GREEN AUDIT REPORT

2022-23

DAKSHIN KAMRUP GIRLS' COLLEGE

MIRZA :: KAMRUP :: ASSAM

Website : www.dkgirlscollege.in

দক্ষিণ কামৰূপ ছোৱালী মহাবিদ্যালয়
মির্জা - ৭৮১১২৫, কামৰূপ ঃ অসম
DAKSHIN KAMRUP GIRLS' COLLEGE
Accredited by NAAC : B Grade
Mirza - 781125, Kamrup : Assam
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FOREWORD

The Green Audit Report is one of the necessary documents for measuring environmental promotion programs for the institution, I on behalf of Dakshin Kamrup Girls' College would like to offer my best wishes to the convenor and other members of Institutional Values and Best Practices Committee of IQAC for their vision to prepare the college for Green Audit. Green Audit of the institution includes Water Management, Waste Management, Healthcare, Improvement of Energy Efficiency, Air Quality and Pollution Assessment etc. which helps the institution to manage an eco-friendly environment.

I would like to offer my gratitude and thanks to Prof. Ashok Kumar Bora, Dept. of Geography, Gauhati University and Dr. Nabajyoti Das, Principal, Dakshin Kamrup College, Mirza for their guidance and preparation of Green Audit Report. I would like to thank Dr. Bimal Chandra Deka Professor of Assam Engineering College, Guwahati for the completion of Energy Audit of the institution. My sincere thanks go to Mr. Arup Jyoti Bora, a Research Scholar of Geography Department for conducting the GPS campus survey and GIS mapping.

I hope that this Green Audit report will serve as a guide for increasing awareness among the students for an eco-friendly environment in the institution.

(Dr. Nara Kanta Adhikary)
Principal,
Dakshin Kamrup Girls' College, Mirza

ACKNOWLEDGEMENT

The Green Audit Report is an important document for showing an eco-friendly atmosphere of an institution. I on behalf of the Institutional Values and Best Practices committee of IQAC express my deep sense of gratitude to Professor Ashok Kumar Bora of Department of Geography, Gauhati University and Professor Bimal Chandra Deka of Assam Engineering College for their continuous guidance and suggestions extended at different steps of green audit preparation. I would also offer special thanks to Dr. Nara Kanta Adhikary, Principal of D. K. Girls' College, Mirza for his support and co-operation in collection of data and other evidences.

I would also offer my sincere thanks to Dr. Ripun Doley, the IQAC coordinator, and to the respected members of the 'Xuani Dharani' Group for their help and cooperation.

I would like to express my gratitude towards Mr. Arup Jyoti Bora, Research Scholar of Geography, Gauhati University for conducting campus GPS survey and GIS mapping. I would also like to extend my thanks to our support staff for their co-operation.

Hope that the green audit report of our institution will serve the desired purpose and help us for the future innovative procedures.

Dr. Nibedita Devi
Convenor
Institutional Values and Best Practices, IQAC
Dakshin Kamrup Girl's College, Mirza

DAKSHIN KAMRUP GIRLS' COLLEGE

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THE GREEN CAMPUS, ENERGY AND ENVIRONMENT POLICY

XUANI DHARANI
(Eco Club)

OBJECTIVES OF XUANI DHARANI (ECO CLUB) OF D.K. GIRLS' COLLEGE

Dakshin Kamrup Girls' College is located at Mirza in the southern part of Kamrup district in Assam. Its area is surrounded by a number of villages with beautiful natural environment. This area is rich in vegetation resources with number of valuable trees and plants. The College Campus has aneco-friendly green environment with a big play ground and garden area. There are variety of trees, bamboo and orchids within the campus.

Maintenance of green eco-friendly campus

To maintain a green eco-friendly campus, D.K girl's college has an eco club by the name "Xuani Dharani" (Beautiful Earth). The main objectives behind the growth of Xuani Dharani eco club are to continue our best practices for maintaining a green and eco-friendly campus. Other objectives of this club are-

- Periodical plantation of trees and plants in the Campus
- To Make the Campus plastic free
- To take initiative to make the area smoke free and also tobacco free.
- To clean the campus through proper waste management system.
- "Xuani Dharani" club also encourages the support staff of the College to maintain the garden area properly.
- To encourage students' society for holding tree planting events and making the campus an eco-friendly one. The club has taken up the following activities for water resource management, wastes management, environmental awareness and energy conservation.

Photo 1: Tree Plantation in College campus by Eco Club 'Xuani Dharani'

Water Resources Management

The institution has sufficient amount of water for its regular uses. There is no water scarcity in the college campus. There are five motor driven deep boring units and also one rain water harvesting unit for preservation of water. There are 24 hours running water facilities in the college campus and hostels.

Waste Management System

Waste management is carried out in the campus for managing the bio-degradable and non-biodegradable wastes in the campus. Some big dustbins are placed in proper location for collection of solid wastes. The NSS unit of the college periodically organises cleanliness programme in the college campus. Use of polyethene is strictly prohibited within the campus. The Social Service unit of the students' union also monitors the cleanliness process of the institution.

Environmental Awareness

The 'Xuani Dharani' club of the institution deals with plantation of different varieties of saplings in the campus. The College is located near the 37 national highway. Hence, to be free from air pollution, the eco-club carries the responsibility of controlling pollution. The College has more than 200 number of trees, and a good number of flowers, orchids and medicinal plants. The whole campus area is covered with a green cover of big Deodar, Nahar, and other big trees.

Energy Conservation

A number of LED bulbs and tubes are installed in almost all the buildings including hostel. To install environment friendly electrical appliances, proposals have been made to use solar energy for energy use and conservation. There is regular monitoring to cut off the electrical energy after the end of the classes etc. so that there is less wastage in electricity consumption.

Xuani Dharani (Eco Club) Committee, 2022-2023

Advisor	:	Dr. Narakanta Adhikary
		Dr. Ranjan Bhuyan
President	:	Dr. Jahnabi Devi
Secretary	:	Dr. Ripun Doley
		Dr. Prasanta Bora
Ex-Officio Member	:	Dr. Ripun Doley, Co-Ordinator (IQAC)
Executive Members	:	Liza Talukdar, General Secretary, Student Union, DKGC, Mirza.
		Shri Harshita Goswami, President, Student Union, DKGC, Mirza.
		Prof. Jinu Das, President, Teacher Unit.
		Dr. Haren Kalita, Secretary, Teacher Unit.
		Shri Sankar Kalita, President, Non-Teaching Staff Unit.
		Shri Nita Mali, President, Alumnae Association.
		Shri Jinti Talukdar, Secretary, Alumnae Association.
		Prof. Kamaleswar Bora, Convener, Students Support & Progression Cell.

(Dr. Jahnabi Devi)
President
Xuani Dharani (Eco Club)
D.K. Girls' College, Mirza

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Dr. Ashok Kumar Bora, M.Sc ; Ph.D.
Professor in Geography and Former Head
Former Director, *UGC – HRDC, GU*
Former Director, *College Dev. Council, GU*
Former Director, *GUIDOL*
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GREEN AUDIT

DAKSHIN KAMRUP GIRLS' COLLEGE

Certificate

It is certified that this Green Audit Report of Dakshin Kamrup Girls' College, Mirza, Kamrup (Assam) contains the original data and information gathered during the survey conducted for the purpose of preparing the report. It is based on the necessary data relating to various aspects and components of the Green Audit which were collected by the members of the criterion- Institutional Values and Best Practices and XUANI DHARANI (Eco Club) Committee of the college and later on submitted to me for facts and data verification. The data and information depicted in this report have been thoroughly checked and updated on the basis of spot verification and field visit. It is also certified that the data and information presented in the report are original and these are neither published nor produced anywhere else. The field survey data and photographs presented here were collected and acquired by the undersigned and his assistants or by the Eco Club of the college.

Date: 22-06-2023

Dr. Ashok K. Bora
Professor
Department of Geography
Gauhati University, Assam

Expert in Environmental
Study and Research

CONTENTS

Green Audit Report

1. INTRODUCTION

Green auditing is an exercise to be regularly conducted with the purpose to assess the status and functioning of the institutional practices in terms of their sustainable and environment-friendly nature. Its basic aim is to identify, monitor, document and report the prevailing status of the environmental elements and factors associated with any region, area, site, etc. Green auditing is a continuous process which provides ample scope to collect relevant baseline data and facts and create an appropriate database relating to environmental parameters of a site and location. In a site of an educational institute, green auditing is quite effective as it empowers the institution to prepare plan for implementing green initiatives and promoting better eco-environmental performance.

Occupational and working environment essentially requires healthy and congenial environment to work. It is more so in the case of an educational institution, where human resource development plans and programmes are conducted with certain basic goals. The working place should always be eco-friendly and environmentally sound. Keeping this vital point in view, the environmental status and quality of the D.K. Girls' College campus has been assessed and to this effect, a Green Audit Report has been prepared. In this context, mention may be rightly made of the 'Swachh Bharat Abhiyan', a national mission declared by our Honorable Prime Minister, Shri Narendra Modiji. In the light of this significant national mission, the University Grants Commission (UGC) has also adopted the concept of 'Green Campus, Clean Campus" for the higher educational institutions. The National Assessment and Accreditation Council (NAAC) has come forward to include the process of green auditing as one of the important components of NAAC's accreditation criterion VII for assessing and accordingly grading the higher educational institutions.

In recent years, global environmental problems have assumed noticeable dimensions. In view of expanding environmental problems, concern about environmental awareness is also increasing at all levels like global, national, regional and local. Environment confined to local area, site or working place bears much significance as it has its immediate effects on the stakeholders. Thus the apex educational bodies of the country have laid emphasis on the issues on environmental quality of the campus of the educational institutions. It is in this context, the D.K. Girls' College has also come forward to conduct a green audit of its campus, realizing the importance of a congenial environment for all the stakeholders. The Green Audit is the outcome

of the keen interest of the college authorities for assessing the environmental status and planning for green initiatives in the campus.

2. OBJECTIVES AND METHODOLOGY

A. OBJECTIVES

This Green Audit Report of D.K. Girls' College has been prepared following the objectives outlined below:

(i) To promote the sense of environmental awareness among the stakeholders of the college.

(ii) To identify, document and review the green initiatives taken in the campus by the college authorities.

(iii) To find out the strengths, weaknesses and challenges associated with green practices and suggest solution to the identified problems.

(iv) To assess the facilities for different types of waste management.

(v) To motivate the stakeholders and set up goals for promoting green practices in the campus.

(vi) To provide a benchmark of environmental assessment for the authorities to go for continuous monitoring, assessment and planning of the campus environment.

B. METHODOLOGY

The following methodologies have been adopted in preparing the Green Audit report of the college:

a) **Visiting the campus:** The members of the Green Audit team of the college had made frequent visits to the campus for ground study, monitoring and verification.

b) **Interviews conducted in the campus:** On regular basis, the internal Green Audit team meets all the stakeholders in connection with the management of environment in the college campus. Interviews are held with different stakeholders to assess the modes and patterns of energy consumption, landscape maintenance, water use, waste disposal, sanitation and cleaning and to collect necessary information.

c) **Water sample collection and quality analysis:** The water use points and sources in the college have been identified and water samples were collected following standard procedure in respect of the water-use sources or points. The collected water

samples were then analysed in the Geomorphology Laboratory of the Department of Geography, Gauhati University using standard techniques and instruments.

d) **Campus mapping using GPS and GIS softwares:** A land survey was conducted to delineate the land use land cover (LULC) units of the college campus. For this purpose, the sophisticated technologies like Global Positioning System (GPS), Geographical Information System (GIS) and softwares like ArcGIS were applied in campus mapping.

e) **Air quality and pollution level assessment:** The air quality and pollution level in the college campus have been assessed using internet data for both winter and summer seasons.

f) **Noise level assessment:** Noise levels at different spots and locations of the college campus have been measured using standard equipment.

g) **Survey on flora and fauna of the campus:** The available floral and faunal species in the campus have been identified and recorded by the eco club members.

3. MAPPING OF LAND USE LAND COVER OF COLLEGE CAMPUS

The D.K. Girls' College has a compact campus located in the Mirza township of Kamrup District, Assam. An aerial view of the campus is shown in **Photo 2**. The Campus topography represents a plain and flat surface with latitudinal extension of 26°05'37" N to 26°05'43" N and longitudinal extension of 91°31'32" E to 91°31'39" E. The entire campus spans over an area of 16312.03 m^2 and is located at 50 m average elevation measured from the mean sea level. On the north of the campus there lies vegetation area and Mirza P.W.D. office while, on the south lies the Kochpara Masjid Road. Its eastern and western boarders are occupied by D.K. Girls' College Road, and settlements and SDC office Road respectively. The college campus map showing its different categories of land use and land cover has been prepared and designed with necessary lay-outs using GPS technology for survey and GIS software (Arc GIS) for mapping by an expert team from Geography Department, Gauhati University. The detailed land use land cover map of the campus is presented in **Fig. 1.**

Photo 2: An Aerial View of the College Campus

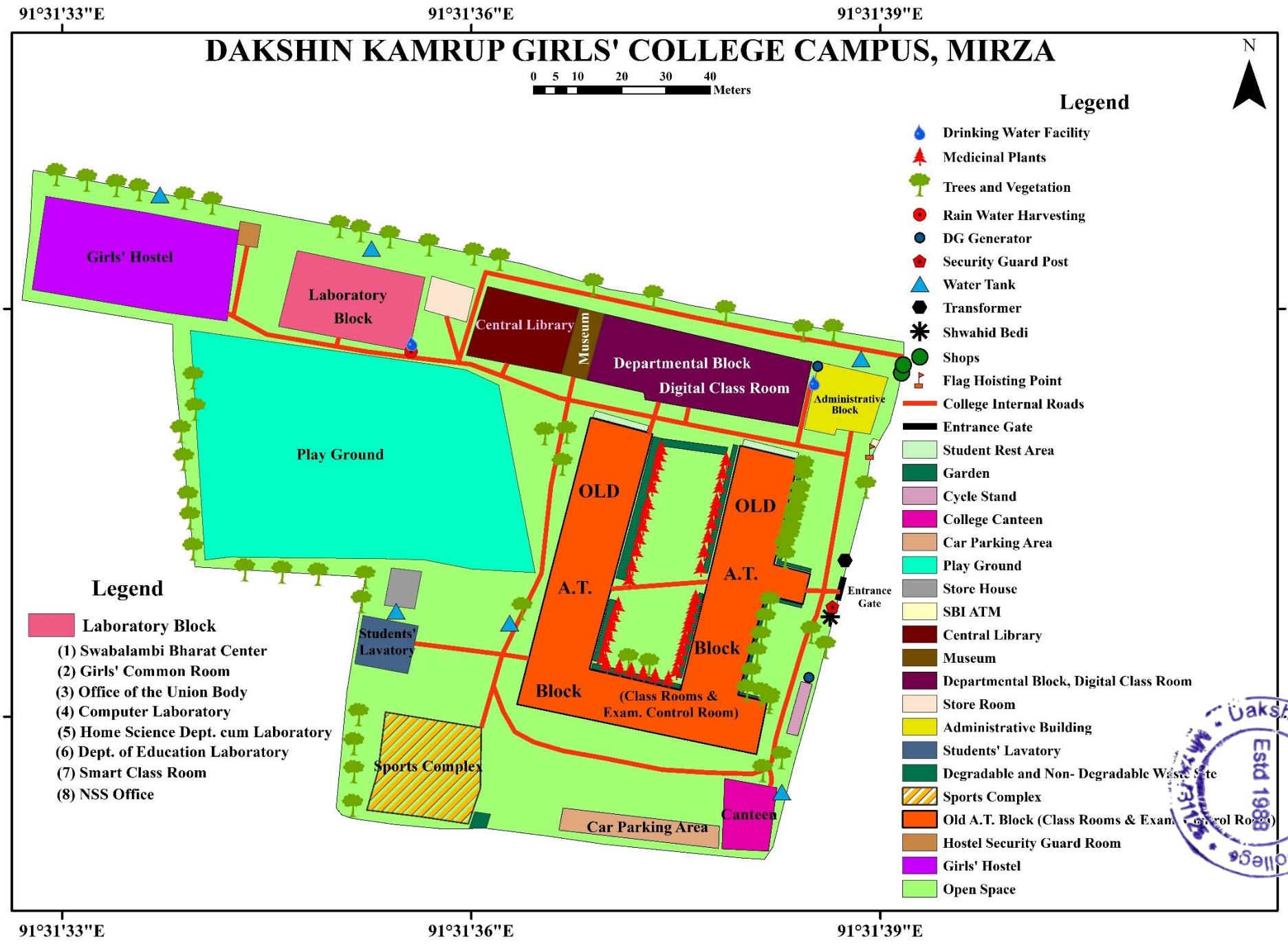

Figure 1: Land Use Land Cover (LULC) Map of D.K. Girls' College Campus

Covering a total area of 16312.03 m^2, the campus has mosaics of various land use and land cover units. Buildings and establishment area covers the highest area of 33.80%, while the open space covers slightly less accounting 33.11% of the campus. The third largest area is covered by the College Play Ground representing 18.57% area of the campus. Grass and vegetations have a coverage of 7.2%, while the internal roads of the campus cover 2.95% of the campus area. Besides, the Medicinal plants area, Garden area and Parking space cover 1.70%, 1.40% and 1.18% respectively of the total campus area.

Table 1: Land Use Land Cover (LULC) Categories of D.K. Girls' College Campus

Sl. No.	LULC Categories	Area Covered (m^2)	Percentage of Areas out of the Total Campus Area
1	Open Space	5401.65	33.11%
2	Grassland and Vegetative Area	1173.90	7.2%
3	Garden Area	229.06	1.40%
4	Building & Establishment Area (All)	5514.24	33.80%
5	Medicinal Plants Area	277.32	1.70%
6	Parking Space	192.78	1.18%
7	Area under Internal roads (Paths)	480.35	2.95%
8	Play Ground	3028.83	18.57%
9	Waste Management	12.00	0.08%
10	Drinking Water Facility Shed	1.90	0.01%
Total Area		16312.03	100 %

Source: Based on GPS survey carried out in the campus

4. WATER RESOURCE AUDIT

Water is a vital resource of the environment. It is a precious resource which supports the basic life system of the biosphere. Being an integral component of the environment, status and quality of water determines the quality and health of the environmental and ecological conditions of any region or area. An estimate issues alarm to all of us that out of the total water on the earth (100%), only 0.26% water is available for human use. But, the most serious concern is that this very little amount of water, i.e 0.26% available for our use is being grilled by pollution and contamination problems caused by wide ranging human activities. This fact rightly points out that water happens to be the precious resource of our environment which needs to be protected and conserved from being polluted and contaminated. Thus, in a locality or a college campus like that of D.K. Girls' College, water resource requires proper use, management and monitoring.

Use and Management of Water Resources

All the stakeholders, i.e the students, teachers, office staff, guests, visitors, guardians etc. use the available water in college campus for various purposes. Water use purposes include drinking, cleaning, washing, use in toilets, hostels, canteens, watering the gardens, lawns etc. which are outlined below:

(1) Water use for various purposes

(a) Used as drinking water by all

(b) Used in washrooms, toilets by the students, teachers, office staff, administrator, library staff, visitors etc.

(c) Used in cooking purpose in hostel and canteen.

(d) Used in room cleaning and washing of floors and cleaning of drains.

(e) Used in watering the gardens, lawns and planted trees.

(f) Used in various construction purposes.

(2) Related data in respect of water use in the campus

(a) Total number of water filters/purifiers/cooler units installed = 14

(b) Total number of water use points/taps = 133

(c) Total number of water storage tanks = 05

As regards sources of water acquisition and collection in the campus, different sources for water use of the stakeholders are identified which include (1) Deep Boring (2) Water Storage/ reservoir tanks and (3) Rain water harvesting unit/reserve (**Photo 3**). The features of these water use sources are mentioned in the **Table 2**.

Table 2: Features of the Water Using Sources in the campus

Sources of water use	**Units / Numbers**	**Lifting of water from depth (Ft) (where applicable)**	**Water Quantities acquired**
(i) Motor-driven Deep Boring	05	180 – 200 Ft	Water obtained sufficiently
(ii) Water Storage Tanks(Reservoirs)	05	_____	Sufficient water reserved with a total capacity of 10000 litres
(iii) Rain Water Harvesting Storage	01	_____	Season-wise water collected to meet the needs during rain deficit season

Photo 3: Rain Water Harvesting Unit

Water qualities of the water used for various purposes of the college have been evaluated. For this purpose, necessary water samples are collected from three different sources of water use, viz. (i) Tap water, (ii) Water storage tanks and (iii) Rain water harvesting storage. Following the standard guidelines, the collected water samples are analyzed in the laboratory within 24 hours time of their collection. The laboratory used in this case was the Laboratory of

the Department of Geography, Gauhati University and a standard and sophisticated water analysis instrument 'OTT Hydro lab DS 5' has been used to obtain the water quality results.

Table 3: Results of Water Quality Analysis of Water Samples Collected from Different Water Use Sources in the College Campus

Sl. No.	Water Parameters	Water parameter values in water of different sources		
		Tap Water	Water Reservoir (storage tanks)	Rain Water Harvesting Storage
1	Temperature (^{0}C)	22.82	23.90	23.61
2	Total Dissolved Solids (mg/l)	18	20	26
3	pH	6.66	6.7	6.5
4	Turbidity (N.T.U)	0	0	0
5	Alkalinity (mg/l)	80	102	123
6	Total Hardness (mg/l)	71	94	101
7	Iron (mg/l)	0.11	0.15	0.12
8	Manganese (mg/l)	0.28	0.21	0.24
9	Magnesium (mg/l)	12	10	15
10	Arsenic (mg/l)	nil	nil	nil
11	Fluoride (mg/l)	0.21	0.22	0.21
12	Chloride (mg/l)	4	5	6
13	Calcium Hardness (mg/l)	11	12	13

Source: Based on water sample analysis conducted in the Geomorphology Laboratory of Geography department, Gauhati University

The water parameter-wise values for the water samples tested in the laboratory are presented in **Table 3**. The laboratory results in respect of as many as 13 water parameters are obtained. Among these parameters, the important and notable ones are pH, Iron, Alkalinity, Total Dissolved Solids, Turbidity, Chloride, Fluoride, Arsenic and Total hardness. The results

reveal that the water qualities of the three water sources are within the referred as well as prescribed tolerance limit.

The college campus has abundant supply of water. But, it is important to maintain the quality of water and manage the water resources through reasonable and judicious use. The supply and availability of water in the campus is ensured for 24 hours. The water for the entire campus is lifted from underground water table through deep boring operated at 5 locations and the collected waters are safely stored in 5 different water reservoirs/storage tanks with a total capacity of 10000 litres. Besides, there is one rain water harvesting unit installed to collect rain water, especially during summer season, which is mainly used for watering the gardens during dry season. As estimated, about 3500 litres of water are used by the stakeholders on daily average basis. In order to obtain pure drinking water, as many as 14 filters/purifiers/cooler units are installed at different locations in the college campus. Some of these are presented in **Photo 4, 5 and 6**.

Photo 4

Photo 5

Photo 6

5. WASTE MANAGEMENT AUDIT

Wastes are produced and found scattered in the environment due to wide varieties of human activities. Volume of wastes are increasing day by day in our surroundings as a result of rapid pace of population and settlement growth. Wastes are creating threats to man and his dwelling environment and ecology. Wastes when exposed to soil, land, water and air cause respective pollution of land, soil, water and air resources of the environment. Wastes generated due to variety of causes and factors are basically of three types such as biodegradable wastes, non-biodegradable wastes and hazardous wastes. Again wastes may occur either in solid or liquid state. Adverse impacts and effects of various types of wastes can be avoided if wastes are properly managed. The biodegradable wastes can be easily managed, while non-biodegradable wastes require some more new technology for their eco-friendly management. Biodegradable wastes include such as food and vegetable wastes generated from hostel and canteen, paper wastes etc. The non-biodegradable wastes are like various types of plastic substances, glass and tin materials which are not degradable through bio-decomposition process. On the other hand, hazardous wastes are the various kinds of toxic and chemical wastes which cause direct harm to man and pollution to the environment. Normally, waste management procedure includes the process of reduction, recycle, reuse and recovery.

Wastes produced in an educational institution and similarly in the campus of Dakshin Kamrup Girls' College, are of different varieties generated from different sources. These wastes are the paper wastes, organic materials, plastic materials, construction related debris materials, e-wastes etc. which are generated from establishments and sites like administrative office, academic departments, canteen and hostel. An estimate made from the wastes collected at different collection points reveals that the college campus as a whole has a production of about 12.95 kg of solid wastes on the average per week. This amount of solid wastes comprising paper wastes, plastic wastes, organic wastes and e-wastes is the outcome of the activities of the stakeholders engaged working in the college. Establishment-wise break-up of the volume of solid wastes generated in the college campus is presented in **Table 4**.

The solid wastes generated in the college are made separated at the source as bio-degradable and non-biodegradable which are separately collected and dumped in respective site marked as 'site for bio-degradable wastes' and 'site for non-biodegradable wastes'. After dumping in the specified collection points, the solid wastes are separately disposed and delivered daily from the campus by a private party. The biodegradable and non-biodegradable

solid wastes collection sites are shown respectively in **Photo 7 and 8**. As regards to liquid wastes, the drainage system of the college provides passage for going out the sewage and liquid wastes from the campus and pouring out into the Municipality drainage system. The sanitary napkin wastes are managed using the Sanitary Napkin Vending Machine (**Photo 9**). Besides, a group of students under the NSS unit of the college joined the 'Clean India Campaign' during the period from 01-10-2022 to 21-10-2022 and a massive drive was taken to clean the entire campus of the college (**Photo 10**) and the wastes collected were delivered to the municipal wastes collecting system of Mirza township. However, no toxic and chemical substances are produced in the college. Above all, all efforts have been made at every level in the campus to reduce the volume of wastes generated.

Photo 7: Site for Collection of Biodegradable Solid Wastes

Photo 8: Site for Collection of Non-Biodegradable Solid Wastes

Photo 9: Sanitary Napkin Vending Machine

Photo 10: Clean India Campaign Undertaken in the College Campus.

Table 4: Volume of Solid Wastes Produced by Various Units of Establishments

Sl. No.	Units of Establishments	Types of solid wastes	Solid wastes produced per week on average in Kg.	Percentage of amount produced
1	Administrative Units	• Paper waste • Plastic waste • Organic waste • E - waste	1.10 0.80 0.75 0.25	37.93 27.59 25.86 8.62
			2.9	100.00
2	Academic Units	• Paper waste • Plastic waste • Organic waste • E - waste	2.00 0.60 1.90 0.10	43.48 13.04 41.31 2.17
			4.6	100.00
3	Hostel	• Paper waste • Plastic waste • Organic waste • E - waste	0.30 0.50 1.20 0.10	14.29 23.81 57.14 4.76
			2.1	100.00
4	Canteen	• Paper waste • Plastic waste • Organic waste • E - waste	0.50 0.70 2.15 ____	14.93 20.90 64.17 ____
			12.95	100.00
Total = 12.95 Kg				

6. HEALTH AUDIT

Health is wealth. Emphatically it can be said that health is the core asset and resource for man, his society and civilization. For the global citizens of the 21st century, health happens to be the most vital asset. With the growth of human population, there is the increasing concern for healthcare, and so is the demand growing for health caring resources. Awareness about health and the health issues has now grown all over the world among all the sections of the people. It is needless to say that today's students are the citizens of tomorrow's nation. Thus, health status and health issues of the student communities are of central concern as the students are the productive and prospective human resource of a country. It is in this context, the health concern and issues of the students in an educational institution have arised as a central focus. In the educational institution – Dakshin Kamrup Girls' College, an assessment of its campus environment is thus taken into consideration and health status assessment of the students, teachers, staff and others working is regarded as one of the important components.

The college authorities have laid emphasis on maintaining a congenial environment of the campus and also good health of the working population, i.e the students, teachers, office staff etc. In this regard, some health camps have been organised by the college for all the stakeholders (**Table 5**). A three-day Yoga Session was held in the campus during 30th May- 1st June, 2022 where 200 participants took part (**Photo 11 and 12**). In collaboration with the Youth Red-Cross Unit, Kamrup Branch, a health camp was organised on 15th July, 2022 (**Photo 13**). Another health camp was organised on February 2, 2023 in the college, where about 250 students participated (**Photo 14**). As a part of maintaining good physical and mental health, some playing facilities are provided to the students in the college. For playing purpose a Sports Complex with facilities for the indoor games like Table Tennis, Badminton etc. has been developed. Moreover, a good playing ground measuring 3028.83 m^2 attached to the college campus provides facilities to the students for playing the outdoor games.

Table 5: Health Camps Organised in the College Campus

Sl. No.	Programme conducted date	Camp location	Number of participants
1	30.05.2022 To 01.06.2022	Dakshin Kamrup Girls' College, Mirza	200
2	15.07.2022	Dakshin Kamrup Girls' College, Mirza	150
3	02.02.2023	Dakshin Kamrup Girls' College, Mirza	250

Photo 11: Three-day Yoga Camp in the campus

Photo 12: Yoga Session conducted in the campus

Photo 13: Programme Under Red Cross Society, Kamrup Branch, Assam

Photo 14: Health Camp in the campus

7. BIODIVERSITY AUDIT

The campus of the college is rich in green vegetation like grass cover and plants. The floral species found in the campus are identified and listed separately as general plants and medicinal plants with their common names and botanical names as shown in **Table 6** and **Table 7** respectively.

Table 6: General Floral Species Identified and Recorded in the Campus

Sl. No	Common Name (Assamese)	Common Name (English)	Botanical Name	No. of Species
1	Aam	Mango tree	Mangifera Indica	3
2	Modhuriyam	Guava tree	Psidium guajava	4
3	Krishna Sura	Gulmohar tree	Delonix regia	3
4	Jolphai	Olive tree	Elaeocarpus	1
5	Moha Nim	Margosa tree	Azadirachta indica	2
6	Dalim	Pomegranate	Punica granatum	1
7	Bhomora	Combrataceae	Belleric Myrobalan	1
8	Jamu	Jamun tree	Syzygium cumini	2
9	Nahar	Nagpuspa tree	Mesua ferrea	10
10	Deba Daru	Mast (Deodar) tree	Polyalthia longifolia	45
11	Kadam	Kadamba tree	Neolamarckia cadamba	1
12	Tulshi	Holy Basil tree	Lamiaceae	12
13	Kal Goss	Banana tree	Musa	3
14	Jaba	Shoeblack tree	Hibiscus rosa Sinensis	4
15	Mussaenda	Tropical Dogwood tree	Mussaenda Erythrophylla	1
16	Dalhia	Dalhia tree	Dalhia pinnata	4
17	Kothal	Jack Fruit tree	Artocarpus chama	2
18	Radha Chura	Peacock tree	Caesalpinia pulcherrinna	1
19	Sewali	Jasmin tree	Nyctanthes arbortritis	2
20	Teteli	Tamarind tree	Tamarindus indica	1
21	Arjun	Arjun tree	Terminalia arjuna	1
22	Bagori	Plum tree	Prunus domestica	2
23	Neemu	Lemon tree	Citrus Lemon	3
24	Tamul	Betelnut tree	Areca catechu	2
25	Aajar	Pride of India	Lagerstroemia speciosa	1
26	Kanchhan	Purple Bauhinia tree	Bauhinia purpurea	1
27	Sal Kuwari	Aloe Vera tree	Aloe Vera	1
28	Nar Singha	Curry tree	Murraya koengil	3
29	Kala Kasu	Taro leaves	Colocasia esculenta	14
30	Silikha	Black Myrobalan tree	Terminalia chebula	2
31	Karabi	Casabela tree	Nerium Oleander	2

Contd.

32	Golap	Rose tree	Rosa rubiginosa	2
33	Nayan Tara	Periwinkle tree	Cathranthus Roseus	2
34	Kathanda	Crape Jasmin tree	Tabernaemontana divaricata	1
35	Aparajita	Aparajita tree	Clitoria ternatea	2
36	Bhedailota	Skunkyine tree	Paederia Foetida	2
37	Kordoi	Carambola tree	Averrhoa carambola	2
38	Dal Cheni	Cinnamon tree	Cinnamomum verum	1
39	Kopowful	Orchid tree	Orchidaceae	30
40	Bahh	Bamboo tree	Bambusa vulgaris	4
41	Aatloch	Custard Apple tree	Annona squamosa	1
42	Narji	Marigold tree	Tagetes	14
43	Momai Tamul	Areca Palm tree	Dypsis lutescens	2
44	Guti Mali	Tuscan Jasmine tree	Jasminum sambac	3

Table 7: Medicinal Plants Identified and Recorded in the Campus

Sl. No	Common Name (Assamese)	Common Name (English)	Botanical Name	No. of Species
1	Moha Nim	Margosa tree	Azadirachta indica	2
2	Bhomora	Combrataceae tree	Belleric Myrobalan	1
3	Arjun	Arjun tree	Terminalia arjuna	1
4	Sal Kuwari	Aloe Vera tree	Aloe Vera	1
5	Kordoi	Carambola tree	Averrhoa carambola	2
6	Dal Cheni	Cinnamon tree	Cinnamomum verum	1
7	Tulshi	Holy Basil tree	Lamiaceae	32
8	Silikha	Black Myrobalan tree	Terminalia chebula	2
9	Sewali	Jasmin tree	Nyctanthes arbortritis	2
10	Nemu	Lemon tree	Citrus Lemon	3
11	Bhedailota	Skunkyne tree	Paederia Foetida	2
12	Nayan Tara	Cathranthus Roseus	Magnoliopsida	2

Along with floral species, a number of faunal species also have their home in the college campus. However, the faunal species are not so prominently as well as abundantly seen in the camps as the campus is not dotted with water bodies and other land features favourable for their colonisation. The important faunal species include butterflies, various types of reptiles, some local birds, grasshoppers, spiders etc.

8. ENVIRONMENTAL QUALITY AUDIT

Air Quality Assessment and Pollution Level

Air quality and air pollution are the integral aspects of physical environment. Air is the most vital component and constituent of environment, and therefore if any degradation of air quality leads to environmental pollution. In a polluted environment, the living organism including human beings can not sustain. That is why, it is important to know and assess air quality. The air quality of D.K. Girls' College campus which determines the status of occupational as well as working environment, especially for the students, teachers and other employees has been assessed. For this purpose, data acquired from Internet source separately for both winter and summer seasons available for the Mirza area are used and thus the air quality status of the D.K. Girls' college is in **Table 8**.

Table 8: State of Air Quality and Air Pollution in D.K. Girls' College Campus (Based on air quality data for Mirza Area)

Site	Air Quality Index (AQI)		Pollution Level as per Central Pollution Control Board, Govt. of India Norms	
	Summer	Winter	Summer	Winter
Dakshin Kamrup Girls' College Campus	102	75	Moderately Polluted **(101 - 200 for moderately polluted air)**	Satisfactory **(51 – 100 for satisfactory air quality)**

The air quality index values and pollution level data suggest that the environmental status of the campus in terms of its air quality lies within the permissible limit. This may be attributed to the fact that there is no such industrial activities localized in the vicinity of the college campus. There is season wise variation of air quality indicating relatively improved quality of air prevailing during the winter season as compared to summer season.

Noise Level Status

Noise pollution is an another important form of environmental pollution. As per guidelines of the Air (Prevention and Control of Pollution) Act, 1981, the Govt. of India has

declared noise pollution as a component of pollution of environment. Generally, pollution level is assessed taking two situations into consideration such as (a) Community area, where noise is classified as community-induced noise. As per norms of the World Health Organization (WHO), the permissible noise level for the community area conforms to about less than 30 dB. In an educational institute, the teaching-learning process finds its normal condition in classroom environment at the permissible noise level of less than 35 dB.

The noise level prevalent in the campus of the D.K. Girls' College was assessed through a survey carried by Professor Kushal Kalita, Department of Physics, Gauhati University, Assam and his assistant selecting five different locations in the campus. The noise level has been measured during day time with a Sound Level Meter (Model: Envirotech SLM 100, Type II db A) at locations like (a) At College Gate and Eastern boundary (b) At Northern boundary (c) At Southern boundary (d) At Western boundary and (e) At the middle of the campus. The measured and assessed data are tabulated in the **Table 9**.

Table 9: Level of Noise Pollution in the D.K. Girls' College at Different Locations of the Campus

Survey locations in the Campus	**Noise Level in dB Leq**		**Permissible (daytime) noise limit as per Central Pollution Control Board (CPCB)**
	10 am – 12 noon	2 pm – 4 pm	
(i) Main Gate and Eastern Boundary	61.90	61.10	For silence zone - 50
(ii) Along Northern Boundary	50.40	48.80	
(iii) Along Southern Boundary	53.70	53.20	
(iv) Along Western Boundary	51.50	52.60	For residential zone - 55
(v) At Mid-Campus position	50.10	49.20	

As revealed from the data presented in **Table 9**, the highest noise level is observed to be 61.90 dB Leq and 61.10 dB Leq respectively at 10 am – 12 noon and 2 pm – 4 pm on the college gate and eastern boundary. A relatively high noise level is found at the gate on the busy road due mainly to traffic. Noise levels at other locations in general are comparatively lower. Considering the other four locations, the noise levels within the campus range from 48.80 to

53.7 dB Leq. which can be regarded to be within the permissible limit. The college campus as a whole is not grilled by noise pollution and level of noise in general remains within the prescribed norms of the concerned authorities.

Soil Quality

The soils occurring in the college campus are good characterised by alluviums and silts. Soil texture conforms to high proportion of silts and clay particles thereby rendering soils fertile and humus-rich. The manures used in the campus for nourishing the plants and flower-plants of the gardens are organic type. No chemical fertilizers are used in the campus.

Energy Audit

The college authorities have arranged to assess the energy use and utilization pattern in the campus by conducting a separate Energy Audit, which will be separately submitted. It is because of this; the energy audit is not included in this green audit.

9. RECOMMENDATIONS

The Eco Club (Xuani Dharani) and the survey team members made spot visits to the campus and its green practice sites and met the stakeholders in order to collect necessary information and data. After compiling, aggregating and analyzing all the data, the Green Audit Report is prepared and some recommendations and suggestions have been forwarded to the college authorities for needful actions.

(i) The green practices and their auditing are the continuous processes, which need to be regularly monitored and conducted in the college campus.

(ii) The wastes management system, especially for the solid wastes should be more strengthened and made more efficient.

(iii) All efforts should be made by all the stakeholders to reduce the amount and volume of solid wastes, especially the non-biodegradable wastes generated in the campus.

(iv) The campus should be kept free from the use of plastics.

(v) The college should gradually move towards the use of non-conventional energy through installation of solar panels and LED bulbs and tubes be used more to reduce electricity consumption load.

(vi) The water leakage points in the water supply system of the college should be identified and repaired to check the loss of water and to avoid contamination chance.

(vii) The necessary measures already taken by the authority to make switch off and switch on of electric bulbs, tubes, fans, etc. as and when necessary in the classrooms and different locations of the campus should be maintained in future also.

(viii) The food quality of the canteens in the campus should be strictly monitored frequently by the authorities.

(ix) All the stakeholders of the college should be made aware of the message 'Clean and Green Campus' and should be brought into force in the campus for all the time to come.

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Government of Assam
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Department of Electrical Engineering

Dr. Bimal Chandra Deka
Professor

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Dakshin Kamrup Girls' College Estd 1988

To Whom It May Concern

This is to certify that the undersigned has successfully completed the audit of energy utilization of Dakshin Kamrup Girls' College, Mirza, Dist. Kamrup, Assam for the year 2022-2023.

The college has been taking lot of initiative to create awareness among the students, teachers and other stakeholders to make the college campus an energy efficient campus. Effort has been made to replace conventional electrical gadgets with energy efficient devices in a phased manner. The college has been taking initiative to install roof-top solar plant as alternative source of energy for producing electricity to meet certain demand. The location of many class rooms, departments and rooms for other academic purposes are such that sufficient natural light and air available during day time and as a result significant amount of electricity is saved.

I wish that Dakshin Kamrup Girls' College will emerge as an institute of Green Campus in the near future.

Dr. Bimal Ch. Deka
Professor
Electrical Engg. Dept.
Assam Engineering College
Jalukbari, Guwahati-13

ENERGY AUDIT REPORT

2022 - 2023

DAKSHIN KAMRUP GIRLS' COLLEGE

MIRZA, DISTRICT: KAMRUP (Rural)

ASSAM, PIN: 781025

Audited by

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No of pages : 10

I. Introduction:

Dakshin Kamrup Girls' College was established in the year 1988 and one of the pioneer institutes for girls' in the district of Kamrup, Assam. The college is located at a distance of 25 km to the west of the Guwahati City.

Energy Auditing is a routine procedure of monitoring energy consumption and conservation of industry/organization/institute and its analysis.

This report presents the energy audit of the D K Girls' College after verifying all electrical loads, its connections, protection schemes and optimal utilization of electricity.

II. Electrical Load of the Campus:

The electricity supply to the college is provided by the Assam Power Distribution Company Limited. A 3- phase transformer was installed to transfer power to the college.

Consumer No.: 025000001388

Connected Load: 85 kW

Contracted Demand: 100 kVA

Tariff Category: HT- IV Bulk Supply (Govt. Education)

Supply Voltage Level: HT Average Power Factor: 0.63

The following sections give details of electrical gadgets used by different academic and administrative blocks of the college.

1. ACADEMIC BLOCK:

(a) Department:

Sl No	Department	Fan	Light	Computer	Printer	UPS
1	Assamese	9	10(L)	1	1	
2	Home Science	3	2(T)	1		
3	Economics	2	2(T)	1		
4	English	3	3(T)	1	1	
5	Political Science	3	2(T)	1		
6	Education	3	3(T)	1		
7	Philosophy	3	2(T)	1		
8	History	3	2(L)	1		
9	Mass Communication	2	2(L)	6 (D)		

Note: L: LED bulb/tube, T: Tube with choke, D: Desktop computer

(b) Class Rooms:

Sl No	Class Rooms	Fan	Light	Digital Board	Audio syst	UPS
1	RCC Room 1	6	6(T)			
2	RCC Room 2	6	6(T)			
3	Mass Com. Class room	1	2(L)			
4	AT Room 1	5	5(L)			
5	AT Room 2	2	2(L)			
6	AT Room 3	5	4(L)			
7	AT Room 4	5	4(L)			
8	AT Room 5	2	2(L)			
9	AT Room 6	5	5(L)			
10	AT Room 7	4	2(L)			
11	AT Room 8	7	6(L)			
12	AT Room 9	9	8(L)			
13	AT Room 10	7	6(L)			
14	AT Room 11	4	4(L)			
15	AT Room 12	4	3(C)			
16	AT Room 13	4	1(L)			
17	Digital Class Room	2	24(L)		1	

Note: L: LED bulb/tube, T: Tube with choke, C: CFL

(c) Laboratory:

Sl No	Laboratory	Fan	Light	Computer	Printer/Projector	UPS
1	Education	4	2	1		
2	Computer	2	3(L)	8(D)	1+1	

2. ADMINISTRATIVE BLOCK:

Sl No	Type	Fan	Light	Computer	Printer	UPS
1	Principal's Room 1	1	2(T)	1(D)		
2	Principal's Room 2	2	4(L)	1(D)	1	
3	Principal's Room 3	2	3(L)			
4	Library	19	12(L)+6(T)	4(D)	1	2
5	IQAC	2	7(C)	2(D)	3	2
6	Office	3	3(T)+4(C)	3(D)	2	

3. OTHERS:

Sl No	Type	Fan	Light	Computer	Printer	UPS
1	Photocopy Room	1	1(L)	1		
2	Museum	4	3(T)			
3	Kitchen		2(L)			
4	Wash Rooms		8(L)			
5	Corridors	3	18(L)+15(T)			
6	Corridors (AT)		19(C)			
7	Girls' Common Room	5	3(L)+2(T)			
8	Student Union Room	1	2(T)			
9	Canteen	6	4(L)			
10	Science Building	31	21(L)			
11	Hostels	12	24(L)			
12	Cosmetic Market		2(L)			
13	Tailor	1	2(L)			
14	ATM		2(L)			

In addition to all the above gadgets, the following electrical appliances are also available in the college:

Sl No	Electrical Items	Rating	Quantity
1	Photocopy Machine		2
2	Air Conditioner	1 to 1.5 Ton	7
3	CC Camera		22
4	DG Set	40 kVA	1
5	Water Pump with motor	1 to 3 HP	5

4. Proposed electrical connections in the near future:

a) A 3-storeyed building has already been constructed for a digital library and a computer lab with approximately 30 terminals. The digital library will include a conference room with centrally operated air conditioner. The computer lab includes battery back-up (UPS), AC and required number of fans and LED lights. Approximate connected load for the same is 10 KW.

b) A new canteen building is also constructed for the college. It will include fans and LED bulbs. Approximate connected load for the same is 1 kW.

Switches:

There are appropriate and sufficient numbers of MCBs and Isolators for maintaining and protecting the equipments.

Outdoor Lighting:

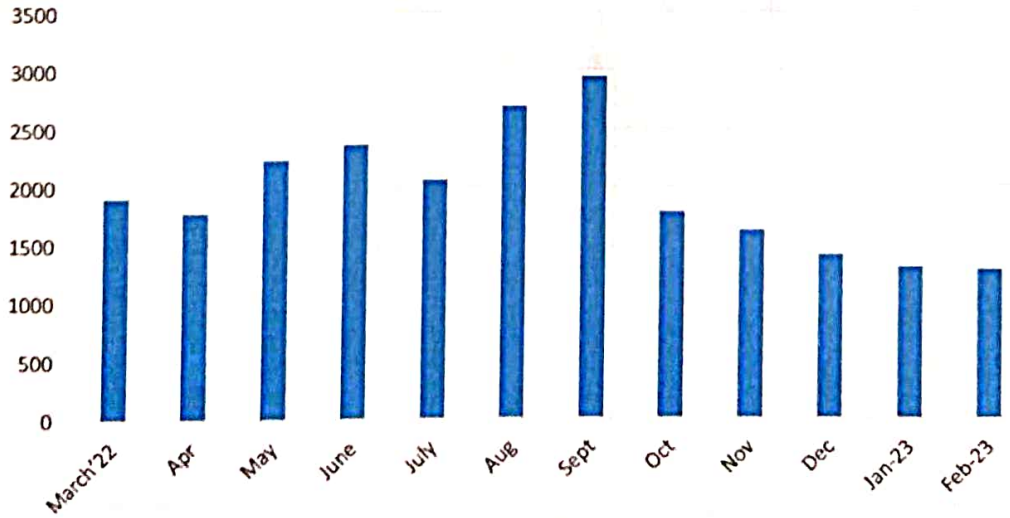
There are sufficient number of bulbs for outdoor lighting during night. It covers the entire college campus.

III. ENERGY CONSUMPTION DATA AND ANALYSIS:

The trend of utilization of electrical gadgets and other appliances are reflected in the monthly bills of energy consumption. The energy consumption data are presented below for twelve months from March 2022 to February 2023. The trend is also illustrated pictorially.

Month	Energy consumption (kWh)	Avg. PF	Maximum Demand (kVA)	PF Penalty /Rebate (in kWh)	Tariff (in Rs.)	Monthly bills (in rupees)
March'22	1904.76	0.503	09.6	572.76	6.45	26812.00
April 22	1782.04	0.477	11.2	586.00	6.75	27129.00
May 22	2232.50	0.597	16.8	446.50	6.75	30693.00
June 22	2365.74	0.675	19.0	343.74	6.75	31608.00
July 22	2058.50	0.700	38.0	268.50	6.75	29469.00
Aug 22	2686.60	0.834	19.5	26.60	6.75	34829.00
Sept 22	2940.30	0.857	24.0	-29.70	6.75	36220.00
Oct 22	1787.52	0.724	14.0	191.52	6.75	10790.00
Nov22	1623.68	0.663	10.6	247.68	6.75	26494.00
Dec 22	1409.40	0.550	05.6	365.40	6.75	25394.00
Jan 23	1299.28	0.473	05.0	427.28	6.75	24840.00
Feb 23	1274.14	0.558	07.2	316.14	6.75	23200.00
Total	**23364.46**	**0.634**		**3762.42**		**327478.00**

Trend of Energy Consumption(kWh)
(Mar 2022 - Feb2023)



From the above data, it is found that total energy consumption for the 12 month period from March 2022 to February 2023 is 23364.46 kWh including penalty. The amount of tariff paid during the period is Rs. 327478.00 and the penalty amount for the above 12 month period is Rs. 25224.50.

IV. CONCLUSION

This report presents a detail of electrical gadgets used in the college and its energy consumption. The location of many class rooms, departments and rooms for other academic purposes are such that sufficient natural light and air available during day time and as a result significant amount of electricity is saved. The college has taken steps to replace conventional electric bulbs with LED bulbs to save energy to some extent. It is suggested to replace all those conventional electric bulbs with LED bulbs in a phased manner. The average power factor is 0.63 which is not satisfactory and due to which the college had to pay large amount of penalty. For example, the college paid penalty of Rs. 25224.50 for the period of 12 months from March 2022 to February 2023. The college must take initiative to replace some old equipment to avoid penalty. The roof-top solar PV plant is another good alternative to save electricity as well as reduction of carbon emission.

The college has been taking lot of initiative to create awareness among the students, teachers and other stakeholders to make the college campus an energy efficient campus. The Green Energy Initiative is another sincere effort of the college for carbon neutrality. With the rising awareness on the necessity to save energy, the college has resorted to ways and means for saving electricity. Efforts have been made to shift to renewable energy phase wise. The e-waste of the college has been disposed as scrap and given away to concerned agencies for recycling.

Sample Electricity Bill of D. K. Girls' College, Mirza

Assam Power Distribution Company Limited

NAME OF ELECTRICAL SUB-DIVISION / IRCA : MIRZA ESD / IRCA GEC-II
CIN: U40109AS2003SGC007242
GSTIN: 18AABCL1354J1ZJ
ELECTRICITY BILL

April 22

Website: www.apdcl.org

Centralized Customer Care Number: 1912

Consumer Name: The Principal
Address: ,Dakhin Kamrup Girls College Mirza,GUWAHA

Contact Number : 9365971719
Email : pack.umang@gmail.com
Tariff Category: HT IV BULK SUPPLY (GOVERNMENT EDUCATION)
Supply Voltage Level: Supply Voltage Level 11 KV

Consumer Number: 025000001388
Old Consumer Number: 63000003201
DTR Number: M079N000
Pole Number :000
Connected Load in KW :85.0
Contracted Demand in KVA: 100.0
Load Security:257200.000
Meter Number: X0688124

Bill Amount: 27129.000
Due Date: 24-May-2022
Bill Number:900023088
Bill Period: 01-Apr-2022 To 30-Apr-2022
Bill Date : 09-May-2022
Number of Days: 30
Meter Status: RUNNING
Billing Status: NORMAL

025000001388

Meter Reading Details

Reading Type	Meter Number	MF	Previous Reading in KWh	Previous Export in KWh	Current Reading in KWh	Current Export in KWh	Difference Reading in KWh	Difference Export in KWh
KWH(Normal)	X0688124	200.0	254.830	0.000	260.810	0.000	5.980	0.000

Units Consumed	PF Penalty/Rebate	LT Metering Penalty	DTR Penalty	HT Rebate	Voltage Rebate	Voltage Penalty	Billable Units in KWh
Normal (1196.0	586.040	0.000	0.000	0.000	0.000	0.000	1782.040

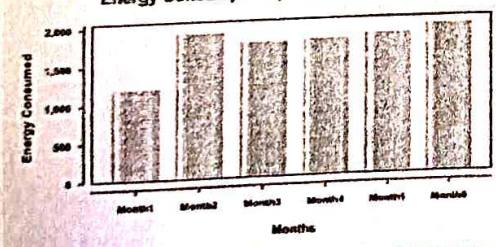
Recorded Demand (in KVA)	0.06	Maximum Demand (in KVA)	11.2	Billing Demand (in KVA)	100.0	Average Power Factor	47.700
Power on Hours	696			Availability Percentage			

Billing Details

Current Demand	Outstanding Amount	Adjustment Amount	Solar Rebate	Net Bill Amount
Rs. 27128.830	Rs. 0.000	Rs. 0.000	0.000	Rs. 27129.860
				In Words: Rupees Twenty Seven Thousands One Hundred Twenty Nine Only

PLEASE PAY YOUR BILL ON TIME AND HELP US TO SERVE YOU BETTER

Energy Consumption (Last Month's Bill)



Charges Breakup			
Details	Units	Rate	Amount
Energy Charge(Normal)	1782.040	6.750	12028.770
Total Energy Charge			12028.770
Energy Charge Re-Estimated			0.000
Rooftop Solar Adjustment			0.000
Demand/Fixed Charge (KVA)	100.0	140.0	13808.21
Electricity Duty			1291.85
Govt. Subsidy		0.0	0.0
Overdrawal Penalty			0.0
Meter Rent		0.0	0.0
Charges for dishonoured cheque			0.0
Arrear Principal			0.000
Arrear Surcharge			0.000
Current Surcharge			0.000
Adjustment Amount			0.000
Rebate if paid before due date			0.00
Payable amount before due date			27129.00
Payable amount after due date			27129.00

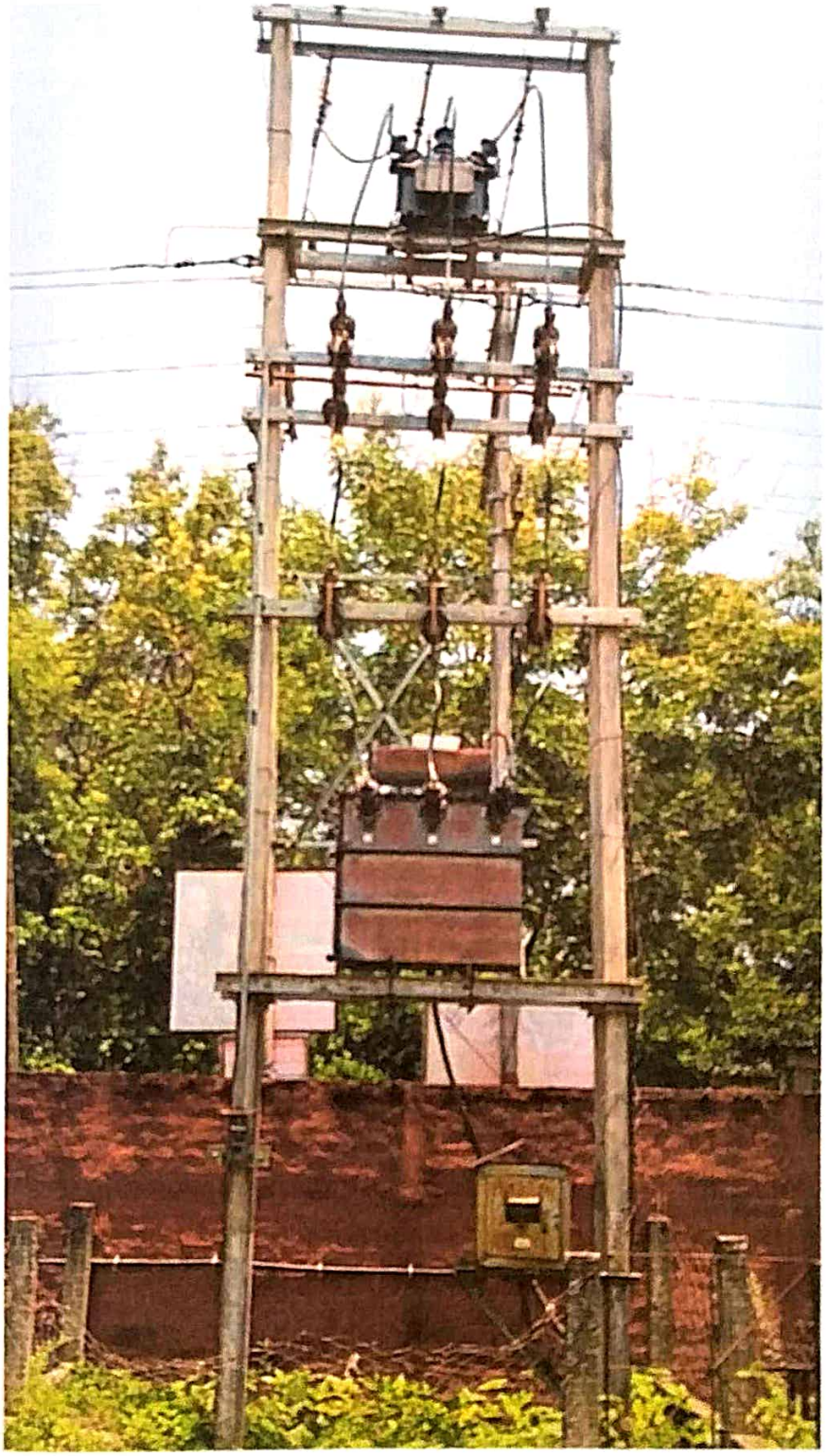
Checked by E&OE:

Prepared by: 40002068

Signature with seal

Area Manager
IRCA-II, APDCL (LAR)
GU Bypass, Gangaon, Jalukbari
P.O.-Pandu, Guwahati-781012

Transformer Connected to D. K. Girls' College, Mirza



Water Treatment Plant of D. K. Girls' College, Mirza

Newly installed DG Set of D. K. Girls' College, Mirza

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