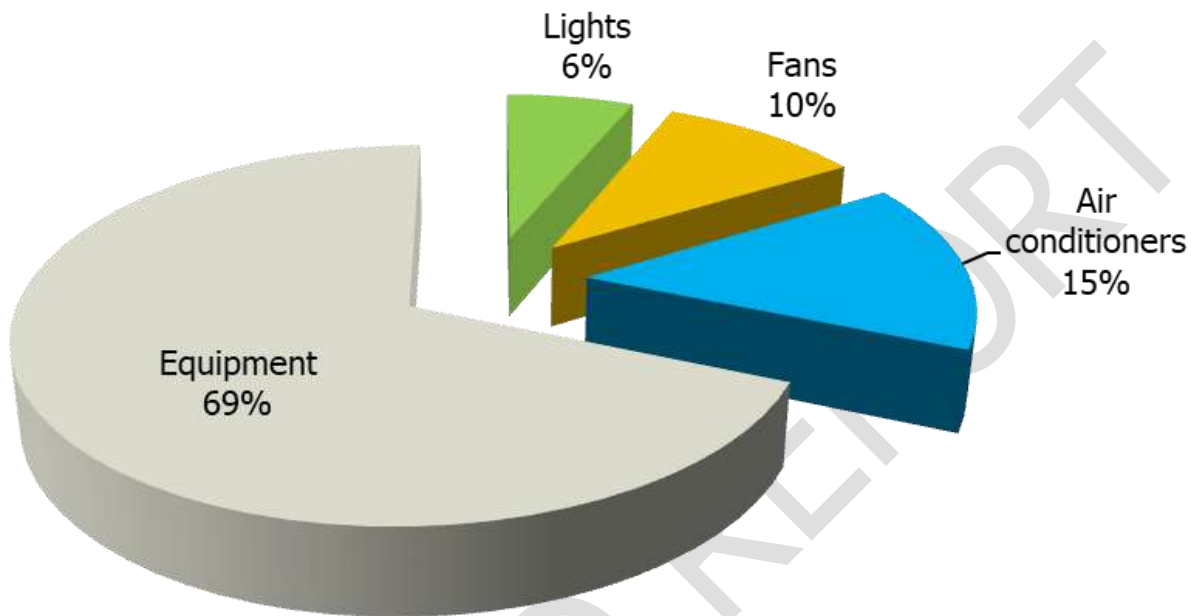


Figure 1: Summary of the calculated electrical consumption as per inventory

The above graph shows that equipment consume 69% whereas air conditioners consume 15% while fans consume 10% and the lights consume 6% of total calculated electrical energy.

5.5 Lights

5.5.1 Types of lights based on the numbers

There are **134 lights on the premises**; the following table shows the various types of lights on the premises.

S. No.	Type	Nos.
1	LED lights (Energy efficient appliance)	128
2	Non-LED lights (Non-Energy efficient appliance)	6

Table 3: Summary of the types of lights on-premise

5.5.2 Types of lights based on the power consumption

The energy consumption of lights is **7,104 kWh** of energy.

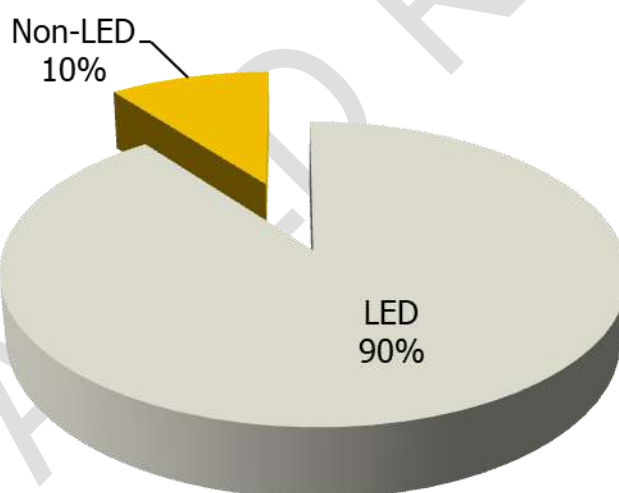


Figure 2: Energy consumed by types of lights in the premise based on the usage study

The analysis of the types of Lights on-premises shows **LED lights consume 90%** whereas the **Non-LED lights consume 10%** of the total power consumed by lights.

Note: The above study is based on the data provided by the Institute; however it was observed there were many Non-LED and non-working lights (In few nos.) within the premises.

5.6 Fans

5.6.1 Types of fans based on the numbers

There are **95 fans** on the premises as follows:

S. No.	Type	Nos.
1	Ceiling fans	89
2	Small motor exhaust fans	4
3	Medium motor exhaust fan	1
4	Wall mounted fan	1

Table 4: Summary of the types of fans in the premises

5.6.2 Types of fans based on the power consumption

The energy consumption of fans is **11,273 kWh** of the energy.

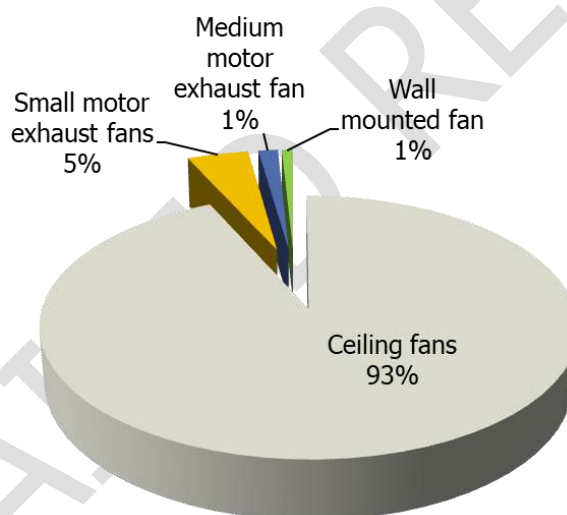


Figure 3: Types of fans based on power consumption

The above analysis shows Ceiling fans (Regular) consume 93% whereas the small motor exhaust fans consume 5% while the medium motor exhaust fans and wall mounted fans consume 1% each of total power consumed by fans.

5.7 Air conditioners

5.7.1 Types of air conditioners based on the numbers

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

5.7.2 Building-wise consumption analysis

The energy consumption of air conditioners is **16,861 kWh** of energy.

5.8 Equipment

Only the major appliances information was shared.

5.8.1 Types of Equipment

There are **73 nos. of equipment** in the premises.

5.8.2 Types of equipment as per their energy contribution

The energy consumption of equipment is **77,398 kWh** of energy.

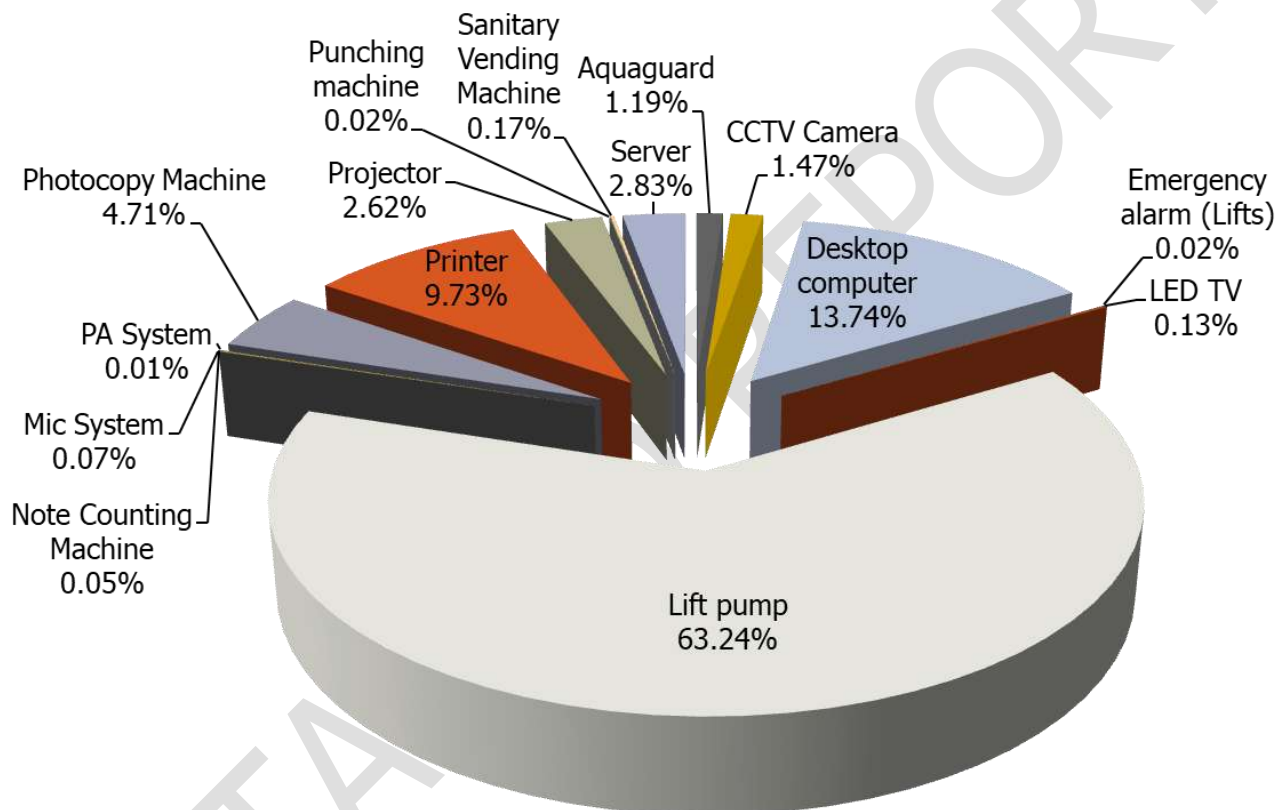


Figure 4: Energy consumed by types of equipment in the educational sector based on the usage study

The above summary shows that **lift pump consumes more energy at 63.24%** while the **desktop computer consumes 13.74%** whereas **printer consumes 9.73%** and **photocopy machine consumes 4.71%** these are major consumers as compared to other equipment.

Section 4 - Building safety

The building is too old, certain hands on observation state

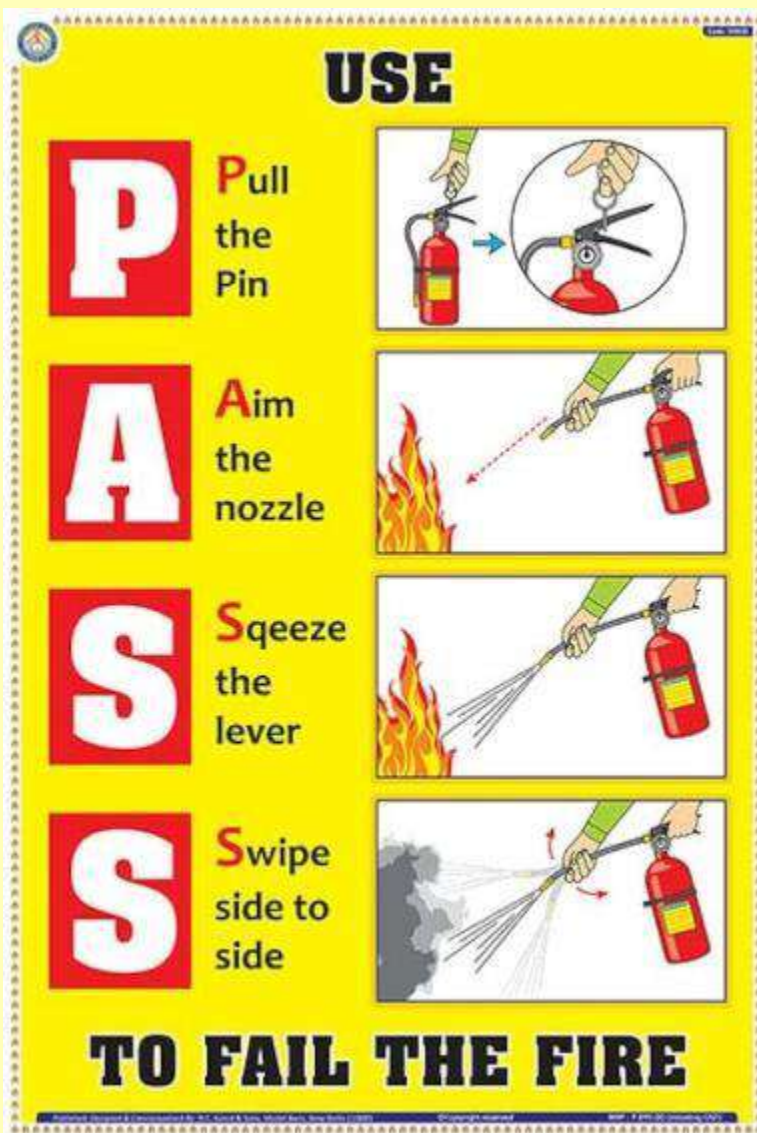
- ➔ A mix of wooden + RCC structure
- ➔ Structural audit undertaken in 2023
- ➔ Building proposed for redevelopment and talks are under process
- ➔ It shall take a while for the building to be redeveloped

DETAILED REPORT

6. Suggestion

The suggestion (inference) would act as a 'PLAN OF ACTION' to implement all the suggestions in a detailed manner.

- ➔ Conduct the 'Before' and 'After' study with photos
- ➔ Document the same in 'Action taken report'

S. No.	Aspect with evidence if any	Suggestion
1.	<p>Fire and Life safety aspect</p> <p><u>Aspect area:</u></p> <p>Signages and display for awareness</p>	<p>Wherever there is a fire extinguisher display the PASS board in English and local language</p>  <p>Source: Amazon</p>

2. Fire and Life safety aspect

Aspect area:

Fire balls

Replace fire extinguishers with fire balls on all staircase landing and kitchen areas

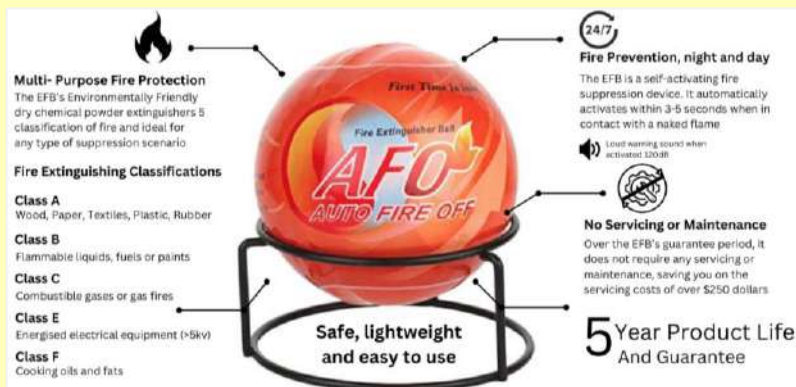


Image source: <https://www.variex.in/fire-ball-capacity/>



Image source: Flipkart and Indiamart

3. Fire and Life safety aspect

Aspect area:

Warning signages

Introduce signages on all beams of staircase landings for safety



4. Fire and Life safety aspect



Aspect area:


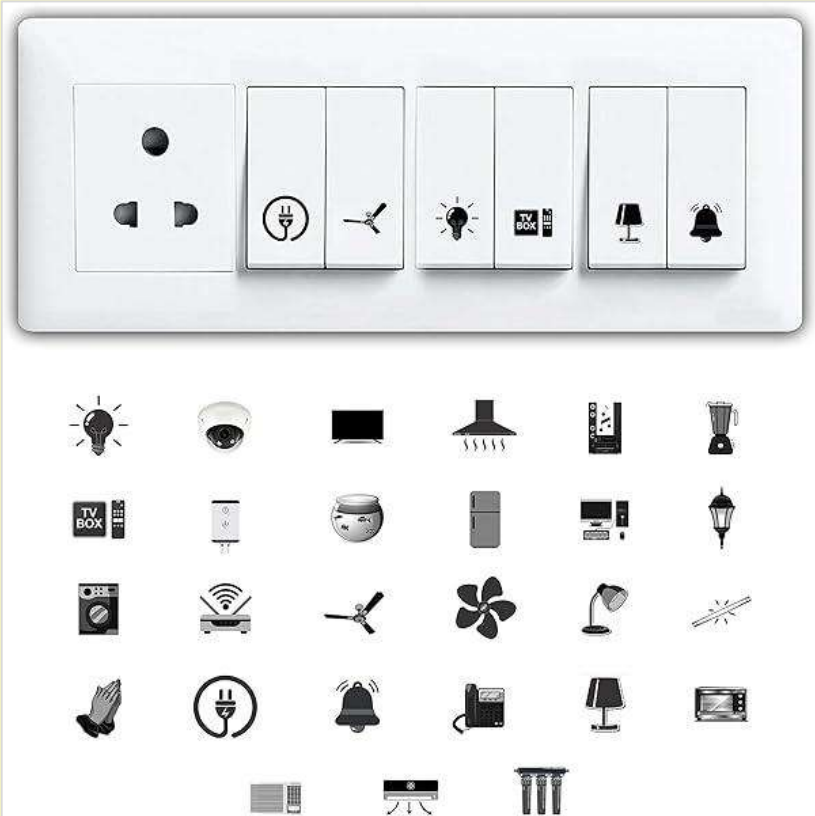
Exposed electrical wiring






Exposed wirings in entire campus

Certain areas were observed to have exposed and double load on electrical wiring; Appropriate concealing and fabrication should be undertaken for these areas using cable concealers

		 <p>Image reference: Amazon</p>	
5.	<p>Fire and Life safety aspect</p> <p><u>Aspect area:</u></p> <p>Safety signages</p>	<p>Introduce fire and life safety signages in appropriate locations in A/3 size poster on every floor near entrance</p>  <p>Image reference: Amazon</p>	
6.	<p>Energy generation aspect</p> <p><u>Aspect area:</u></p> <p>Windmill</p>	<p>Efforts can be made to undertake feasibility study to check whether windmills in small size can be installed on rooftop or solar panels to reduce electrical loads.</p>	

7.	<p>Energy consumption aspect</p> <p>Aspect area:</p> <p>Old appliances added to electrical load</p>	<p>Removed unwanted/ non-functioning appliances and wirings</p> 
8.	<p>Energy consumption aspect</p> <p>Aspect area:</p> <p>Document switches</p>	<p>The switches should be indicated as follows:</p>  <p>Image source: Amazon</p>
9.	<p>Structural safety aspect</p> <p>Aspect area: Study</p>	<p>External structural audit through a structural engineer should be conducted every year and report should be made public on website. Additionally, mandatory visit and review by local fire dept. should be undertaken with proper report displayed on website and near entrance of premises.</p>

10.	<p>Structural safety aspect</p> <p><u>Aspect area:</u></p> <p>Civil work</p>	<p>Certain areas were observed for water leakages, broken ceiling, cracks in structural elements, moss accumulation, these possess safety and health risk; civil work should be undertaken immediately or redevelopment measures should be fastened.</p> <div data-bbox="667 439 1506 1151">   </div>
11.	<p>Structural safety aspect</p> <p><u>Aspect area:</u></p> <p>Unwanted storage</p>	<p>Unwanted storage should be removed from terrace & other areas</p> <div data-bbox="746 1216 1430 1807">  </div>
12.	<p>Structural safety aspect</p> <p><u>Aspect area:</u></p> <p>Unwanted storage</p>	<p>Till the redevelopment/ structural measure are put into action; the thread of riser of staircases can be repaired immediately.</p>


		
13.	<p>Structural safety aspect</p> <p><u>Aspect area:</u></p> <p>Emergency exit</p>	<p>The staircase from library was infomed us 'Emergency exit' however it is not feasble to access the same; similar the breakout areas are covered with storage materials – It is uggested to clear the storage and demarate these areas as 'Danger zones'</p> 

Table 5: Observation based suggestion study of the campus

7. Compilation

The study is based on the data collected, analyzed, 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 analyze and study the data collected.

Specific references for study related to energy

- ➔ <https://www.energy.gov/eere/buildings/zero-energy-buildings>
- ➔ <https://www.dsaarch.com/zero-net-positive-energy>
- ➔ U.S. Energy Information Administration
- ➔ <https://www.happysprout.com/inspiration/what-is-smart-gardening/>
- ➔ <https://ieeexplore.ieee.org/document/6779316>
- ➔ <https://www.murata.com/en-global/apps/industry/security/entranceandexitsystem>
- ➔ <https://www.energuide.be/en/questions-answers/what-are-the-alternatives-to-air-conditioning/2121/>
- ➔ IGBC Green Campus rating system Abridged Reference Guide
- ➔ GEM Sustainability Certification Rating Program
- ➔ Inference study reference images
 - https://seors.unfccc.int/applications/seors/attachments/get_attachment?code=NG125PFE4WHMWSYAK8TCAKIHMWX0F4QD
 - <https://housing.com/news/smart-gardening/>
 - <https://solarpowerproject.in/solar-panels-for-parking-lots.php>

GREEN AUDIT

STUDY PERIOD (TWO YEARS) 2022 – 2023 & 2023 - 2024

Sustainability study

AUDIT REPORT

Studied for

Marwadi Sammelan's

B. M. Ruia Girls' College

11 Krishna Kunj, Vachcha Gandhi Road,
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Studied in the capacity of

Accredited and Certified GBP



Studied by

Website: <https://thegreenviosolutions.co.in/>

Email: greenviosolutions@gmail.com

Background reference image Sasin Tiachai on unsplash

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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

Introduction

About the Institution

The Institute envisions "Empowerment and Enlightenment of women by envisaging their aspirations in the light of wisdom"

The practices undertaken as an awareness/ sensitization activity with stakeholder involvement have been documented below:

S. No.	Initiative	Date
Academic year 2022-2023		
1.	Cleanliness Drive Program - Swachh Bharat Abhiyan	12 Aug. 2022
2.	NSS Unit organized an Awareness Program about "Say No Plastic" on the occasion of NSS Day.	24 Sept. 2022
3.	NSS Unit organized a Premises Cleaning Activity under 'Clean India Campaign'	15 Oct. 2022
Academic year 2023-2024		
4.	NSS Unit organized a Poster making on the topic 'Energy Consumption (Save Energy: Save Environment and Life) under the G20 3rd Energy Transition guidelines received from Government of India	15 May 2023
5.	NSS Unit organised a National Webinar on Lifestyle for Environment under G20, 3 rd Energy Transition	17 May 2023
6.	Under "Swachhata Hi Seva Campaign" - 45 volunteers of NSS Unit carried out a cleanliness campaign of the college premises under the "Swachhata Hi Seva Campaign"	23 Sept. 2023
7.	On the occasion of National Service Scheme (NSS) Day (24 th September) a program was organized on the topic 'Say No Plastic' by Program Officers of NSS Unit of the college under "Swachhta Hi Seva Abhiyaan"	25 Sept. 2023
8.	Under the "Swachhta Hi Seva Abhiyan", A cleanliness campaign program was carried at adopted village Umroli, Gram Panchayat located in Palghar (district)	30 Sept. 2023
9.	Awareness session on the occasion of World Water Day by NSS P.O.s	22 March 2024

Table 1: Details of the environmental initiatives undertaken by Institute

ENVIRONMENT AUDIT

STUDY PERIOD (TWO YEARS) 2022 – 2023 & 2023 - 2024

Sustainability study

AUDIT REPORT

Studied for

Marwadi Sammelan's

B. M. Ruia Girls' College

11 Krishna Kunj, Vachcha Gandhi Road,
Gamdevi, Mumbai, Maharashtra. 400007

Studied in the capacity of

Accredited and Certified GBP



Studied by

Greenvio
Solutions

Website: <https://thegreenviosolutions.co.in/>

Email: greenviosolutions@gmail.com

Disclaimer

The Audit Team has prepared this report for **Marwadi Sammelan's B.M.Ruia Girls' College, Mumbai** located at 11 Krishna Kunj, Vachcha Gandhi Road, Gamdevi, Mumbai, Maharashtra. 400007 based on input data submitted by the Institute 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 internal team. 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.

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

Introduction

About the Institution

The Institute envisions "Empowerment and Enlightenment of women by envisaging their aspirations in the light of wisdom"

The details of the flora are documented below.

S. No.	Plant name	Type	Nos.	Planted by
1	<i>Dracaen Marginata</i>	Plant	5	Purchased by College
2	<i>Hibicus</i>	Plant	2	Purchased by College
3	<i>Marigold</i>	Plant	1	Purchased by College
4	<i>Bamboo</i>	Plant	17	Purchased by College
5	<i>Papaya</i>	Plant	2	Purchased by College
6	<i>Money Plant</i>	Plant	2	Purchased by College
7	<i>Lime</i>	Plant	1	Purchased by College
8	<i>Yucaa</i>	Plant	4	Purchased by College
9	<i>Cowpea</i>	Plant	6	Purchased by College
10	<i>Water Crass</i>	Plant	1	Purchased by College
11	<i>Rose</i>	Plant	6	Purchased by College
12	<i>Garden Croton</i>	Plant	2	Purchased by College
13	<i>Seguine</i>	Plant	5	Purchased by College
14	<i>Cactus</i>	Plant	4	Purchased by College
15	<i>Aloevera</i>	Plant	2	Purchased by College
16	<i>Radiator</i>	Plant	1	Purchased by College
17	<i>Gale of the Wind</i>	Plant	4	Purchased by College
18	<i>Areca Palm</i>	Plant	3	Purchased by College
19	<i>Mikewood Pine</i>	Plant	1	Purchased by College
20	<i>Chambeyronia Macrocarpa</i>	Tree	1	Purchased by College
21	<i>Golden Camelia</i>	Tree	1	Purchased by College
22	<i>Red beed Tree</i>	Tree	1	Purchased by College
23	<i>Cuban Royal Palm</i>	Plant	7	Purchased by College
24	<i>Kadam</i>	Tree	1	Purchased by College
25	<i>Creeper</i>	Plant	1	Purchased by College
26	<i>Elm</i>	Plant	1	Purchased by College
27	<i>Birthwort</i>	Plant	1	Purchased by College
28	<i>Philodendorm</i>	Plant	1	Purchased by College

Table 1: Details of the plantations in the site

As per the above data there are 84 nos. of plantations within the premises.

ENERGY AUDIT

STUDY PERIOD (TWO YEARS) 2022 - 2023 & 2023 - 2024

Sustainability study

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The following documentation is based on the consumption practice on a regular working day.

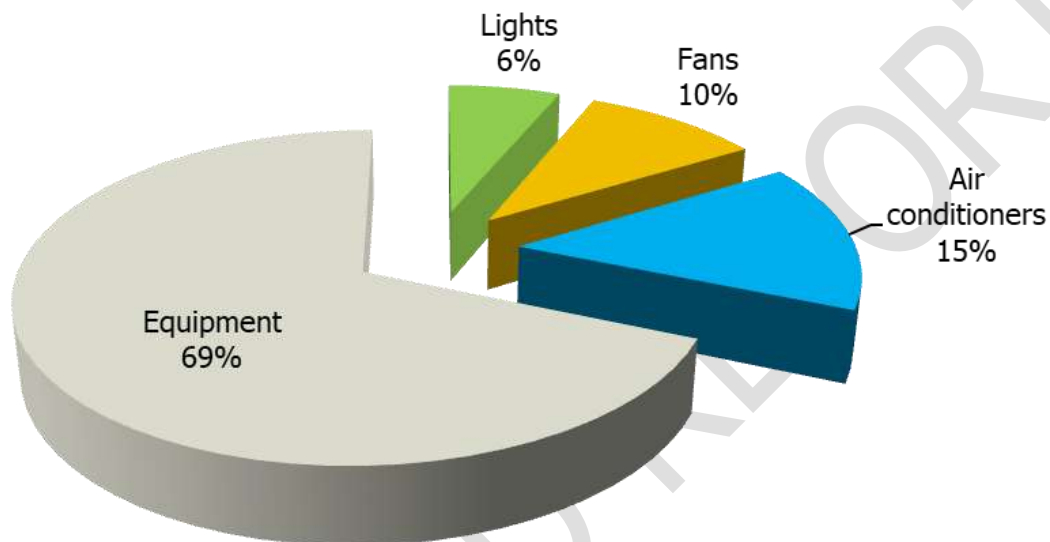


Figure 1: Summary of the calculated electrical consumption as per inventory

The above graph shows that equipment consume 69% whereas air conditioners consume 15% while fans consume 10% and the lights consume 6% of total calculated electrical energy.



Threco. EW.B2B.2024-25.CE198

Issued to: Marwadi Sammelan's B. M. Ruia Girls' College

This is to certify that Marwadi Sammelan's B. M. Ruia Girls' College has given 126 kg of E-waste to The Recycling Company (Threco Recycling LLP) to recycle in an eco-friendly manner.

The pick-up activity was carried out on 20/12/2024
Threco applauds responsible disposal undertaken.

Find the benefits of recycling electronic devices responsibly. You will be surprised to learn that your efforts benefit the environment in a tremendous way!



For Threco Recycling LLP

THE RECYCLING COMPANY
MPCB Authorisation No.
MPCB/RO(HQ)/HSMD/Autho/20/EW-
18 GST No. 27AAPFT6883K1Z6



Niti Aayog
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National Institution for Transforming India