Green Audit Report

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Satish Misal Educational Foundation's
BRICK
SCHOOL OF ARCHITECTURE

SMEF's Brick School of Architecture

PUNE, MAHARASHTRA - 411060

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1. INTRODUCTION:

The green audit evaluates environmental practices on and around the BSOA campus to enhance eco-friendliness. It systematically identifies, quantifies, records, reports, and analyzes environmental components. This audit aims to assess institutional activities that may pose risks to health and the environment. By conducting a green audit, the college can identify ways to improve its environmental impact and address various factors that influence its effectiveness.

1.1. NEED FOR GREEN AUDITING

Green auditing assesses whether institutional practices are eco-friendly and sustainable. Historically, we have used natural resources efficiently. However, over time, excessive use of resources like energy and water, especially in common areas, has become habitual. It is now essential to evaluate if our processes consume more resources than necessary and whether we handle these resources responsibly. Green audits regulate such practices and promote efficient natural resource utilization. In an era of climate change and resource depletion, verifying and converting processes to be green and clean is crucial. Green audits facilitate this transition and raise environmental awareness among institutional staff

1.2. GOALS OF GREEN AUDIT

BSOA conducts the Green Audit every two years with the following goals:

1. Identification and documentation of green practices followed by the college.
2. Identify strengths and weaknesses in green practices.
3. Analyze and suggest solutions for problems identified.
4. Assess the facilities for different types of waste management.
5. Increase environmental awareness throughout campus.
6. Identify and assess environmental risks.
7. Motivates staff for optimized sustainable use of available resources.
8. The long-term goal of the environmental audit program is to collect baseline data on environmental parameters and resolve environmental issues before they become problems.

1.3. OBJECTIVES OF GREEN AUDIT

1. To examine the current practices which can impact the environment, such as of resource utilization, waste management, etc.
2. To identify and analyze significant environmental issues.
3. Setup goal, vision, and mission for Green practices in campus.
4. Establish and implement environmental management on various fronts.
5. Continuous assessment for improvement in green performance of the college.

1.4. BENEFITS OF GREEN AUDIT TO THE INSTITUTION

There are many advantages to a green audit for the institute:

1. It would help to protect the environment in and around the campus.
2. Recognize cost saving methods through waste minimization and energy conservation.
3. Empower the institution to frame better environmental performance.
4. It portrays good image of institution through its clean and green campus.

2. OBJECTIVE AND SCOPE

The broader benefits of the eco-auditing system would be -

- Environmental education through systematic environmental management approach
- Improving environmental standards
- Benchmarking for environmental protection initiatives
- Sustainable use of natural resources on campus.
- Financial savings through a reduction in resource use
- Curriculum enrichment through practical experience
- Development of ownership, personal and social responsibility for the College campus and its environment
- Enhancement of College profile
- Developing an environmental ethic and value systems in young people

3. EXECUTIVE SUMMARY

An environmental audit provides a snapshot of campus compliance with environmental laws and regulations. While it serves as a useful benchmark, it quickly becomes outdated without ongoing monitoring mechanisms. This report includes observations and recommendations to enhance environmental awareness and compliance.

4. BRICK INFRASTRUCTURE

SMEF's Brick School of Architecture offers a holistic learning environment that integrates effective teaching, co-curricular, and extracurricular activities. Our infrastructure surpasses the minimum requirements set by the Council of Architecture (COA) and Savitribai Phule Pune University (SPPU), with which our B. Arch and M. Arch Design & Project Management programs are affiliated. The campus spans 4.68 acres with a built-up area of 3259.61 square meters, providing numerous interactive spaces and an informal working atmosphere, essential for fostering creativity among architecture students and faculty. There are 11 studios for B.Arch. & M.Arch. courses with adequate light and ventilation.

Muktangan: The central courtyard functions as a multipurpose area, optimizing natural light and airflow to passively cool the building while promoting sustainability.

Examination Room: Equipped with a computer and seating for three, this room supports exam-related activities. A separate submission room is available for end-of-semester submissions.

Permanent Exhibition Space: A dedicated area for displaying students' curricular and co-curricular work, vital for architectural institutes.

Faculty Seating and Lounge Area: Features 31 workstations for core and visiting faculty, a well-ventilated area with a furnished pantry, dining space, and lounge for interactions.

Conference Room: An air-conditioned space with a smart screen and video-conferencing facilities, accommodating over 35 people for formal meetings, seminars, and presentations.

Meeting/Boardroom: A formal meeting space accommodating up to 20 people.

DETAILS OF TREES AND PLANTS IN CAMPUS

S.No	Botanical Name	Common Name
1	Bambusa vulgaris	Bamboo
2	Globulus Labill	Eucalyptus
3	Magnolia champaca	Champa
4	Azadirachta indica A	Neem
5	Ficus benghalensis	Banyan tree
6	Vachellia nilotica	Babool
7	Cocos nucifera (L.) (Arecaceae)	Coconut
8	Psidium guajava L.	Guava

9	Terminalia arjuna	Arjuna
10	Leucaena leucocephala	Wild tamarind
11	Acacia nilotica	Gum arabic tree
12	Rubia tinctorum	Wild madder
13	Magnolia grandiflora	Hima champa
14	Simarouba glauca	Paradise tree
15	Punica granatum	Pomogrenate
16	Hibiscus rosa-sinensis	Hibiscus
17	Citrus limetta	Mausambi
18	Murraya koenigii	Curry leaf
19	Annona squamosa	Custard apple

LIBRARY

The library stands as a crucial hub, meticulously crafted to meet the academic and research requisites of both students and faculty. Housing a meticulously curated collection, it encompasses 3,008 volumes dedicated to the Bachelor of Architecture (B. Arch) program and 116 volumes tailored for the Master of Architecture (M. Arch) program. This comprehensive compilation ensures thorough coverage across all disciplinary domains, offering indispensable resources for coursework, research endeavors, and professional advancement. Moreover, the library's design ethos is centered around harnessing natural resources to their utmost potential. Through thoughtful planning, it emphasizes the optimization of natural light and airflow, minimizing dependence on artificial sources, and reducing energy consumption. Incorporating elements like expansive windows, skylights, and open-air ventilation systems, the library cultivates a well-illuminated and well-ventilated atmosphere conducive to sustainability and energy efficiency. This holistic approach not only elevates the library's ambiance but also fosters a conducive environment for the holistic well-being of students, faculty, and staff alike. By prioritizing sustainable design principles, the library emerges as a beacon of eco-consciousness and responsible resource management within the academic sphere. Additionally, the library's layout is carefully tailored to provide a comfortable and serene learning environment, accommodating up to 50 individuals. This adaptable space enables students to engage in focused study sessions and collaborative group discussions, fostering a dynamic and enriching academic experience.

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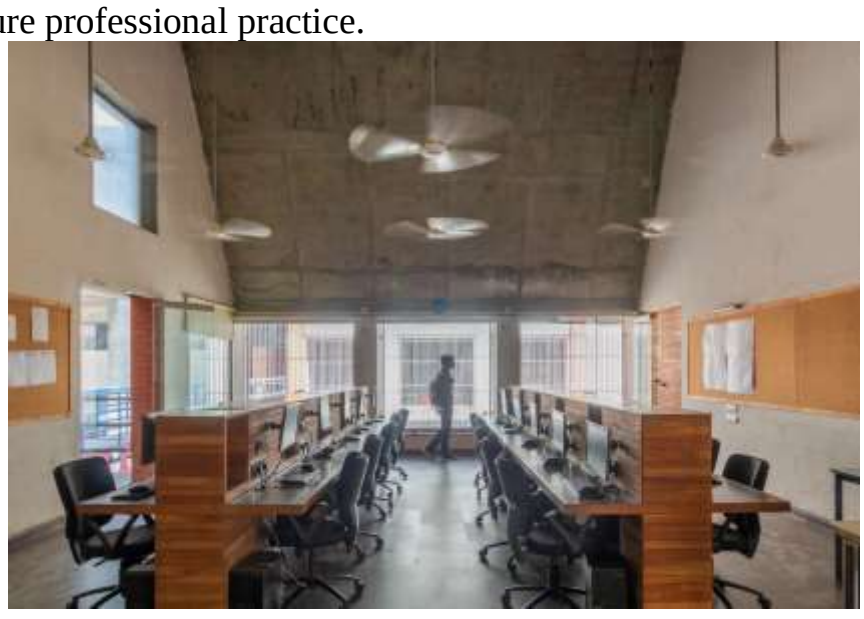
SEMINAR HALL & SPECIALISED LABS

The Seminar Hall, named "Nari," is a modern and well-equipped facility designed to host various academic and professional events. Acoustically treated to ensure optimal sound quality, "Nari" minimizes echo and background noise, creating a clear and pleasant auditory experience. The hall is fully air-conditioned, providing a comfortable environment regardless of external weather conditions, which enhances concentration and engagement during extended events. With a seating capacity for 80 people, the hall is furnished with ergonomic chairs that support good posture during long sessions. The flexible seating arrangement accommodates different event types, from lectures and panel discussions to interactive workshops. Equipped with state-of-the-art audio-visual technology, "Nari" features a high-definition projector and a large screen for clear and impactful visual presentations. The professional-grade sound system, complete with an amplifier, ensures even sound distribution throughout the room, with microphones and speakers facilitating effective communication between presenters and the audience. Additionally, the hall's adjustable lighting can be tailored to match the nature of the event, whether it requires a bright environment for note-taking or dimmed lights for video presentations. Connectivity options, including Wi-Fi and ports for laptops and other devices, ensure seamless integration of various technologies during presentations. In summary, Seminar Hall "Nari" is a premier venue that combines advanced acoustical treatment, climate control, comfortable seating, and cutting-edge audio-visual equipment to support a wide range of impactful and engaging events.

Computer Lab

The Computer Lab is a state-of-the-art facility designed to support the technological and software needs of architecture students. Housing 40 computers, each workstation is equipped with the latest software essential for architectural design and modeling. The software suite includes industry-standard applications such as AutoCAD for precision drawing and drafting, 3ds Max for 3D modeling and rendering, Revit for Building Information Modeling (BIM), and MS Office for various documentation and presentation tasks. This comprehensive setup enables students to engage in a wide range of activities, from detailed design work to complex simulations and presentations, fostering a hands-on learning environment that is integral to their education and future professional practice.



Material Lab
The Material Lab is a dedicated space that functions as a comprehensive library for various building materials. It includes an extensive collection of both structural and non-structural materials, providing students with a tactile and visual understanding of the different components used in construction and design. The collection covers a wide array of materials, such as façade cladding, interior finishing materials, and those used in mechanical, electrical, and plumbing (MEP) services. This hands-on lab allows students to explore and understand the properties, applications, and performance of different materials, enhancing their ability to make informed decisions in their architectural projects.

Climatology Lab
The Climatology Lab is equipped with advanced tools to measure and analyze environmental conditions critical to architectural design. This lab features instruments such as luxmeters for measuring light intensity, multisensors for detecting various environmental parameters, and devices to measure air velocity, temperature, and humidity. By providing these tools, the lab enables students to conduct detailed climatological studies, which are essential for designing sustainable and comfortable buildings. Students learn to assess and interpret data related to natural light, ventilation, and thermal conditions, incorporating these factors into their design process to create more efficient and livable spaces.

Surveying & Leveling Lab
The Surveying & Leveling Lab offers hands-on experience with essential surveying tools and equipment, crucial for any architectural project. The lab is equipped with levels, theodolites, and total stations, which are fundamental for precise measurement and mapping of land. These instruments allow students to practice and master the techniques of surveying and leveling, ensuring they understand how to accurately determine distances, angles, and elevations. This practical experience is vital for site analysis, layout planning, and construction, providing students with the skills needed to execute detailed and accurate surveys in their professional careers.

These specialized labs are designed to provide students with the practical skills and knowledge necessary for their academic and professional development. Each lab is equipped with the tools and resources required to support a comprehensive learning experience, bridging the gap between theoretical knowledge and real-world application.

RAINWATER HARVESTING

The BRICK campus exemplifies innovative rainwater harvesting through its intelligently designed roof slopes. Each roof is strategically angled to channel rainwater toward designated collection points on the ground. As rainwater flows from the roofs, it is directed through a network of gutters and downspouts, effectively guiding it to storage tanks and ground-level recharge pits. These recharge pits play a crucial role in replenishing the groundwater table, ensuring sustainable water management on campus. This system not only mitigates the risk of waterlogging during heavy rains but also contributes to the long-term ecological health of the area by enhancing groundwater levels and promoting sustainable water usage practices.

VIEWS OF GREENERY

SIGN BOARDS IN CAMPUS OF BSOA

AERIAL VIEW OF GREENERY IN CAMPUS

5. WASTE MANAGEMENT

The types of waste generated on campus include **paper**, **plastic**, **canteen** and **kitchen waste**, and **e-waste**.
On a daily basis, the institute generates -

- 2 kg (approximately) of biodegradable waste,
- 8 kg of non-biodegradable waste,
- 2 kg of other waste types, and
- 0.5 kg of biomedical waste
- E-waste, on the other hand, is generated at a rate of 2 to 5 kg per semester.

The institute manages its waste through various methods, including composting, recycling, and reusing. Paper waste is recycled through a collaboration with a Pune handmade paper factory. Plastic waste is managed by TEFF, while e-waste is handled by the Poornam Eco-vision Foundation. Biomedical waste, including sanitary waste, is managed by the Undri Pisoli Gram Panchayat.

Although the institute has not yet achieved zero garbage, it is possible through effective waste management policies and planning. Efforts toward sustainability are evident in the green areas of the campus, such as the courtyards between the studios, which serve as interactive spaces for students.

Tree plantation drives are organized annually, with one drive held on campus and another off-campus. Additionally, the institute has a Plant Ownership Program, where the Green Club pledges to adopt and sustain one tree for each batch. These

trees are planted and maintained by different studios, fostering a sense of responsibility and environmental stewardship among students.

Students planting trees at Anandvan extension 04 (Off-campus drive)

6. WATER MANAGEMENT

The campus has no permanent residents, such as security staff, cleaning staff, or hostel occupants. It has two water storage tanks with a combined capacity of 50,000 liters. Currently, there are no drinking water filters installed on campus; instead, the college uses 25 water dispensaries per day to meet its drinking water needs.

For its water supply, the campus relies on tankers, requiring two tankers per day. There is no specific requirement for water for landscaping, as there are no designated areas for this purpose. The campus does not have an existing drinking water filtration system, a sewage treatment plant (STP).

Additionally, there are no manmade or natural water bodies within the campus. However, the campus does have functional kitchen facilities, including four pantries and one cafe, to cater to the needs of students and staff.

7. ENERGY MANAGEMENT

The campus's energy consumption trends indicate notable variations throughout the year, with the highest electricity usage recorded in April 2024 at 6,142 units costing ₹1,55,920, and the lowest in December 2023 with 3,999 units costing ₹1,22,775. This pattern highlights increased consumption during warmer months, likely due to heightened use of air conditioning and cooling systems. To address rising energy costs and enhance sustainability, the campus has/ adopting several strategic measures. These include -

- utilizing solar energy,
- upgrading to existing energy-efficient equipment and appliances,
- encouraging energy-saving behaviors,
- improving building insulation.

Implementing these actions has significantly reduced electricity consumption, lower operational costs, and contributed to environmental conservation, aligning with both economic and ecological objectives.

Month	Unit (kW)	Amount (Rs)
Apr-24	6,142	1,55,920
Mar-24	5,400	1,42,914
Feb-24	4,979	1,36,869
Jan-24	4,561	1,30,823
Dec-23	3,999	1,22,775
Nov-23	4,183	1,25,428
Oct-23	5,130	1,37,886
Sep-23	4,809	1,33,291
Aug-23	4,590	1,28,599
Jul-23	5,033	1,34,626
Jun-23	4,988	1,34,348
May-23	5,778	1,44,863
Apr-23	4,622	1,29,458

Electricity consumption of 2023-2024 (bills)

8. GREEN CAMPUS INITIATIVES

BSOA is committed to creating a sustainable and eco-friendly campus through a series of green initiatives. These efforts are designed to reduce environmental impact, promote healthy living, and enhance the overall campus experience for students, staff, and visitors.

1. Restricted Entry of Automobiles: To minimize carbon emissions and reduce noise pollution, the campus restricts the entry of automobiles. This measure not only helps in maintaining a cleaner and quieter environment but also encourages the use of more sustainable modes of transportation.
2. Pedestrian-Friendly Pathways: The campus is designed with wide, well-maintained pedestrian pathways to encourage walking. These pathways are interconnected, providing easy and safe access to all parts of the campus. The plan highlighting these pedestrian-friendly pathways ensures that walking is not only a viable option but also a pleasant one, enhancing the physical activity and well-being of the campus community.
3. Ban on Use of Plastic: The institution has implemented a strict ban on the use of plastic within the campus. This initiative is supported by regular awareness drives, posters, and campaigns to educate the community about the environmental impact of plastic waste. Photos and posters from these drives are displayed around the campus to reinforce the message and commitment to a plastic-free environment.
4. Landscaping with Trees and Plants: The campus boasts a thoughtfully designed landscape, rich with trees and plants that contribute to biodiversity and provide natural cooling. The landscaping plan includes native and drought-resistant species that require minimal water and care. This green cover not only enhances the aesthetic appeal of the campus but also plays a crucial role in improving air quality and providing shaded areas for relaxation and study.

These green campus initiatives are documented with geotagged photographs to ensure transparency and accountability. The visual evidence of these efforts highlights the institution's commitment to sustainability and serves as an inspiration for other campuses to follow suit. Overall, these initiatives foster a healthier, more sustainable campus environment, aligning with the institution's goal of promoting environmental stewardship and responsible resource utilization.

9. CONCLUSION

The green audit of BSOA evaluates the environmental practices on and around the campus to enhance eco-friendliness. This systematic process identifies, quantifies, records, reports, and analyzes various environmental components, aiming to assess institutional activities that may pose risks to health and the environment. Through this audit, the college identifies ways to improve its environmental impact and addresses various factors influencing its effectiveness.

The goals of BSOA's green audit include documenting green practices, identifying strengths and weaknesses, suggesting solutions for identified problems, assessing waste management facilities, increasing environmental awareness, and motivating staff for optimized sustainable resource use. The long-term aim is to collect baseline data on environmental parameters and resolve issues before they become problematic.

10. RECOMMENDATIONS

1. Utilizing Solar Energy: Installing solar panels on campus can significantly reduce reliance on non-renewable energy sources, leading to substantial cost savings and a reduction in the carbon footprint.
2. Upgrading to Energy-Efficient Equipment: Replacing outdated systems with energy-efficient appliances will lower electricity consumption. This includes upgrading HVAC systems, lighting, and other electrical equipment.
3. Encouraging Energy-Saving behaviors: Promoting awareness and practices such as turning off lights and equipment when not in use, using natural light, and scheduling high-energy activities during off-peak hours can lead to significant reductions in energy usage.
4. Roof Catchment Systems: Install gutters and downspouts on all buildings to collect rainwater from rooftops.
   Direct the collected water to storage tanks or recharge pits.
5. Surface Runoff Harvesting:Create contour trenches or bunds to capture surface runoff.
   Construct check dams and percolation ponds in open areas to facilitate groundwater recharge.
6. Storage Tanks:Install large capacity storage tanks underground or above ground to store collected rainwater.
   Ensure the tanks are equipped with filtration systems to remove debris and contaminants.
7. Recharge Wells: Develop recharge wells to direct collected rainwater into the groundwater table, helping replenish local aquifers.
8. Permeable Pavements:Replace impermeable surfaces with permeable pavements to allow rainwater to seep into the ground, reducing runoff and promoting groundwater recharge.
9. Rain Gardens:Create rain gardens in landscaped areas to collect and absorb rainwater. These gardens can also enhance the campus aesthetics and support biodiversity.
10. Regular Maintenance:Establish a routine maintenance schedule for all rainwater harvesting structures to ensure they are functioning efficiently and remain free from blockages and leaks.

11. Awareness Programs:Conduct workshops and awareness programs for students and staff to promote the importance of rainwater harvesting and encourage responsible water use practices.

By implementing these measures, BSOA can achieve a more sustainable and eco-friendly campus. These actions will not only reduce operational costs but also contribute to environmental conservation, aligning with the institution's economic and ecological goals. The green audit process ensures ongoing monitoring and improvement, fostering a culture of sustainability and environmental responsibility among students and staff.

1) E-waste is segregated, handled, and disposed of properly in an eco-friendly manner.

2) Reducing the use of one-time use plastic bottles, cups, folders, pens, bouquets, and decorative items will be useful to solve the problem of plastic pollution to some extent.

3) Rainwater is collected from the rooftop to recharge the groundwater level table.

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