

GREEN AUDIT REPORT
2021-22

BHARATI VIDYAPEETH'S
COLLEGE OF ENGINEERING,
KOLHAPUR



Prepared by

M/S NISARG ENVIRO SERVICES

KOLHAPUR.

Web: www.nisargenviro.com

E-mail : info@nisargenviro.com



NISARG ENVIRO SERVICES

A Mission for Clean, Green & Sustainable Environment...

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We have a great pleasure in presenting the Green Audit Report of Bharati Vidyapeeth's College of Engineering, Kolhapur for the Academic Year 2021-22. The Green Audit report gives detailed information about their greenery area of college campus, wastewater reuse, energy conservation, water conservation, disposal of general waste & steps to reduce the minimum use of natural resources.

They have been maintaining well their ecological diversity in college campus.

We wish them all success in the future.

For Nisarg Enviro Services,

Mane Narendra I.



Pune Office :

Flat No. J/104, First Floor, Mayur Nagari,
Phase 2, Pimple Gurav, Pune.

Sales & Service Office :

Jaysingpur Office : Jayraj Building, Lane No. 11,
Opp. J.J. Magdum Hospital, Tel. (02322) 236493.

FOREWORD...

World is facing various serious environmental issues, different reports from World Health Organization, IPCC, various National and International organizations highlights the Environmental issues are most sensitive and widely discussed issues in the world today. From local issues like unsafe drinking water, regional issues like urban smog to global warming to deforestation etc. are the environmental issues that are discussed at global level but true fact is that regional or local activities are responsible to make such issues global. On the background of scenario components involved in higher education institutions like universities, colleges, research institutes are expected to take lead role in environmental conservation and protection. Institutions must play an active role in creating and modeling solution for environmental problems.

Bharati Vidyapeeth College of Engineering Kolhapur is following different sustainable practices as their vision. As a part of Quality System, college is committed to take lead role and create its own identity in the protection and conservation of environment. College has been following eco-friendly and sustainable practices to manage the available resources. As a part of such voluntary practices and component of Quality System internal environmental audit is conducted to evaluate the actual scenario on the campus.

Green auditing of college campus is planned systematic assessment of day to day activity with special reference conservation of natural resources, optimum use of available resource and control over waste generation. Green audit assessment will show way to find out the eco-friendly and non-eco-friendly practices on the campus. Objectives of green auditing vary with the operational activities of the organization. In case of our college green audit is an internal requirement of Quality System. Green audit show alternative path for management for non-ecofriendly activities. It also promotes a good environmental management practices and raises the awareness about the environmental conservation and its long term benefits. College has already implemented conservation practices in vision, which provides chance to explore opportunities for better performance in the future.

As a part of Quality System over the past five years college has fixed goal for conservation of environment and sustainable practices. For the achievement of goal college accepted various new and advanced technologies which are eco-friendly; such as self-sufficiency in water by adapting watershed management and roof top rain water harvesting systems. Plantation of local and endemic plant species on campus is big challenge that is accepted by the college. Over the years various green practices helped for number of significant changes, which have helped to increase the green area on the campus.

I am very happy to forward this Green Audit report of Bharati Vidyapeeth College of Engineering, Kolhapur. I must congratulate NAAC cell and his team for efforts taken for the completion of such type of report. I hope the report will be helpful to all concerned and will motivate all to change non sustainable practices.

Principal

Bharati Vidyapeeth College of Engineering, Kolhapur..

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INTRODUCTION

Bharati Vidyapeeth College of Engineering, Kolhapur was established in 2001 with facility for 330 Graduate (B.E.) admissions per year. The college also runs Postgraduate Courses, admitting 54 candidates in 3 branches per year.

The college is housed in multi-stored, well ventilated, spacious building with an area of 40464 Sq. Mtr. The institute is well-equipped with laboratories and state of the art center for academic excellence.

The college has well organized theoretical and practical teaching schedule for the students, so that they can become excellent professionals to serve the society. With highly qualified & dedicated staff and advanced equipment the institution imparts quality training for the students and completes patient care.

Our faculty members are undertaking quality research projects through Institutional Ethical Committee and many of them have represented it National and International level. The institute has as provided comfortable accommodation facility for the students and also has residential quarters for the teaching staff.

Collage Information:

Bharati Vidyapeeth College of Engineering is a well-known center of clinical excellence located in the same premises. The college provides 24 hour central Library facility computer center laboratories, workshops, class rooms with seminar halls. All facilities are available for basic study. The college is well equipped with all facilities for teaching, training and study care.

The administrative sections and record rooms are fully automated. College is linked with Digital Library where national & international journals are available. The central Laboratories of College are well equipped with latest instruments like Fully Automated analyzers, etc.

College provides various facilities for student such as

- 1.Free Health checkup camps,
- 2.Wi Fi facility in campus area
- 3.Skill development courses
4. Health Centre /Gymkhana
- 5.RO water coolers
- 6.Hostel for Boys and Ladies hostel.
- 7.Sports facility

Institute also undertake following activities and programs

- Celebration of International Yoga Day
- Tree Plantation Program
- Training Program on "SAVE FUEL & SAVE MONEY"
- Workshop on "Personality Development Skills"

1.1 INFRASTRUCTURE

a) Academic Physical Facilities:

Sr. No.	Facility	Numbers
1	Central Library	01
2	Computer Centre	01
3	Laboratories	58
4	Cafeteria	01
5	Workshops	02
6	Class rooms	18
7	Computer Lab	4
8	Auditorium/Exam Hall	01

b) Residential Facilities:

Sr. No.	Facility	Numbers
1	Boys Hostel	Capacity 24 Students
2	Cafeteria	1
3	Mess/Canteen	1

c) Sports Facilities:

Sr. No.	Indoor / Outdoor	Facilities
1	Outdoor	Well-equipped playground of 6700 sq.mts.
2	Indoor	Gymnasium, Carrom & Table Tennis 105 sqmtr

d) Medical Facilities for students and staff:

i) Free Health Check-up & Services
ii) Health Scheme for the staff

1.2 Green Audit an overview:

Educational Institutes are playing a key role in continues development of human resources worldwide through teaching and research. Educational institutes conduct various activities with aim to percolate the knowledge among the different levels of society. Likewise educational institutes also try to give issues related environmental conservation and pollution control. Various types of evolutionary methods are used to identify the environment concerning problem. It includes Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), Carbon Footprint Mapping, Green audit etc.

“Green audit is a tool to highlight general practices accepted and implemented by organization in term of its impact on environment”. Green audit also focus on adverse practices which are cause and responsible for harm to environment. Green audit shows strength and weakness of organization towards protection and conservation of environment. It also mark and highlight the non-accepted practices of natural resources utilization. Green audit shows the path to continuously run healthy practices, new innovative system for optimum utilization of resource and minimization of waste generation. It helps for protection and conservation of environment, natural resources and lead institution sustainable campus in social, economical and environmental views.

1.3 Need of Green Auditing:

Green auditing is the process of assessment of practices accepted by institution in view of whether they are ecofriendly and sustainable or not. Traditionally, Indian culture teaches good and efficient users of natural resources. But over the period of time uncontrolled excess use of resources like energy, water, chemicals are become threat to the environment and society also. Now, it is necessary to check whether our accepted practices are consuming more than required resources? Whether we are handling waste carefully? Where we have control over the use of natural resources. Green audit shows all such practices and gives an well direction to optimizes the use of natural resource. In the era of global warning, climate change, pollution and resource depletion it is necessary to verify the accepted practices and convert it in to green and clean one. Green audit provides an approach for it. It also increases overall awareness among the stack holders of institution towards an environmental conservation and green practices to be accepted.

1.4 Goals of Green Audit:

College has conducted green audit with following goals.

1. Baseline data collection of environmental parameters and measures over the environmental issue before they become problem.
2. Find out strength and weakness in green practices.
3. Conduct a survey to collect base line ground reality about green practices.
4. Find out the hurdles in green practice, and suggest solution over the hurdle's.
5. Check out the facility of different types of waste management.
6. Increase environmental awareness throughout campus with training.

1.5 Objectives of Green Audit:

1. To collect the base information over the current practices which can impact on environment?
2. To find out significant environmental issues.
3. Setup goal, vision and mission for environmental conservation and sustainable practices in campus.

METHODOLOGY

This is the first attempt to conduct Green Audit of Bharati Vidyapeeth's College of Engineering Kolhapur. First target was to collect the base line data concern about the green practises. The present report is based on onsite visits, personal observations and questionnaires survey tools. Primarily, based on data requirement, different type of questionnaires were prepared. Questionnaires were provided to all concern asked them to fill the same. The generated data is subsequently gathered and used for further analysis. From the outcome of the overall study, a final report is prepared. Before the survey all the required secondary data were collected from concern departments.

2.1 Survey by Questionnaire:

Baseline data for green audit report preparation was collected by questionnaire survey method. Questionnaires were prepared based on the guidelines, rules, acts and formats prepared by Ministry of Environment and Forest, New Delhi, Central Pollution Control Board and other statutory organizations. Green audit report of Shivaji University, Kolhapur is used as format for the report preparation. Most of the guidelines and formats based on broad aspects and some of the issues or formats were not applicable for educational institutions. In fact questionnaires were prepared, using these guidelines and formats, combinations, modifications and restructuring them, sets of questionnaires were prepared as solid waste, energy, water, hazardous waste, and e-waste.

All the questionnaires comprises of group of modules. Questionnaires were prepared in such a view that it will be easy to extract the general information of the concerned department, which broadly includes name of the department, total number of students and employees, visitors of the department, average working days and office timings etc. Another part of the questionnaires extract the present consumption of resources like water, energy, or the handling of solid and hazardous waste. Maintaining records of the handling of solid and hazardous waste is much important in green audit. Last part of the questionnaires shows possibilities of loss of resources like water, energy due to improper maintains.

2.2 Onsite visit and observations:

Bharati Vidyapeeth's College of Engineering campus has vast built up area comprising of various departments, administrative building, Library, Class rooms, student hostels, sports complex. All these amenities have different kind of infrastructure as per their requirement. All these buildings were visited by the surveyors. Presents conditions were checked by specific check list. Personal observations were made during the onsite visit.

2.3 Data analysis and final report preparation:

Required primary and secondary data were collected by different ways live questioners, check list etc. Collected data were crossed checked during the personal onsite visit. In case of green audit, the filled questionnaires of the survey from each group, were tabulated in excels spreadsheets. The tabulated data is then used for further analysis. SPSS software is used to find out the frequency distribution and results in percentile format. For better understanding of the results and to avoid complications, averages and percentages of the Tables were calculated. Interpretation of the overall outcomes is included in Final report.

OVERVIEW OF GREEN AUDIT

Audit Criteria

- 3.1 Green Cover
- 3.2 Waste Management
- 3.3 Electricity and Energy Audit
- 3.4 Water Conservation
- 3.5 Health and Hygiene
- 3.6 Training and Awareness

3.1 Green Cover

The college continuously conducts tree plantation drives as a mission. The plantation movement is conducted three times during the year i.e. before the arrival of monsoon, during monsoon and post monsoon. Space has been allocated for developing a garden. The college premises indicate the awareness level on floral biodiversity among the staff and students of the college.

Counting of trees and shrubs in the college premises was done by Student volunteers. The college has maintained books on identification of flora and fauna. College students are also encouraged for bird watching within the campus. Records of such surveys on floral & faunal biodiversity are maintained and were available during the audit.

Different activities by student are continuously trying to highlight the issues concern about environmental conservation and protection. Various field visits are organised to get aware about the local biodiversity. Apart from this, students organize time to time trips and nature treks to places of ecological importance for students who are interested. Following activities clears the intention towards development of Green Belt.

List of Flora and fauna

With the help of students a project on identification of plants in campus was undertaken and list of floral biodiversity is listed. Project on identification of fauna which includes, birds, reptiles etc. in campus was undertaken and list of faunal biodiversity is listed. (Attached with Annexure I)

Drip and Sprinkler irrigation system

As a part of water conservation Technique College installed drip and sprinkler system for watering the plant and garden premises.

Plantation of Rare Endangered Species

College has developed a garden by planting various local plants. Space has been allocated for developing a garden in premises. The college premises indicate the awareness level on floral biodiversity among the staff and students of the college.

Plantation with villagers at different nearby villages

College has started a unique movement of plantation, motivational approaches are developed in local people to plant more and more trees. As a part of this movement villagers from surrounding villages are motivated to plant a tree in front of their house as well as on road side and nourish the same.

Revenue from the sale of different items from garden

College premises have some fruit plants which contain mango, coconut etc. These fruit plants are full grown and produce saleable fruits. College has its own horticulture department which takes care of all these plants. By selling the different items college generates revenue. Horticulture department sells the products and keeps the record of revenue generated. Practice is too much fruitful because fresh and healthy items are supplied to people with affordable rates as compared to market rate. Since the fresh and cheap item is available the demand is more and more.

Drinking water system for birds and animals

As a part of conservation of biodiversity college has made separate drinking water systems for birds and animals. Specific water bowls are placed at typical locations considering the less human interference. This practice shows very good results and bird and animal count is increased because of availability of water and secure place.

3.2 Waste Management

Solid waste management is a burning issue in current days. The rate of generation of solid waste is very high management technology is too adequate. Unscientific handling of solid waste is also a burning issue which can create threats to public health and environment. It is necessary to manage the solid waste properly to reduce the load on waste management system. The purpose of this audit is to find out current management practice of solid waste generation in the campus. Paper waste is a major solid waste generated in the campus. Most of the departments including office, library are major contributors in the paper waste generation. Followed by paper plastic is secondary contributing solid waste generated in large quantity in the campus. Office staff is using one side papers for printing and writing. Biodegradable waste generated in campus is mostly from canteen, hostels and guest house kitchens. Glass waste is less contributing but it takes part in solid waste generation. Glass waste generated from laboratory mainly in the form of bottles, many times bottles are reused for storing of other chemicals. Other glass waste is thrown with solid waste. The college has well established protocol to recycling and reuse of resources such as paper in the form of annual sale of stored newspapers and waste papers to scrap dealer. Very few departments are categorizing the plastic and sending it for

recycling. Metal scraps and waste is segregated separately and sent for recycling yearly. Canteen waste is collected and some biodegradable waste is treated with vermicomposting process. It was observed that e-wastes were collected but due for disposal with recycler. Wastes such as electronic peripherals and paper wastes are stored and later collected by the peon.

3.3 Electricity and Energy Audit

Major energy sources utilized include Solar Energy, Electricity and LPG. Major use of the energy is at office, hostel, laboratories, and library canteen and class rooms for lighting, transportation, cooking and laboratory work. Electricity is supplied to the campus by Maharashtra State Electricity Board. **They have made provision for generating energy from solar power.**

The NAAC Cell conducted an Energy Audit as a part of Green Audit. Prime aim of audit was to find a way of energy conservation. College use solar energy as conventional energy source. Hostels are covered under use of solar energy. It is documented that Placards and posters are displayed near electricity supply and rooms however it was nowhere to be seen during the walk through. The peon switched off all power supply in non-lecture hours and was confirmed during the site walk through visit. Lab In charge of all laboratories conveyed that electricity during nonworking hours are put to off. Different awareness programs were conducted for peons, staff and students. The college initiated to install CFL and LED bulbs in the college campus the initiative could be strengthened with help of action plan. The college targets to reduce electricity out of total electricity consumed in college as per the documents. This may be supported by maintaining proper relevant records and benchmarking the present consumption.

3.4 Water Conservation

For the purpose of water audit an on-site walk through survey and assessment was conducted to determine the efficiency of water use end to develop recommendations for improving water use efficiency. Overall agenda of conducting a water audit isto identify opportunities to make water use more efficient. Water audit includes tracking, assessing and validating all components of flow from distribution system into the consumer's properties. On the other hand, water audit of a campus review direction and quantity of water used for domestic, laboratory, drinking, gardening, sanitary and landscaping processes.

3.4.1 Drinking water is provided on assessable place in the campus. Drinking water is regularly being tested for the water parameters according to prescribed BIS standards for drinking water. Toilets were checked for leakages and spillage. These toilets were checked at random and found to be maintained in leakages and spillage free. Although it is highly appreciated that the college has initiated **Rain Water Harvesting** on site. Student conducts water conservation drives inside the campus and also at public places. (Details are attached with annexure). College incited to reduce water consumption by raising awareness in students & staff members and having periodic check on leaks. There were no displays of signage or message for Good Practices in the College premises for Water Conservation. It is needed for the continuous highlight of the issue. The college incited to recycle and reuse the wash water of wash basin for gardening purposes as a future plan. The college also planning for the rain water harvesting system as conservation practices.

3.4.2 Waste Water Management

As a concern of waste water management college has installed Sewage Treatment Plant Separately. The latest fourth generation state-of-the-art aerobic biological treatment technology is offered.

3.5 Health and Hygiene

The college incited to promotes **Swatch Bharat Abhiyaan** by maintaining cleanliness on campus. It is well concentrated on housekeep. Toilets were checked for hygiene, leakages and spillage. These toilets were checked at random and found to be maintained in hygienic condition also students were found to be satisfied with hygiene level. It is documented that Sweeper cleans the floor and toilets regularly Swachh Bharat Abhiyaan are promoted by the students and staff. For a good hygiene practices college run following activities.

Campus as Oxygen Park

By covering maximum area under green cover i.e. under plantation college has been Oxygen Park for the human as well as birds and plants also. College campus works as an oxygen park because campus it provides good, fresh and non-contaminated air. Considering the conditions local people enjoying the campus ride at morning and evening time.

Illumination and ventilation

College buildings are more spacious and class room and all other rooms are good ventilated. Natural illumination and ventilation is too good. There is no need of artificial ventilation and illumination.

Sanitation drive

College conducts sanitation drive, which motivated student and staff about the cleanliness practices and give them exposes for the voluntary work. College has appointed contractor for sanitation purpose.

Housekeeping/Pest control

College has adopted a good practice of housekeeping and pest control. Contract is given to third party for housekeeping and pest control and monitored regularly.

Awareness Campaign

As a part of health and hygiene practices college arranges different awareness camping on different diseases. As a routine activity Awareness campaign on Ebola, Zinka, SwineFlue were arranged.

3.6 Training and Awareness.

The college student's conducts street plays on various environmental, health and hygiene issues. Students with teaching and non-teaching staff actively participate to promote **Swachh Bharat Abhiyaan**. Time to Time College organizes the lectures on experts on the issue of environment and social responsibilities.

3.7 Corporate Social Responsibility (CSR)

College does not work as a typical educational institution; key aim of college is to percolate the knowledge at the lower line of the society without any expectation. Now days it is called as Corporate Social Responsibility (CSR) but same is the vision from their establishment and it is achieved locally via different educational institutions. By following ways college reaches to society or mass.

Summary and Audit findings

1. College takes efforts for solid waste management especially general waste by proper methods.
2. Recycling and reuse practice is followed strongly.
3. Solid waste and Biomedical waste is managed properly and appreciated
4. Electricity consumption is more and non-controllable at some departments.
5. Use of CFC and CFL lamps is minimum and is to be encouraged.
6. Toilets and bathrooms are consuming more water particularly at hostels.
7. Good watershed management program is implemented on campus.
8. Well adequate water filtration and Water treatment plants system are available.
9. E-waste segregation, handling and disposal should be done properly.
10. Good housekeeping is maintained throughout the premises.
11. Visual signage boards for generating awareness about conservation of water and electricity are found and displayed at prominent location.
12. Drinking water is currently tested for the water parameters according to prescribed standards.

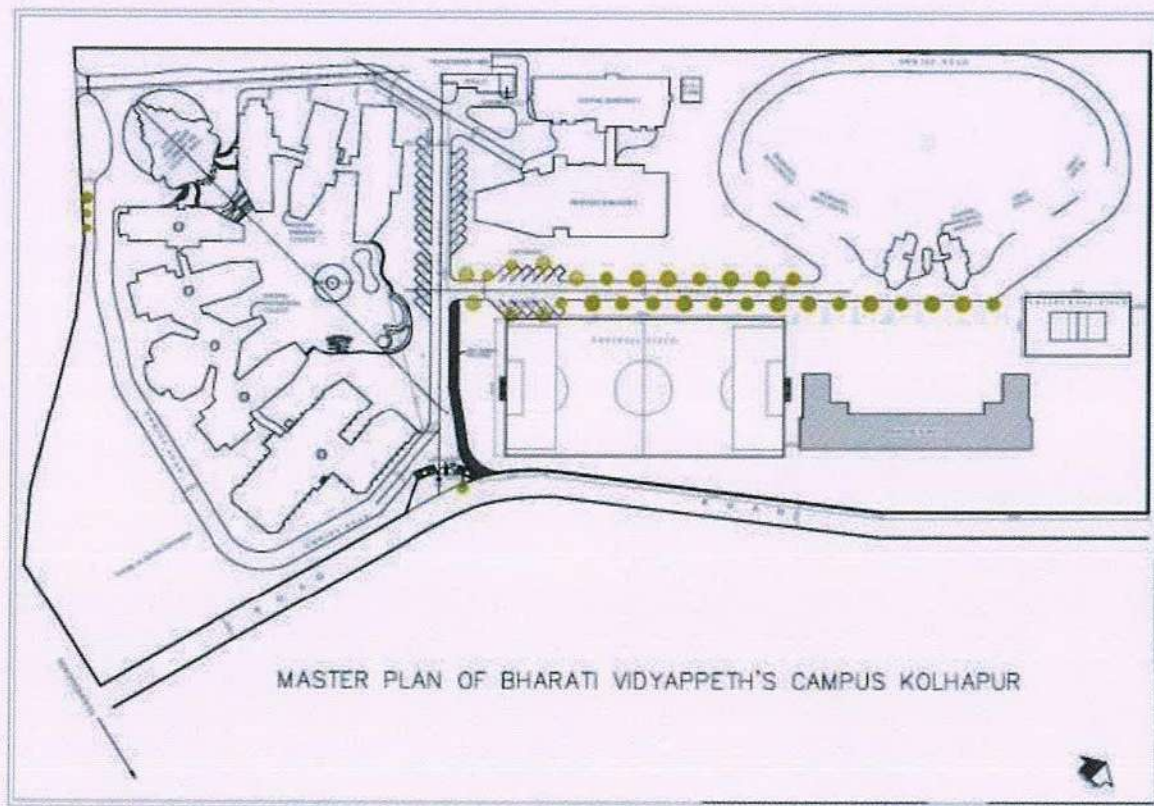
Recommendations

Following are some of the key recommendation for improving campus environment.

1. Vision Mission and Goal to be prepared for consumption & reuse of all natural resources with all the recommendations and current practice carried by institution.
2. The college should develop internal procedures to ensure its compliances with environmental issues.
3. Leakages and corrosion of pipes, overhead tanks be maintained timely and promptly.
4. The college should improve its monitoring and reporting system for water usage, electricity consumption etc.
5. The college should develop a segregation protocol for the segregation of different type of solid waste.
6. To achieve the target of reduction in electricity and water consumption, there should be proper documented management programs to achieve the same.
7. College should arrange special drive to check of PUC and should be made mandatory for students who use and park personal vehicles in the college premises.

ANNEXURES

Layout of Campus



Maintenance of the infrastructure

Maintenance of the infrastructure is undertaken by,

- **General Maintenance**
- **Electrical Maintenance**

- **General Maintenance**

- It is sub-divided into – Plumbing, Carpentry, Welding, Mason, Maintenance of Sewer lines etc.
- A total of 04 staff and 2 supervisors are working with general maintenance department.
- This department is supervised one in charge.
- The department maintenance College, Hostels, Central Library, Staff Quarters, Filtration Plant & Sewage Treatment Plant.

- **Electric Maintenance Department**

- It consists of well qualified technical staff headed by Electrical Engineer.
- There is AMC for generators, UPS, Vacuum Compressor in OT and air conditioning system which is supported by our team.
- The Electric Maintenance department looks after over all preventive maintenance as well as break down maintenance.
- The electric supply to the campus by High Tension line supported by 250 KVA diesel generator sets.
- We maintain the power factor to save electricity for which we are been regularly awarded incentive by Maharashtra State Electric Board.

1. DRINKING WATER PLANT (D.W.T.P.)

- The plant having capacity of 200 LPH for Raw Water and Filtered Water each.
- **Source of Water** – Bore as well as well water lifted from Kandalgaon approximately 2 km from Bharati Vidyapeeth College Campus.

2. SEWAGE TREATMENT PLANT - (FAB SYSTEM)

PROCESS DESCRIPTION

The treatment scheme offered is aerobic biological extended aeration treatment using the fluidized media FAB process. Excess aerobic biological sludge generated will be thickened in the Hopper Bottom Secondary Clarifier and aerobically digested in a Sludge Tank and before disposal (by Client) using Sludge Tankers.

The treatment scheme proposed is split into three distinct parts:

1. **Pre-treatment**, this comprises of screening and oil and grease removal tank.
2. **Biological treatment** comprising of FAB fluidized media aeration followed by clarification.
3. **Tertiary treatment** comprising to chlorination with using the sodium hypochlorite and the filtration system using dual media filter and activated carbon filter.

Detailed description of each treatment step is given below:

2.1 PRE-TREATMENT

The raw sewage is collected through a 10 mm clear spacing Coarse Bar Screen in a Equalization tank and then pumped to the STP. The Bar Screens are made of steel bars, placed at equal intervals. The inclination of bars is kept such that manual raking becomes easy. Manual removal of large foreign objects trapped in the Bar Screen will be carried out by the Client so as to protect downstream pipelines/ pumps from choking.

The Equalization tank will be provided with a coarse air bubble diffuser for aeration so as to prevent bad odors. Raw sewage will be pumped from the Equalization Tank through Raw Sewage Transfer Pumps to the Inlet (flange) of the Package Sewage Plant.

2.2 BIOLOGICAL TREATMENT

The organic pollutants in the raw sewage are measured in the form of Bio-chemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). Aerobic bacteria bio-degrade the organic pollutants present in domestic sewage to harmless by-products such as water and carbon dioxide as well as to additional bacterial biomass which has to be disposed off as sludge.

Aerobic biological treatment using the 'FAB' fluidized media technology is carried out in the Sewage Treatment Plant. The STP consists of an Aeration Tank, a Hopper Bottom Secondary Clarifier, and a Sludge Tank. The Aeration Tank is divided into two nos. compartment having the equal volume. Each compartment is fitted with corrugated polypropylene media. Aerobic bacteria will attach on to the corrugated media surface thereby allowing a large bacterial concentration to be maintained in the Aeration Tank. Air Blowers are provided to supply air through an underwater piping grid and fine air bubble membrane diffusers. The fine air bubble diffused aeration system provided will ensure dissolved oxygen supply to the aerobic bacteria in the Aeration Tank. The media is made of small plastic elements. Due to constant aeration, the media is set in whirling motion, so that continuous mixing takes place.

The Aeration Tank will be provided with a drain line with valve to empty the tank as required. The drain point will be protected by a SS 304 wire mesh having mesh size 10 mm to prevent any media loss while draining the Aeration Tank.

Aerated sewage will overflow to a Hopper Bottom Secondary Clarifier through a SS 304 Screen having clear spacing 10 mm to prevent overflow of media into the Clarifier. The Client will arrange to clean the Screen periodically with a rake to avoid choking due to bacterial growth. The Hopper Bottom Secondary Clarifier will be equipped with tube settler media. Tube settlers effectively increase the clarification plan area available by a factor of 6-7.

The MBBR fluidized media technology does NOT require any recycle of settled sludge from the Secondary Clarifier back to the Aeration Tank. The settled sludge can therefore collect and thicken in the Hopper Bottom of the Secondary Clarifier over time. An air lift pump arrangement will be provided to transfer the settled sludge from the Hopper Bottom of the Secondary Clarifier to the Sludge Tank intermittently as required.

The Sludge Tank will be provided with a coarse air bubble diffuser for aeration and aerobic digestion of the thickened waste activated sludge. Aerobic digestion of the waste activated sludge ensures that the sludge will be free of bad smell. The aerobically digested sludge can be wasted as required using an airlift pump arrangement to a Sludge Tanker (to be arranged by Client) for final disposal. Supernatant from the Sludge Tank will overflow by gravity back to the Aeration Tank.

2.3 TERTIARY TREATMENT

The treated sewage is collected in a Chlorine Contact Tank/ Pressure Filter Feed Sump. Sodium hypochlorite is added to treated sewage to kill the pathogens/ E-Coli bacteria. For Sodium hypochlorite, A Storage tank is installed on the chlorine contact tank and one metering pump is given for dosing the sodium hypochlorite solution. The treated sewage is then pumped through a Dual Media Pressure Filter and an Activated Carbon Filter.

Filtered sewage is stored in filtered water tank. Filter water from the filtered water holding tank will be used for backwashing of DMF and ACF. A common suction line is provided to filter feed pump from filtered water tank.

After tertiary treatment, the sewage can be reused for gardening, horticulture, flushing, floor washing, cooling water supply or disposed of suitably by the Client.

The tertiary treated sewage will be free of E. coli and pathogenic bacteria.



3. Green Campus:

- College maintain a lush green campus.
- There are more than 300 trees and lawns of 500 sqmt.
- We have also maintained 1000 garden pots.
- We have maintained diverse flora with fruit bearing, flowering and ornamental plants.
- We have developed nursery for nurturing saplings. We are also outsourcing these garden pots to other institutes.
- Water is supplied through drip irrigation, sprinklers and gun method.
- All the water required for the gardening is recycled water from STP plant.
- We practice composting of garden waste.
- The garden facility is maintained by 4 gardeners, 1 supervisor and headed by environmental engineer.

4. Solar water heating system :

- Solar water heating system of flat plate collector type of total 5000 litre capacity is installed in the campus. This provides hot water facility to all the hostels and laboratory.
- It is eco-friendly system which helps in reducing use of electricity and other conventional fuels.

It is maintained through AMC with professional service provider

5. Water Softener Plant:

- College have installed a 100 CMD capacity water softener along with three reverse osmosis plants: 2 for college & hostel, 1 for office staff.
- Total capacity is 500 litres of water.
- The water from main water purification plant undergoes reverse osmosis and ultraviolet treatment to provide the quality of packaged water.

6. Fire Safety:

- College have installed various types of fire extinguishers at various locations, certified by external agency authorised by fire department of Municipal Corporation.
- The system consists of 16 Nos of various types & capacities.
- There are ample and easily accessible fire alarms and fire extinguishers.
- The fire extinguishers are well displayed in each building.
- External agency is employed for regular maintenance of fire extinguishers and water pumps.
- Regular maintenance is looked after by well-trained personnel.

SURVEY DETAILS

A SIMPLE PROFORMA FOR GREEN AUDIT

Bharati Vidyapeeth College of Engineering, Kolhapur.

The University as well as its constituent colleges may monitor the environmental conditions in the respective institutes and campuses from various angles that are relevant to Indian requirements, without stress on legal issues or compliance. They should answer a series of questions on a regular basis regarding environmental conditions in their respective units. This innovative scheme, developed by the P. R. Environmental Education Centre, Chennai, is simple and user-friendly. This environmental monitoring system helps the institution to set environmental examples for the community and to educate young learners. It can be adapted to urban and / or rural situations.

The broad aims/benefits of the eco-auditing scheme would be

- Environmental education through systematic environmental management
- Improving environmental standards
- Benchmarking for environmental protection initiatives
- Reduction in resource use
- Financial savings through a reduction in resource use
- Curriculum enrichment through practical experience
- Development of ownership, personal and social responsibility for the college/ institute and its environment
- Enhancement of college/ institute profile
- Developing an environmental ethic and value systems in young people
- The areas of eco auditing to be followed / practiced by participating institutions:
 - A. Waste Minimisation and Recycling
 - B. Greening
 - C. Energy Conservation
 - D. Water Conservation
 - E. Animal Welfare

The principals/ directors are requested to fill the following simple questionnaire for the period 2021-22.

1) What is the total strength of students and teachers in your College/ Institute?

Total no. of Students: 1187 No. of Teachers: 46

2) Which of the following are available in your college/ institute?

i) Garden area - Available

ii) Playground - Available

- iii) Kitchen - Available
- iv) Toilets (number) - 26
- v) Garbage dump (number) - 01
- vi) Laboratory – Available
- vii) Canteen - Available
- viii) Others (specify)- NA

3) Which of the following are found near your college/ institute? Mark the level of disturbance it creates for the college/ institute in a scale of 1 to 9.

- i) Municipal dump yard – NA
- ii) Garbage heap – NA
- iii) Public conveyance – 2
- iv) Sewer line – NA
- v) Stagnant water – NA
- vi) Open drainage – NA
- vii) Industry – (Mention the type) – 2
- viii) Bus / Railway station – 1
- ix) Market / Shopping complex / Public halls – NA

I - WASTE

1. Do your college/ institute generate any waste? If so, what are they? –

General waste from canteen & office.

Yes, our college/ institute generate general waste i.e paper & canteen waste.

2. What is the approximate amount of waste generated per day? (Please put ✓ mark in the table below at appropriate places.)

Approximately	Bio-degradable	Non-bio-degradable	Hazardous	Others
Less than one kg.			NA	
Between 1 and 10 kg.	06	03		
More than 10kg	√	√	√	

3. How is the waste generated in the college/ institute managed By?

Composting	Garden waste is decomposed by vermin culture and composting procedure.
Recycling	Waste sewage water is recycled daily 50 m ³ . It is used for garden & plantation.
Reusing	Reuse of waste water by operating STP plants.
Others (specify)	NA

4. How many separate boxes do you think you would need to put into a classroom to start a waste segregation and recycling campaign?
 - A. Waste segregation in college is done through as per wastemanagement & handling rules 1989 in that 3 colour codes are used for segregation of waste. These codes are Yellow, Green, Red.
 - B. In classroom two dust bins one for recyclable waste and other for non-recyclable waste are required to start waste segregation and recycling campaign.
5. What would each be used for? (Develop a colour code with reasons)
 - A. College: As per waste management & handling rules 1989.
 - i) **Yellow:** Paper waste, cotton, etc.
 - ii) **Green:** General waste from garden and canteen
 - iii) **Red:** laboratory waste, solid & liquid waste
 - B. Classrooms, hostels and residential area:

Two: Green for recyclable waste and Black for organic waste.
6. Do you use recycled paper in college/ institute?

Yes we use recycled paper in our college.
7. How would you spread the message of recycling to others in the community?

Our students during their community outreach activities communicate and educate the people regarding importance of recycling.
8. Have you taken any initiatives? If yes, please specify.

We have started to sensitize the staff & students with importance of recycling.
9. Can you achieve zero garbage in your college/ institute? If yes, how?

Currently it is very difficult given the limitations of availability of infrastructure and cost constraints. However it is definitely a goal of the institute to achieve zero garbage in future.

II - GREENING THE CAMPUS:

1. Is there a garden in your college/ institute? List the plants there, with approx. numbers of each species. –

Yes, approximately 340 plants including all varieties.

Sr. No.	Name of Plants and Trees	Quantity
1	Bahuniablakeana	126
2	Cordiasebestena	27
3	Cassia nodusa	32
4	Anthocephaluschinesis	18
5	Wodyetia bifurcate	19
6	Milligtoniahortensis	36
7	Filiciumdeciapiens	20
8	Allistemonforgate	14
9	Brassiaactinophylla	4
10	Plumeriarubra	20
11	Azadirachtaindica	24
Total		340

2. Suggest plants for your campus. (Trees, vegetables, herbs, etc.) – Medicinal trees, Forest trees, fruit trees & shrubs.

We are planning to plant Ayurvedic Medicinal Plants like Brahmi, Ashwagandha, Bael, Nirgundi, etc.

3. List the species planted by the students, with numbers. :

50 Cocosnucifera plants were planted by the students at the time of “**Vruksha Dindi Abhiyan**”.

III - ENERGY

1. List the ways that you use energy in your college/ institute. (Electricity, LPG, others). Using this list, try to think of ways that you could use less energy every day.

Sr. No.	Ways you use energy	Ways that you could use less energy
1	Electricity: Illumination, Ventilation, all electric equipment.	Use of these electric appliances and instruments judiciously.
2	LPG: Cooking, experiments	Using only when absolutely necessary and using along with appliances designed to reduce the energy expenditure.
3	Diesel / Petrol	Proper maintenance and judicious use of vehicles.
4	Solar water heaters	Increase the use to conserve non-renewable.

2. Are there any energy saving methods employed in your college/ institute? If yes, please specify and suggest more. If no, suggest some.

Employee and students are instructed and educated to use electricity judiciously and avoid wastage. Newer, energy efficient appliances like LED bulbs, LED TVs, Energy efficient refrigerators etc. are gradually inducted in day to day use replace conventional appliances. Impetus is given to utilization of solar energy in the form of solar heaters. The institute plans to use solar cells for production of energy.

3. How much is the monthly expenditure of your college/ institute on energy such as electricity, gas, etc.

Month	Expenditure on Electricity Bill	Expenditure on Gas	Expenditure on Generator (Rs/M)
January 2021	170655.00	---	12000.00
February 2021	159950.00		12000.00
March 2021	193745.00		12000.00
April 2021	198691.00		12000.00
May 2021	169035.00		12000.00
June 2021	190820.00		12000.00
July 2021	190815.00		12000.00
August 2021	190608.00		12000.00
Sept. 2021	186314.00		12000.00
October 2021	196369.00		12000.00
November 2021	217818.00		12000.00
December 2021	228422.00	---	12000.00
Total	18,54,640.00		1,44,000.00

4. What is the percentage of CFL bulbs has your college/ institute installed? If the percentage is less what are the reasons?

The percentage of CFL bulbs is 15%. The reason behind the low usage is necessity of proper uncompromised illumination for college. However we are planning to increase use of high capacity LED bulbs in future.

5. Are any alternative energy sources employed / installed in your college/ institute? (Photovoltaic cells for solar energy, windmill, and energy efficient stoves, etc.)

Solar water heaters are used for providing hot water. Similar we have photovoltaic cell employed for street lights. We plan to expand use the photo-voltaic cells for energy production.

6. Do you run "switch off" drills at college/ institute? What is the effect of such drills?

Yes and also we have advisory regarding the same displayed at various places. It has helped creating awareness and thus decreasing wastage of electricity in the institute.

7. What percentage of computers and other equipment's in your college/ institute are usually put on power-saving mode?

Almost all the computers and majority of equipment with the facility of power-saving mode are usually put on power-saving mode.

All the staff members are instructed for the same.

8. Does your machinery (TV, AC, Computer, weighing balance, printers, etc.) run on standby modes most of the time? If yes, how many hours?

Standby mode is used on the machinery only if is utmost necessary and related to patient care or else the machinery are switched off if not in use.

IV - WATER CONSERVATION

1. List four uses of water in your college/ institute.

- i. Drinking
- ii. Laboratory
- iii. Washing
- iv. Gardening

2. How do your college/ institute store water? Are there any water saving techniques followed in your college/ institute? What are they?

Yes, the college has a water storage facility. Our institute give conservation of water an utmost importance.

- i. We had incorporated a culture of water preservation by educating the staff and students its importance and methods.
- ii. We have installed a state of the art water purification plant which ensures availability of pure & safe water with least amount of wastage during the process.
- iii. The integrity of plumbing is constantly ensured and vigilance is constantly maintained to mend any leaks.
- iv. We have an efficient sewage water treatment plant. We recycle the waste water, and this water is used for gardening and plantation in the campus. Thus we ensure that nearly 50000 litres water is reused per day.
- v. Gardening is done using drip and sprinkler irrigation.

3. If there is water wastage, specify why?

Although we had strived to ensure to eliminate water wastage but some waste is inevitable due to,

- i. Non-compliance to water saving techniques by the beneficiaries especially illiterate patients.
- ii. Some machinery requires excess water to control the temperature rise during functioning.

4. How can the wastage be prevented / stopped?

- i. Educating to all the stakeholders for judicious use of water.
- ii. Strong vigilance on leaking areas through the plumbing & maintenance.

5. Write down four ways that could reduce the amount of water used in your college/ institute.

- i. Use of the modern equipment's requiring less amount of the water for functioning.
- ii. Expansion of capacity of water treatment plant as well as improving the quality of output from the treatment plant, rendering it potable.
- iii. Use of chemical cleaning instead of water cleaning.
- iv. Use of automatic taps.

6. What is the average consumption of water (in kilo-liters) per month?

Nearly 15000000 kilo – liters per month.

7. Does your college/ institute harvest rain water? If yes, how many rain water harvesting units are there?

Yes, all the buildings in the campus are equipped with rain water harvesting units.

VI - GENERAL

1. Are you aware of any Environmental Laws pertaining to different aspects of environmental management?

- i. Hazardous Waste Management and Handling Rules – 1989.
- ii. Air Pollution & Prevention Act – 1981
- iii. Water Pollution & Prevention Act – 1974.

2. Does your college/ institute have any rules to protect the environment? List possible rules you could include.

- i. Our college abides to the rules & regulations under the hazardous waste management and handling Act – 1989

3. How does the college/ institute bring environment awareness among stakeholders of the college/ institute?

The institute imparts Environmental Awareness Education to the teachers and the students by informal communication, posters and guest lectures by imminent authorities.

VII. PROVIDE ANY OTHER SIGNIFICANT INFORMATION.

NA