Maratha Vidya Prasarak Samaj's Shrimati Vimalaben Khimaji Tejokaya Arts, Science & Commerce College (S.V.K.T. College) Deolali Camp Nashik

(2018-19)

Prepared by

Ashwamedh Engineers & Consultants
y No.102, Plot No.26, WadalaPathardi Road, Indira Nagar, Nashik-422009, Maharashtra, India
uru Gobind Singh School, Near PandavNagari, / SaiMandirChowk / Samrat Sweet Turning) ,sales@ashwamedh.net T/F:+91-253-2392225

Table of Contents

College's Main Entry Gate

College's another Entry Gate

Executive Summary

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this backgroundit becomes essential to adopt the system of the Green Campus for the institute which will lead for sustainable development.

The Maratha Vidya Prasarak Samaj's Shrimati Vimalaben Khimaji Tejokaya Arts, Science & Commerce College (S.V.K.T. College) is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends. Being a premier institution of higher learning, the college has initiated 'The Green Campus' program that actively promote the various projects for the environment protection and sustainability.

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons, data analysis, measurements and recommendations, green awareness programme monitoring. It works on the several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Waste water management, Rain water harvesting, Paperless Work, Alternative Energy and Mapping of Biodiversity. With this in mind, the specific objectives of the audit are to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the departments are in compliance with the applicable regulations, policies and standards. It can make a tremendous impact on student's health and learning college operational costs and the environment. The criteria, methods and recommendations used in the audit are based on the identified risks.

1. Introduction

Green Audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The 'Green Audit' aims to analyze environmental practices within and outside the college campus, which will have an impact on the eco-friendly ambience. It was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth by carrying out Green Audit.

Green audit is assigned to the criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India and it declares the institutions as Grade A, B or C according to the scores assigned during the accreditation.

1.1 About the College

Maratha Vidya Prasarak Samaj's Shrimati Vimalaben Khimaji Tejokaya Arts, Commerce & Science College (S.V.K.T. College) Nashik, Maharashtra, was established in1984. It is a college having three departments- Arts, Commerce and Science. It is affiliated to Savitribai Phule Pune University, Pune. It is the Premier center of learning in the Nashik. The institution has adopted a strategy of promoting research culture among the staff and students.

The College has appointed a Research Monitoring Committee to supervise and encourage research culture among the faculty. It motivates faculty members to take up Minor and Major Research Projects, publishing research papers, attending seminars and conferences, refresher and orientation programme. The committee also encourages faculty members to avail higher qualification such as Ph.D. The College also provides space, equipment, duty leaves and other facilities for carrying out the research. Notifications of university and other organizations that provide financial support are circulated and displayed on the

staff notice board. The college also provides seed money for the research orientated activities. The faculty as well as students is encouraged to participate in the International, National and State level Research Project Competitions.

The college has also adopted the 'Green Campus' system for environmental conservation and sustainability. The goal is to reduce CO_2 emission, energy use and water use, while creating an atmosphere where students can learn and be healthy.

VISION:

To contribute in nation building by imparting academic excellence, social awareness and inculcating moral and ethical values amongst the students representing different strata of society.

MISSION:

To enhance the level of education in rural areas and support students from under privileged, rural and defence background in acquiring education which is appropriate for meeting the current challenges.

GOALS:

1. To ensure good academic education to our students through a disciplined approach and better quality of teachers.
2. To ensure all round development of students through participation in NCC, NSS and other personality development program.
3. To promote higher education, competency and enhancement among teaching fraternity and sensible attitude to environmental awareness and social values.

4. Objectives of the Study

The main objective of the green audit is to promote the Environment Management and Conservation in the College Campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Green Audit are:

- To introduce and make students aware of real concerns of environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analysing the pattern and extent of resource use on the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections require high cost.
- To bring out a status report on environmental compliance.

5. Methodology

In order to perform green audit, the methodology included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. The study covered the following areas to summarise the present status of environment management in the campus:

- Water management
- Energy conservation
- Waste management
- E-waste management
- Green area management

6. Observations and Recommendations

4.1. Water Use

This indicator addresses water consumption, water sources, irrigation, storm water appliances and fixtures. A water audit is an on-site survey and assessment to determine the water use and hence improving the efficiency of its use.

a) Observations

The study observed that Nashik Municipal Corporation is the main source of water for the campus. Water is used for drinking purpose from with two connections. Water is used for canteen, toilets, laboratory and gardening purpose. During the survey, no loss of water is observed, neither by any leakages nor by over flow of water from overhead tanks. The data collected from all the departments is examined and verified. On an average the total use of water in the college is 10,000 L/day, which include 7,500 L/day for domestic purposes, 1,500 L/day for gardening and 1,000 L/day for different laboratories.

The College has rain water harvesting facility in a campus. And the water from the tank is used for gardening purpose. So, the College has saved 15 M^3water per year. The total amount of water consumption is reduced by this facility.

The College has Water Coolers having capacity 40 L/hr. and cooling capacity 20 L/hr. with U.V. attached filters. And the rejected water from this process is used for the gardening purpose. From the Campus, water used for drinking purpose analyzed as per IS 10500:2005 drinking water specification and observed it was potable.

b) Appreciations:

- Water is properly used in the campus and water reusing strategy is followed by the college like reusing rejected water from cooler for gardening purpose.
- Appreciate that Need of monitoring, controlling overflow is essential and periodically supervision drills should be arranged.
- Rain water harvesting is properly managed by collecting rain water from roof top of college and it is discharged into campus well.

c) Recommendations:

- In campus small scale/medium scale/ large scale reuse and recycle of water system is necessary.
- In campus installation of R.O. system is necessary instead of water cooler with advanced purification system.
- The college does not have waste water treatment for waste water generated from laboratories, canteen, hostel kitchen, toilets, bathrooms and office rooms.
- It is necessary to install at least septic tank for the college campus.
- Ensure that all cleaning products used by college staff have a minimal detrimental impact on the environment, i.e. are biodegradable and non-toxic, even where this exceeds the Control of Substances Hazardous to Health (COSHH) regulations.
- Year wise water consumption report.

Test Report

Sr. No.	Parameters	Results	Acceptable Limit as per IS 10500: 2012	Units
1.	Colour	1	*Max.* 5	Hazen Units
2.	Odour	Agreeable	Agreeable	-
3.	pH	7.05	6.5-8.5	-
4.	Turbidity	0.4	*Max.* 1	N.T.U.
5.	Total Dissolved Solids	75	*Max.* 500	mg/L
6.	Calcium (as Ca)	9	*Max.* 75	mg/L
7.	Chloride (as Cl)	13	*Max.* 250	mg/L
8.	Fluoride (as F)	<0.05	*Max.* 1	mg/L
9.	Iron (as Fe)	<0.06	*Max.* 0.3	mg/L
10.	Magnesium (as Mg)	2.90	*Max.* 30	mg/L
11.	Nitrate (as NO_3)	5.20	*Max.* 45	mg/L

12.	Sulphate (as SO_4)	2.95	*Max.* 200	mg/L
13.	Alkalinity (as $CaCO_3$)	20	*Max.*200	mg/L
14.	Total Hardness (as $CaCO_3$)	35	*Max.* 200	mg/L
15.	*E. coli*	Absent	Not Detectable	/100 ml
16.	Total Coliforms	Absent	Not Detectable	/100 ml

Instrument Name/I.D.	Calibration Date	Calibration Due Date
AEC/EQ/270	29/08/2018	28/08/2019
AEC/EQ/276	27/11/2018	26/11/2019

Water Sampling for Testing Purpose

Rain water Harvesting

Energy Use and Conservation

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliance, natural gas and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment.

a) Observations

Energy source utilized by all the departments and common facility center is electricity only. Total energy consumption is determined as 35838 kWh/Year(4.088 kW)by major energy consuming equipment.

All the departments and common facility centers are equipped with LED & CFL lamps. Approximately 13 computers, 21 printers, 3 scanners, 5 laptops, 9 projectors, 4 UPS, 3 Wi-Fi lines, 1 VGA Splitter these all are observed during the survey. Besides this, photovoltaic cells are also installed in the campus as an alternate renewable source of energy. Equipment like Computers are used with power saving mode. Also, campus administration runs switch-off drill on regular basis. In various labs after completion of work, electricity was shut downas one of the practices for energy conservation.

Photovoltaic cell

b) Appreciations:

- Appreciate that college has total 48 solar panels of capacity 11054 kWh/year which helps to reduce the total consumption of electricity and saves the cost and approximately 99%of cost get reduced among the total cost of electricity bill.
- The outcome is that the power generated by solar system is greater than the total power requirement per annuum.
- Appreciate that it is preferable to purchase electricity from a company that invests in new sources of renewable and carbon-neutral electricity.
- Due to the roof top solar panel system 10390.76 kg of CO_2 is saved it means that it is saved 0.94 kg/unit Carbon Credits. And it is one of the best practices the college has adapted.

c) Recommendations:

- This includes evaluation of procurement practices with ISO 50001. This does not exactly mean that you need to buy the most efficient, but you need to buy the most efficient which is financially viable. Example AC with efficiency starratings, Transformer etc.

- Centralized controls of lighting, auditorium etc. to avoid any mis-use of electricity.
- Installation of LED lamps instead of CFL is necessary because CFL consumes maximum energy and it is observed that college has maximum CFL lamps.
- Installation of Solar panels, Power Purchase Agreements with Solar Power Plant Owners to buy environmentally friendly energy Source etc.
- Shift to paperless regime wherever not required, example attendance muster replaced by biometrics, DG logbook replaced by computerised logbook, daily reports converted from paper to paper less, HOD meetings converted to paperless formats, and all such examples.
- Maintenance of solar panels in the campus is necessary.

Waste Generation

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. and recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus. The different solid wastes collected as mentioned above.

a) Observations

The total organic waste collected in the campus is 1.5 kg/day. Waste generated from canteen and garden is a major solid waste in the campus. The waste is segregated at source by providing separate dustbins for Bio-degradable and Non-Bio-degradable waste. Single sided used papers reused for writing and printing in all departments. Important and confidential reports/papers are sent for recycling after completion of their preservation period. Very less plastic waste (0.1 kg/day) is generated by some departments, office, garden etc. but it is neither categorized at point source nor sent for recycling. Metal waste and wooden waste is stored and given to authorized Scrap agents for further processing. Few glass bottles are reused in the laboratories. The food waste from main canteen and mess is sent for composting.

The institute has adopted vermicompost unit backside of college campus having area 100 sq. feet. The main purpose of this is to breakdown & decompose all

kind of organic waste into compost within 24 hrs. with a volume reduction of 85-90%. After complete process of composting, it is used as manure in the garden and lawns. Awareness program among farmers is also conducted in the village nearby. Recently by using earthworm species rich vermicompost is obtained and distributed to farmers nearby area.

Vermicomposting Unit

Vermicompost Preparation

Campus is well equipped with Dry and Wet waste segregation facility

b) Appreciations:

- Appreciate that college campus is well equipped with dry and wet waste collection system having colour coding blue and green. Among that green coloured dustbin is used for wet waste and blue colour is used for dry waste.

c) Recommendations

- Reduce the absolute amount of waste that produces from college staff offices.
- Make full use of all recycling facilities provided by City Municipality and private suppliers, including glass, cans, white coloured and brown paper, plastic bottles, batteries, print cartridges, cardboard and furniture.
- Provide sufficient, accessible and well-publicized collection points for recyclable waste with responsibility for recycling clearly allocated.
- Important and confidential papers after their validity to be sent for pulping.
- Daily maintenance of Vermicomposting is necessary.

E-Waste Generation

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. This makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic components contain cadmium, lead, mercury and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

a) Observations:

The E-waste generally includes the tubelights,CFL, LED are stored into the scrap yard of college and stored. E-waste generated in the campus is very less in quantity. The college has total of 65 computers, 5 Laptops and 35 printers, 4 UPS, 3 Scanners in working condition. The cartridges of laser printers are refilled outside the college campus. Administration conducts the awareness programmes regarding E-waste Management with the help of various departments. The E-waste and defective item from computer laboratory is being stored properly. The institution has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner.

b) Recommendations:

- Recycle or safely dispose of white goods, computers and electrical appliances.
- Use reusable resources and containers and avoid unnecessary packaging where possible.

- Always purchase recycled resources where these are both suitable and available.

Green Area

This includes the plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards. This also helps in ensuring that the Environmental Policy is enacted, enforced and reviewed using various environmental awareness programmes.

a) Observations

To create- green cover, eco-friendly atmosphere, pure oxygen at the college campus, plantation program is organized every year with involving all students, principal and all departments faculty members.

Campus is located in the vicinity of approximately 520 (species) of trees. Various tree plantation programs are being organized during the month of July and August at college campus and surrounding villages through NSS unit. This program helps in encouraging eco-friendly environment which provides pure oxygen within the institute and awareness among villagers. The plantation program includes plantation of various type of indigenous species of ornamental and medicinal as well as wild plant species. Under the biodiversity and ecological survey, rain water harvesting is well maintained. The Institute has a policy of gift a plant to guests in any programme. It is a good thing for environment.

b) Appreciation:

- Appreciate that the college conducts various tree plantation programme in various nearby villages.
- Appreciate that the college has well developed Botanical Garden and lawns.
- Appreciate that college established Green Cell in college for the enactment, enforcement and review of the Environmental Policy.
- Appreciate that college celebrates 5th June as 'Environment Day' every year and plant trees on this day to make the campus Greener.

c) Recommendations

- Review periodically the list of trees planted in the garden, allot numbers and names to the trees and keep records. Give scientific names to the trees.

- Try to plant more trees in the campus.
- Promote environmental awareness as a part of course work in various curricular areas, independent research projects and community services.
- Create awareness of environmental sustainability and take actions to ensure environmental sustainability.
- Ensure that an audit is conducted annually and action is taken on the basis of audit report and recommendation and findings.

Campus has well developed Botanical Garden

Green Campus

7. Environment:

a) Air Quality: Air quality in the academic institute is very important for health of the students, faculty and staff of the institute. The air pollution sources in the college campus are wind storm, pollen grains, natural dust, vehicular emissions, generators, fires and laboratory fumes etc.

Observation: All results of Ambient Air monitoring (Near Main Gate) found within limits as perNational Ambient Air Quality Standards, 2009.

Test Report

Meteorological Data / Environmental Conditions				
Average Wind Velocity: 3.0 km/h	Wind Direction: W	Relative Humidity (Max./Min.): 73/65 %	Temperature (Max./Min.): 31/25°C	Duration of Survey: 24 h

Parameter	Results	NAAQS 2009	Unit
Sulphur Dioxide (SO_2)	**18**	80	$\mu g/m^3$
Nitrogen Dioxide (NO_2)	**21**	80	$\mu g/m^3$
Particulate Matter (size less than 10 µm) or PM_{10}	**67**	100	$\mu g/m^3$
Particulate Matter (size less than 2.5µm) or $PM_{2.5}$	**25**	60	$\mu g/m^3$
Ozone (O_3)	**<19.6**	180	$\mu g/m^3$
Lead (Pb)	**<0.02**	1	$\mu g/m^3$
Carbon Monoxide (CO)	**0.63**	4	mg/m^3
Ammonia (NH_3)	**<4**	400	$\mu g/m^3$
Benzene (C_6H_6)	**<1**	5	$\mu g/m^3$
Benzo (a) Pyrene (BaP)- particulate phase only	**<0.2**	1	ng/m^3
Arsenic (As)	**<0.3**	6	ng/m^3
Nickel (Ni)	**<3**	20	ng/m^3

Instrument Name/I.D.	Calibration Date	Calibration Due Date
AEC/EQ/419	6/10/2018	5/10/2019

d) Noise Environment: The noise levels measurements were carried out using Noise level meter. The Noise level survey was carried out at two locations, at outside as well inside the study area campus. The major source of noise identified in the study area has been predominantly the vehicular movement and the transportation activities.

Location	Time	1	2	3	4	5	Noise Level Readings dB (A)
Outside	11.30	52	53	55	56	56	54
	12.30	54	53	55	55	54	54
Inside	13.30	55	53	54	51	52	53
	14.30	57	54	55	54	56	55
As per The Noise Pollution (Regulation & Control) Rules, 2000 (Rules 3(1) and 4(1))							

Area Code	Area Type	Limits in dB (A)weighted scale	
		Day (6 a.m. to 10 p.m.)	Night (10 p.m. to 6 a.m.)
C	Residential	55	45

Instrument Name/I.D.	Calibration Date	Calibration Due Date
AEC/EQ/464	07/09/2018	06/09/2019

Noise Level Monitoring Near Main Gate

Noise level monitoring in classroom

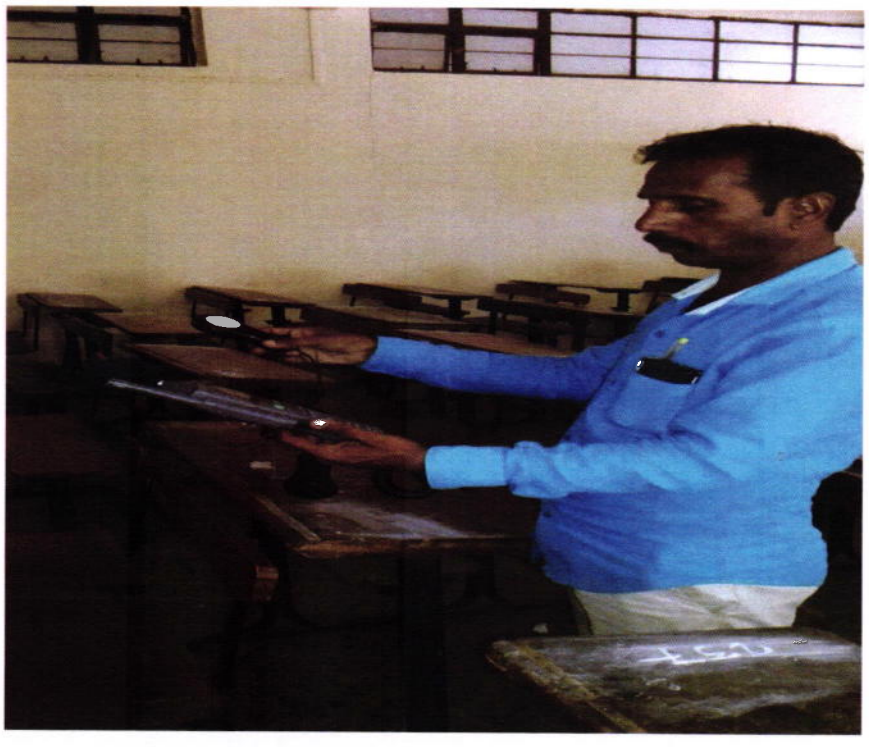
Observation: All results of Noise level monitoring (Inside & Outside) found within limits as per the Noise Pollution (Regulation & Control) Rules, 2000

e) Illumination Study: The Illumination Study were carried out using Lux meter. The Illumination Study was carried out at two locations, in Classroom & Laboratory.

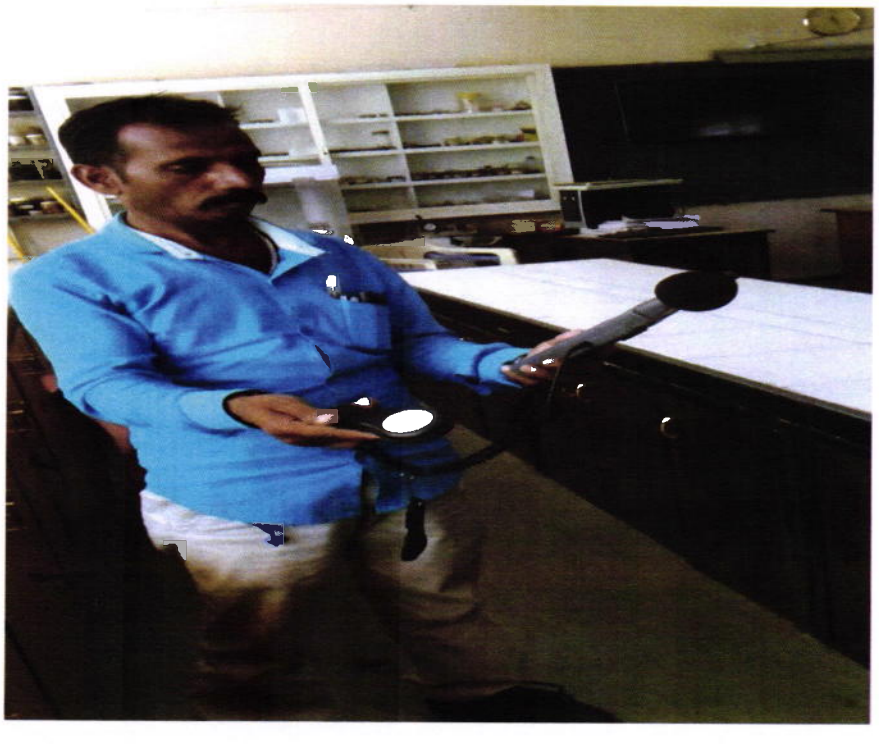
Sr. No.	Location	Time	Lux Level Reading (LUX)				Average LUX
			1	2	3	4	
1.	Classroom	12:00	310	315	300	305	307.5
2.	Laboratory	12:30	290	310	315	300	303.75

Instrument Name/I.D.	Calibration Date	Calibration Due Date
AEC/EQ/488	26/02/2018	26/02/2019

Observation: All results of Illumination Study (Classroom & Laboratory) found within limits as per MF Rules-Section-35, Schedule B



Illumination Monitoring in Classroom



Illumination Monitoring in Lab

D) Ventilation Study: The ventilation study was carried out by using anemometer. The ventilation study was carried out at two locations, in classroom and in laboratory.

Sr. No.	Name of Location	Temperature (^{0}C)	Relative Humidity (%)	Air velocity (m/s)
1.	Classroom	26.6	26.4	0.4
2.	Laboratory	26	26	0.5

Instrument Name/I.D.	Calibration Date	Calibration Due Date
AEC/EQ/444	25/08/2018	24/08/2019

Observation: All results of ventilation study (classroom & laboratory) found within limits as per Factory Act 1948, Rule 22-A.

Ventilation Monitoring in Classroom

Ventilation Monitoring in Laboratory

Photo Gallery

Tree Plantation Programme

Swatch Bharat Abhiyan

Annual Cultural Programme

Seminar on Cyber Crime

8. Conclusions

Considering the fact that the institution is predominantly an Arts, Science and Commerce, college and there is significant environmental awareness both by faculty and students and initiatives taken by them are substantial. The installation of solar panels, rain water harvesting management, paperless work system, maximum use of bicycle instead of motorcycles these practices are noteworthy. Besides, environmental awareness programmes initiated by the administration shows how the campus is going to be a green. Few recommendations are added to curb the menace of waste management using ecofriendly and scientific techniques.

As part of green audit of campus, we carried out the environmental monitoring of campus includes Illumination, Noise level, Ventilation, Drinking Water Testing which is used for drinking purpose in the campus and Indoor Air quality of the class room. It was observed that Illumination and Ventilation is adequate considering natural light and air velocity present. Noise level in the campus well within the limit i.e. below 50 dB at day time. Canteen water also analyzed and found it was potable.

This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development.

9. Acknowledgement

We are grateful to the committee members of The Maratha Vidya Prasarak Samaj's Shrimati Vimalaben Khimaji Tejokaya Arts, Science & Commerce College (S.V.K.T. College) Nashik, to award this prestigious project and allowed us to enter the new era of Green Audit in the College Campus.

Further we sincerely thank the college staff for providing us necessary facilities and co-operation during the audit. This helped us in making the audit, a success.

Further we hope, this will boost the new generation to take care of Environment and propagate these views for many generations to come.

FOR ASHWAMEDH ENGINEERS & CONSULTANTS

Ashwamedh Engineers & Consultants