



## GREEN AUDIT REPORT FOR ANANDNIKETAN WARORA COLLEGE CAMPUS WARORA DIST. CHANDRAPUR, MAHARASHTRA

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**LIST OF ABBREVIATIONS:**

<b>IECRS</b>	INDIAN ENVIRONMENTAL CONSULTANCY & RESEARCH SERVICES
<b>GREEN</b>	GLOBAL READINESS IN ENSURING ECOLOGICAL NEUTRALITY
<b>CSR</b>	CORPORATE SOCIAL RESPONSIBILITY
<b>IAQ</b>	INDOOR AIR QUALITY
<b>GHG</b>	GREENHOUSE GAS
<b>MOEFCC</b>	MINISTRY OF ENVIRONMENT FOREST AND CLIMATE CHANGE
<b>IGBC</b>	INDIAN GREEN BUILDING CERTIFICATION
<b>MPCB</b>	MAHARASHTRA POLLUTION CONTROL BOARD
<b>NAAC</b>	NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL
<b>PUC</b>	POLLUTION UNDER CONTROL
<b>AAQ</b>	AMBIENT AIR QUALITY

## **1.0 INTRODUCTION**

Indian Environmental Consultancy & Research Services, (IECRS) is pleased to present this proposal for Green Audit for Anandniketan Warora College campus, Warora Dist. Chandrapur Maharashtra.

It was in 1951 that late Padmshri Baba Amte laid the foundation of now world famous "Anandwan." Moved by the plight of the neglected lepers this visionary made up his mind to devote his life for the welfare of this abandoned lot. He cleared a piece of barren land with his own hands and planted his dream there. As the years passed, his little dream grew from a small sapling into a gigantic tree.

Today, Anandwan stands as an unshakable lighthouse not only for leprosy patients but for every section of society: be it the blind, the deaf and dumb, the old, the orphans, the widows, and even the budding and aspiring youth of new generation. Anandwan has something concrete to offer to all these sections of society. Out of several project started by Maharogi Sewa Samiti, Anandwan Warora, Anand Niketan College is one important venture. At present Anand Niketan College of arts, Commerce and Science affiliated to Nagpur University, under the blessings and guidance of late Baba Amte, Dr. Vikas Amte, and Shri. Kaustubh Amte. The college has traversed miles in the field of basic & agriculture education.

Over the years, the college has grown by leaps and bounds and has made rapid strides in the fields of Basic and Agriculture education, Research and Extension. It has earned the reputation of one of the topmost educational institutes of this region. Today it not only boasts of having produced several top-nochers of the university but also having initiated many innovative projects in the fields of Agricultural research and Training and guidance to the farmers. The college is equipped with well furnished laboratories, a rich library, sproawing fields and supportive facilities.

At present college is undergoing NAAC accreditation assessment where various parameters would be testified for re-assessment to achieve higher grade from B++ to higher one. Where A Green audit could be a toll to jack-up its claim for higher gradation through NAAC assessment system, which might be competitive to world education system across university.

Green Audit was founded as an environmental consultancy and review organization with the aim of monitoring the performance of organizations whose activities might threaten the environment and the health of citizens. The aim of Green Audit is to give citizens the information they need to

be able to question the organizations which are destroying the environment we all depend on. It was the worrying recognition that such information is presently suppressed and restricted which provided the impetus for the founding of Green Audit.

Green Audit undertakes and supports independent studies in the general areas of environmental public health, pollution, energy efficiency, and social and policy research in relevant areas. It is in on-line, networked communication with similar organizations and environmental databases worldwide so that any new threat to humanity can be monitored and evaluated.

Colleges and Universities have broad impacts on the world around them, both negative and positive. The activities pursued by colleges can create a variety of adverse environmental impacts. But colleges are also in a unique position as educational institutions to be leaders in pursuing environmentally sustainable solutions.

- ✓ Green building for quality living
- ✓ Know green and think green is promoted on the campus
- ✓ Water conservation and prevention of water wastage
- ✓ Use of CFL bulbs instead florescent bulbs
- ✓ Small generators are substituted with 250 KVA generators to save diesel
- ✓ Usage of recycled paper bags was promoted among students by displaying boards like 'Say No to Plastic'
- ✓ Reduce – Reuse – Recycle methods are followed
- ✓ Carbon dioxide neutrality is maintained on the campus by developing greenery
- ✓ Turning of monitors after the work
- ✓ Global warming, bio-diversity and pollution incorporated in the curriculum

Colleges and Universities have broad impacts on the world around them, both negative and positive. The activities pursued by colleges can create a variety of adverse environmental impacts. But colleges are also in a unique position as educational institutions to be leaders in pursuing environmentally sustainable solutions.

For Anandniketan Warora College expresses its commitment to sustainability in many ways. It has taken a number of positive steps to reduce its environmental impact. But many areas remain in which substantial improvements can be made. This report serves to highlight Anandniketan

College many accomplishments, and to make recommendations for improving the College's environmental sustainability.

The structure for this report was taken from the Good Company's "Sustainable Pathways Toolkit." The Good Company has conducted environmental audits at several institutions around the country and granted us permission to use its Toolkit in conducting this study, expressing an interest in expanding the number of colleges compared within the Toolkit format.

The primary benefit of using the Good Company's format is an increase in the ability to compare our findings to those for other colleges. In adapting the format from the Good Company's report, we maintained many of their indicators, but also combined indicators where we felt it was appropriate and created our own where we felt there were gaps in analysis. The result is a report that is still largely comparable to those done for other colleges, but that is also uniquely fitted to Anandniketan College.

We focus on twenty indicators, covering an extremely wide range of environmental impacts. For each indicator, we establish a benchmark to evaluate Anandniketan College overall performance. These benchmarks are often taken straight from the Toolkit, but were occasionally adapted to be more relevant to Anandniketan College. We then examine the performance of Anandniketan College on each of these indicators, and offer recommendations about how the College can reduce its environmental impact within each indicator.

We hope that this report will provide an accurate snapshot of Anandniketan College environmental impact at this point in time, and that it will aid the College in prioritizing positive steps it can take to improve overall sustainability.

## **2.0 PURPOSE OF THE DOCUMENT**

This document has been prepared for providing scope of work for carrying out Green Audit for Anandniketan Warora College Campus" at Chandrapur Road, Warora as per NAAC regulations and marking assessment.

The term „Green“ means eco-friendly or not damaging the environment. This can acronymically be called as „Global Readiness in Ensuring Ecological Neutrality“ (GREEN). Green Accounting" can be defined as „systematic identification, quantification, recording, reporting & analysis of components of ecological diversity & expressing the same in financial or social terms. "Green Auditing", an

umbrella term, is known by another name „Environmental Auditing“. In auditing literature both the terms are being used interchangeably. To implement the green audit other important aspects such as objective of green audit. Drivers of green audit, future scope, benefits, and advantages are necessary to understand. The green audit practically involves energy conservation, use of renewable sources, rain water harvesting, efforts of carbon neutrality, plantation, hazardous waste management & E-waste management Finally, Green audit is a requirement of NACC committee to the junior college. The concept of Green Audit, industries are using it as a management tool to evaluate the environmental standards; industries can perform better and better for the sustainable development of the organization. The experiments on the nature by avoiding natural rules, this can be a one major reason behind that is green Audit.

In scenario people are not caring of nature, they are directly or indirectly damaging the environment and it causes problems like; global warming, difficulties in maintaining ozone layers, air pollution, water pollution etc. Green Audit is the most efficient & ecological way to solve such a environmental problem. For protecting the nature as a human being we have to show our sense of humor towards the mother earth. In corporate sector the practice of saving environment through the various programmes like CSR (Corporate Social Responsibility), GO Green, Save Water, Save Trees, Plantation of trees are to be taken. It will definitely work for the future. (Bețianu,2008).

That is the only way out to safeguard the planet. The Green Audit of is Requirement of NACC Committee to the Junior college. It is necessary to conduct a green audit in college campus because student aware of the green audit, its advantages to save the planet & they become good citizen of our country. Green audit and sustainable development process help to reduce the wastage and associated cost as well as increases the product quality. Obviously, there is relationship between Green Audit and Sustainable Development of the any business organization. The primarily needs for achieving the sustainable development of the business are to determine the Green Audit policy, Green Audit Framework, Accurate implementation, and Result analysis of it. Strong Green Audit process can help to achieve the sustainability. Green Audit framework helps to achieve the goal set by an organization. Green Audit is linked to Sustainable development process. Green audit and sustainable development process help to reduce the wastage and associated cost as well as increases the product quality.

## **2.1 SCOPE OF THE WORK: GREEN AUDIT FOR UNIVERSITIES, INSTITUTES AND COLLEGES**

Green audit was initiated with the beginning of 1970s with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. It exposes the authenticity of the proclamation made by multinational companies, armies and national governments with the concern of health issues as the consequences of environmental pollution. It is the duty of organizations to carry out the Green Audits of their ongoing processes for various reasons such as; to make sure whether they are performing in accordance with relevant rules and regulation, to improve the procedures and ability of materials, to analyze the potential duties and to determine a way which can lower the cost and add to the revenue. 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 of carrying out Green Audit. Some of the incidents like Bhopal Gas Tragedy (Bhopal; 1984), Chernobyl Catastrophe (Ukraine; 1986) and Exxon-Valdez Oil Spill (Alaska; 1989) have cautioned the industries that setting corporate strategies for environmental security elements have no meaning until they are implemented.

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation.

The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, colleges, companies and organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmental friendly institute.

## **2.2 AIM OF GREEN AUDIT**

- ❧ The objective of carrying out Green Audit is securing the environment and cut down the threats posed to human health.
- ❧ To make sure that rules and regulations are taken care of
- ❧ To avoid the interruptions in environment that are more difficult to handle and their correction requires high cost.
- ❧ To suggest the best protocols for adding the sustainable development.



### 2.3 FEW KEY COMPONENTS UNDER GREEN AUDIT

- **Water Audit:** Evaluating the facilities of raw water intake and determining the facilities for water treatment. Water harvesting is one of the best techniques that can be adopted by simply storing the water and using it at the time of scarcity. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water.
- **Waste Disposal Audit:** The waste clearance measures associated to hazardous wastes and recycling are reviewed. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.
- **Energy Audit:** It deals with the energy conservation and methods to reduce its consumption and the related pollution. The auditor targets at the energy consuming methods adopted and find whether these methods are using the energy in a conservative way or not.
- **Environmental Quality Audit:** Analyzes the air quality, noise level and the programs undertaken by the institute for plantation. The Green Belt should be maintained to reduce the pollution level by decreasing the Carbon Dioxide Level.
- **Health Audit:** It analyzes the occupational diseases and safety measures undertaken within the institutes. Advocate the college initiative to encourage students to respect environment and conserve it through plantations. Excessive Plantations also helps in reducing the Carbon dioxide emission.
- **Using Renewable Energy:** Resources which can be replenished should be used such as rain, sunlight, wind tides etc. These resources are more advantageous as they cause least pollution. The importance of these resources is explained by the Audit team.
- **Carbon accounting:** It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is necessary to know how much the organization is contributing towards the sustainable development. The auditor considers several efforts practiced by the institute to lower the Green House Gases in the atmosphere in order to make the campus more environmental friendly. But no technical Carbon Sequestration in basic audit report will cover due to restricted time & purpose of audit.

## **2.4 STEPS UNDER GREEN AUDIT**

### **I] PRE-AUDIT**

- ❏ Plan the audit
- ❏ Select the audit team
- ❏ Schedule the audit facility
- ❏ Acquire the background information
- ❏ Visit the site.

### **II] ON-SITE**

- ❏ Understand the scope of audit
- ❏ Analyze the strengths and weaknesses of the internal controls
- ❏ Conduct the audit
- ❏ Evaluate the observation of audit program
- ❏ Prepare a report of the observations side by side.

### **III] POST-AUDIT**

- ❏ Produce a draft report of the data collected
- ❏ Produce a final report of the observations and the inference with accuracy
- ❏ Distribute the final report to the management
- ❏ Prepare an action plan to overcome the flaws
- ❏ Keep a watch on the action plan.

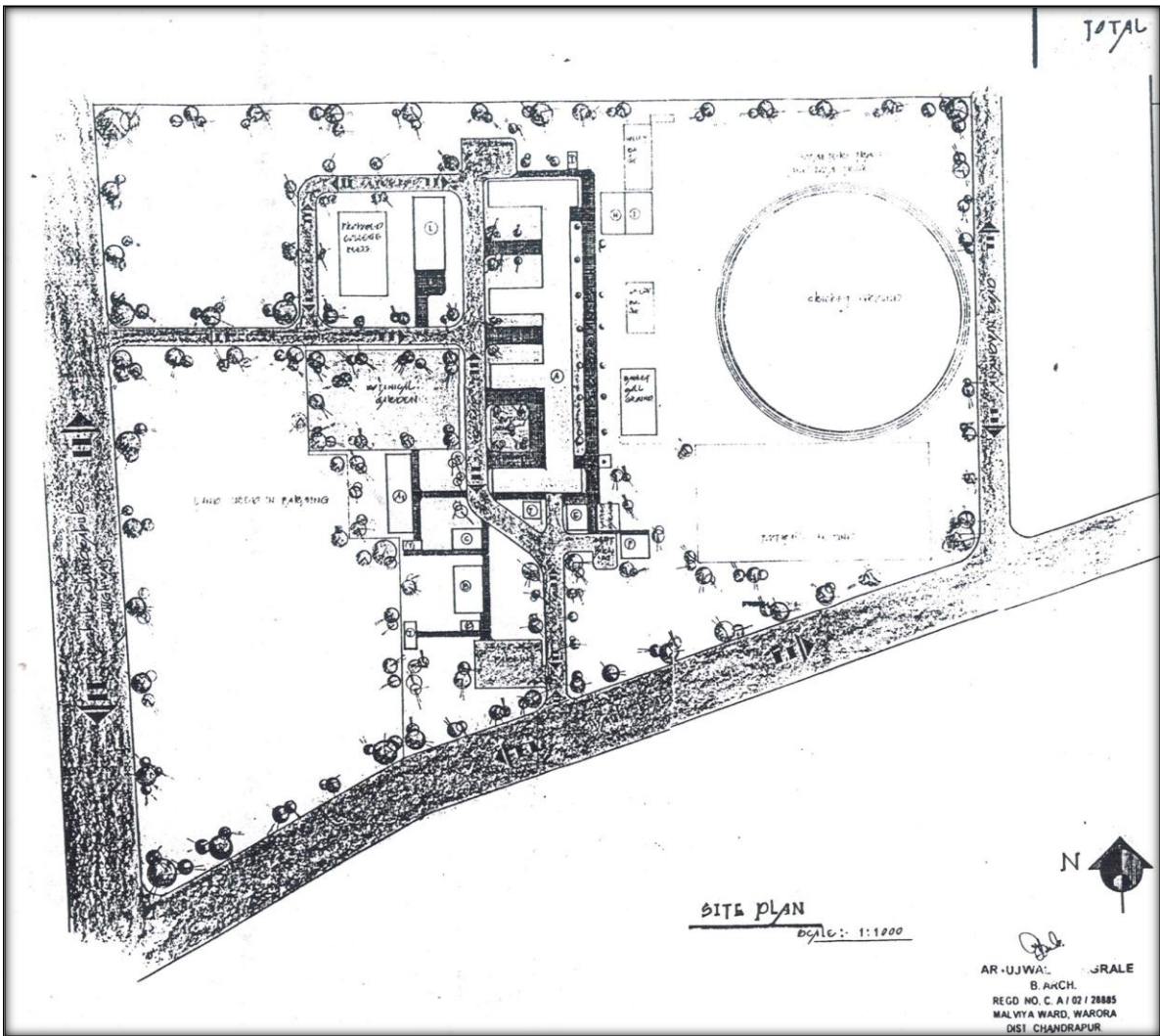


FIGURE 1 : SANCTONED LAYOUT FOR ANANDNIKETAN COLLEGE CAMPUS



**Figure 2: SATELLITE IMAGE OF ANANDNIKETAN COLLEGE WARORA CHANDRAPUR**

## **2.5 BENEFITS OF GREEN AUDIT**

Advantages of Green Audit If Enforced in Positive Mode:

- ❧ It would help to shield the environment.
- ❧ Recognize the cost saving methods through waste minimizing and managing
- ❧ Point out the prevailing and forthcoming complications.
- ❧ Authenticate conformity with the implemented laws.
- ❧ Empower the organizations to frame a better environmental performance
- ❧ It portrays a good image of a company which helps building better relationships with the group of stakeholders.
- ❧ Enhance the alertness for environmental guidelines and duties.

## **2.6 ASSESSING ANANDNIKETAN COLLEGE CAMPUS: ENVIRONMENTAL AUDIT**

Various Indicators selected for Environmental Green Audit are as follows:

1. Water Use, Recycle and Management
2. Energy: Renewables And Source Profile
3. Recycling Systems & Solid Waste Management At Site
4. Food Procurement And Disposal
5. Indoor Air Quality And Greenhouse Gas (GHG) Inventory
6. Hazardous Wastes Management
7. Conservation And Restoration of Natural Resources
8. Computer Hardware, Electronic Waste And Its Disposal
9. Campus Culture And Environmental Awareness

## **2.7 INTRODUCTION TO GREEN AUDIT ASSESSMENT (PHASE-I)**

Colleges and Universities have broad impacts on the world around them, both negative and positive. The activities pursued by colleges can create a variety of adverse environmental impacts. But colleges are also in a unique position as educational institutions to be leaders in pursuing environmentally sustainable solutions.

Anandniketan College expresses its commitment to sustainability in many ways. It has taken a number of positive steps to reduce its environmental impact. But many areas remain in which substantial improvements can be made. This report serves to highlight Anandniketan's many accomplishments, and to make recommendations for improving the College's environmental sustainability.

The primary benefit of format is to increase the ability of the college in compare to other colleges. We applied many indicators to assess the college standard and the gaps as per need of NAAC accreditation and environmental regulation along with cost impact to fill gaps in analysis. The result is a report that is still largely comparable to those done for other colleges, but that is also uniquely fitted to Anandniketan.

We focused on basic indicators, covering an extremely wide range of environmental impacts. For each indicator, we establish a benchmark to evaluate Anandniketan's overall performance. These benchmarks are often taken straight from the sustainability & environmental standards, but were occasionally adapted to be more relevant to Anandniketan. We then examine the performance of Anandniketan on each of these indicators, and offer recommendations about how the College can reduce its environmental impact within each indicator.

We hope that this report will provide an accurate snapshot of Anandniketan's environmental impact at this point in time, and that it will aid the College in prioritizing positive steps it can take to improve overall sustainability and grade by NAAC. We intend this document to be revisited periodically and updated, perhaps by future consultant and environmental experts.

## **2.8 INDICATOR: WATER USAGE, RECYCLE AND MANAGEMENT**

**Goal: Encourage efficient water use and reporting.**

### **Benchmark:**

- Water use does not exceed 13-35 gallons per scaled campus unit per day for non- residential and non-athletic campus facilities.
- The campus has complete and clear records of its water use, and there exists a regular, on-going reporting process for all water use data (monitored at a single point of campus). Water is metered through bill and pumping from borewell is used for irrigation.
- The campus facilities department provides information to campus users about water use in ways that raise awareness and facilitate action.

### **Performance:**

- The college is within the Average- 25 gallons per day.

Officially, any abnormally high water usage for a particular duration could be tracked only after monitoring each activity in near future with activity classification with purpose. But, there is no formal system for providing feedback to campus users.

The College has begun installing water-saving devices as fixtures are replaced. Specifically, the College is implementing 1.6-gallon flush toilets, 1-gallon flush urinals and water-saving showerheads.

### **Recommendations:**

- The College should improve its monitoring and reporting of water usage, including monitoring irrigation water use separately.
- Anandniketan should try to provide information and feedback on water use to campus users in the laboratories, lavatories, canteen /potable and for irrigation purpose.
- All soak pits ( figure below) must be done scientifically to avoid any seepage of bacteriological contamination into ground water
- All chemical/ biological wastewater must be treated ( disinfected) prior release to environment

## **2.9 INDICATOR: ENERGY: RENEWABLES AND SOURCE PROFILE**

### **Goal:**

- I. To encourage efficient energy use and reporting.
- II. Encourage purchasing and/or production of renewable energy.

### **Benchmark:**

- I. Total energy use for heating, cooling, and electricity does not exceed 110-150 MMBtu per Scaled Campus User (SCU) per year
- II. A percentage of energy purchased and/or produced from renewable sources (wind, low-impact hydroelectric, geothermal, solar, etc.)

### **Performance:**

- In order to compare Anandniketan's energy use with that of other colleges we are using the Good Company's weights for different types of campus users. Calculations A and B represent two different weighting scales used by Good Company—details on these calculations are included in Appendix A.

Since 1949 the college has employed several measures to save energy including; conversion of electric bulbs to tubelights then migrated to CFL and now LED bulbs and lamps are planned. Air coolers and Air Conditioners are used only after 2005. Non-residential school/college is run especially in day light to avoid usage of non-renewable energy sources. These projects have helped to reduce the overall energy consumption on campus.

Anandniketan's commitment also created awareness for energy conservation when renovating and building new structures on campus classroom like windows for light and ventilations. In the two most recent projects on campus, the Student Housing Project and the Academic and office /Project, energy consultants were used in evaluating energy saving options, and most of the appliances were Energy Star rated. In the Academic and Dining Project, the installation of a program called Energy Assets helps optimize the buildings thermal performance and light sensors were added to reduce the amount of artificial light used.



Measuring individual buildings on campus is still a problem for Anandniketan. For all buildings on the central campus grid there is only one meter. Also, there are laboratories and buildings located across campus with single monitoring unit. Records for these buildings are not immediately available and are not combined with total electrical use data.

Anandniketan College does not purchase or has source of renewable energy. There has been little discussion of replacement or non-renewable energy sources and high consuming equipment's at college in the future.

However, Anandniketan College has coordinated with management to install solar panels in school premises. While it does not mean that Anandniketan is only using the green energy but its using for auxiliary purposes like street light, night peripheral lighting etc. This system seems like a reasonable contribution to renewable energy and the reduction of non-renewable energy production in long run.

**Recommendations:**

- The College should improve its monitoring and reporting of energy usage and provide information to campus users. In order to do this the College must install meters for campus buildings. Also, many schools have begun posting the amount of electricity use in individual dorms. Since the off-campus houses are already individually monitored it would be easy to start doing this.
- Anandniketan should begin to purchase or produce or utilise renewable energy from various sources like solar panels, wind turbines etc. If the wind turbine project goes well Anandniketan could make money and this money could be used to defer the cost of renewable energy.
- Most of time convetional energy is used which could be avoided by using renewable or natural day light



## **2.10 INDICATOR: GREEN HOUSE GAS INVENTORY**

**Goal:** Encourage full accounting of GHG emissions in all areas of campus operations.

**Benchmark:**

- Conduct GHG inventory for all campus options (at a minimum, campus utilities use; preferably, include waste stream impacts)

**Performance:**

- The Anandniketan facilities department is provided with a yearly report on the type and amount of emissions from the steam generator plant. This report does not account for all utility use on campus, especially the off-campus buildings, which are monitored separately.

Amid the last session of 2016-17, Anandniketan school had considered different measures for reduction of GHG outflows yet not according to green construction standard was taken after because of reasonable compel and monetary achievability for execution on grounds. IECRS directed a GHG stock which included transportation of refuse to the landfill, staff travel, lab outflows, cooling units like AC and Refrigerator and wastewater and strong waste. Such a comprehensive examination has not yet been refined at Anandniketan.

**Recommendations:**

- Anandniketan should encourage students & staff to undertake the recommendations below to balance the GHG inventory-
  - ✓ Application of cooling systems with no GHG emissions like water cooler & natural ventilation
  - ✓ Recycling of scrap, wastewater and cooling water
  - ✓ Proper solid waste management at campus to avoid GHG emission
  - ✓ Regular PUC check-up for vehicle and transport used for school/college and also by each staff
  - ✓ Day light maximum utilization and
  - ✓ Heating through renewable energy sources
  - ✓ Decrease in application of fertilizers and pesticides

## **2.11 INDICATOR: RECYCLING SYSTEMS**

**Goal:** Provide the physical and organizational structure to make recycling convenient for campus users and create a benchmark for reducing our overall waste stream.

**Benchmark:**

- Recycling has four components: infrastructure present across campus; recycling rate above 50%; collection of feasible recyclable materials; and recycling education across campus

**Performance:**

- Anandniketan has done quite well at emerging its reprocessing infrastructure, increasing it considerably over the past several years. The basic recycling services the College offers include “co-mingled” recycling of glass, aluminum and plastic, and paper recycling, which can also include such items as paperboard and newspaper. Bins for these two services are located throughout campus, wherever there are collection sites for regular waste. They are present in many prime locations for waste, such as the mailroom and the computer labs. In addition, recycling bins are provided to all students living in a campus dorm room to assist in making the recycling process easier. This program appears to have been a success, and students like the convenience of having access to small cans in their room.
- The College also provides recycling for many non-traditional items, such as batteries, ink cartridges, fluorescent lights and cardboard. The cardboard is collected and handled on campus, then shipped to a recycling facility. However, the recycling rate is still lower than the benchmark. We have a weekly average of about 0.5 tons of waste, of which approximately 30% is recycled.
- Our recycling education could also serve to be expanded. We currently engage in some education efforts to inform students about their recycling options, and signs are posted on the appropriate bins indicating what can be recycled in each bin. However, there are no signs posted to tell students where to go for the disposal of other recyclables. For example, batteries are disposed of in general waste bin of Campus Center, including ink cartridge recycling bags. This might create confusion for students who have to determine the location for disposing of different items. Having a better education program and more signage about recycling could assist campus users.

**Recommendations:**

- To reach the goal of a 50% recycling rate, which some institutions have achieved, Anandniketan should compost food waste and be more vigorous about our recycling education.
- Anandniketan should continue to work towards composting post-consumer food waste generated by the cafeterias. As present composting pit is not scientifically designed. ( Figure below)
- All waste or recyclable material like batteries and ink cartridges must be refilled to reuse or dispose off campus through standard waste management procedure according to local urban body/ village grampanchayat etc.
- All paper / cardboards must be collected and sold out to recycler to save raw material (trees), old books/note books/ journals etc. to use for making colored journals/magazines/paper bags industry or local general store to avoid plastic/ polythene.
- Tube light/bulb fixtures etc., must be disposed off to hazardous waste recycler
- All metals ( any type rusted or waste cuttings) must be sale to recycler
- All old /outdate equipment's from laboratories must be disposed off to electronic waste management rules 2015 and amendments accordingly
- Plastic bottles/ glassware must be collected and sold to specific recycler dealer for recycling



**FIGURE 3 : COMPOST PIT**

## **2.12 INDICATOR: AMBIENT AIR QUALITY (AAQ)**

**Goal:** Ensure the quality of the ambient environment, which is critical for health.

**Benchmark:**

- Have in place a program to monitor and maintain ventilation systems, major ambient air pollutants/contaminants, and standards for air /gas release in ambient atmosphere at campus
- Have a process of responding to AAQ issues and concerns.
- Use materials for design and construction that minimize or eliminate off-gassing from various exhausts
- Construction and renovation should include heightened flue gas chimney
- No open burning for waste material/ rags/polythene/paper/organic dry

**Performance:**

- The college has program to fully and thoroughly examine issues of ambient air quality in the Anandniketan college campus. This program involves a room-by-room in-depth assessment of each building and interviews with the occupants on any issues or complaints they may have. This first phase of data collection will take into account Heating, Ventilation and Air Conditioning systems, locations of rooms (basement, first floor, etc.), location of operable windows, location of building air intakes and type of filtration, occupancy type, and history of complaints.

After collecting the complete data on each building on campus, the next step will be to develop an assessment of risk priority and confirm or modify the prioritization based on actual air sampling from representative locations across campus and around. Air sampling will consist of tests for SO<sub>x</sub>, NO<sub>x</sub>, carbon monoxide, hydrogen sulfide, humidity, and temperature, as well as tests for molds and/or some Heavy Metals, if appropriate. The test results will be used to finalize the risk priority and set a schedule for remediation and ongoing sampling and testing.

In terms of prevention, the college currently uses low-VOC paints, which is good for AAQ. Also, products are selected and implemented in order to minimize AAQ issues. Most buildings have operable windows which users can use to adjust AAQ with cross air ventilation can be arranged to decrease the energy consumption and dust reduction. Water spray across campus while games and physical activity during working hours of college.

**Recommendations:**

- The college should consider giving additional funds to expedite the current AAQ program.
- After completion of the AAQ evaluation, the college should continue to work to prevent IAQ problems from arising from laboratory sections during practical sessions
- Green belt around campus with minimum space within as corridor to be developed instead a linear row of trees being planted to avoid dust & pollution entering from surrounding traffic & activities
- All construction or civil repair must be done in off sessions to avoid impact of dust on campus users
- In case of DG sets emissions must be monitored regularly for its emission flue quality against NAQMS. Stack must be raised to an optimum height (atleast 10 Mt AGL)
- Major open spaces must be made green carpet using local grass to avoid any dust raising during hot summer or any other physical activities
- All exhaust and waste chemical water must be discharged to treatment facility or to N-Pit to neutralise prior discharging to common sewer or stored into lined pit and solar dried as per policy mentioned in college ISO documents.

### **2.13 INDICATOR: HAZARDOUS MATERIALS**

**Goal:** To insure proper handling and disposal of hazardous wastes and materials generated by campus operations.

**Benchmark:**

- There should be in place a policy for the handling and disposal of hazardous materials.
- The college should have in place plans for dealing with hazardous wastes in academic departments (like laboratory and Power Backup Units etc.) as well as facilities plants (gas cylinders, solvents, chemicals and paints, etc.).

**Performance:**

- The college does a good job of ensuring that hazardous materials are disposed of properly, and over the years has increased its use of environmentally friendly substances and practices. All college departments and offices dispose of hazardous wastes through the chemistry department.
- Hazardous materials from the chemistry department (i.e. used chemicals/solvents) are collected from each lab and stored; twice a year an authorized recycler/ collector company comes and collects the hazardous materials. Some small amounts of chemicals can escape down the sink when glassware is cleaned, but not much. All chemicals are labeled with handling and disposal instructions to insure proper use and disposal in the labs. The solvents the college uses have become much more benign over the years. Also, the amount of chemicals used in the labs has decreased about 4X over the last twenty or so years, which reduces chances of incident, injury, spills, and reduces the amount of chemicals that must be cleaned up and disposed of.
- The maintenance department has many programs in place to deal with hazardous wastes through authorized recycler. Paint is cleaned up with mineral spirits instead of turpentine. Vegetable oil is used to clean up inks instead of a solvent or other harmful chemical. Spent acid is disposed of with the chemistry department hazardous materials. Some very small amounts of inks and acids do go down the sink, but not much. Rags that may have small amounts of ink or solvents on them do get thrown out.
- Any waste light fixture containing mercury and heavy metals filaments, pesticides containers, empty chemical bottles and packets are disposed off to recycler



- All medical first aid centre and soak pit waste like muck etc. is disposed off to hazardous waste landfill through authorized transporter
- Used batteries and its content acidified water is disposed at garage repair centre and computer system /server system is disposed off to recycler
- Waste drums and paint brushes is disposed off to hazardous recycler

**Recommendation:**

- To be followed as per Hazardous Waste Management Rules 2008 (Transport, Collection, Treatment, Recycling, Disposal and Landfill facility) and its amendment subsequently

## **2.14 INDICATOR: GROUNDS MAINTENANCE**

**Goal:** Minimizing the environmental impact of maintaining landscaping, including athletic fields.

**Benchmark:**

- Total use of chemicals well below conventional norms; implementation of techniques to minimize or eliminate the use of toxic and persistent chemicals.
- Ensure the implementation of water saving devices and techniques for irrigation throughout campus, especially where easiest and most cost-effective. Track water use for irrigation separately.
- Select plants with low maintenance requirements and that otherwise fit the local ecosystem (i.e. non-invasive and provide habitat for native species).
- Policies ensure that development minimizes the use of impermeable surfaces such as parking spaces and hardscaping in order to reduce impacts on storm water quantity and quality.

**Performance:**

- Overall, it seems the grounds department is actively attempting to minimize its environmental impact. The College has recently increased its use of corn gluten, a biodegradable non-toxic herbicide. Some broadleaf spaying still occurs in specific areas, but the grounds department aims to maintain these areas with corn gluten once the initial weed population has been eliminated with chemical herbicide. Fertilizer use is fairly limited, and restricted to athletic fields. (For more specific information on grounds chemical use at Anandniketan, see Appendix B.)

At the time of this report, no data on irrigation water use was available (see water use section for information on irrigation monitoring.) However, the grounds department's basic philosophy is to use the minimal amount of supplemental water necessary. The irrigation system is recommended to be fully automated, and two watering stations have rain sensors to prevent watering after a recent rain.

The grounds department has always emphasized low-maintenance landscaping due to a limited staff. A large portion of the landscaping on campus is native (see Appendix), and further emphasizes on native and sustainable landscaping.

The College does not have policies regarding minimizing storm water runoff, although the issue is discussed every time the school applies for a building permit. The layout of the campus is relatively open with much green space, thus keeping the amount of impermeable surface area below 50% (see Appendix D).

**Recommendations:**

- Anandniketan should consider developing explicit policies for reducing the impact of new construction on impermeable surface area and runoff.
- The College should continue working to reduce the amount of broadleaf spraying on campus.

## **2.15 INDICATOR: CONSERVATION AND RESTORATION ACTIVITIES**

**Goal:** To promote preservation and restoration of natural areas, to educate students about the process and the importance of these activities.

**Performance:**

The arboretum consists of mainly dry-deciduous to semi-evergreen habitat. The College also owns and maintains its original prairie.

The Arboretum is home to a number of native and migratory species, (list of same in included). The dry-deciduous forest also provides an important ecosystem service—as it regenerates, it will aid in management of the waste and dry mix, by preventing soil erosion during monsoon and heavy rains.

Active restoration work is taking place in order to return former agricultural land to prairie, forest and dry-deciduous to semi-evergreen, and reintroduce species once native to this area. Student-based work crews work throughout the year to remove weed species, maintain trails, plant native tree and prairie species, and maintain prairie and its ecosystems.

Due to limited resources, the arboretum has a fairly small interpretive program. A limited number of signs are posted throughout the arboretum. A few students serve as “student naturalists” each year, and lead a few informational tours during the year. The Arb also does a breeding bird survey every spring. Detailed list of medicinal plants species across campus is also included through survey by college subject experts and verified by IECRS on site visit.

**TABLE 1: DETAILS OF INFRASTRUCTURE AREA USED WITHIN CAMPUS**

<b>CLASS ROOMS :-</b>	40' x 25' - 2 (Room No. 5 & 8)
	30' x 25' - 7 (Room No. 3,6,7 & 10)
	25' x 17' - 1 (Room No. 11,12 & 13)
	16' x 12' - 1 (Room No. 10)
<b>LABORATORY :-</b>	40' x 25' - 5 (Che 2,Bot.1,Zoo.1,Phy.1)
	30' x 25' - 3 (Phy.2, Bot.1)
	16' x 16' - 1 (Che.Bal.Room)
	18' x 25' - 1 (Chem.store room)
	15' x 10' - 1 (Che.staff room)
	25' x 32' - 1 (Elect.Lab)
	15' x 20' - 1 (Gas room)
<b>OFFICE :-</b>	20' x 22' - 2 (Administrative)
	10' x 22' - 1 (Account)
<b>PRINCIPAL ROOM</b>	20' x 22' - 1
	12' x 21' - 1 (Accounts)
	10' x 22' - 1 (NACC office)
<b>LADIES COMMON ROOM</b>	26' x 18' - 1 (with concealed varanda & attached Toilet)
	18' x 10' - 1 (Study room)
<b>ADULT EDU.&amp; CONTD.EDU.</b>	14' x 23' - 1 (Room No.2)
<b>NCC</b>	24' x 23' - 1 (Room No.1 with attached toilet)
<b>CLASS ROOM</b>	21' x 23' - 1 (Room No. 11)
<b>OPEN STAGE</b>	7' x 43' -
<b>UNDER UGC SCHEME :</b>	
Science workshop	28' x 43' - 1 (Lab)
Dark Room	35' x 9' - 1 (Lab)
Tissu culture Lab.	36' x 32.6' - 1(Lab)
Biology Musium	36' x 8' - 1 (Lab)
Lecture Hall	32.6' x 35.7' - 2 (Room No. 4,5)
Library	100' x 30' - 1
NSS Bhavan	28' x 13' - 1
Gents students toilet	54.5 x 11.2' - 1
Office staff toilet female	13' x 5' - 1
Office Tea club room	18.5'x14.9' - 1
Ladies common room	31.6'x22.6' - 1
Dom	20' x 18' - 3
Office staff toilet Male	31 x 13- - 2

**TABLE 2: WATER UTILISATION PATTERN WITHIN CAMPUS AND LABORATORY**

<b>Sr. No.</b>	<b>Water Used For</b>	<b>April 2014 February 2015</b>
1	Domestic Purpose including canteen.	4 m3/day
2.	Agricultural Gardening	1.5 m3/day
3.	Laboratory Purpose.	1.0 m3/day

**LABORATORY WATER CONSUMPTION**

	<b>Laboratories consumption</b>	<b>Lab. Water Consumption /Day</b>
1.	Chemistry Laboratory	600 lit
2.	Zoology Lab	200 Lit
3.	Botany Lab	200 Lit

**Recommendations:**

- Ideally, the arboretum should increase its interpretive program in order to fulfil its educational goal. The student naturalist program is expected to expand next year, which will hopefully help to increase awareness of conservation, the restoration process, and the natural history of the Arboretum.
- Also an awareness (skill oriented & certified) program must be conducted to generate the skill to passing out senior college students.

## **2.16 INDICATOR: ELECTRONIC, PLASTIC AND E-WASTE**

**Goal:** Provide high-quality, energy efficient computer hardware, considering long-term impact rather than short-term benefits. Minimize negative impacts of computer disposal by maximizing reuse, recycling, and safe disposal.

### **Benchmark**

- Computer companies are rapidly developing in the area of energy efficiency
- Many computer hardware and electrical supply companies now cooperate with customers to reclaim old or damaged parts.

### **Performance:**

The College's has improved in the last several years in its practices of computer hardware purchasing and disposal. Perhaps the most significant improvement has been the general switch from CRT (cathode ray tube) monitors to LCD (liquid crystal display)/flat panel display monitors. This change occurred in response to Anandniketan's initiative to try to meet its Kyoto Protocol standards. Although over twice as expensive up front, LCD monitors are estimated to use 40-60% less energy overall than CRTs. All computers purchased by the college have an Energy Star rating, which is beginning to be a standard requirement for computers.

Old computers and other equipment are planned to dispose-off to authorised recyclers, to reclaim, reuse and recycle the required parts, and disposing of other parts. Toner is taken by refilled, to re-use instead direct disposal. The College has no official purchasing guidelines for paper. Individual departments and offices make separate decisions about which of the two options they would like to use

### **Recommendations:**

- Any future increases in servers should be consolidated in one "machine room," rather than building another on campus with the same high maintenance requirements. Additionally, when the College's phone system is replaced, the central system could also be consolidated in this space.
- College should cooperate with branded computer suppliers/ manufacturer and other computer hardware supply companies to reclaim materials, rather than sending them to a non-part/company-specific processor.
- Anandniketan should continue to offer the 30% recycled paper option, and should consider offering higher recycled-content paper options in the future as product quality increases.

- Anandniketan should strongly consider adopting a fee system for printing, which would significantly decrease paper use on campus.





## **2.17 INDICATOR: ENVIRONMENTAL STUDIES CURRICULUM**

**Goal:** Educate all students in the area of environmental studies in an interdisciplinary framework, and provide adequate for training for those students who wish to pursue environmental research, graduate school, or environmentally-related career choices.

**Benchmark:**

- Develop a clear assessment of the environmental studies curriculum and work from this analysis to achieve goals recommended by faculty, students, and administration
- Environmental studies is an increasingly significant area of study in institutions of higher education

**Performance:**

- Anandniketan College's environmental studies curriculum currently do not comprise of Environmental and Technological Studies (ENTS) program (as distinguished from a department).

Some significant questions being considered are how to clearly establish and articulate the philosophy and goals to establish the ENTS program, and whether ENTS should become a department and/or develop a major. This is a highly critical period for determining what the nature of the program should be for the next several years.

ENTS should be maintained as a viable concentration and consider the pros and cons of establishing a department and major, as students have strongly recommended. Increase in staffing level should be seriously considered. The College must clearly delineate goals and organizational structure in writing.



## 2.18 RELATIVE PERFORMANCE AND CONCLUSION

Green Audit is the most efficient & ecological way to solve such an environmental problem. The experiments on the nature by avoiding natural rules, this can be a one major reason behind Green audit process.

Green Audit is one kind of professional care which is the responsibility of each individual who are the part of economical, financial, social, environmental factor. The Green Audit of is Requirement of NACC Committee to the Junior college. It is necessary to conduct a green audit in Anandniketan College campus because student aware of the green audit, its advantages to save the planet & they become good citizen of our country. Thus Green audit Become necessary at the college level.

The findings of this report show that the college performs fairly well on sustainability issues. The college does consider the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. In conversations with faculty, staff, and administration at the college, a major theme has been the improvements made over the last several decades in how the college performs environmentally.

Even though the college does perform fairly well, the recommendations in this report highlight many ways in which the college can work to improve its actions and become a more sustainable institution.

The IECRS Firm has completed environmental audits for the above college. This allows us to compare Anandniketan's performance to these other schools. Anandniketan seems to undergo similar problems with monitoring and information dissemination. Many schools have problems with accurately and consistently monitoring electrical usage (especially in terms of individual buildings) and water usage (in terms of separating irrigation water monitoring system etc.). Many of the schools also have limited plans for circulating the information to the people who affect the amount of water and electricity is used.

Anandniketan does not have a well devised and succinct environmental code or statement through which all decisions are filtered. Many schools, especially larger ones, seem to have environmental principles or codes for sustainability. These statements ensure that all decisions are thought of in terms of the environmental impacts that they will have. Anandniketan currently has a broad environmental principle. However, while many decisions may take environmental concerns into mind, there is no binding clause that requires them to do so. Also, some schools are beginning to form committees that ensure that the investment policy is socially and environmentally conscious. Anandniketan does not yet have such a plan.



Energy conservation for campus activities and applications could be planned according to BEE/IGBC guidelines to save energy and apply renewable energy exploration & utilisation. In this line Anandniketan, has initiated few steps by using LEDs and solar light on play ground fields. Technical saving in regards to same is not complied yet.

Chemical awareness at Anandniketan is high. Anandniketan, however, does not implement a strict “green chemistry” program. Many large universities have implemented such programs for various purposes and needs which is more cost intensive as starting a “green chemistry” program.

The recycling program at Anandniketan is comparable to other institutions. However, many schools are now implementing composting programs (at least at smaller levels) and Anandniketan has yet to start such a program. Anandniketan also has not converted, or even offered the option, for 100% post-consumer recycled content paper.

Self-sustainable nursery has been developed within campus through students participation and developing green belt across campus area. Its detailed annexures and identified list by systematic flora- fauna study report is included. But various schedule species and its conservation plan is not in place, which could be done through awareness and training programme at college campus.

Overall the College’s performance is adequate. There are areas where Anandniketan is leading the way and can distribute advice to schools looking to do the same, but there are other areas where Anandniketan should take advice and change current policies.

In this section, the recommendations are ranked in terms of priority. We have three categories based hierarchically on immediacy, importance, and potential impact: high priority, medium priority, and future and minor concerns.

*The high priority recommendations are:*

- Improve the College’s monitoring and reporting of water and energy usage and provide better feedback and information to campus users.
- Continue working towards energy saving and use of renewable energy for various applications
- Consider expanding local and organic food options in the dining halls.
- Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.



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- Create a formal structure, such as a committee, to engage in an ongoing discussion of investment responsibility.
  - With regards to the concerns mentioned in this report, the college should consider adopting specific goals and targets in its pursuit of sustainability.

*The medium priority recommendations are:*

- Look towards meeting Kyoto standards.
- Dead storage for cars should be reviewed and enforced.
- Communicate with computer manufacturer and other hardware suppliers to find out what materials they can take back themselves.
- Start a program to recycle CDs/ BUS/Drivers.
- Develop explicit policies concerning the impact of new construction on impervious surface area and runoff.
- Continue working to reduce the amount of broadleaf spraying on campus.
- Continue to stay current with chemical products that may have a minimal environmental impact and make this an explicit formal goal.
- Consider a more formalized process of product selection and evaluation.
- Consider using micro-sizing in labs and using a more “green curriculum.”
- Increase recycling education on campus.
- Continue to offer the 30% recycled paper option, and consider offering higher recycled-content paper options in the future as product quality increases.

*The minor and future concerns are:*

- Offer students/faculty/staff option for “taxing” themselves in order to purchase green energy.
- Encourage student project on environmental footprint for Anandniketan College.
- The college should continue its focus on preventing IAQ & AAQ problems.
- Look for a way to dispose of rags and other such materials that may contain hazardous chemicals.



Concluding remark is Anandniketan College campus initiated the green audit phase-I (general reconnaissance assessment) also known as Initial Environmental Examination and its found to be adequate to prepare for phase \_II audit with technical analysis and monitoring plan.

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