

GREEN AUDIT REPORT

(2022-2023)



HARISH CHANDRA POST GRADUATE COLLEGE

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Prepared by



Paramarsh Servicing Environment & Development

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Green Audit Report 2022-23

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ACKNOWLEDGEMENT

We express our sincere gratitude to Harish Chandra Post Graduate College, Varanasi for giving us the opportunity to be a part of their mission towards environment conservation. We are thankful to all officers and employees of Harish Chandra Post Graduate College, Varanasi with whom we have interacted during the field study for their whole-hearted support in undertaking measurements and eagerness to assess the system/equipment efficiencies and saving potential. The willingness of these key personnel to participate in this program and acknowledge the call for energy efficiency is more than half the issues received.

DISCLAIMER

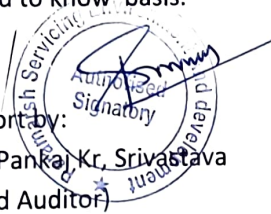
PARAMARSH Green Audit Team has prepared this report for Harish Chandra Post Graduate College, Varanasi based on input data submitted by the representatives of college complemented with the best judgment capacity of the expert team. All the details contained in this report have been compiled in good faith based on information gathered. All reasonable care has been taken in its preparation of report.

It is further informed that the conclusions are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

PARAMARSH and its staff shall keep confidential all information relating to your organization and shall not disclose any such information to any third party, except that in the public domain or required by law or relevant accreditation bodies. PARAMARSH and accreditation bodies have signed individual confidentiality undertakings and will only receive confidential information on a 'need to know' basis.

Report by:

Mr. Pankaj Kr. Srivastava
(Lead Auditor)



CONTEXT

National Assessment and Accreditation Council or NAAC certification can be defined as a measure to evaluate and then guarantee a standard of education provided in higher institutions across the nation. The **University Grant Commission (UGC)** has issued a decree stipulating that every university and faculty must get certification by the council called **National Assessment and Accreditation Council**.

As per NAAC accreditation, institutions get an excellent opportunity to-

- Multiply its productivity & efficiency
- Figure out the shortcomings & academic strengths
- Enhance teaching-learning processes
- Continuously improve the plan of action

Thus, the NAAC accreditation stands for a reliable methodology to maximize student & institutional success.

NAAC- ASSESSMENT CRITERIA

There are 7 assessment criteria which the institution has to comply with in order to get a NAAC accreditation

1. Curricular Aspects
2. Teaching-Learning and Evaluation
3. Research, Consultancy and Extension
4. Infrastructure and Learning Resources
5. Student Support and Progression
6. Governance, Leadership and Management
7. **Innovations and Best Practices**

Criterion 7: Innovations and best practices

This criterion is to assess factors like

1. The approach of institution towards a greener, eco-friendly campus,
2. Energy conservation in the institution,
3. Innovative ideas implemented in the institution, and
4. Practices towards a common, better future. Etc.

These all proclaims the nature perspectives of the institution towards the outside world, and its moral values. The 'Best practises' includes anything that have contributed towards the institutional objectives and quality improvement.

In India, the process for environmental audit was first mentioned under the Environment Protection Act, 1986 by the Ministry of Environment of forests on 13th march, 1992. As per this act, every person owning an industry or performing an operation or process needs a legal consent and must submit an environmental report or statement.

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory from the academic year 2019-20 onwards that all Higher Educational Institutions should submit an annual Green, Environment and Energy Audit Report. Moreover, it is part of Corporate Social

Responsibility of the Higher Educational Institutions to ensure that they contribute towards the sustainable environment.

In view of the NAAC circular regarding environment auditing, the College management decided to conduct an external environment assessment study by a competent external professional auditor.

The term 'Environmental audit' means differently to different people. Terms like 'assessment', 'survey' and 'review' are also used to describe similar activities. Furthermore, some organizations believe that an 'environmental audit' addresses only environmental matters, whereas others use the term to mean an audit of health, safety and environment-related matters. Although there is no universal definition of Environment Audit, many leading companies/institutions follow the basic philosophy and approach summarized by the broad definition adopted by the International Chambers of Commerce (ICC) in its publication of Environmental Auditing (1989).

The ICC defines Environmental Auditing as:

"A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environment and natural resources in its operations/projects."

This audit focuses on the environment legal compliances and implementation of rules defined by MoEFCC or state pollution control board. The concepts, structure, objectives, methodology, tools of analysis, and objectives of the audit are discussed below.



GREEN AUDIT
Year - 2022 – 2023

1.1 Green audit: An effective tool towards Environment sustainability and protection

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

Educational institutions have broad impacts on the world around them, both negative and positive. The activities pursued by campus can create a variety of adverse environmental impacts. But they are also in a unique position as educational institutions to be leaders in pursuing environmentally sustainable solutions. Green audit is assigned to the criteria 7 of NAAC, which is a self-governing organization of India which declares the institutions as Grade A, B or C according to the scores assigned during the accreditation.

1.2 Why Green audit

Green auditing is the process of identifying and determining whether an institution's practices are eco-friendly and sustainable. Traditionally, we are good and efficient users of natural resources. However, over the period of time excess use of resources like energy, water, chemicals are become habitual for everyone especially, in common areas.

Now, it is necessary to check whether our processes are consuming more than the required resources? Whether we are handling waste carefully? Green audit regulates all such practices and gives an efficient way of natural resource utilization. In the era of climate change and resource depletion, it is necessary to verify the processes and convert them into green and clean ones. The green audit provides an approach for it. It also increases overall consciousness among the people working in institutions towards an environment.

1.3 Objectives of Green audit

The Green Audit of an educational institute is becoming an important criterion for self-assessment of the institution/college which reflects the role of the college in mitigating the present environmental problems. The college has been putting efforts to keep its environment clean since its inception.

Therefore, the **main objectives of carrying out Green audit are:**

1. To verify whether the design of Environment Management Systems (EMS) at all departments meets the requirement of the international standards
2. To map the Geographical Location of the college

3. To verify whether the implementation of EMS to define organizational EMS procedures is in line with the Green Policy
4. To document the waste water and solid waste disposal system
5. To record the meteorological parameters of where college is situated
6. To document the ambient environmental condition of weather, air, and water of the college.
7. To document the floral and faunal diversity of the college
8. To estimate the Energy requirements of college
9. To report the expenditure on green initiatives during the last five years

1.4 Benefits of Green audit to an Educational Institute

There are many advantages of green audit if is implemented properly:

- It would help to protect the environment in and around the campus.
- Recognize the cost saving methods through waste minimization and energy conservation.
- Find out the prevailing and forthcoming complications.
- Empower the organization to frame a better environmental performance.
- It portrays good image of institution through its clean and green campus.
- Empower the organizations to frame a better environmental performance

1.5 Introduction of Auditing Firm

M/s Paramarsh Servicing Environment And Development is an ISO 9001 :2015,ISO 14001:2015 & OHSAS 18001:2007 Certified Company, accredited by Quality Council of India (QCI-NABET) approved by Ministry of Environment Forest and Climate Change (MoEF&CC) as an Environment Consultant Organization. Aiming to manage the complex sustainable environment management system M/s Paramarsh Servicing Environment & Development was founded by Mr. Akash Kumar who has 15 years of experience in the field of environment, ecology, and pollution control.

M/s Paramarsh is the leading consultancy provider in the areas of environment, industrial safety and management systems. We are team of eminent and outstanding technocrats and professionals. The directors and associate team members are very well experienced in the field of Audit. The associate team and experts are highly qualified and experienced in the field of Audit and Services.

Table 1.1: Details of Auditing firm

Name of Firm	M/s Paramarsh Servicing Environment And Development
Address	MS 1/10 Sector A, Sitapur Road Yojna (Near St. Anthony School, Ram Ram Bank Chauraha, Aliganj) Lucknow - 226 024, U.P.
Contact Details	0522-4307467, +91 - 7318000550, +91 - 9335881715
Director details	Mr. Akash Kumar M.Tech. – Env. Engg. , M.Sc. – Env. Scs., PDCIS – Industrial Safety, IGBC - AP

1.5.1 Audit Participants

On behalf of college, the composition of the Core Green Group is provided below:

Table 1.2: Audit Core Green Group of Harish Chandra Post Graduate College

S. No	Name	Committee Designation
1.	Prof. Rajnish Kunwar (professor/principal)	Chairman
2.	Dr. Dheeraj Kumar Singh (Asst Prof Botany)	Co-ordinator
3.	Dr. Sangita Shukla (Asst Prof Zoology)	Co-ordinator
4.	Dr. Alok Kumar (Asst. Prof., Botany)	Member
5.	Dr. Shivanand Yadav (Asst. Prof., Geography)	Member
6.	Shri. Shankar Ram (Asst. Prof., Chemistry)	Member

1.5.2 Members of auditing firm

Audit was conducted on behalf of PARAMARSH:

Table 1.3: Members of auditing firm

Sl. No	Name	Designation
1	Dr. Surendra Vikram Ghavri	Sr. Consultant
2	Mr. Pankaj Kr. Srivastava	Lead Auditor
3	Mr. Akash Kumar	Co-Auditor
4	Mr. Pramod Kumar Vishwakarma	Auditor
5	Mr. Rajkumar Gautam	Co-Teamer
6	Mr. Ravi Shankar	Co-Teamer

1.6 About Harish Chandra Post Graduate College

Harish Chandra Post Graduate College, Varanasi is a Govt. aided college and is one of the premier seat of learning of Eastern U.P. under the auspices of Harish Chandra Vidyalyaya Samiti (a non profitable charitable institution registered under Indian Society Act 1860. Bharatendu Harishchandra, the profounder of the modern Hindi Language founded this institution with five students of the locality in 1866. The institution had started High School Classes. The Intermediate Classes started in year 1939. The Undergraduate Classes in Arts and Commerce began on oct. 4, 1951. At first; the college was affiliated to Banaras Hindu University. The recognition of the Law Classes was made possible in the year 1958.

However, owing to certain amendments and changes in the rules and regulation of B.H.U., the college shifted its affiliation with the University of Gorakhpur in the year 1960. Consequently; the B.Ed. Classes began the same year, whereas recognition for BSC classes in Maths Group and Bio Group was granted in the year 1963 and 1974 respectively.

With the establishment of the Purvanchal University, Jaunpur the college was affiliated to this University in 1987-88. From the session 2009-10, the affiliation of the college is shifted to M.G.Kashi Vidyapeeth, Varanasi.

The college has Post Graduate in the subjects-Commerce, Statistics, Hindi, Mathematics, Chemistry, Botany, Zoology, Political Science, English and Psychology.

10	Class rooms & Seminar Halls	31
11	Boys Reading room	02

1.8.1 Area of the Campus

The Area of the college is 76890.3 sq meter. Rich green vegetation and large open land provide good infiltration of the rainwater in the college campus.

1.8.2 Population of college campus

Harish Chandra P.G. College is fairly well-spread, student-centric institute, with more than 8251 students enrolled in a broad range of graduate, post graduate programs including several professional schools. The main campus is spread over 5640.24 acres.

Table 1.4: Population details of Harish Chandra P.G. College

S.No.	Particulars	Population
1	Teachers	89
2	Class III employee	36
3	Class IV employee	43
4	Self finance teachers	38

1.8.3 Land use of Harish Chandra Post Graduate College

The total area of college 76890.3 sq mt out of which the built up area is 35583.83 m². The same is illustrated in Figure 2 respectively:

Table 1.5: Land Use Details: Harish Chandra P.G. college

Particulars	Area (Sq mt)
Ground coverage	26911.61
Green belt area	25571.01
Road and paved area	15378.06
Open space	9029.625

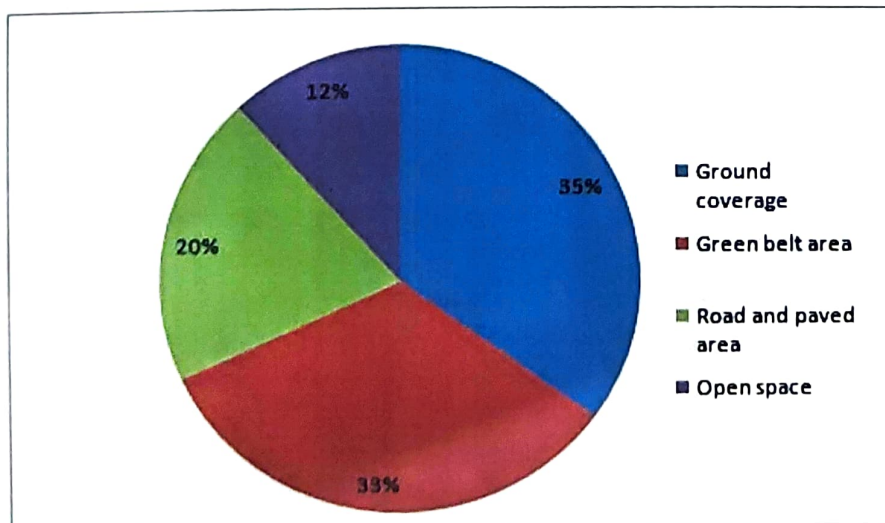


Figure 1.1: Pie graph showing the land use of Harish Chandra P.G. College

Table 1.6: Area occupied by various building at Harish Chandra P.G. College

S.No	Name of Blocks	Area (sq.ft)
1	Total covered area of Block A	4487.80
2	Total covered area of Block B	5392.58
3	Total covered area of Block C	4160.13
4	Total covered area of Block D	18894.79
5	Total covered area of Block F	2129.15
6	Total open area Block E	25017.37
7	Total covered area of temple	629.30
8	Covered area of Bawan Bigha campus	11100.00

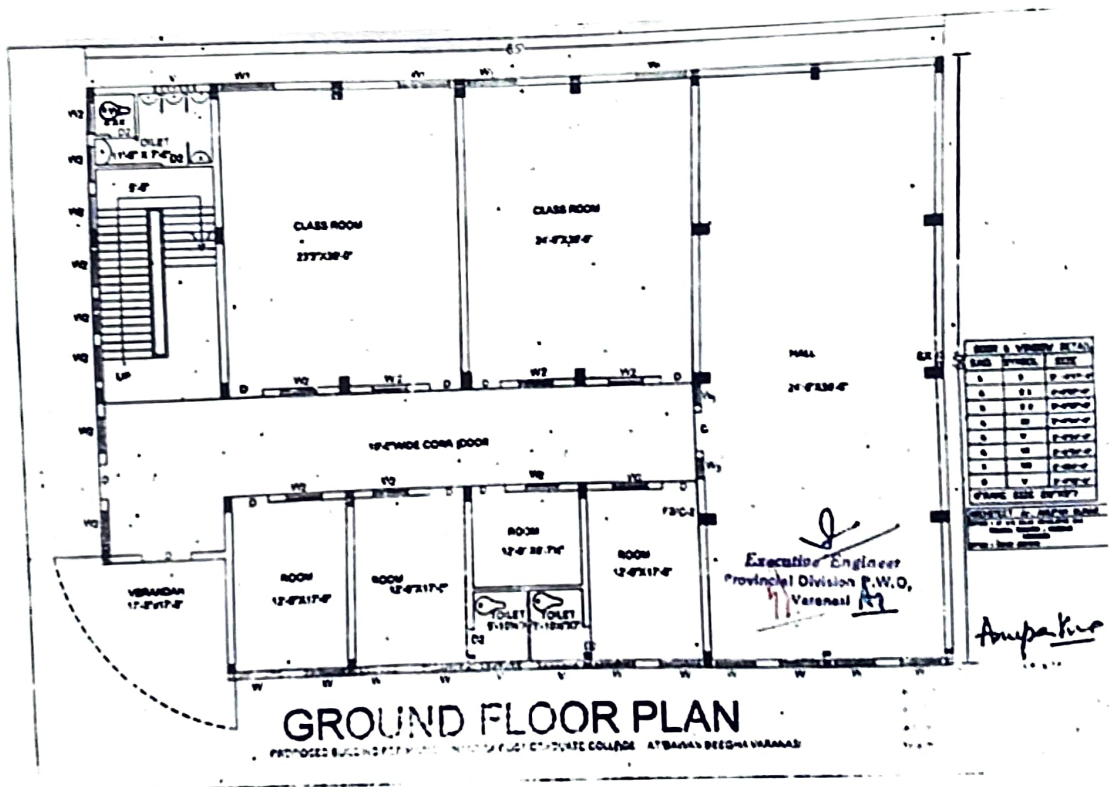


Figure 1.2: Ground Floor plan of Harish Chandra P.G. College

The college has also adopted the 'Green Campus' system for environmental conservation and sustainability. The 'Green Campus' has been active for the last several years as an assembly group of sub committees along with the Horticulture section that actively promotes the various projects. The college administration works on several activities for 'Green Campus' including Renewable Energy, Water Conservation, Tree Plantation, Waste Management, Paperless Work, etc.

1.9 College Campus Infrastructure

Harish Chandra P.G. College has a very good and systematic building infrastructure. All classrooms are fully ventilated and comfortable. The college from the outside looks great and is quite unique keeping the architecture of other universities in mind. The college has also an interesting historical legacy which is interesting to learn about.

Presently, it is one of the premier educational institutions of the state encompassing a vast, beautiful, and pollution-free campus which sprawls over 19.0 acres of land having vast playgrounds and experimental fields, the teaching department belonging to different faculties are housed in spacious buildings and have well advanced facilities. The Facilities present at college is described below:

COMPUTER CENTRE

The Computer Centre has about 15 computers. Broadband internet facility at the centre is used extensively by the college faculty, research scholars and P.G. students for enhancing their research/ teaching area based knowledge as well as for other knowledge based activities.

◆ CENTRAL LIBRARY

The college has a central library holding sufficient number of books and periodicals/journals to meet the requirements of the faculty members and the students. It has separate reading room to accommodate 70-80 students.

◆ NCC (National Cadet Corps)

The college provides training syllabi for the cadets offering NCC, the organization engaged in grooming the youth (boys and girls) of the country in disciplined and patriotic citizens. For enrollment and other information related to NCC Shri Alok Kumar Singh (Botany Department) can be approached at the NCC office.

◆ NSS (National Service Scheme)

NSS provides diversified opportunities to students to develop their personality through community service.

◆ Sports

Games center at College offers facilities of indoor and outdoor games for the wholesome development of the students, The center is very well equipped with the modern facilities. Various extra-curricular activities are organized throughout the year and the participation in inter -collegiate events are encouraged .Many of our students represent V. B. S. Purvanchal University team in different sports and participate in inter university /state and national level tournaments and secure position in these events every year.

◆ U.P. Rajarshi Tandon Open University Centre

U.P. Rajarshi Tandon Open University has chosen our college to be one of its study centre's to provide the facility of acquiring professional degree. This center runs various courses like Diploma in journalism's, library and information science, tourism etc. and many other degree courses.

◆ The College Magazine

JYOTISHMATI: To contribute the creative ideas in English, Hindi and Sanskrit among the students, the college publishes magazine JYOTISHMATI annually. Dr Richa Singh (Hindi Department) is the editor of the magazine.



GREEN AUDIT METHODOLOGY
Year - 2022 – 2023

2.1 Pre Audit Stage

A pre-audit meeting provided an opportunity to reinforce the scope and objectives of the audit and pre-audit discussions were held on the basis of green initiatives taken and the current scenario of the college campus. This meeting is an important prerequisite for the green audit because it is the first opportunity to understand the concerns. This meeting was an opportunity to gather the information that the audit team can study before arriving on the site. The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself. The pre-audit meeting was conducted successfully and necessary documents were collected directly from the college before the initiation of the audit processes. The actual planning of audit processes was discussed in the pre-audit meeting. An Audit team was also selected in this meeting with the help of staff and the college management. The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself.

2.2 Management Commitment

The Management of the college has shown a commitment towards green auditing during the pre-audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environmentally friendly such as awareness programs on the environment, campus farming, planting more trees on the campus, etc., after the green auditing. The management of the college was willing to formulate policies based on a green auditing report.

2.3 Objectives of the study

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care that is the responsibility of each individual who is part of economic, financial, social, environmental factors. It is necessary to conduct a green audit on a college campus because students become aware of the green audit, its advantages to saving the planet and they become social and responsible citizens of our country. Thus Green audit becomes necessary at the college level.

The broad objectives are as follows.

- ◆ Development of ownership, personal and social responsibility for the college and its environment.
- ◆ Developing environmental ethics and value systems in young people.
- ◆ Providing certain recommendations based on environmental audit reports.
- ◆ Ensuring compliance, not only with laws, regulations, and standards but also with company policies and the requirements of an Environmental Management System (EMS) standard.
- ◆ Enabling environmental problems and risks to be anticipated.
- ◆ To demonstrate that college is aware of its impact upon the environment.

2.4 Audit Stage

Green Audit was done with the help of co-associates involving different student groups, teaching, and non-teaching staff. The green audit began with the teams walking through all the different faculty at the college, determining the different types of appliances and utilities as well as measuring the usage per item and identifying the relevant consumption patterns and their impacts. The staff and learners were interviewed to get details of usage, frequency, or general characteristics of certain appliances. Data collection was done in the sectors such as Waste generation, Green Area, and Water use. College records and documents were verified several times to clarify the data received through surveys and discussions.

2.4.1 Methodology

The audit process was carried out in three phases. At first, all the secondary data required for the study was collected from the 08 faculty of Harish Chandra P.G. College.

A broad reference work was carried out to clear the idea of green auditing. Different case studies and methodologies were studied and the following methodology was adopted for the present audit. The methodology of the present study is based on onsite visits, personal observations and data provided by the college. The generated data is subsequently gathered and used for further analysis. From the outcome of the overall study, a final report is prepared.

2.4.2 Data Analysis and final report preparation

Proper analysis and presentation of data produced from work is a vital element. In the case of a green audit, the survey details from each group were tabulated as per their modules, in Excel spreadsheets. The tabulated data is then used for further analysis. For a better understanding of the results and to avoid complications, averages, and percentages of the tables were calculated. A graphical representation of these results was made to give a quick idea of the status. Interpretation of the overall outcomes was made which incorporates all the primary and secondary data, references, and interrelations within. Final report preparation was done using this interpretation.

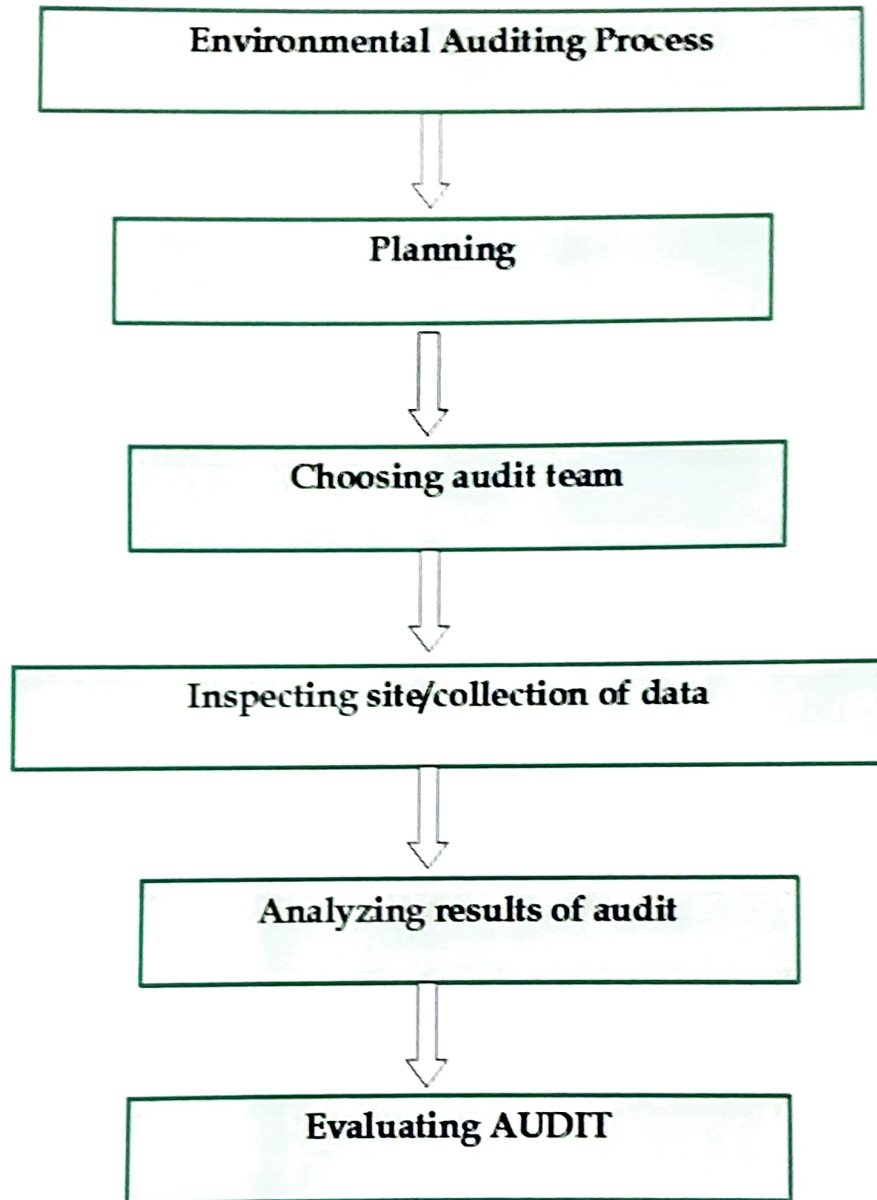


Figure 2.1: Flow chart showing the methodology of Green Audit



WATER AND WASTE WATER AUDIT
Year - 2022 – 2023

3.1 Water and waste water audit

Water is a precious natural resource available with a fixed quantum. The availability of water is decreasing due to the increasing population of the nation; as per capita availability of utilized water is going down. Due to the ever-rising standard of living of people, industrialization, urbanization, demands for freshwater is increasing day by day.

The discharge of untreated sewage into rivers or seas, then the water in the rivers or seas would also get contaminated. If this contaminated water is used for drinking, then it can cause diseases such as cholera, typhoid, dysentery, etc. That is why it is harmful to discharge untreated sewage into rivers or seas. Hence, the national mission on water conservation was declared by the Honorable Prime Minister Narendra Modi as 'Jal Shakti Abhiyan' and appealed to all citizens to collectively address the problem of water shortage, by conserving every drop of water and suggesting conducting water audits for all sectors of water use. Water audit can be defined as a qualitative and quantitative analysis of water consumption to identify means of reducing, reusing, and recycling water. Water Audit is nothing but an effective measure for minimizing losses, optimizing various uses, and thus enabling considerable conservation of water in the irrigation sector, domestic, power, and industrial sectors.

A water audit is a technique or method which makes it possible to identify ways of conserving water by determining any inefficiency in the system of water distribution. The measurement of water losses due to different uses in the system or any utility is essential to implement water conservation measures in such an establishment.

Importance of Water Audit

- Systematic process
- May yield some surprising results
- Easier to work on solutions when the problems are identified.
- Attracting mechanism can be put into place.

It is observed that a number of factors like climate, culture, food habits, work and working conditions, level and type of development, and physiology determine the requirement of water.

3.2 Water Audit

Water usage can be defined as water used for all activities which are carried out on campus from different water sources. This includes usage in all academic blocks, Girls and Boys hostel, canteen etc. Wastewater is referred to as the water which is transported off the campus.

3.2.1 Water requirement and their source

The water requirement met through Groundwater supply. The total water requirement has been estimated to be 381KLD. This includes requirement of water used for domestic and for landscaping activities. The groundwater is lifted to the overhead tank (OHT) of different capacity in the college. Details of water requirement are given in Table-3.1.

Table 3.1: Water requirement of Harish Chandra Post Graduate College

S. No	Particulars	Nos.	lpcd	Water requirement (KLD)
1	Students	8251	45	371.20
2	Faculty & staff	206	45	9.27
	Total water requirement (KLD)			380.56~ 381

Source: Water requirement as per NBC 2016 norms

The major resource for the water in the college is a self-reliant water boring system installed on the campus. In the campus of college total 02 bore well of different capacity has been installed for fulfill the water requirement. To fulfill the need for the supply of the campus, overhead storage tanks are available with different capacity.

Table 3.2: Detail of Tube well/Bore well in college campus

S. No.	Locations	Specification
1	Ground Floor (quantity -01)	Bore Size - 4" Drilling Depth - 220 fit Pump Capacity - 5 HP
2	First Floor (quantity -01)	Bore Size - 6" Drilling Depth - 220 fit Pump Capacity - 2 HP



SOLID WASTE AUDIT
Year - 2022 – 2023

4.1 Solid Waste Audit

Solid waste is the unwanted material generated from human activities in a residential, industrial, or commercial area. Solid waste management reduces or eliminates the adverse impact on the environment and human health. A number of processes are involved inefficiently managing waste for an organization. It is necessary to manage the solid waste properly to reduce the load on the waste management system. Solid waste generation and its management is a burning issue in current days. The rate of generation of solid waste is very high and yet we do not have adequate technology to manage the generated waste. Unscientific handling of solid waste can create threats to public health and environmental safety issues. Thus, it is necessary to manage solid waste properly to reduce the load on the waste management system. The purpose of this audit is to find out the quantity, volume, type, and current management practice of solid waste generation in the college campus. This report will help for further solid waste management and to go for green campus development.

4.2 Solid Waste Collection System

The solid waste is collected from different sources/establishment by various methods. The solid waste management activity in Harish Chandra Post Graduate College consists of wastes generator throwing the waste into the different types of bins provided by the waste management system at different locations. The sweepers sweep the road and drain and transfer the waste into the bins and hand carts. There are different types of plastic bins are placed in Harish Chandra Post Graduate College. Three types of dust bins are used. The collection of waste from these dust bins is planned in accordance with frequency of container becoming full by the by sweepers.

4.3 Types of Waste generated in College Campus

To create effective waste management plans, College first need to know the types of waste they produce. Below, we have compiled a list of various kinds of waste commonly generated on institutional campus:

1. **Food Waste** - College campus generates food waste.
2. **Recyclable Paper, Cardboard, Plastic, Glass and Cans** - Campus tends to produce vast quantities of these recyclables. The same is sold/auctioned to the scrap vendors time to time.
3. **E – Waste - Student and facility electronics**
As campus continually upgrade their computing facilities and office computers to keep up with the latest technology, the old computers have to go somewhere. So do old printers, phones, copy machines and other electronics that receive upgrades over the years. Students may throw away old phones, TVs, tablets, laptops and printers, along with cords and other accessories. Recycling is a much more eco-friendly option — the metals in old electronics often have a high reuse value.
4. **Solid Waste** - The College is managing solid waste by providing it to the Municipal Corporation.

6. Landscape Waste – College campus has lavish greenery and grounds those results significant horticulture waste which is managed by in-house composting system.

The total solid waste generation rate in Harish Chandra Post Graduate College is 1014.84kg/day. The category wise solid waste generation rate is given below.

Table No 4.1: Category wise solid waste generation in college campus (kg/day)

Quantity	Biodegradable waste	Recyclable waste	Inert waste	Garden waste	Hazardous waste
Kg/day	1014.84	507.42	169.14	2.96	0.1

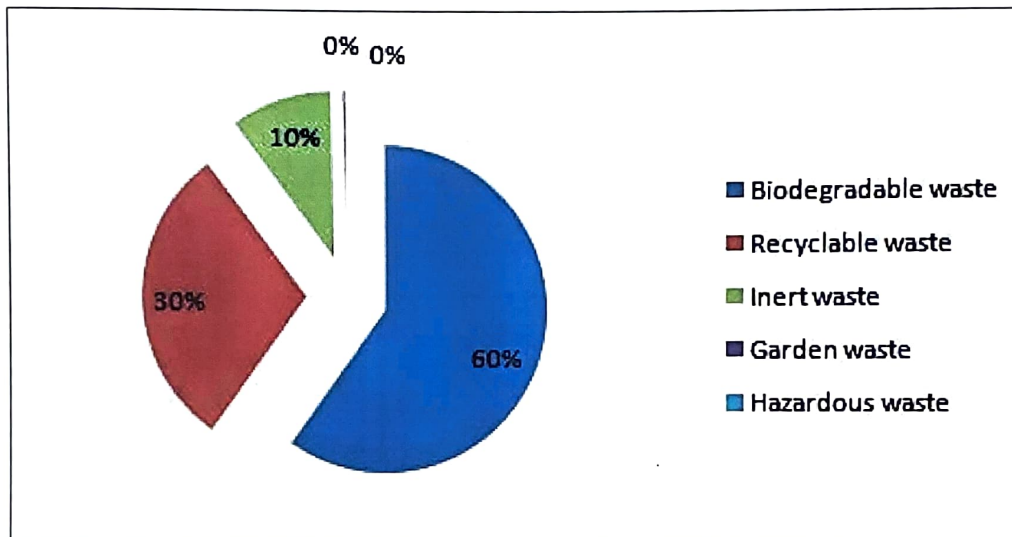


Figure No: Category wise solid waste generation in college campus (kg/day)

The average amount of solid waste generated per day in is approximately 1691kg/day. On the basis of observations, the highest quantity of solid waste generated is biodegradable waste which is about 1014.84kg/day. This waste is produced from mess, Canteens and Gardens. The leaf litter produced in the garden and premises is 2.96kg/month. The recyclable waste is produced i.e. 507.42kg/day which is given to the vendor.

Percentage wise distribution of different sources of solid waste is shown in the above graph. The maximum percentage of solid waste generated is of biodegradable waste which is 59% and minimum percentage of hazardous waste generated is about 0.07 %. The biodegradable waste is produced mostly through canteens, hostel mess and garden litter in the campus.

4.4 Hazardous waste audit of the college

Hazardous waste is waste that has substantial or potential threats to public health or environment. The sources of hazardous waste in the Harish Chandra P.G. college are very less. The amount of hazardous waste generated in the college is 0.1kg/day. Very less quantity of hazardous waste and effluent are generated through chemical laboratories during the use of acids and various chemicals, fumes in the practicals. Further, the hazardous effluent gets diluted with remaining grey water and sewage generated in the campus and therefore, the toxicity gets decreased. Soak peat is provided for the chemical lab discharge.

4.5 E-waste generation in the college

Generation of e-waste is found in every educational institute. All discarded electronic appliances are called as E-waste. E-waste requires special treatment for disposal so it is also called as special waste. It is observed that the e-waste generated at in this college is of Schedule II category. Computers, printers, scanners, internet routers, CPU's, UPS, fused bulbs and tubes are used for administrative and laboratory work. The wire required for the connectivity also gets included in the E-waste. The college has its own computer laboratory. Besides this computer lab, each department and administration use computers for their routine work.

4.6 Solid Waste Management

Solid-waste management, the collecting, treating and disposing of solid material that is discarded because it has served its purpose or is no longer useful. Improper disposal of solid waste can create unsanitary conditions, and these conditions in turn can lead to pollution of the environment and to outbreaks of vector-borne disease that is, diseases spread by rodents and insects. The bio-degradable waste is being managed by using vermicomposting technology and via biodynamic pits & inert waste sent to municipal site for disposing off. The details of collection, storage, recycle and disposal of solid wastes are given in the Table below.

Table 4.2: Solid waste management

Quantity	1014kg /day
Nature	Biodegradable: Waste vegetables and foods Non-biodegradable: Papers, cartons, thermocol, plastics, glass etc
Collection and disposal	The solid wastes generated from the college campus segregated into biodegradable waste, non-biodegradable waste, plastic waste, domestic hazardous waste and horticulture waste in separate bins as per Solid Waste Management Rules, 2016. The biodegradable wastes composted in on-site composting unit and the manure used for landscaping.
Recycling	Recyclable wastes comprising paper, plastic, and glass etc. is being disposed at designated site through to authorize vendors.
E-waste	E-waste (i.e. discarded electrical and electronic equipment including their components, consumables, parts and spares etc.) be stored in a separate room within the premises and finally disposed through authorized recycler or designated take back service provider as per the E-Waste (Management) Rules, 2016



ENVIRONMENT QUALITY AUDIT
Year - 2022 – 2023

ENVIRONMENT QUALITY AUDIT

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

5.1 Green development

Green area means an area of grass, trees, or other vegetation set apart for recreational or aesthetic purposes in an otherwise urban environment. It plays a very vital role in boosting the mental health of the student. It seems obvious that a place where people are able to make connections, meet new friends and participate in recreational activities is also good for the locals' mental health. After all, physical health and strong relationships are important to maintaining mental well being. Yet the mental health benefits of green space go beyond the obvious. Direct exposure to nature has its own benefits on mental health, reducing stress and increasing happiness and these effects take place almost immediately.

- The entire plant past is maintained by the section through regular trimming, pruning, turf management and maintenance of pots etc.
- Maintenance and beautification of college buildings and gardens viz., Hostels/Schools/Administrative/Guest house/ Auditorium.
- Section maintains a small nursery for fulfilling basic requirement like decoration during cultural activities

5.1.1 Plantation Programme

The area is immensely diverse with a variety of tree species performing a variety of functions. Most of these tree species are planted in different periods of time through various plantation programmes organized by the authority and have become a part of the college.

Campus encompasses approximately 80 types (species) of flora and fauna. Various tree plantation programs are being organized during the month of July and August at college campus and surrounding villages through NSS unit. This program helps in encouraging eco-friendly environment which provides pure oxygen within the institute and awareness among villagers. The plantation program includes various types of indigenous species of ornamental and medicinal. The list of plant species planted in college campus is given below:

Table 5.1: Table showing the list of trees planted in college campus

Botanical name	Common name
<i>Mimusops elengi</i>	Spanish cherry
<i>Morus alba</i>	White mulberry
<i>Terminalia arjuna (arjuna)</i>	Arjuna or arjun tree
<i>Senna siamea (Kassod)</i>	kassod tree,
<i>Bombax Ceiba</i>	Cotton tree
<i>Azadiracta indica</i>	Neem
<i>Polyalthia longifolia</i>	False ashoka
<i>Alstonia scholaris</i>	Blackboard tree
<i>Psidium guajava</i>	Guava

<i>Cassia fistula</i>	Golden shower tree
<i>Acacia nilotica</i>	Gum arabic tree
<i>Dalbergia sisso</i>	Shisham
<i>Jatropha integerrina</i>	Peregrina
<i>Pothos</i>	Golden Pothos
<i>Ficus virence</i>	White Fig
<i>Ficus racemosa</i>	Gular
<i>Rhoeo discolor</i>	Boat Lily,
<i>Tabernaemontana divaricata</i>	Crape Jasmine
<i>Areca palm</i>	Golden Cane Palm
<i>Euphorbia tithymaloides</i>	Devils Backbone
<i>Hawarthia</i>	Aloe Vera
<i>Crassula ovata</i>	Money Plant

5.1.2 Faunal diversity

The campus showed a rich and diverse presence of nearly 83 species of birds in its varied habitats. Various authors have confirmed that birds are ecological indicators of ecosystem and green spaces in the urban areas have immense importance in conservation of biodiversity. In that context, college campus provides safe and excellent habitats to the avifauna as evident from its rich species diversity. Some of common bird species are Crow, Maina, Pigeon, Parrot, Cheel etc. are found in the campus.

Table 5.2: Faunal diversity in college campus

	Zoological Name	Common Name	Family
Mammals			
	<i>Funambulus pennanti</i>	Gilhari	<i>Sciuridae</i>
Reptiles			
	<i>Hemidactylus brooki</i>	Chipkali	<i>Gekkonidae</i>
	<i>Chamaleo chamaleons</i>	Chameleon	<i>Gekkonidae</i>
	<i>Hemidactylus</i>	Rock Gaeko	<i>Gekkonidae</i>
Amphibians			
	<i>Rana tigrina</i>	Common Frog	<i>Ranidae</i>
	<i>Bufo bufo</i>	Toad	<i>Bufonidae</i>

5.1.3 Maintenance of Plantations

Apart from the maintenance of gardens, all previously planted trees (like roadside and other plantations) in different locations of the college campus are regularly nurtured by cleaning, fertilization, watering, etc.

5.1.4 Environmental Conservation Programme

College is very active in the practical education of the students with regard to environmental conservation. The college has arranged visits to their faculties to the Wildlife Institute of India (WII), Botanical Garden, Sanctuaries, Zoological park Sacred grooves in order to educate their

students. The college also took their students to different National Park in order to educate the students about in situ Conservation of Wildlife.

5.2 Ambient Air quality in Harish Chandra P.G. College

Central Pollution Control Board, New Delhi initiated National Ambient Air Quality Monitoring (NAAQM) program in the year 1984 to get a spatial and temporal variation of ambient air concentrations for a wide range of pollutants that are considered relevant for evolving strategic management plan. The program was subsequently renamed NAMP (National Air Quality Monitoring Program). Under NAMP, three air pollutants viz., Sulphur dioxide (SO₂), Nitrogen dioxides (NO₂), and Repairable Suspended Particulate Matter (RSPM/PM₁₀) have been identified for regular monitoring at three locations.

Monitoring of pollutants has been carried out for 24 hours (4-hourly sampling for gaseous pollutants and 8-hourly sampling for particulate matter) as per CPCB monitoring protocol. One Repairable Dust Sampler (RDS) machine is installed at the Main Gate of the college Campus which monitored the changes in ambient air quality during 24- hours. College campus monitors air pollution regularly under National Ambient Air Quality Monitoring Program, Central Pollution Control Board, New Delhi.

Table 5.3: Ambient air quality in the College campus

S.No.	Parameters	Unit	Result	Requirement permissible limits as per NAAQS/CPCB	Test method
1	Particulate Matter, PM ₁₀	µg/m ³	93.53	100	IS:5182 (P-23) : 2006
2	Particulate Matter, PM _{2.5}	µg/m ³	56.97	60	IS:5182 (P-24) : 2006
3	Sulphur Dioxide (as SO ₂)	µg/m ³	13.67	80	IS:5182 (P-2) : 2006
4	Carbon Monoxide (as CO)	mg/m ³	0.69	04	IS:5182 (P-10) : 2006
5	Oxide of Nitrogen (as NO ₂)	µg/m ³	19.53	80	IS:5182 (P-6) : 2006

Source: Central Pollution Control Board

Central Pollution Control Board, New Delhi has set guidelines to monitor and analyze the air pollution quality parameters. The trees cover on the campus is the leading sources to absorb CO₂ and release enough fresh O₂ across the college Campus. The result shows that Campus's air quality status is good as compared to other locations.

5.3 Ambient Noise Quality in Harish Chandra P.G. College

College campus is located in the center of the city. The major source of noise in college is automobile noise. At the main gate of the Campus, human communication and transportation are producing some sound levels. Ambient noise monitoring was carried out in different areas of

campus like at campus entry, administration building, and Academic building. The sampling was carried out using calibrated Sound Level Meter (AZ 8921) by logarithmic scale in decibels (dB). The details of noise status in college campus are given in the below table.

Table 5.4: Ambient Noise levels in College Campus

S.No.	Sampling Locations	Parameter	Unit	Observed value	Standards (ambient Noise)
1	Main gate – Campus entry	Equivalent Noise level Leq (Day time)	dB (A)	62.5	65
2	Administration	Equivalent Noise level Leq (Night time)	dB (A)	49.8	55

All parameters expressed in dB(A) Leq and observed under permissible limits.

5.4 Drinking water quality at Harish Chandra P.G. College

The drinking water source is groundwater. The quality of groundwater was analyzed at different location of college. It was found the all the water quality parameters are found within the limit. The detail about the ground water quality is given below:

Table 5.5: Drinking water quality of college

S.No	Parameter	Test Method		Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11):2022	7.45	-	6.5-8.5	-
2	Colour	IS:3025(Part-04):2021	5.0	Hazen	5	15
3	Odour	IS-3025(Part-05):2018		-	Agreeable	Agreeable
4	Taste	IS:3025(Part-07):2017		-	Agreeable	Agreeable
5	Turbidity	IS-3025(Part-10):1984	0.5	NTU	1	5
6	Total Hardness (as CaCO ₃)	IS:3025(Part-21):2009	272	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40):1991	73.60	mg/l	75	200
8	Magnesium(as Mg)	APHA 3500-Mg-B 23rd Ed.: 2017	21.60	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32):1988	62.62	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53):2003	0.068	mg/l	1	No Relaxation
11	Fluoride(as F)	APHA 4500 F(D) 23rd Ed.: 2017	0.55	mg/l	1	1.5
12	Alkalinity	IS:3025(Part-23)	204	mg/l	200	600
13	Total dissolved solid	IS:3025(Part-16)	433	mg/l	500	2000
14	Nitrate	IS:3025(Part-34)	6.70	mg/l	45	No relaxation

5.5 Emergency Response Plan (ERP) in Harish Chandra P.G. College Campus

The overall objective of an Emergency Response Plan (ERP) is to make use of the combined resources at the site and outside services to achieve the following:

1. To localize the emergency and if possible eliminate it,
2. To minimize the effects of the accident on people and property,
3. Effect the rescue and medical treatment of casualties;
4. Safeguard other people;
5. Evacuate people to safe areas,
6. Informing and collaborating with statutory authorities,
7. Initially contain and ultimately bring the incident under control;
8. Preserve relevant records and equipment for the subsequent enquiry into the cause and circumstances of the emergency,
9. Investigating and taking steps to prevent reoccurrence

The ERP is therefore related to identification of sources from which hazards can arise and the maximum credible loss scenario that can take place in the concerned area. The plan takes into account the maximum credible loss scenario actions that can successfully mitigate the effects of losses/ emergency need to be well planned so that they would require less effort and resources to control and terminate emergencies Main hazards identified for the project include hazards pertaining to fires in buildings and fire in diesel storage areas, earthquake and LPG leakage and an ERP pertaining to these is described in the following section

RESPONSE IN CASE OF EARTHQUAKE

Response Procedures for Occupants

If indoors:

1. Take cover under a piece of heavy ture or against an inside wall and hold on
2. Stay inside: The most dangerous thing to do during the shaking of an earthquake is to try to leave the building because objects can fall on you.

If outdoors:

Move into the open, away from buildings, streetlights, and utility wires. Once in the open, stay there until the shaking stops.

If in a moving vehicle:

Stop quickly and stay in the vehicle. Move to a clear area away from buildings, trees, overpasses, or utility wires. Once the shaking has stopped, proceed with caution. Avoid bridges or ramps that might have been damaged by the quake.

After the quake

1. After the quake be prepared for aftershocks.
2. Although smaller than the main shock, aftershocks cause additional damage and may bring weakened structures down. Aftershocks can occur in the first hours, days, weeks, or even months after the quake.

Help injured or trapped persons.

1. Give first aid where appropriate. Do not move seriously injured persons unless they are in immediate danger of further injury. Call for help
2. Remember to help those who may require special assistance--infants, the elderly, and people with disabilities.
3. Stay out of damaged buildings,
4. Use the telephone only for emergency calls.

Response Procedure for Emergency Team

1. Formulate an Emergency Response Team for earthquake response. Using the public address system, inform employees of response procedure discussed above
2. Inform the necessary authorities for and
3. Ensure no person is stuck beneath my debris in case of a structural failure
4. Ensure that all occupants standing outside neat the buildings are taken to open areas.
5. Ensure that the first aid ambulance and fire tender vehicles are summoned if necessary.
6. Inform the nearby hospitals if there are any injuries,
7. Check the utilities and storage tanks for any damage.

Response for LPG Leakage

1. The affected area should be evacuated and cordoned off immediately
2. Initiate an Emergency Response Team for LPG leakage.
3. Shut down the main valves in the gas bank.
4. Ensure that only concerned personnel are present in the affected area and all other personnel und visitors are moved to the nearest assembly points.
5. Rescue trapped personnel, also check if any personnel are unconscious in the area and immediately move them outside and provide first aid. Ambulance should be summoned to take injured personnel to the nearest hospital.
6. Personnel in the nearby buildings to close all doors and windows to prevent entry of the leaked gas.
7. Source of leakage to be traced and isolated from all the other areas. And if required use pedestal fans to bring down the eas concentration.
8. In case of a fire follow the instructions in case of fire

RESPONSE IN CASE OF FIRE

1. Required response during in the event of a fire should be described in signs located in the lobby
2. On sighting a fire, it should be immediately informed to the environment manager giving the exact location and type of fire in detail,
3. Intimate the Emergency Response Team for fires.
4. If the fire is small, engage in extinguishing the fire using the nearest fire extinguisher
5. Guide the Emergency Response Team staff in the emergency assembly point
6. The Emergency Response Team should immediately inform the nearest dispensary und security forces. If required a fire tender should be summoned.

7. The response team should immediately move to the point of fire and take all necessary steps to stop the fire. If the fire is not controllable and spreads then the manager in charge should inform the district authorities and call for external help.
8. The Emergency Response Team will provide immediate relief to the injured occupants at the scene of incident. Any injured persons should be evacuated on priority to the dispensary or one of the nearest hospitals based on their condition



**ACTION PLAN FOR GREEN AUDIT REPORT
2022 – 2023**

6.1 Preparation of Action Plan

Management's policies referring to college and approach towards the use of resources need to be considered in purview of green audit report. An environmental policy should be formulated by the management of the college. The college should have a policy on green awareness raising or training programmers for students and staff, green awareness policy right from kitchen staff to procurement policy by the management. Based on the policies, college should have an action plan. The green auditing report will be a base line for the action plan to be evolved.

6.2 Follow up Action and Plans

Green Audits are exercises which generate considerable quantities of valuable environment and resource management information. The time and effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organization and action plans and implementation program based on the audit findings. Audit follow up is part of the wider process of continuous improvement. Without follow up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organizational priorities and the passing of time.

6.3 Environmental Education

The following environmental education programmes may be implemented in the college before the next green auditing:-

Training programmes in solid waste management, liquid waste management, setting up of biodiversity garden, tree management, medicinal plant nursery, butterfly garden, vegetable cultivation, water management, energy management, landscape management, pollution mitigation methods, and water filtration methods.

- Display of environmental awareness board such as – Save water, save electricity, No wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.,
- Give priority to environmental clubs and its programmes
- Set up model rainwater harvesting system, vegetable garden, medicinal plant garden, butterfly garden etc,
- Conduct exhibition on throw away plastic danger, recyclable products etc
- Display various slogans and pictures to protect environment
- Different coloured waste bins to segregate waste and its easy collection
- Focusing on more green belt development and conducted the awareness programs

6.4 Consolidation of Audit Findings

Green Audit will create a greater appreciation and understanding of the impact of college actions on the environment. Harish Chandra P.G. College has successfully been able to identify the impacts on the environment through the various auditing exercises. The green auditing exercises has brainstormed and provide insights on practical ways to reduce negative impact on the environment. Participating in this green auditing procedure has gained knowledge about the need of sustainability of the college campus. It will create awareness around the use of the

Earth's resources in your home, college local community and beyond. HCPG College should adopt an Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.

6.5 Conclusion and recommendations

Green Audit is the most efficient way to identify the strength and weakness of environmental sustainable practices and to find a way to solve problem. Green Audit is one kind of professional approach towards a responsible way in utilizing economic, financial, social and environmental resources. Green audits can "add value" to the management approaches being taken by the college and is a way of identifying, evaluating and managing environmental risks (known and unknown).

Harish Chandra P.G. college has set out standards to ensure that sustainability is a critical part the standard operating procedures and is fully integrated into the working, research, teaching, social and cultural spheres of the campus. There is scope for further improvement, particularly in relation to waste, energy and water management. The college in recent years considers the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the college does perform fairly well, the recommendations in this report highlight many ways in which the management can work to improve its actions and become a more sustainable institution.

6.6 Suggestions

Some of the very important suggestions are:-

- Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.
- Increase recycling education on campus.
- Increase Awareness of Environmentally Sustainable Development- Use every opportunity to raise public, government, industry, foundation, and college awareness by openly addressing the urgent need to move toward an environmentally sustainable future.
- Educate for Environmentally Responsible Citizenship- Establish programs to produce expertise in environmental management, sustainable economic development, population, and related fields to ensure that all college graduates are environmentally literate and have the awareness and understanding to be ecologically responsible citizens.
- Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.
- Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in environmentally sustainable development. Expand work with community and nongovernmental organizations to assist in finding solutions to environmental problems.

- Collaborate for Interdisciplinary Approaches- Convene college faculty and administrators with environmental practitioners to develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- Increase reduce, reuse, and recycle education on campus

6.7 Recommendations

- The College should adopt the water conservation technology like roof top rain water harvesting.
- For efficient water use, water meters should be installed. As we know water scarcity is increasing day by day & minute by minute. The neat and clean water has become a dream, so the college must monitor the water usage which can be achieved by installing the water meters.
- The college will develop their own sewage Treatment Plant (STP). By doing so there will be a great reduction in water usage, as the water after treatment can be used for various purposes in the college.
- Installing motion sensors in buildings so that when rooms or hallways are vacant the lights shut off on their own. By this we need not to practice the switch off drills and can save energy efficiently.
- Making sure that all computers in computer labs are turned completely off during unoccupied hours. Mostly there are limited hours for students to practice the computers, in order to save energy, the computers should be turned off in such timings so that the energy could be saved.
- Management of biodegradable waste by vermicomposting other processes should be positively incorporated in college campus to utilize or using as alternate.
- The College should motivate or educate every local human by activities; poster and College should apply energy saving method in campus for reducing the use of energy.
- The noise was monitored in the college; the college noise within the limits given by MOEF (Ministry of Environment and Forests) & CPCB (Central pollution Control Board). It is recommended to control the noise within the campus.
- Particulate matter was also monitored at various locations. The PM in Indoor was found under the limits. It is recommended to keep a continuous vigil on the PM concentrations in the college.
- The college should use the rain water for gardening.
- The College should follow the Environmental aware laws for different aspect of Environmental management.
- The College should make the rule & poster the slogan in campus for protecting the environment.
- The College should make an internal panel to check the laboratory quality.

6.8 Commitments after Green Auditing

In the light of green audit the college should, adopt some additions in the vision and mission Statements promoting compliance with environmental laws and regulations for sustainable existence of the college.

6.9 Vision Statement

The college is committed to becoming an innovative leader among academic institutions in the areas of environmental education and research and in the practice of environmental management and stewardship. The college is obliged to the principle of sustainable development, and will use its resources in a manner that does not compromise the ability of future generations of the college and global communities to meet their needs.

6.10 Mission Statement

To promote the environment management and conservation in the college and integrate sustainability across all levels in the campus by engaging students, staff, faculty, alumni, and partners with the purpose to identify, quantify, describe and prioritize framework of environment sustainability in compliance with the applicable regulations, policies and standards.

DECLARATION

I, hereby certify that I was a part of the Audit team that developed the Green Audit Report for Harish Chandra Post Graduate College, Varanasi, UP

Name: Mr. Akash Kumar


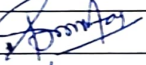
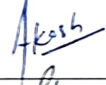

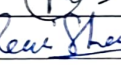
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Audit was conducted on behalf of PARAMARSH:

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