



GREEN AUDIT REPORT, 2021

BIR LACHIT BORPHUKAN COLLEGE

Namtial Pathar, PO & Dist: Sivasagar-785640



Green Audit Report of BIR LACHIT BORPHUKAN COLLEGE was prepared by GREEN TECH Environmental Engineer & Consultants.

The audit was conducted in Dec '2021.

The Green Audit Report provides suggestions and recommendations to improve environmental sustainability.


(Mrs. Dipali Deog)
Principal
BIR LACHIT BORPHUKAN COLLEGE

Principal in-Charge
Bir Lachit Borphukan College
SVASAGAR

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Introduction

Green Audit Report of BIR LACHIT BORPHUKAN COLLEGE, Namtial Pathar, P.O. & Dist: Sivasagar-785640 was conducted in Dec'2021. The Green Audit Report presents green initiatives followed and taken up by the College and provides suggestions and recommendations to improve environmental sustainability like waste management, energy saving etc. Green Audit is carried out to find direction as how to improve the condition of environment.

About the College:



Bir Lachit Borphukan College was established in 1981 and situated at Namtial Pather , P.O. & Distt. : Sivasagar, Assam. The college covers an area of about 5.5 acre. To cope with the pace of time, the college has also introduced some professional / job oriented courses apart from 7 (Seven) nos. of UG Programmes. BLB College has also been a STUDY CENTRE of Krishna Kanta Handique State Open University (KKHSOU) since 2008. The STUDY CENTRE offers B.A. in various Programmes , Bachelor of Mass Communication , BBA , BCA , M.A. (Assamese), M.A. (Pol. Science), M.A. (Sociology) , M.A. (Education), M.A. (English) and M.A. (Economics) .

Objectives:

- 1) The green audit is carried out to secure environment and to determine hazards to human health
- 2) To assess the quality of Air, Water and Soil Quality in the BLB College Campus
- 3) Quantify the energy consumption pattern
- 4) To assess the method of collection, recovery, reuse and recycling of Solid Waste.
- 5) Total Waste Water and Solid Waste generation and Management plan in the campus.
- 6) To assess the carbon footprint and measure taken to reduce the carbon footprint
- 7) To Provide Database for Corrective action and future plan

Steps under Green Audit:**Water Audit:**

Water is a natural resource; all living organisms depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. Groundwater depletion and water contamination are taking place at an alarming rate. Hence, it is essential to examine the quality and usage of water in the college. 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.

Waste Disposal Audit:

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health. Pollution from waste is aesthetically displeasing and results in large amounts of litter in our communities which can cause health problems. Solid waste can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. Bio-degradable wastes include food wastes, canteen waste, wastes from toilets etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the college. Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems

Energy Audit:

Energy conservation is an important aspect of campus sustainability which is also linked with carbon foot print of the campus. 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.

Green Campus Management Audit:

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 released by the trees of the campus is good for the people in the campus. So while you are busy studying and working on earning those good grades, all the trees in campus are also working hard to make the air cleaner for you.

Carbon Footprint Audit

Burning of fossil fuels (such as petrol) has an impact on the environment through the emission of greenhouse gases into the atmosphere. 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 Green Audit Page 10 activities is commonly known as carbon emissions. Vehicular emission is the main source of carbon emission in the campus, hence to assess the method of transportation that is practiced in the college is important

Methodology:

Plan the audit, Collection of Data, Inspection of the college campus, documentation and data analysis, prepare a report of observation, prepare an action plan to overcome the flaw, Keep watch on the action plan.

GREEN AUDIT REPORT

Water Quality assessment

Water sample was collected and analyzed for its quality parameters. The sample was collected from main water filter which is the main water source of the college campus. The samples was collected by GREEN TECH Environmental Engineer & Consultants (NABL Accredited Laboratory) and analyzed for various physio-chemical parameters. The major parameters analyzed include dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, conductivity, total dissolved solids. The results are presented in the Table 1 The results are comparable with the values of drinking water standards prescribed by IS 10500: 2012

Table 1.

SL. NO.	DESCRIPTION	METHOD	UNIT	RESULTS	IS-10500:2012	
					Requirement (Acceptable Limit)	Permissible Limit in the absence of alternate source
1	Alkalinity	IS 3025 Part 23 1986(RA.2019)	mg/l	8	200	600
2	Calcium	IS 3025 Part 40 1991(RA.2014)	mg/l	1.6	75	200
3	Chloride	IS 3025 Part 32 988(RA.2014)	mg/l	8.9	250	100
4	Chromium	IS 3025 Part 52 2003(RA.2014)	mg/l	< 0.05	0.05	No relaxation
5	Colour	IS 3025 Part 4 1983(RA.2017)	Hazen	1	5	15
6	Conductivity	IS 3025 Part 14 1984(RA.2013)	µs/cm	0.10	-	-
7	Copper	IS 3025 Part 42 1992(RA.2014)	mg/l	< 0.05	0.05	1.5
8	Iron	IS 3025 Part 53 2003(RA.2014)	mg/l	0.18	0.30	No relaxation
9	Lead	IS 3025 Part 47 1994(RA.2014)	mg/l	< 0.01	0.01	No relaxation
10	pH	IS 3025 Part 11 1983(RA.2017)	-	6.59	6.5 - 8.5	No relaxation
11	Sulphate	IS 3025 Part 24 1986(RA.2019)	mg/l	6.90	200	400
12	TDS	IS 3025 Part 16 1984(RA.2017)	mg/l	112.0	500	2000
13	Turbidity	IS 3025 Part 10 1984(RA.2017)	NTU	1	1	5

Water Management

The source of water used in the College is ground water (Bore well/ Tube well) present in the campus.

Table 2

Sr. No.	Parameter	Response	Remark
1	Source of Water	Bore Well/ Tube Well	
2	No of Bore Well/ Tube Well	1	
3	No Of Motor Used	2	
4	Horse power- Motor	2 hp & .5 hp	
5	Depth of Well	30 m	
6	Water Level	4m	
7	No of Water Tank	2	
8	Capacity of Water Tank	2 KL	
9	Quantity of Water pumped per day	1.5 KL	
10	Any Water wastage	NO	
11	Water usages for Gardening	Yes	
12	Waste water source	Canteen	
13	Use of waste Water	No	
14	Rain Water Harvesting	Yes	
15	Any Leaked taps	No	
16	Amount of Water lost per day	0.2 KL	
17	Any Water management plan used	Water Audit Conducted	
18	Any water saving techniques followed?	Nil	
19	Are there any signs reminding peoples to turn off the water?	Yes	

Soil Quality assessment

Soil samples were collected from Two locations of the campus and analysed for the basic parameters. The results are tabulated and presented in the table 3.

Table 3

Parameter	Location 1 (Boundary Wall)	Location 2 (Ground)
pH	5.8	6.2
Total Organic Carbon (%)	1.6	1.4
Phosphate (mg/kg)	0.2	0.2

Energy Audit Report

Table 4 shows the energy consumption pattern of the college for a month.

The college has consumed an average of **6.5 KVA/Month** electricity in a month and the one year electricity bill amount was **6400/-**

Table 4

Sr. No.	Electrical Appliances/ Instruments	Number	Power W/(unit)	Total Power W	Kw	Operation /day	kW/hr	Operation Days in month	Total Consumption per month
1	CFL	3	50	150	0.15	8 Hr	1.2	30	36
2	LED Bulb	20	9	180	0.18	2 hr	0.36	24	8.64
3	LED Tube	13	25	325	0.325	8 hr	2.6	24	62.4
4	Projector	3	280	840	0.84	1 hr	0.84	24	20.16
5	Speaker	2	10	20	0.02	1 hr	0.02	24	0.48
6	Fan	30	80	2400	2.4	4 hr	9.6	24	230.4
7	Computers	30	250	7500	7.5	2 hr	15	24	360
8	Laptops	4	50	200	0.2	4 hr	0.8	30	24
9	Printer	5	60	300	0.3	1 hr	0.3	24	7.2
10	Photo state Machine/ Scanner	1	650	650	0.65	1 hr	0.65	24	15.6
11	UPS	1	850VA	850	0.85	24 hr	20.4	20	408

12	UPS	1	1200 VA	1200	1.2	24 hrs	28.8	20	576
13	A/C	3	700	21000	21	3 hr	63	24	1512
14	Refrigerator	1	150	150	0.15	24 hr	3.6	30	108
15	Table Fan	8	55	440	0.44	4 hr	1.76	24	42.24
16	Sanitary Napkin Incinerator	1	1200	1200	1.2	1 hr	1.2	24	28.8

Waste management

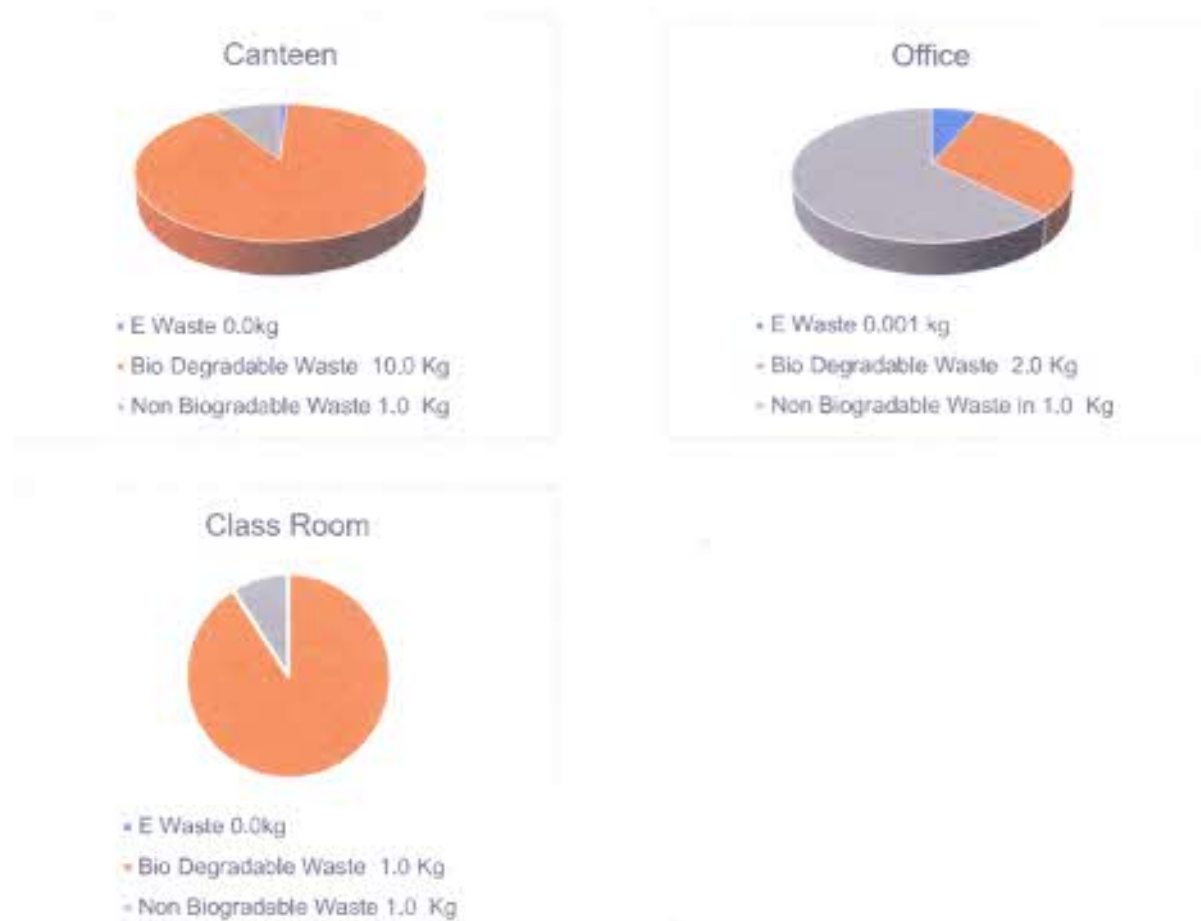
Waste management is important for an ecofriendly campus. In a college different types of wastes are generated, its collection and management are very challenging. The following data provide the details of the waste generated and the disposal method adopted by the college. Total number of stakeholders in the college: **985** Total number of building (Class rooms, canteen, office, auditorium, library etc): **3 Floors , 2 Assam Type Buildings & an Auditorium under construction.**

Table 5.

Different types of waste generated in the college and their disposal-

Types of waste	Particulars	Disposal method
E-Waste	Computers, electrical and electronic parts	Direct selling
Plastic waste	Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc	Direct selling
Solid wastes	Damaged furniture, paper waste, paper plates, food wastes	Reuse after maintenance energy conversion
Waste water	Washing, urinals, bathrooms	Soak pits
Sanitary Napkin	-	Napkin Incinerator

Fig. 2 Per day waste generation in class rooms, offices and canteen



Waste management Practices adopted by the college

For the last few years, college is following zero organic waste protocol throughout the campus. The food waste generated by the students and staffs are taken by them to their own home, so that, minimum waste is generated inside the campus. In addition, the organic waste generated in the canteen is used as feed for the vermi-compost pit and the resulting vermin-cast is used as manure in the garden.

Green Campus

Total number of plant species identified: **22**

Total number of plants in the campus: **57**

Table 6. List of plants in the campus

Sl. No.	Common/local name	Scientific Name	No of trees
1	Bokul (Spanish Cherry)	Mimusops Elengi	3
2	Nahar	Mesua Ferrea	9
3	Neem	Azadiracta Indica	4
4	Sewali (Jasmine)	Nyctanthes Arbor – tristis	1
5	Kothal (Jackfruit)	Artocarpus Heterophyllus Lam	1
6	Krishna Sura (Gulmohar)	Delonix Regia	3
7	Mango	Mangifera Indica	1
8	Jamun	Syzygium Jambolanum	4
9	Pine	Genus Pinus	4
10	Pear	Pyrus Communis	1
11	Amla (Indian Gooseberry)	Phyllanthus Emblica	2
12	Papaya	Carica Papaya	2
13	Hilikha	Terminalia Chebula	1
14	Rain Tree	Albizia Saman	4
15	Dalim (Pomegranate)	Punica Granatum	1
16	Guava	Quisqualis Indica L.	2
17	Gul Nemu (Lemon)	Citrus Jambhini Lush	2
18	Kaji Nemu (Lemon)	Citrus Lemon	2
19	Debodaru	Polyathia Longifolia Sonn	4
20	Ghora Neem (China Berry Tree)	Melia Azedarach	1
21	Thuja	Thuja Occidentalis Linn	4
22	Joba (Hibiscus)		1



Bokul



Mahaneem



Pine



Hasnahana



Debodaru



Tokow



Naspati

Campus farming

The college has started a novel venture of **cultivation of fruit trees & flowers in a 10 cent area of the campus**. In addition, organic vegetable farm, medicinal plant garden were also properly maintained inside the campus.

Routine Green Practices

Every year college celebrates World Environment Day, World Water Day and Ozone Day in the campus. The main focus of these programs was to provide awareness to the students about the importance of the environment, its conservation and sustainable use of environmental resources. The programmes are conducted through seminars, poster presentation, quiz competition debates etc.

Carbon Foot Print Analysis

1. Total number of vehicles used by the stakeholders of the college: 8
 2. Number of cycles used: 22
 3. No: of two wheelers used: 12
 - Average distance travelled: 10 km
 - Average quantity of fuel used: ½ Ltr
 4. No: of cars used: 11
 - Average distance travelled: 425 km/21 km= 20 km
 - Average quantity of fuel used: 1 Ltr
 5. No: of persons using public transportation: 700
 6. No: of persons using college conveyance: 0
 7. No: of generators used per day: 1 (25 KVA Kirlosker) (Using 20 hrs / Month)
 8. Amount of fuel used: 60 Ltr
 9. No: of LPG cylinders used in canteen/ Labs: 1
 10. Use of any other fossil fuels in the college: Nil
 11. Any suggestion to reduce the use of fuel: ---
- Solar Panel: **02 UPS Charging by 2.1 KVA**

SUGGESTIONS AND RECOMMENDATIONS

Water Management

The water sources are safe in terms of contamination. The students are taking back the food waste as per the zero waste management strategy of the college. It helped in reducing the consumption of water for washing. The rainwater can be collected from rooftops of building. The area of the rooftop is **12271 SQFT.**(1140 SQR Meter) with average rain fall in Sivasagar district 150 mm, Approximately **171 KL** of water can be harvested from the roof area of the building. The rain water can also be used as source for drinking water.

The canteen waste can also be subjected to aerobic composting by setting-up of few composting yards in the campus. This will provide a chance for the students to learn by seeing and operating such compost yards by themselves. Also a good practice of managing their own waste (from lunch box) instead of carrying them back home they can be trained in operating the compost yard ,by using their lunch time waste to produce good organic manure.

Energy management

The energy audit recommends to avoid the use of more energy consuming electrical appliances and to replace with more environment friendly and energy efficient appliances (for example five stars rated Air conditioner) in the college. The potential of renewable energy sources have to be explored. As the college has a very large roof area for installing solar panels so that it can be effectively used for generating power. The college has started steps in installing the solar panels for office. It is recommended to install the following solar powered appliances in the campus; Solar powered water heater and cooker in the college canteen Solar powered street lights and LED display board Green Campus In order to increase the carbon credit and greenery of the campus, it is recommended to plant more indigenous and evergreen / fruit trees inside the campus.

Waste Management

Try to avoid the use of plastic in the campus, and to encourage the use of biodegradable materials as alternatives. Try to achieve the goal of plastic free campus.

Leaf litter from the campus can be effectively used for aerobic/ vermi composting, so that the composted material can also be used as good manure.

Recycle the paper waste instead of incinerate or burning.