

# Green Audit and Environment Audit Certificates & Report

(2022 - 2023 & 2021 - 2022)

Date : 22/12/2022

## Certificate

This is to certify that a **“Green Audit & Environment Audit”**, for **Guru Ghasidas Vishwavidyalaya, Bilaspur** has been conducted in December-2022 to assess the green initiatives planning and efforts implemented in the university campus like Green Campus Management, Plantations, Waste Management and Rainwater Harvesting, Conservation of Energy. This audit is also aimed to assess the impact of green initiatives in developing an eco-friendly campus.



Greenserve Energy  
Management Solutions

**Mr. Rahul Agrawal** Durg (C.G.)

Certified Energy Auditor

(EA-20984)

Place : Durg (C.G.)





2022

# GREEN & ENVIRONMENT AUDIT REPORT

## Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)



**December 2022**

Prepared by:  
**Greenserve Energy Management Solutions**  
Vijay Nagar,  
Durg (C.G.) - 491001



## Acknowledgement

*We are thankful to the Management and the Vice Chancellor of the Guru Ghasidas Vishwavidyalaya, Bilaspur for entrusting processes of Green & Environment auditing with us. We thank all the participants of the auditing team especially students, faculty and non-teaching staff who took pain along with us to gather data through survey. We also thank the office staff who helped us during the document verification.*

## Audit Team Members

1	Rahul Agrawal	Certified Energy Auditor
2	Jayendra Mohabe	Senior Energy Engineer
3	Bhumesh Jagnit	Energy Engineer

***For Greenserve Energy Management Solutions,***

***Rahul Agrawal***

***Certified Energy Auditor (EA-20984)***

***Bureau of Energy Efficiency (MoP)***



## 1. Executive Summary

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

Guru Ghasidas Vishwavidyalaya Bilaspur, Chhattisgarh is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends. Being a premier institution of higher learning, the university has initiated 'The Green Campus' program that actively promote the various projects for the environment protection and sustainability.

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



## 2. Introduction

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

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

### 2.1 About the University

Guru Ghasidas Vishwavidyalaya (गुरु घासीदास विश्वविद्यालय), is a Central University of India, located in Bilaspur C.G. State, established under Central Universities Act 2009, No. 25 of 2009. Formerly called Guru Ghasidas University (GGU), established by an Act of the State Legislative Assembly, was formally inaugurated on June 16, 1983. GGU is an active member of the Association of Indian Universities and Association of Commonwealth Universities. The National Assessment & Accreditation Council (NAAC) has accredited the University as B+.

Situated in a socially and economically challenged area, the university is appropriately named to honor the great Satnami Saint Guru Ghasidas (born in the 17th century), who championed the cause of the downtrodden and waged a relentless struggle against all forms of social evils and injustice prevailing in the society. The University is a residential institution, having its jurisdiction spread over Bilaspur Revenue Division of the state of Chhattisgarh. It covers almost the entire spectrum of the higher education requirements of the country along with the local people. It has several University Teaching Department (UTDs) on its campus.



**Location:**

Guru Ghasidas Vishwavidyalaya, Bilaspur and the GPS Coordinates of the university is **22°07'45.7"N 82°08'09.9"E.**



**Total Campus Area & University Building Spread Area**

<b>Campus area</b>	<b>2645673 Sq. m</b>
<b>Total Campus Building Area</b>	<b>258132 Sq. m.</b>



### 3.0 Pre-Audit Stage

A pre-audit meeting provided an opportunity to reinforce the scope and objectives of the audit and discussions were held on the practicalities associated with the audit. This meeting is an important prerequisite for the green audit because it is the first opportunity to meet the auditee and deal with any concerns. The meeting was an opportunity to gather 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. In the university pre-audit meeting was conducted successfully and necessary documents were collected directly from the University before the initiation of the audit processes. Actual planning of audit processes was discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the University management. The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself. The audit team worked together, under the leadership of the lead auditor, to ensure completion within the brief and scope of the audit.

#### **Management's Commitment**

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

#### **Scope and Goals of Green & Environment Auditing**

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 & Environment Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of Economical, financial, social, environmental factor. It is necessary to conduct green audit in university campus because students become aware of the green audit, its advantages to save the planet and they become good citizen of our country. Thus, Green audit becomes necessary at the University level. A very simple indigenized system has been devised to monitor the environmental performance of Guru Ghasidas Vishwavidyalaya, Bilaspur. It comes with a series of questions to be answered on a regular basis. This innovative scheme is user friendly and totally voluntary. The aim of this is to help the institution to set environmental examples for the community, and to educate the young learners.





## **Benefits of the Green& Environment Auditing**

- More efficient resource management
- To provide basis for improved sustainability
- To create a green campus
- To enable waste management through reduction of waste generation, solid- waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing and pointing out the prevailing and forthcoming complications
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmentalmanagement approach and Improving environmental standards
- Benchmarking for environmental protection initiatives
- Financial savings through a reduction in resource use
- Development of ownership, personal and social responsibility for the university campus and its environment
- Enhancement of University profile
- Developing an environmental ethic and value systems in youngsters.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the university.



## **Target Areas of Green and Environment Auditing**

Green audit forms part of a resource management process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency.

All these indicators are assessed in process of “Green and Environment Auditing of educational institute”. Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute’s energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.

### **Auditing for Water Management**

Water is a natural resource; all living matters depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. We need to use water wisely to ensure that drinkable water is available for all, now and in the future. A small drip from a leaky tap can waste more than 180 liters of water to a day; that is a lot of water to waste enough to flush the toilet eight times! Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water. It is therefore essential that any environmentally responsible institution examine its water use practices.

### **Auditing for Energy Management**

Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent bulb uses approximately 60W to 100W while an energy efficient light emitting diode (LED) uses only less than 10 W. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental



degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.

### **Auditing for Waste Management**

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals.

This indicator addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste can be divided into two categories: general waste and hazardous waste. General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and petrol. Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair, and reuse. Thus, the minimization of solid waste is essential to a sustainable university. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems. It is therefore essential that any environmentally responsible institution examine its waste processing practices.

### **Auditing for Green Campus Management**

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's delicate balance and our quality of life. Without this variability in the living world, ecological systems and functions would break down, with detrimental consequences for all forms of life, including human beings. Newly planted and existing trees decrease the amount of carbon dioxide in the atmosphere. Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen that a single tree produces is enough to provide one day's supply of oxygen for people. So, while you are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner for us. Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which a huge deal is considering many students are under some amount of stress.

### **Auditing for Carbon Footprint**

Commutation of stakeholders has an impact on the environment through the emission of greenhouse gases into the atmosphere consequent to burning of fossil fuels (such as



petrol). The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. An important aspect of doing an audit is to be able to measure your impact so that we can determine better ways to manage the impact. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created. One aspect is to consider the distance and method travelled between home and institute every day. 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 sustainable development. It is therefore essential that any environmentally responsible institution examines its carbon footprint.

### **Methodology of Green and Environment Auditing**

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The criteria, methods and recommendations used in the audit were based on the identified risks. The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the document, interviewing responsible persons and data analysis, measurements and recommendations. The methodology adopted for this audit was a three-step process comprising of:

1. Data Collection – In preliminary data collection phase, exhaustive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurements.

Following steps were taken for data collection:

- The team went to each department, centres, Library, canteen etc.
- Data about the general information was collected by observation and interview.
- The power consumption of appliances was recorded by taking an average value in some cases.

2. Data Analysis - Detailed analysis of data collected include: calculation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by the Chhattisgarh State Electricity Board (CSEB). Data related to water usages were also analysed using appropriate methodology.

3. Recommendation – On the basis of results of data analysis and observations, some steps for reducing power and water consumption were recommended. Proper treatments for waste were also suggested. Uses of fossil fuels have to be reduced for the sake of community health. The above target areas particular to the university was evaluated



through questionnaire circulated among the students for data collection. Five categories of questionnaires were distributed.

## 4.0 Post-Audit Stage

### 4.1 Energy Usage:

#### DETAILS OF ENERGY CONSUMPTION:

No.	Building Name	Consumption (kWh)
1	Administrative building	540
2	Auditorium Building	272
3	Cafeteria Building	134
4	Dept. of Pure & Applied Physics Biology Building	827
5	GGV Dignity Meal Building	11
6	Swami -Vivekanand Boys Hostel-OLD	154
7	Raj Mohini Devi Girls Hostel	213
8	Bilasa Devi Girls Hostel	133
9	Mini-mata Girls Hostel	133
10	International Gust House	702
11	Jawahar Sadan- Guest House	230
12	Biotechnology Building	563
13	Department of Rural Technology & Social Development Building	176
14	Department of Forestry Wildlife & Environmental Science-Old building	145
15	Department of Forestry Wildlife & Environmental Science-New Building	174
16	UTD Building	411
17	Central Library Building	218
18	OLD IT Building	355
19	Sahid Veer Narayan Boys Hostel	219
20	Babasaheb Ambedkar Boys Hostel	157
21	New IT Building	535
22	Engineering & Technology Workshop	88
23	Department of Education	176
24	Department of Arts & Social science	271
25	Scholar o Studies of Commerce & Management	144
26	School o Law Building	105
27	CSIT Building	147
28	UGC Department Building	209
29	Department of Chemistry	219
30	Zoology Building	183
31	Pharmacy building	403
<b>Total Consumption (kWh)</b>		<b>8248</b>



## 4.2 Water Usage:

### Water Storage Tank Capacity in Litre

Sl No.	Location	No.of Tank	Tank Capacity (Ltr)	Storage Capacity (Ltr)	Total Storage (Ltr)
1	University Building	3	150000	450000	646000
		89	2000	178000	
		13	1000	13000	
		1	5000	5000	
<b>Total Water Storage</b>					<b>646000</b>

### Water Supply in Campus (in Litre/ Day)

Sl No.	Source Of Water	kW Rating	Location	Under Control	Rated Flow (LPM)	Pump Running Minute /Day	Supply Ltr/Day	% age of Supply Water
1	Submersible Pump (5 HP x 30 Nos.)	3.7	University Building	University premises	15000	66.664	1000000	50
<b>Total Water Supply</b>							<b>500000</b>	



## University building water Consumption (Litre / Day)

Sl. NO.	PARAMETERS	INFORMATION
1	No of well	Nil
2	No of motor pump used	30 NOS
3	Horse power - motor	2HP-02 NOS, 3HP-6NOS, 5HP-19NOS, 7.5HP- 3NOS
4	Capacity of tank (overhead tank)	3,80,000 L
<b>WATER USED IN DIFFERENT SECTION OF THE CAMPUS</b>		
	SECTIONS	WATER USES (L/DAY)
6	Hostel	148500
7	Residential quarter	169200
8	Administrative block	15000
9	Construction work	200000
10	Canteen	10000
11	Urinals and toilets	75000
12	Departments	80000
13	Gardens	25000
14	Laboratories	12000
15	Drinking	26000
16	Leakages	12000
17	Main purpose of water uses in campus	Drinking, cooking, laboratories, gardens, toilets, construction
18	Nos of water tap excluding household and residential quarter	1000 nos
19	Water cooler and drinking water filtration facilities	55
20	Nos of urinals and toilets ( excluding household and residential quarter)	115



21	Nos of waterless / bio toilets	Nil
22	Any water wastage /why	Yes, leakage from pipe and tank leaving of taps open at times
23	Waste water sources	Leakage from pipe and tanks, overflow of tanks from residential quarter, toilets, laboratories, hostels.
24	Uses of waste water	Nil
25	The fate of wastewater from labs	Discharge into soak pit in case of contamination and natural discharge
26	Any waste water treatment for lab water	No
27	Whether any green chemistry method practiced in labs	No
29	Rain water harvesting	Rain water harvesting is maintained by the water body within the premises which also help in maintaining the ground water level and there is no reusable rainwater which is harvested. Lake serves the main purpose of rain water harvesting





## Existing water management methods installed in the campus

Sl No.	Source of ground recharger	Location
1	Rain water harvesting	In all buildings (New + Old)

## 4.3 Waste measure and its disposal

### MONTHLY PAPER USAGE DETAILS:

Sl No.	Details of Paper		New Paper	Waste Paper
	Paper	Unit	A4 size	Waste Paper
1	Paper Packet (A4 Size)	No.	3000	90
2	Weight Per Packet (Kg)	Kg / Packet	2.20	2.20
	<b>Total Weight</b>	Kg	<b>6600</b>	<b>198</b>

## Existing waste management methods practiced

- Cleaning the campus on daily basis.
- Segregation of waste into degradable and non-degradable by the cleaning staff.
- Waste bin's placed in corridors, office and staff rooms.
- E-waste and plastic waste disposal at municipal collection center.
- Campaigns for reduce, reuse and recycle.
- Special arrangement for exist of waste water from chemical lab.



#### 4.4 Greenery in Campus

University has 291024.0135 m<sup>2</sup> (11%) area under plantation of various species such as Peltophorum, Eucalyptus, Mango, Syzygium, Ficus, Pongamia, Cassia, Acacia, Bauhinia, Bamboo, Albizia, Embilica, Anthocephalus, Mimosa elengi, Terminalia arjuna, Azadirachta indica, etc. established as Miyawaki and miscellaneous forests.

- Total area in campus covered with forest vegetation : more than 35% area
- Total area on campus covered in planted vegetation : 10 -20 % of Total area
- Total area on campus for water absorption beside forest and planted vegetation more than 20%



## 5.0 Conclusion and Recommendations

Green and Environment 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 university and is a way of identifying, evaluating and managing environmental risks (known and unknown). There is scope for further improvement, particularly in relation to waste, energy and water management. The university 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 university does perform fairly well, the recommendations in this report highlight many ways in which the university can work to improve its actions and become a more sustainable institution.

### Major Audit Observations

- i. Use of notice boards and signs are inadequate to reduce over exploitation of natural resources.
- ii. Programs on green initiatives have to be increased. Campus is declared plastic free, stringent actions should be taken to maintain this.
- iii. Existing Rain water harvesting systems, solar power generation, environmental education programs have to be strengthened.
- iv. Display boards against the misuse of water use are lacking.
- v. Display boards for awareness in relation to energy conservation is found inadequate.
- vi. There are fans of older generation and non-energy efficient which can be phase out by replacing with new energy efficient fans.
- vii. Solid waste management systems established are insufficient.
- viii. Waste bins in the class rooms, veranda, canteen and campus are inadequate.
- ix. Regular planting of trees in the campus can be increased.
- x. Display boards to all plants & trees identified, Should be increased.
- xi. There is only very few fruit trees in the university campus to attract birds.
- xii. University has not yet taken any initiative for carbon accounting.



## **Recommendations:**

### **Water**

- i. Remove damaged taps and install sensitive taps if possible.
- ii. Awareness programs on water conservation to be conducted.
- iii. Install display boards to control over exploitation of water.

### **Environment**

- i. Arrange training programmes on environmental management system and nature conservation. .

### **Energy**

- i. Establish a purchase policy that is energy saving and eco-friendly.
- ii. Replace incandescent and CFL lamps with LED lights.
- iii. Conduct seminars, workshops and exhibitions on environmental education.
- iv. Establish water, energy and waste management systems.
- v. Increase the number of display boards on environmental awareness such as – save water, save electricity, no wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.
- vi. Replace old fans with energy efficient fans.
- vii. Replace Window AC with Split AC

### **Waste**

- i. Conduct exhibition of recyclable waste products.
- ii. Conduct more seminars and group discussions on environmental education.
- iii. Remove damaged taps and install sensitive taps is possible.
- iv. Practice of waste segregation to be initiated.
- v. Avoid plastic / thermocol plates and cups in the University level or department level functions.
- vi. Establish an E-waste collection center in campus.



## Green Campus

- i. All trees in the campus should be named scientifically.
- ii. Create more space for planting.
- iii. Grow potted plants at both verandah and class rooms.
- iv. Create automatic drip irrigation system during summer holidays.
- v. Not just celebrating environment day but making it a daily habit.
- vi. Beautify the university buildings with more indoor plants.
- vii. Conducting competitions among departments for making students more interested in making the campus green.

## Carbon footprint

- i. Establish a system of car pooling among the staff to reduce the number of four wheelers coming to the University.
- ii. Encourage students and staff to use cycles.

## Commitments after Green and Environment Auditing

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



## CERTIFICATION

This Part shall indicate certification by Certified Energy Auditor stating that:

-

- I. The data collection has been carried out diligently and truthfully.
- II. All data monitoring devices are in good working condition and have been calibrated or certified by approved agencies authorized and no tampering of such device has occurred.
- III. All reasonable professional skill, care and diligence had been taken in preparing the Green & Environment Audit Report and the contents there of are a true representation of the facts.
- IV. Adequate training provided to personnel involved in daily operation after implementation of recommendation.

Signature:

Name of the Certified Energy Auditor: Mr. Rahul Agrawal

Certification Detail: EA-20984

## Green Audit Certificate 2020-2021

This is to certified that a "Green Audit" for **Guru Ghasidas Vishwavidyalaya, Koni, Bilaspur, Chhattisgarh-495009** has been conducted in 2020-21 to assess the green initiative planning and efforts implemented in the University. The activity and measures carried out by the University has been verified based on the report submitted and was found to be satisfactory. The effort taken by the faculty members, administration and students towards environmental and sustainability is highly appreciated and commendable.



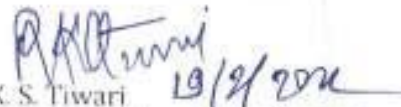
Dr. M. P. Mishra, Chief Chemist  
Chhattisgarh Environment Conservation  
Board, Bilaspur (Regional Office)  
**Member of Green Audit Committee**



Prof. R. V. Shukla  
Retired Professor, Botany Department,  
CMP Degree College, Bilaspur  
**Member of Green Audit Committee**



Er. Devvrat Mishra  
Regional Officer  
Chhattisgarh Environment Conservation  
Board, Bilaspur (Regional Office)  
**Member of Green Audit Committee**



Prof. R. K. S. Tiwari  
Dean, Barrister Thakur Chhedilal College of  
Agriculture & Research Station Bilaspur -  
495001 (C.G.).  
**Convener of the Green Audit Committee**



Er. Laxmikant Jaiswal  
GGV University Engineer  
**Member of Green Audit Committee**



Dr. S. K. Snahi, Associate Professor  
Botany Department, GGV, Bilaspur  
**Member Secretary Green Audit  
Committee**

# **GREEN AUDIT REPORT**

## **2020-2021**



**Guru Ghasidas Vishwavidyalaya,  
Bilaspur**







आंतरिक गुणवत्ता आश्वासन प्रकोष्ठ  
INTERNAL QUALITY ASSURANCE CELL  
गुरु घासीदास विश्वविद्यालय, बिलासपुर (छ0ग0)  
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (CG)  
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क. 25 अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)  
(A CENTRAL UNIVERSITY ESTABLISHED BY THE CENTRAL UNIVERSITY ACT 2009 NO. 25 OF 2009)  
दूरभाष : 07752-260294, फ़ैक्स : 07752-260154 ई-मेल: director-iqac@ggu.ac.in वेबसाइट: www.ggu.ac.in  
Phone: 07752-260294, Fax: 07752-260154 E-Mail: director-iqac@ggu.ac.in Website: www.ggu.ac.in

क्रमांक 225 /आई.क्यू.ए.सी./2021

दिनांक - 07.12.2021

आदेश

डॉ0 एस0के0 शाही, सदस्य सचिव, Green Audit द्वारा दो सदस्य नामित किये जाने का प्रस्ताव प्रस्तुत किया गया है। आंतरिक गुणवत्ता आश्वासन प्रकोष्ठ द्वारा पूर्व में जारी आदेश क्रमांक 198/आई.क्यू.ए.सी./2021 दिनांक 22.11.2021 में आंशिक संशोधन उपरान्त समिति में निम्नलिखित दो सदस्यों को नामित किया जाता है।

1. प्रो0 आर0के0एस0 तिवारी, अधिष्ठाता, ठाकुर छेदीलाल वैरिस्टर, कृषि महाविद्यालय, समन्वयक सरकंडा, बिलासपुर (छ0ग0)
2. डॉ0 आर0व्ही0 शुक्ला, सेवानिवृत्त प्राध्यापक, सी0एम0डी0 महाविद्यालय, बिलासपुर (छ0ग0)सदस्य बिलासपुर (छ0ग0)
3. प्रभारी अधिकारी, पर्यावरण संरक्षण मंडल, बिलासपुर (छ0ग0) सदस्य
4. डॉ0 एम0पी0 मिश्रा, चीफ कैमिस्ट, पर्यावरण संरक्षण मंडल, बिलासपुर (छ0ग0) सदस्य
5. श्री एल0के0 जायसवाल, विश्वविद्यालय यंत्री (प्रभारी) सदस्य
6. डॉ0 एस0के0 शाही, सह-आचार्य, वनस्पतिशास्त्र विभाग, सदस्य सचिव उपरोक्त Green Audit हेतु समय-सारिणी एवं विस्तृत विवरण पृथक से प्रेषित किया जावेगा।

निदेशक  
आई.क्यू.ए.सी.

पृ.क्र./226 /आई.क्यू.ए.सी./2021  
प्रतिलिपि :-

दिनांक - 07.12.2021

1. कुलपति के निजी सचिव को माननीय कुलपति महोदय के सूचनार्थ।
2. कुलसचिव के निज सहायक को कुलसचिव जी के सूचनार्थ।
3. समन्वयक, नैक की ओर सूचनार्थ।
4. विशेष कर्तव्यस्थ अधिकारी, विकास विभाग की ओर सूचनार्थ।
5. अध्यक्ष, छत्तीसगढ़ पर्यावरण संरक्षण मंडल, बिलासपुर (छ0ग0)
6. सदस्य सचिव, छत्तीसगढ़ पर्यावरण संरक्षण मंडल, बिलासपुर (छ0ग0)
7. समिति को सम्माननीय सदस्यों की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु।
8. डॉ0 एस0के0 शाही को यथाशीघ्र Green Audit की प्रक्रिया पूर्ण किये जाने हेतु प्रेषित।
9. कार्यालय प्रति।

निदेशक  
आई.क्यू.ए.सी.

## **Green Audit**

### **at Guru Ghasidas Vishwavidyalaya, Bilaspur**

The policy of most of the Governments world over is to have a policy which can enhance labour productivity and economic growth through accumulation of human capital. The development of the work force can largely be influenced by improving the knowledge and skills of the work force which in turn influence the future well-being of the nation with considerable gains in GDP. This has led governments to devote huge resources in improving the educational standards of its Citizens and Guru Ghasidas Vishwavidyalaya has also meticulously worked in on these lines to bring about a change. With the increasing cutting-edge research experiences in different science and technology disciplines there has been development and growth of Guru Ghasidas Vishwavidyalaya also which has led to increasing carbon footprints. The policy of the Government of India under the leadership of our Honourable PM Shri. Narendra Modi Ji has also been in this direction, by declaring the mission of 'Swachh Bharat Abhiyan', whose voice resonates with the message of "Green Campus, Clean Campus" mission launched by the University Grants Commission for all higher educational institutes. The National Assessment and Accreditation Council (NAAC), which is an autonomous body funded by the University Grants Commission of Government of India, has made 'Environmental Consciousness' mandatory criterion (Criterion VII) for grading educational institutes. At present Guru Ghasidas Vishwavidyalaya has been pursuing the policy of Sustainable development and at this juncture green audit becomes part and parcel of management of the campus with due scope to take up academic activities within the close circles of environmental conservation and management.

Green auditing is the process of identifying and determining whether the practices taken up at Guru Ghasidas Vishwavidyalaya are eco-friendly and sustainable. It is an effective ecological tool that helps to create a culture of sustainability by implementing it through regular identification, quantification, documenting, reporting and monitoring of environmentally important components. Green auditing will thus help in preserving the rich floral and faunal diversity in and around the campus; garnering interest and creating awareness among the stakeholders in future. Guru Ghasidas Vishwavidyalaya is committed to responsible stewardship of resources and to demonstrate leadership in sustainable academic practices. The University supports the climate neutrality goals as outlined by the Government of India and thus will monitor the sustainability of the research and education mission through the Green Audit Committee.

The policy goals of the Guru Ghasidas Vishwavidyalaya Green Audit are:

- a) Identification and documentation of the strengths and areas of improvement within sustainable operations of administrative, academic and research laboratories via gap analysis, and outlining actions that can be implemented to further targets.
- b) Increase environmental awareness throughout campus and motivate all stakeholders for

optimized sustainable use of available resources.

- c) The importance of the program is to collect baseline data of environmental parameters and resolve the environmental issue before they become a problem.

To achieve the aforementioned goals, Guru Ghasidas Vishwavidyalaya Green Audit Committee endeavours towards the following objectives:

- a) To identify current and emerging environmental issues.
- b) To monitor environmental management practices.
- c) To examine the current practices that can impact the environment.
- d) To create awareness among the various stakeholders of the University.
- e) To prepare a Green Audit Report on green practices followed by different Departments, support services and administration.

#### **METHODOLOGY ADOPTED**

The methodology adopted to conduct the Green Audit of Guru Ghasidas Vishwavidyalaya will have the following components:

- a) Onsite field visits were conducted by the Green Audit Team as and when necessary.
- b) Enquiries were conducted amongst different stakeholders to know about the various components in connection with water use, energy consumption and waste disposal, etc.
- c) The water quality analysis was done using standard protocols.
- d) Air quality analyses of the University campus were carried out using standard protocol.
- e) The noise levels were measured using a Sound Level Meter at selected sampling stations during the day and night time within the campus. ♦ Different standard protocols were followed to document and estimate the floral and faunal diversity.

#### **AUDIT STAGE**

Guru Ghasidas Vishwavidyalaya started its green audit by assessing the green cover followed by looking into all the aspects which have been a part of the green audit viz. recording the land use and land cover (LULC), water availability and usage, waste generate and their management practices, recording of the environmental parameters, energy consumption and conservation strategies, etc.

The members of the audit team recorded the different facilities at the Guru Ghasidas Vishwavidyalaya, determined different types of appliances and utilities (Water cooler, taps, toilets, lights, fan, ACs etc.) as well as measured the usage per item (Watts indicated on the appliance or measuring water from a tap) and identified the relevant consumption patterns (such as how often an appliance is being used) and their impacts. The staffs, students and other stakeholders were interviewed through structured questionnaires to get details of

usage, frequency or general characteristics of different appliances. Data collection was done by onsite visit and also through questionnaires in different sectors such as water, energy, waste, biodiversity status. The ambient quality of the campus was recorded to monitor the environmental status within the University campus using standard protocols. The data obtained were collated and analyzed to prepare this audit report of Guru Ghasidas Vishwavidyalaya.

## POST AUDIT STAGE

### Land use and land cover

The topography of Guru Ghasidas Vishwavidyalaya campus is undulating with a wetland (lake) towards the centre that drains to the south eastern boundary. The water body is rain fed and has water almost throughout the year. The whole campus is interspersed with scattered trees at few places thus, making it a picturesque landscape suitable for a wide spectrum of flora and fauna. The Academic Departments and residential quarters/hostels have come up over the area which were highlands or in gradually filled lowlands. The present study revealed that the Guru Ghasidas Vishwavidyalaya campus has a total of 653.76 Acre of land. The GGV campus occupy an area of 491.93 acres under forest green area, 49.58 acres under wetland (Lake area), 6.77 acres under Botanical garden, 16.77 acres of playground. The large wetland is a home to a wide diversity of aquatic flora and fauna. It is a matter of concern that the wetland has been observed to be silted up and presently some of the area of the lake is under a thick cover of grass and aquatic weeds.



**Fig 1: The Map of Guru Ghasidas Vishwavidyalaya campus**

It is found that a total of about 71.24 acres are under the built-up category, of which residential quarters, hostels, academic departments and administrative units form a significant part. In absence of available high ground, the wetland is being filled up for new constructions. The campus is dispersed with roads connecting each building and along the

boundary of the main area which covered an estimated area of approximately 38.33 acres and the playgrounds covering an area of nearly 16.77 acres of land.

**Table 1: Land use categories in Guru Ghasidas Vishwavidyalaya Campus**

SI.NO.	LAND USE CATEGORY	AREA ( IN APPROX. ACRES)
1	BOTANICAL GARDEN AND FOREST PARK	1.05
2	WETLAND ( LAKE AREA)	49.58
3	PLAY GROUND	16.77
4	ROADS	38.33
5	FOOT PATH	1.44
6	PUMP STATION	0.85
7	PROTECTION WALL	0.58
8	DRAIN	3.6
9	RETAINING WALL	0.95
10	CULVERT	0.076
11	BUILDING UNDER CONSTRUCTION	8.53
12	OVERHEAD TANK	0.09
13	CAR PARKING	22.46
14	GARAGE	0.15
15	BUILDING	71.24
16	TRANSFORMER	1.05
17	GENERATOR	0.05
18	SECURATIES HOUSE	3.59
19	WATER PUMP	0.06
20	SEPTIK TANK	0.12

21	JUNGLE AREA	491.93
22	TIN SHED	0.95
23	POWER SUB STATION	1.45
24	TOILET	1
25	GARDEN	6.77
26	STATUE	0.008

#### **Observations**

- a) The vegetation areas are found to be reducing over the years due to the coming up of new buildings.
- b) Occurrence of dense weed growth is a common feature after the rains and so the area is being cleaned every year in order to give an aesthetic look of the campus.
- c) Roadside avenue trees lack attention.
- d) Drainage links were found to be missing.

#### **Suggestions and Recommendations**

- a) Future plans of construction and activities should be based on the Landscape.
- b) Forest area, Wetland (Lake area), needs to be conserved as carbon sink.
- c) The trees planted needs to be managed regularly and more diversified plant to be planted instead of *Acacia*.
- d) To establish the Medicinal Plant Garden, Botanical Garden for awareness of students towards importance of medicinal plants and various other species of Plants for local people understanding.

## Water

Water is an important natural resource and is available naturally depending on the climate and topographic features. All organisms are dependent on water for their living. Although water is available in nature, portable water is not available freely for human consumption. There have been many practices to conserve water so that it can be readily available for human use. It has been noticed that due to unsustainable use of water resources there is contamination and depletion of the ground water and also water which is available in various reservoirs like lakes, ponds, streams etc which is becoming more alarming. Therefore it becomes increasingly important to conserve protect and manage the water resources availability and usage so that it is sustainably used within the university campus. Water auditing is conducted to evaluate the quality, availability and usage of water; the facilities available and methods adopted to revitalize and use it so that the resources are intact without leading to deterioration.

### Uses and management

A total of 800000 L of water is pumped every day for the university dwellers as well to meet the daily demands of the academic and administrative Departments (Table 2). The daily use of the water during 2020-21 was approx. 772700 L per day.

**Table 2: Source and uses of water in the GGV campus**

Sl. NO.	PARAMETERS	INFORMATION
1	No of well	Nil
2	No of motor pump used	30 NOS
3	Horse power - motor	2HP-02 NOS, 3HP-6NOS, 5HP-19NOS, 7.5HP- 3NOS
4	Capacity of tank (overhead tank)	3,80,000 L
<b>WATER USED IN DIFFERENT SECTION OF THE CAMPUS</b>		
	<b>SECTIONS</b>	<b>WATER USES (L/DAY)</b>
6	Hostel	148500
7	Residential quarter	169200
8	Administrative block	15000
9	Construction work	200000

10	Canteen	10000
11	Urinals and toilets	75000
12	Departments	80000
13	Gardens	25000
14	Laboratories	12000
15	Drinking	26000
16	Leakages	12000
17	Main purpose of water uses in campus	Drinking, cooking, laboratories, gardens, toilets, construction
18	Nos of water tap excluding household and residential quarter	1000 nos
19	Water cooler and drinking water filtration facilities	55
20	Nos of urinals and toilets ( excluding household and residential quarter)	115
21	Nos of waterless / bio toilets	Nil
22	Any water wastage /why	Yes, leakage from pipe and tank leaving of taps open at times
23	Waste water sources	Leakage from pipe and tanks, overflow of tanks from residential quarter, toilets, laboratories, hostels.
24	Uses of waste water	Nil
25	The fate of wastewater from labs	Discharge into soak pit in case of contamination and natural discharge
26	Any waste water treatment for lab water	No



27	Whether any green chemistry method practiced in labs	No
29	Rain water harvesting	Rain water harvesting is maintained by the water body within the premises which also help in maintaining the ground water level and there is no reusable rainwater which is harvested. Lake serves the main purpose of rain water harvesting

The stake holders of the residential quarters of Guru Ghasidas Vishwavidyalaya not utilizing the grey water which is obtained from the various domestic activities. Guru Ghasidas Vishwavidyalaya is blessed with a natural large water body (lake) inside its premises. Naturally, this large lake serves the main purpose of rain water harvesting.

### Water Quality assessment

The water requirements of Guru Ghaida Vishwavidyalaya, Bilaspur are met from underground tube wells. The water used by various section/Department given in the table 2. Water samples from different sources were collected and analysed for its quality parameters and the results are presented in Table 3. Heavy metals of two ponds were analyzed by Ultimate Environmental solution (Third party evaluation) and the data were recorded in the table.

**Table 3: Water quality analysis report of the water samples obtained from different sources within GGV.**

S N	Sample	Temperature	pH	Turbidity (NTU)	Total Dissolved solids (mg/l)	Dissolved Oxygen (mg/l)	BOD (mg/l)	CO D (mg/l)	Chloride (mg/l)	Total Alkalinity (mg/l)	Electrical conductivity ( $\mu$ s/cm)
1	Pond water 1	25.2	7.8	46	180	7.6	1.4	26	30	124	342
2	Pond water 2	25.0	8.0	52	186	7.2	1.8	28	36	144	250
3	Pond water 3	25.9	7.2	50	190	7	1.2	29	32	76	167.6

### Observations

- GGV does not have a reusable water treatment facility for wastewater generated from Academic buildings, Administrative buildings, library, residential quarters, guest houses,

hostels, laboratories, canteen, etc.

- b) At times there is overflowing of overhead water tanks.
- c) Water consumption is not properly monitored within the campus as there are no systems to record it.
- d) There is accumulation of sediments in the GGV lake area especially during the rains.
- e) Water from the buildings is discharged into the lake.

**Suggestions and Recommendations**

- a) Rainwater harvesting systems could be improved so that there is a facility available in every building for reusing of water.
- b) A water conservation drives should be initiated by involving all the stake holders.
- c) Automated sensors can be installed to prevent the overflow from water tanks.
- d) Automated taps could be used so that usage of water can be reduced.

## **Solid Waste Management**

Management of solid waste is one area where all stakeholders are more-or-less aware of the issues involved. Each of these sections/ stakeholders has appropriated their own set of solid waste management practices as per their convenience, requirements, and availability of resources. Investigations revealed that 32 Academic Departments of the University have a total of about 100 numbers of indoor dustbins installed for solid-waste disposals. On an average, each of these departments has a provision of about 3 dustbins. At present none of the Departments had facility of segregating the waste.

The teacher's quarters maintain on an average one personal dustbin for solid-wastes disposals and a pit for the dumping of organic wastes. 10% of the Academic Departments and 1% of residential quarters maintain separate disposal systems for dry and wet waste. The practice of separating bio-degradable waste from non-biodegradable ones is prevalent in the teacher's quarters, Guest House and 20% of Academic Departments but is absent in hostels. For all the academic departments, administrative office, residential quarter/hostels/guest house and canteens 90 % of the accumulated solid waste excluding the ones which are dumped in the pits is lifted by Bilaspur Municipal Corporation (BMC) every two days, which is then segregated and land filled while for the rest is composted. However, the need for a formal and centralized system for segregating the waste generated ought to be adopted in the University which will then followed by composting. Solid-waste recycling and composting is not practiced in the campus. Moreover, the practice of recycling is another avenue that requires immediate operationalization. The organic wastes filled in the pits are subjected to composting which forms a best practice in the campus. In addition to the organic waste generated from different units, large sources of organic wastes other than kitchen wastes (University canteen, house hold) like leave litter, terrestrial weeds etc that are generated from maintain and cleaning the campus are collected during different periods of the year. These organic wastes are hard to degrade in the soil due to high content of lignin.

Vermicomposting is the technology where with the use of locally available appropriate species of composting earthworms (*Perionyx excavatus*), huge amount of plant biomass produced in the University campus is reduced into available plant nutrient rich organic manure within a short time span. In our University some places we e using vermicomposting to manage the solid waste.

**Liquid waste management:** Liquid waste is generated from Science laboratories, Hostels, Residential quarters and canteen. Liquid wastes generated by the University are of two types:

### **1. Sewage waste**

### **2. Laboratory, residential washing and canteen effluent.**

The laboratory liquid is sent to soak pit and other liquid wastes are mainly drained to improve the ground level of water. University does not have any sewage treatment plant yet.

**Biomedical waste management:** In GGV University only few faculties use animal for their

research purpose from where some biomedical waste is produced. Though the amount of waste is very negligible amount

### **E-waste management**

GGV has very efficient mechanism to dispose E wastes generated from various sources. E-wastes are generated from computer laboratories, electronic labs, Physics Labs, Chemistry Lab, Biotech Labs, Academic and Administrative Offices. The e-waste includes out of order equipments or obsolete items like lab instruments, circuits, desktops, laptops and accessories, printer, charging and network cables, Wi-fi devices, cartridges, sound systems, display units, UPS, Biometric Machine, scientific instruments etc. All these wastes are put to optimal use. All such equipment's which cannot be reused or recycled is being disposed off through authorized vendors. Instead of a new procurement BuyBack option is preferred for technology upgradation. Hazardous Waste In India, the Ministry of Environment, Forest and Climate Change, Government of India; is the agency to promulgate the Hazardous Waste (Management and Handling) Rules, 1989, under the provision of the Environment Protection Act, 1986. These rules were amended and new rules entitled "Hazardous waste (Management, Handling, and Trans-boundary Movement) Rules, 2008" were promulgated, which was further amended in the years 2009 & 2010 for proper management and handling of hazardous waste in the country (CPCB, 2010-2011). These regulations sometimes require detailed knowledge of the constituents and properties of waste streams so they can be managed properly. GGV, like other entities that generate and manage hazardous wastes, is faced with a range of problems. The following features create hazardous waste management problems unique to the University:

- ◆ Most departments do not generate large quantities of hazardous waste and can be classified as conditionally exempt small quantity generators (generators of less than 100 grams of hazardous waste per month)
- ◆ Stakeholders are not adequately aware of the regulations that may apply to them, or they may have chosen to ignore the regulations, believing they do not have to comply. During the study it was noticed among the faculty members of GGV by the Green Audit Committee, that majority of the stakeholders (> 90%) were confident about their understanding of hazardous waste and their obligation in disposing of materials. Ideally, Handling, collection, and transportation and proper handling of chemicals begin with understanding the potential hazards related to their use. All stakeholders, especially from Academic Departments and laboratories should be responsible for disseminating information on hazardous materials being used in the facility. The dissemination of information can involve discussions on reactivity and possible health effects. The survey carried out by GGV Green Audit Committee revealed that despite having an understanding of hazardous waste; a majority of the respondents were uncertain of disposal of hazardous waste. Many respondents were not aware of the green initiatives which can be taken to manage hazardous waste. It is evident that hazardous wastes which though is generated in very small quantity requires transportation off the university property, to an approved treatment facility. It is evident that there is no

collection and management of waste across the campus, but improvements in the overall liquid waste is required to manage the handling and transportation of the generated waste to a treatment facility off the campus. The university faces several obstacles to ensuring the disposal of hazardous wastes in an appropriate manner. These include the need for funds to pay for an outside handler and on-site coordinator to manage the waste management program. The large variety and small quantities of wastes produced by the Academic Departments and the residential is also a manner of concern. Data from the survey indicates that household batteries such as alkaline batteries were most frequently disposed of as compared to household and office cleaners such as tiles and floor cleaners, pesticides, wood preservatives such as varnishes and paint products which are disposed in very low quantity. Caution must be taken while moving hazardous waste materials through campuses along public streets.

#### **Observations**

- a) Disposal of biomedical waste generated in the GGV laboratories is not streamlined.
- b) The liquid hazardous waste generated in the laboratories required transportation to off campus disposal facility.

#### **Suggestions and Recommendation**

- a) The GGV campus is to be declared as a plastic-free campus.
- b) The practice of using biodegradable materials should be encouraged as alternatives.
- c) Vermi-composting facilities could be expanded.
- d) A centralized system of recycling paper could be adopted.
- e) The incinerator can be installed in the campus.

#### **Environmental quality**

##### **Air quality assessment**

For air quality monitoring three parameters namely Particulate Matter (PM 10), was considered for measurement in the University campus. PM10 is suspended particulate matter, either solid or liquid, with a diameter of 10 micrometers or less, including smoke, dust, soot, salts, acids, and metals. Particulate matter can also be formed indirectly when gases emitted from motor vehicles and industries undergo chemical reactions in the atmosphere. There is no air quality monitoring station is set up at the University premises. The air quality monitoring was conducted for 24 hour schedule by Environmental pollution Board, Bilaspur in 4 different location of the university. The sampling procedures for measurement of PM10 was made according to the internationally accepted standard technique through use of Respirable Dust Sampler (RDS) manufactured by M/s Environtech Instruments PVT. LTD., New Delhi. The Particulate matter PM10 was observed to be 84  $\mu\text{g}/\text{m}^3$  Table, in the GGV campus which is lower than the permissible limits of CPCB Ambient Air Quality Standards of 100  $\mu\text{g}/\text{m}^3$ . In the

University Campus, the major source of PM10 might be the dust from Vehicular traffic, construction, and burning.

**Table : Status of ambient air quality in the campus of GGV**

Monitoring location	Time weighted	Particulate matter (PM10) $\mu\text{g}/\text{m}^3$	Standards (CPCB, 2009)	Method Used
Near Zoology Department	24 Hours	97.70	100	Gravimetric
Near Professor colony	24 Hours	76.0	100	Gravimetric
Near HRDC	24 Hours	80.0	100	Gravimetric
Near Cafeteria	24 Hours	84.0	100	Gravimetric

In indoor environments people require fresh air because people spent most of the time inside the dwelling (Lingnel 2008, Ayanbimpe et al. 2010). According to Chadeganipour et al. (2010), all atmospheric air, whether indoor or outdoor, contains certain varieties of some fungal spores. Generally, outdoor air is the dominant source of indoor fungi (Shelton et al. 2002). Fungal spore concentration in outdoor environments consistently differs from indoor environments. Many aerobiological studies have been conducted for airborne fungal spores (Khandelwal 2008) but mainly from outdoor environments (Almina et al. 2019) but indoor environments are equally important because people spend most of their time indoor, punctuated by physicians (Portnoy et al. 2005). Nowadays fungal allergy is very common to people mainly those who spend most of the time indoor but it is difficult for diagnosis from the other type allergy due to fungi which are many and antigenically variable than the other allergens. The assessment of airborne fungal concentration was performed by Dr. SK Shahi, Botany Department, GGV and his team of Scholars using sedimentation plate technique (Karmakar et al 2020). Saboraud Dextrose Agar (SDA), Czapek-Dox Agar (CDA), Potato Dextrose Agar (PDA) and Malt Extract Agar (MEA) was prepared. The plates were exposed in indoor and outdoor environments of the Library, Canteen, Newly Constructed Building and Class Room. These plates were exposed for 5 minutes during the time in between hour 11 am to 5 pm after which they are sealed, labeled and transported to the laboratory. The culture plates were incubated at room temperatures (25°C) until growth appeared. Isolates were identified based on the standard texts and keys (Ellis 1971, Domsch et al. 1980, Watanabe 2002). A total of 132 colonies (Table 9) were found comprising of 10 genera. The dominant fungal genera were *Alternaria* sp. (10.0%), *Aspergillus* sp (32.87 %), *Fusarium* sp (4.06%), *Penicillium* sp (40.18%) and *Trichoderma* sp (12.79%). In this present study it was found that the number of fungal isolate was maximum in outdoor (85) compare than indoor (45).

It was concluded that proper and periodic maintenance of working environments involving

frequent cleaning, disposal of accumulated wastes, setting up of modern infrastructure facilities, application of fumigants/fungicides and use of dust masks while working can certainly help to improve the air quality and reduce the allergic incidence to people who work in such environments

### **Vehicular movements**

It was estimated that on an average around 500 nos. of two wheelers and 150 nos of four wheeler vehicles visited GGV Campus in general days per month during 2020-21 excluding the vehicles of campus dwellers. The University has two designated parking places. Except 40 percent of the vehicles, rest are visiting for a while. Ambient Noise Levels Under the Air (Prevention and Control of Pollution) Act, 1981, noise is regarded as a pollutant. There are two major settings where noise mostly occurs; these are - community noise and industrial noise. Community noise is also called environmental noise and is defined as the noise emitted from all the sources except the noise from the industrial sources. As far as community noise is concerned the WHO guidelines recommend less than 30 dB(A) in bedrooms during the night which is essential for good quality sleep. Again, it should be less than 35 dB(A) in classrooms which is important for good teaching and learning conditions. The noise level monitoring was carried out to assess the equivalent noise level (Leq) around the GGV campus both in the day time and night time. Mobile based Sound Level Meters application was used for monitoring of noise levels. The noise levels were monitored at least for 20 minutes at each location. The noise monitoring was carried out at the different location of the University.

**Table 10: Ambient Noise Levels within GGV. Campus**

Sl. No.	Location Measured	Noise Level at Day Time Leq dB(A)	Standard at Day Time for Sensitive Zone Leq dB(A)	Measured Noise level at Day Time Leq dB(A)	Standard at Night Time for Sensitive Zone Leq dB(A)
1	Biotechnology Department	41	50	34	40
2	Canteen	61	50	45	40
3	Central Library out side	49	50	34	40
4	Engineering and Technology department	48	50	33	40
5	Chemistry	48	50	37	40

6	Prof. Colony	46	50	23	40
7	Kali Mandir	48	50	32	40
8	HRDC	48	50	23	40
9	PNB ATM	50	50	23	40
10	Main gate	46	50	34	40
11	Main road outside the campus	69	50	65	40

Due to the reduced population on the campus, the community noise levels at most locations are within the permissible levels. However, it is important to note that the average noise level, considering all sampling stations within the campus, was higher than the maximum permissible limit of 50db(A) as recommended by the CPCB for all the location nearing the boundary. Although the Leq levels are high outside the atmosphere of the classrooms are quite calm and should be below the WHO recommended value of 35 dB(A) which is suitable for classroom teaching-learning environment.

#### **Observations**

- a) It is estimated that > 60 percent of campus dwellers walk within the campus.
- b) Noise is a disturbing factor on campus, particularly along the national highway, and within the campus during all India Examinations and Admission periods.

#### **Suggestions and Recommendations**

- a) Students and staff should be encouraged to use bicycle.
- b) The vehicular account should be maintained for the campus dwellers and staff members.
- c) Stop the entry of vehicle in to the campus to maintain the noise and pollution.
- d) Noise attenuation has to be done by planting vegetation around buildings and along Highway.
- e) Govt. authorities are requested to monitor the use of loudspeaker and noise producing sources within the 100m radius outside the University campus in compliance with prescribed rules.

#### **Biodiversity**

Biodiversity audit of GGV University is a continuous process and efforts of the faculty members, researchers, and the students to assess the living biota and its conservation have been going on for many years. Regularly many conservation practices are taken up by the University so that anthropogenic impact on the biodiversity components and ecosystems are



minimized. The scientific information and existing database are based on various studies as well as research work done by Botany, Zoology and Forestry and Biodiversity departments of GGV University. Despite various limitations, data have been compiled to prepare authentic documentation that provides an insight into the status of the biodiversity and natural ecosystem in the campus. Different conservation practices also have been applied for a better and sustainable campus ecosystem. The main objective of biodiversity audit is to provide documentation of biodiversity components within the institutional area, to observe ecosystem structures and functions along with regular biodiversity monitoring of the different components of biodiversity. A lake is located within the campus and maintained by GGV University to enrich the beauty of the campus. Many migratory birds are often observed and some of the fishes are available during the rainy seasons. Spread over approximately 700 acres of land, the GGV University campus is home to different varieties of fauna as well as flora.

#### **Observations**

- a) Fascinating characteristic of the GGV University Campus is its lush green environment with rich floral and faunal diversity.
- b) The trees existing are not managed properly and even are axed at times for construction activity.
- c) Growth of weeds and other invasive species is a cause of concern after the rains.

#### **Suggestions and Recommendations**

- a) The ecosystem of the campus should be managed properly for a better environment.
- b) The lake which forms the wetland of the campus should be conserved and maintained.
- c) Proper landscape and long-term plan of the vegetational distribution/area is required for sustainable management of the trees and other vegetation in the campus.

#### **Overall Suggestions and Recommendations**

Committee member suggested for audit for next year audit to incorporate some other experts like person of energy, health and pharmacy.



क्षेत्रीय कार्यालय,  
छत्तीसगढ़ पर्यावरण संरक्षण मण्डल,  
व्यापार विहार पं. दीनदयाल उपाध्याय पार्क के पास, बिलासपुर (छ.ग.)

e-mail: cecb.robilaspur@gmail.com, Ph. No. 07752-261172

क्रमांक 2/27 /क्षेका/छ.ग.प.सं.मं./2022

बिलासपुर, दिनांक: 07/01/2022

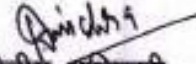
प्रति,

✓ रजिस्ट्रार,  
गुरुघासीदास विश्व विद्यालय,  
कोनी, बिलासपुर (छ.ग.)

विषय:- जल विश्लेषण एवं वायु मॉनिटरिंग रिपोर्ट के सम्बंध में।

उपरोक्त विषयांतर्गत आपके गुरुघासीदास विश्व विद्यालय परिसर के 02 तालाबों से एकत्रित जल नमूनों का विश्लेषण परिणाम एवं 04 स्थानों में किये गये वायु मॉनिटरिंग रिपोर्ट संलग्न कर प्रेषित है।

संलग्न:- उपरोक्तानुसार।

  
क्षेत्रीय अधिकारी,  
क्षेत्रीय कार्यालय  
छ.ग.पर्यावरण संरक्षण मण्डल  
बिलासपुर



**Ultimate**  
ENVIROLYTICAL SOLUTIONS

HDD-272, Phase III - Near JP Chowk  
Ring Road No.-2, Kabir Nagar, Raipur (C.G.) - 492099  
Ph : 0771 - 4027777 | Email : ultimatenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer		Report No.	UES/TR/21-22/04909
<b>To,</b> <b>THE DEPARTMENT OF BOTANY</b> <b>C/o PRINCIPAL</b> <b>GURU GHASIDAS VISHWAVIDYALAYA</b> <b>KONI, BILASPUR - 495009</b>		Lab Ref No.	UES/21-22/W/08720
		Date of Sampling	22/12/2021
		Date of Receipt	22/12/2021
		Date of Report	27/12/2021
		Date of Analysis	START: 22/12/2021      END: 27/12/2021
SAMPLE DETAILS			
Sampling Location	1. SW - 3 GGU		
Customer Ref. No.	Mail Received, dated : 21/12/2021		
Sample Type	Surface Water	Sample Condition At Receipt	Ok
Packing Of Sample	Plastic Bottle	Sample Collected By	Customer
Other Details	Sealed	Quantity Received	Approx. 2 Ltr.

### TEST REPORT

SR. NO.	PARAMETER	UNIT	METHOD OF TEST	RESULT
				SW - 3 GGU
1	Nickel (as Ni)	mg/l	IS:3025: (Part-54)	N.D.
2	Arsenic (as As)	mg/l	IS:3025: (Part-37)	N.D.
3	Lead (Pb)	mg/l	IS:3025: (Part-47)	N.D.
4	Mercury (Hg)	mg/l	IS:3025: (Part-48)	N.D.
5	Fluoride (as F)	mg/l	IS:3025: (Part-60)	0.11

Note: mg/l=milligram per liter, N.D. - Not Detection

**REMARKS: RESULTS ARE AS ABOVE**

#### Terms & conditions

- > The report for publication, arbitration or as legal dispute is forbidden.
- > Last sample will be retained for 15 days after issue of test report unless otherwise agreed with customer.
- > This is for information as the party has asked for above tests only.

 REVIEWED BY		For ULTIMATE ENVIROLYTICAL SOLUTIONS  AUTHORIZED SIGNATORY
--	---	---

-----End of the test report-----



HDD-272, Phase III - Near JP Chowk  
 Ring Road No.-2, Kabir Nagar, Raipur (C.G.) - 492099  
 Ph : 0771 - 4027777 | Email : ultimatenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address of The Customer		REPORT NO	UES/TR/21-22/04910	
<b>To,</b> <b>THE DEPARTMENT OF BOTANY</b> <b>C/o PRINCIPAL</b> <b>GURU GHASIDAS VISHWAVIDYALAYA</b> <b>KONI, BILASPUR - 495009</b>		LAB REF NO	UES/21-22/S/08721-08724	
		DATE OF SAMPLING	22/12/2021	
		DATE OF RECEIPT	22/12/2021	
		DATE OF REPORT	27/12/2021	
		DATE OF ANALYSIS	START: 22/12/2021	END: 27/12/2021
<b>SAMPLE DETAILS</b>				
MONITORING FOR	SOIL	CUSTOMER REF. NO. & DATE	MAIL RECEIVED, DATED : 21/12/2021	
SAMPLING LOCATION	1. S-1 GGU			
	2. S-2 GGU			
	3. S-3 GGU			
	4. S-4 GGU			
SAMPLE COLLECTED BY	CUSTOMER			
SAMPLING PROCEDURE	MANUAL ON SOIL, PLANT & WATER ANALYSIS			
SAMPLE QUANTITY/PACKING	500 GM(APPROX) EACH			

### TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Result			
				S-1 GGU	S-2 GGU	S-3 GGU	S-4 GGU
1	pH Value	-	IS: 2720: (PART-26):1987 RA 2011	7.63	7.72	7.19	6.12
2	Nitrogen (as N)	kg/ha	AGRICULTURE SOIL MANUAL	146.3	168.9	176.4	180.2
3	Phosphorus (as P)	kg/ha	AGRICULTURE SOIL MANUAL	9.77	7.92	9.53	8.29
4	Potassium (as K)	kg/ha	AGRICULTURE SOIL MANUAL	224.9	369.9	409.2	494.8
5	Organic Carbon (OC)	%	AGRICULTURE SOIL MANUAL	0.46	0.53	0.58	0.62

N.D.-NOT DETECTED

**REMARKS: RESULTS ARE AS ABOVE**

**Terms & conditions**

- > The report for publication, arbitration or as legal dispute is forbidden.
- > Test sample will be retained for 15 days after issue of test report unless otherwise agreed with customer.
- > This is for information as the party has asked for above test(s) only.

 27/12/2021 REVIEWED BY		For ULTIMATE ENVIROLYTICAL SOLUTIONS  27/12/2021 AUTHORIZED SIGNATORY
-------------------------------	--	--

-----End of the test report-----



**Ultimate**  
ENVIROLYTICAL SOLUTIONS

Format No. UES/FORM

HDD-272, Phase III - Near JP Chowk  
Ring Road No.-2, Kabir Nagar, Raipur (C.G.) - 492099  
Ph : 0771 - 4027777 | Email : ultimatenviro@gmail.com

Recognized by Ministry of Environment Forest and Climate Change under EP act 1986

Name & Address Of The Customer		REPORT NO	UES/TR/21-22/04911
<b>To,</b> <b>THE DEPARTMENT OF BOTANY</b> <b>C/o PRINCIPAL</b> <b>GURU GHASIDAS VISHWAVIDYALAYA</b> <b>KONI, BILASPUR - 495009</b>		LAB REF NO	UES/21-22/S/08725
		DATE OF SAMPLING	22/12/2021
		DATE OF RECEIPT	22/12/2021
		DATE OF REPORT	27/12/2021
		DATE OF ANALYSIS	START: 22/12/2021    END: 27/12/2021
<b>SAMPLE DETAILS</b>			
MONITORING FOR	SOIL	CUSTOMER REF. NO. & DATE	MAIL RECEIVED, DATED : 21/12/2021
SAMPLING LOCATION	1. S-5 GGU		
SAMPLE COLLECTED BY	CUSTOMER		
SAMPLING PROCEDURE	MANUAL ON SOIL, PLANT & WATER ANALYSIS		
SAMPLE QUANTITY/PACKING	500 GM (APPROX)		

### TEST REPORT

Sr. No.	Parameter	Unit	Method Reference	Result
1	pH Value	-	IS: 2720: (PART-26): 1987 RA 2011	7.66
2	Nitrogen (as N)	kg/ha	AGRICULTURE SOIL MANUAL	171.6
3	Phosphorus (as P)	kg/ha	AGRICULTURE SOIL MANUAL	9.45
4	Potassium (as K)	kg/ha	AGRICULTURE SOIL MANUAL	382.8
5	Organic Carbon (as OC)	%	AGRICULTURE SOIL MANUAL	0.49
6	Nickel (as Ni)	mg/kg	AGRICULTURE SOIL MANUAL	N.D.
7	Lead (as Pb)	mg/kg	AGRICULTURE SOIL MANUAL	N.D.
8	Zinc (as Zn)	mg/kg	AGRICULTURE SOIL MANUAL	0.31
9	Chromium (as Cr)	mg/kg	AGRICULTURE SOIL MANUAL	N.D.
10	Copper (as Cu)	mg/kg	AGRICULTURE SOIL MANUAL	0.20

N.D.: NOT DETECTED

**REMARKS: RESULTS ARE AS ABOVE**

**Terms & conditions**

- > The report for publication, arbitration or as legal dispute is forbidden.
- > Test sample will be retained for 15 days after issue of test report unless otherwise agreed with customer.
- > This is for information as the party has asked for above test(s) only.

 27/12/2021		For ULTIMATE ENVIROLYTICAL SOLUTIONS  27/12/21
---	---	---



**Ultimate**  
ENVIROLYTICAL SOLUTIONS

272-HDD, Phase - III  
Kabir Nagar, Ring Road-2  
Raipur, Chhattisgarh

**TAX INVOICE**

**ORIGINAL FOR RECEIPT**

**Ultimate Envirolytical Solutions**

HDD - 272, Phase - III, Near JP Square,  
Kabir Nagar, Ring Road No. - 02,  
Raipur (C.G.) - 492099  
Email - ultimatenviro@gmail.com

**GSTIN Number** 22AAEFU4612N2Z4  
**State Code** 22  
**SAC Code** 9983  
**PAN NO.** AAEFU4612N

**Party Details :**

**To,**  
**The Registrar,**  
**Guru Ghasidas Vishwavidyalaya,**  
**Koni, Bilaspur - 495009 (C.G.) (India)**

**Invoice Number** UES/21-22/0731  
**Invoice Date** 30/12/2021  
**Ref. No.** Mail Received  
**Ref. Date** 21-12-2021

Sr. No.	Description	Qty	Rate (Rs.)/Sample	Amount (Rs.)
1	Water Analysis.	2	1,250.00	2,500.00
2	Water Analysis.	1	4,000.00	4,000.00
3	Soil Analysis.	4	2,175.00	8,700.00
4	Soil Analysis.	1	6,175.00	6,175.00

**Charges** 21,375.00

**Discount @ 40%** 8,550.00

**Amount** 12,825.00

**CGST @ 9%** 1,154.25

**SGST @ 9%** 1,154.25

**Total Amount** 15,133.50

**R/O(+)** 0.50

**Payable Amount** 15,134.00

**Rupees in words:**

**(Fifteen Thousand One Hundred Thirty Four Only.)**

**Our A/c Detail:**

Name: State Bank of India  
Address: SME Pandri Raipur  
Branch Code: 63712  
A/c No. 35728362295  
IFSC Code-SBIN0063712

For, Ultimate Envirolytical Solutions

*[Signature]*  
30/12/2021  
Authorized Signatory