AUDIT CERTIFICATE

This is to certify that

GOVT MIZORAM LAW COLLEGE

has successfully undergone a Green Audit during April 2023 under the supervision of Eco-Management Services and the College is credited with Grade "A+".

ISO/IEC 17020:2012

ECOMS

24.5.2023

DATE

Eco-Management Service

SIGNATURE

Director

AUDIT CERTIFICATE

This is to certify that

GOVT MIZORAM LAW COLLEGE WOMEN HOSTEL

has successfully undergone a Green Audit during April 2023 under the supervision of Eco-Management Services and the Hostel is credited with Grade "A+".

ISO/IEC 17020:2012

ECOMS

24.5.2023

DATE

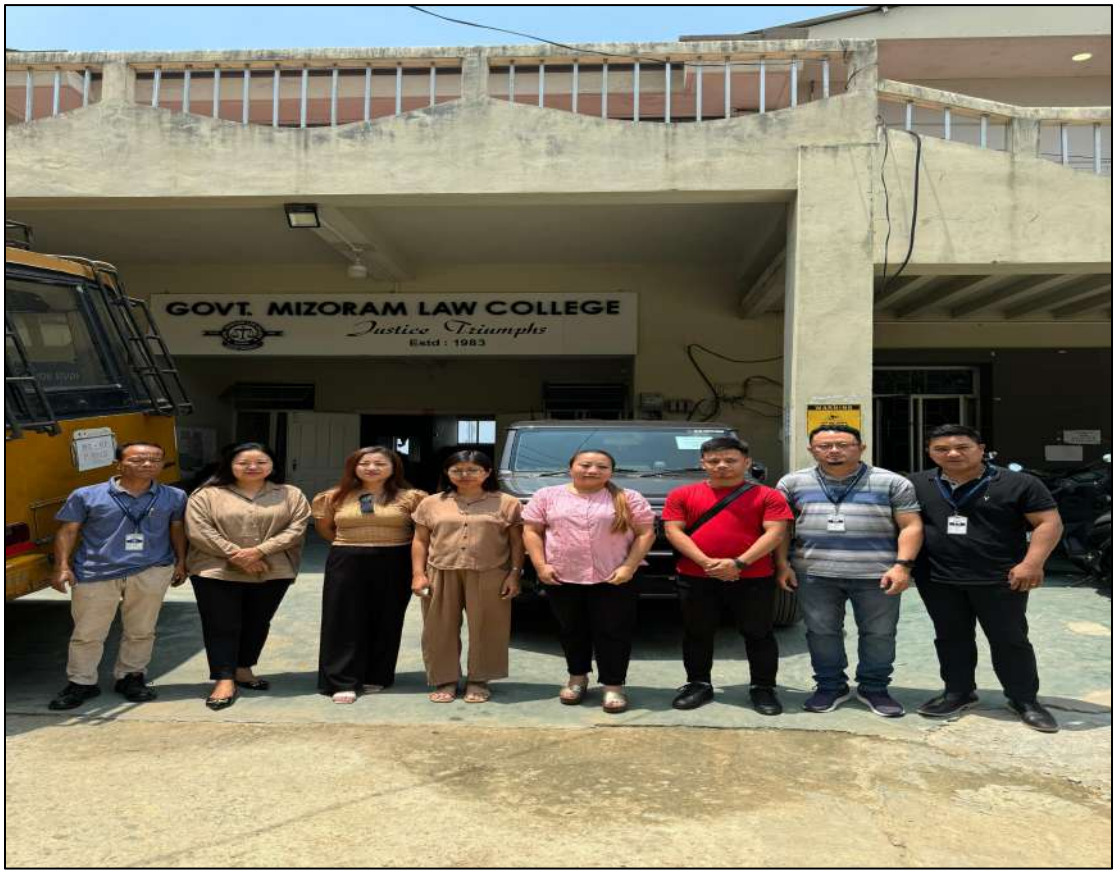
Eco-Management Service

SIGNATURE

Director

GREEN AUDIT

GOVERNMENT MIZORAM LAW COLLEGE



ECOMS

Preface

The Green Audit report of Government Mizoram Law College was prepared by an audit team consisting of Dr. Lalmuansangi, Zohmangaiha and Lalhumhima from Eco-Management Services, Aizawl, Mizoram. Sufficient and appropriate audit procedures were completed and evidence gathered to support the accuracy of the conclusion reached and contained in this report. The conclusion is based on a comparison of the situations as they existed at the time of the audit with the established criteria.

This report covers a significant matter which includes base assessment of the existing Green Infrastructure (GI) in the campus such as land, trees, green spaces, management and conservation of energy, water, solid wastes. The contribution of the college to climate change was also included.

This report is divided into seven chapters – Introduction, Objectives, Criteria for Green Audit, Methodology, Findings, Conclusion and Recommendations. The findings of the Audit is further divided into three sections viz., Section I – Govt. Mizoram Law College Main Building/Campus; Govt. Mizoram Law College and Section II – Women Hostel, Govt. Mizoram Law College.

The main findings of the audit show that, in general, all departments and students are aware about the need for environmental protection at a general level. It also observed that a number of best practices such as maintaining potted plants, introducing plastic free zones, adoption of rain water harvesting technique and compost pit and use of energy efficient LED/ CFL bulbs and tubes for minimizing energy consumption are followed in the college campus. However, on detailed review, it was observed that the college is implementing Green Policy for the first time and certain aspects would benefit from further review in order to improve their efficiency, fairness and consistency.

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Chapter – 1
Introduction

1.1. Outline of Green Audit

The process of green audit was begun on the 1970s with an intention of identifying the activities carried out in a given institution or company. This was initiated against the background of growing concern over changing climate and related aspects. Green audit is a tool to identify the range of environmental impacts and assess the compliance of the operations on the development and regular activities within an organisation. It may also assess the compatibility of the operations within an organisation or a company with existing applicable laws and regulations and the expectations of their various stakeholders. It further assesses the possible implications and effect of pollution due to the operations within the organisation. The audit also seeks to identify possible means and methods to save investments, enhance work quality, improve health and safety of their employees, reduce liabilities and reduce the rate of environmental pollution. A continuous process of such audit might result in maintaining the quality of these aspects within the premises of any organisation.

1.2. Aims and Objectives

Most companies, government and non-government bodies and other institutions conduct green audit aiming:

• To ensure that the performance of the institution with respect to environmental activities they are involved in, is in compliance with existing laws and regulations.

• To check the functionality and their operating success including water supply, energy related matters and other similar matters that are related to green operations in the campus

• To formulate or update the institution's environmental policy, if warranted.

• To measure the environmental impact of operational process related to green activities in the campus.

• To measure the performance of each green related operations and actions in the campus.

• To generate a database of green activities for continuous monitoring to assess the success of each of them.

• to identify future potential liabilities.

• to align the institution's developmental and day to day activities with the stated vision, mission, strategies, etc.

• to identify possible ways to reduce expenditure and running costs on equipment, appliances, etc. or try enhance revenue income.

• to improve process and materials efficiency, and in response to stakeholder requests for increased disclosure.

The process of green audit based on operational activities within an institution happens not necessarily based on laws and regulations. It might be largely based on awareness and concerns on environmental performances within and outside the institute's premises. This further strengthens the fact regarding social responsibilities of the organisation. Majority of the institutions that conducted green audits in the recent past has realized the importance of the same as they could easily manage their operational costs and provide good atmosphere to their stakeholders. The green audit also provides opportunities to identify full range of operations within an organisation, the impacts of maintaining and functioning of its operational goods and services, the actual source of raw materials for different activities within the organisation, the costs of operations of its offices, functional units, and other facilities. It also provide chances to understand the relationship with employees, material suppliers, stakeholders, etc. The recommendations, findings and suggestions that emerge during green audit would certainly help the management of the organisation to set up future action plan that best suits to them.

1.3. General steps involved in Green Audit

1. Systematic and exhaustive data collection.
2. Evidence based documentation of activities.
3. Regular monitoring.
4. Provide standards and methods for improvement by establishing cost effective green action plan.

Chapter – 2

Audit Preparations

2.1. Management

The Government Mizoram Law College management was very keen in taking up the recommendation of conducting a green audit. In the light of this, the college management approached Eco-Management Services, which is a consultancy firm offering services like green audit of institutions. The **Eco-Management Services Team** agreed to conduct the green audit of Mizoram Law College. After this, there was a visit to the campus to set up different criteria and questions that are necessary for an updated green audit.

The following were different criteria set forth for the present green audit.

a) Green Practices

b) Water Management

c) Energy Management

d) Carbon Footprint

2.2. The Green Audit Process:

1. Selection of area/activities/parts of the campus.

2. Scope of audit process was identified in consultation with the auditee.

3. Data pertaining to identified parameters for green auditing of the campus were collected directly through an on-site visit.

4. Available background information on the identified activities and other parameters were collected.

5. The role of each stakeholder in green related activities has been collected.

6. Historical aspects of green activities in the campus including water usage and waste generation, etc. were collected.

7. Visit to the campus by audit team.

8. Data analysis and evaluation.

9. Discussion on the findings.

10. Report preparation.

2.3. Onsite audit activities

1. The onsite visit and meeting with the campus authorities was the first step between the audit team and auditee.

2. Site inspection for determining parameters for audit.

3. Site visit and evaluation of collected information of the audit team.

4. Meeting with the Principal, teachers, non-teaching staff.

5. Meeting with the in-house audit team for evaluation and clarifications.

Chapter –3

Green Audit

Criteria adopted for Green Audit

In this audit the following criterion are adapted to study or assess the environmental management and conservation practices within the campuses.

3.1 Land & Other Infrastructure

Land use means utilization of land in a particular area. Land use pattern includes types of land and how much land is being utilized under different uses. Land is basic resource of human society and land use is the surface utilization of all developed and vacant land on specific point at a given time and space. It is a systematic arrangement of various classes of land on the basis of certain similar characteristics mainly to identify and understand their fundamental utility, intelligently and effectively in satisfying the needs of human society. Land use is very vital to understand the geographical adjustment of various resources. It is also very important resource for man, so it should be put for right use according to its capability and according to its type. Land capability depends upon factors such as relief features, climate, Soil, vegetation, socio- economic and institutional factors. Today, as the population is increasing at a faster rate the land is put under tremendous pressure to fulfill the growing demands of the population.

Mizoram is a beautiful state with rich biodiversity. Perching on the high hills of the North Eastern corner, Mizoram is a storehouse of natural beauty with its endless variety of landscape, hilly terrains, meandering streams deep gorges, rich wealth of flora and fauna. The state has a mild and very pleasant climate of 110 C in winter and 30^{o}C in summer. The entire area is under the direct influence of south west monsoon. A special feature of the climate is the occurrence of violent storm during March- April. Mizoram is blessed with a literate population, a hard working people with a rich culture and a strong and cohesive civil society with no class distinction and no discrimination on grounds of sex.

Due to urbanization and the growing population of a city, availability of free land for various purposes decreases so utilization of limited land resources in an economically, sustainably and eco-friendly manners are vital.

Infrastructure is the basic physical and organizational structure needed for the operation of a society or enterprise or the services and facilities necessary for an economy to function. It is a set of interconnected structural elements that provide framework supporting an entire structure of development and is an important criterion for judging the regions development.

3.2 Air Quality

Air pollution is the introduction of chemicals, particulates, or biological materials into the atmosphere causing discomfort, disease, or death to humans, damage other living organisms such as food crops, or damage the natural or built environment.

Indoor air pollution and urban air quality are regarded as two of the World's Worst Toxic Pollution Problems. Indoor air quality is a term which refers to the air quality within a home, buildings, an institutions or commercial facilities especially as it relates to the health and comfort of building occupants. IAQ can be affected by gases (including carbon monoxide, radon, volatile organic compounds), particulates, microbial contaminants (mold, bacteria), or any mass or energy stress or that can induce adverse health conditions. Indoor air pollution is a concern in the developed countries, where energy efficiency improvements sometimes make houses relatively airtight, reducing ventilation and raising pollutant levels. Indoor air problems can be subtle and do not always produce easily recognized impacts on health. Different conditions are responsible for indoor air pollution in the rural areas and the urban areas. Source control, filtration and the use of ventilation to dilute contaminants are the primary methods for improving indoor air quality in most buildings. Residential units can further improve indoor air quality by routine cleaning of carpets and area rugs.

3.3 Water

Water is the prime natural resources and indispensable component for sustenance of all forms of life in the earth. Adequate availability of water is the prerequisite for sustainable socio-economic development. Of the water resources on Earth only three percent of it is fresh and two-thirds of the freshwater is locked up in ice caps and glaciers. Of the remaining one percent, a fifth is in remote, inaccessible areas and much seasonal rainfall in monsoonal deluges and floods cannot easily be used. As time advances, water is becoming scarcer and having access to clean, safe, drinking water is limited among countries. At present only about 0.08 percent of

all the world's fresh water is exploited by mankind in ever increasing demand for sanitation, drinking, manufacturing, leisure and agriculture. Due to the small percentage of water remaining, optimizing the fresh water we have left from natural resources has been a continuous difficulty in several locations worldwide. As a limited resource, water supply sometimes supposes a challenge.

Water is so common that we often do not think about where it comes from or where it is managed. As water becomes scarcer, the importance of how it is managed grows vastly. Finding a balance between what is needed by humans and what is needed in the environment is an important step in the sustainability of water resources. Water management means dealing with water in the best possible way. This can be done by local authorities (municipal water management) or it can be done by individuals (when we manage how we use our own water supplies). Good water management will involve organizing water so that everyone has enough, and controlling water supplies and water treatment centers (and other equipment and logistics relating to water) so that they work in the best possible way. Water management affects many aspects of our lives. A fundamental strategy in sustainable water management is to integrate water management goals into physical, social and economic planning.

3.4 Energy Management and Administration

Energy management includes planning and operation of energy production and energy consumption units. Objectives are resource conservation, climate protection and cost savings, while the users have permanent access to the energy they need. It is connected closely to environmental management, production management, logistics and other established business functions. One of initial steps for an effective energy cost control program is the base line energy assessment, which examines the pattern of existing energy usage by the government or any sub-entity of the government or private organization. This program will set the reference point for improvements in energy efficiency. Energy efficiency can improve the existing energy usage and benchmark of every individual section.

It is important to integrate the energy management in the organizational structure, so that the energy management can be implemented. The central task of energy management is to reduce costs for the provision of energy in buildings and facilities without compromising work processes. Especially the availability and service life of the equipment and the ease of use should remain the same

4.5 Waste Management

Waste can take any form that is either solid, liquid, or gas and each have different methods of disposal and management. Waste management normally deals with all types of waste whether it was created in forms that are industrial, biological, household, and special cases where it may pose a threat to human health. It is produced due to human activities.

Solid Waste management is the process of treating solid wastes and offers variety of solutions for recycling items that don't belong to trash. It is about how garbage can be used as a valuable resource. Waste management is something that each and every household and business owner in the world needs. Waste management disposes of the products and substances that you have use in a safe and efficient manner. Waste management is intended to reduce adverse effects of waste on health, the environment or aesthetics. *"Waste management or disposal is* the activities and actions required to manage waste from its inception to its final disposal. This includes amongst other things, collection, transport, treatment and disposal of waste together with monitoring and regulation. It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling etc.*"*

3.6. Inspection

The preliminary visit in connection with the pre-audit process to the campus had identified criteria for audit, parameters to be evaluated and time schedule of green audit of Mizoram Law College. It included meeting with the Principal, IQAC teachers in charge of different green audit and Green activities of the campus and students representing different departments, clubs and fora. This enabled the auditing to gather all necessary information that is useful in preparing audit report. The on-site audit team collected information-based observation and secondary data/previous data.

3.7. Evaluation of documents and reports

The audit visit to the campus evaluated documents and reports (departments, clubs) that are necessary for the audit process. This further strengthened the claims made by the campus

authority on green operations in the campus. To generate future action plan, the audit team had a detailed site inspection with different in-house team in the institute.

FINDINGS

SECTION I
GOVT. MIZORAM LAW COLLEGE
MAIN BUILDING/ CAMPUS

A. Land & Other Infrastructure
- **Task I : Land Survey**
- **Task II : Other Infrastructure**

B. Air Quality
- **Task I : Mode of Transportation to College Campus**
- **Task II : Contribution to Climate Change**
- **Task III : Ambient Air Quality around the campus**
- **Task IV : Ventilation of the rooms**

C. Water
- **Task I : Sources of Water**
- **Task II : Water harvesting/ Storage**

D. Energy Management & Administration
- **Task I : Sources of Energy in the college?**
- **Task II : Energy Consumption**
- **Task III : Energy Conservation**

E. Waste Management
- **Task I : Solid Waste Management**
- **Task II : Liquid Waste Management**
- **Task III : Electronic Waste Management**
- **Task IV : Drainage system**

A. LAND & OTHER INFRASTRUCTURE

TASK I: Land Survey

Govt. Mizoram Law College is a lone Legal Institution in the state of Mizoram. It plays a vital role in absorbing the aspiring local youths in the line of legal education. It is serving as an avenue for continuing education for the youths and provider/facilitator of employments as is Professional course and then to achieve justice in the society. Govt. Mizoram Law College was established in 1983 with a humble beginning, having the name of *Aizawl Law College* with the initiatives of some prominent citizens, academic and politicians. First Law Class was held in the Govt. J.L. High School (now Govt. J.L. Higher Secondary School) on the 25th August, 1983 and was formally inaugurated by Brig. T. Sailo, the then Chief Minister of Mizoram on the 7th September, 1983. Thereafter, Liandingpuia Law College was established in 1996. Ultimately, Mizoram Government amalgamated the two law colleges in July, 2004 and hence, the college is named as Mizoram Law College w.e.f. October, 2004.

The College at first was affiliated to the North Eastern Hills University (NEHU), Shillong, Meghalaya. Then, with the establishment of Mizoram University in 2001, the College become affiliated to the Mizoram University. At the same time, the College is also affiliated to the Bar Council of India.

Mizoram Law College was upgraded to deficit Grant-in-Aid status w.e.f. 25.08.2006 and provincialized w.e.f. the 19th September, 2013.

Government Mizoram Law College is located in the western part of the Aizawl City, at the adjacent of Govt. Ch. Chhunga High School, Luangmual, near the YHAI Hostel. It is on the side of the main road leading to Mizoram University. The vegetation of the area falls under the Montane sub-tropical forests. Plant diversity in this area is quite rich.

The College is to provide avenue to the youths and young graduates for continuing education in the line of legal education as well as to enlighten the general public as a legal luminary. As such, it is not an exaggeration to say that Mizoram without Govt. Mizoram Law College is unthinkable. It enriches legal knowledge to the people by holding National/Regional/State level and even local level Seminars, Workshop, Legal Awareness Campaigns etc. on contemporary legal issues and also participates in similar programme organized by other organisations.

Therefore, promotion of legal education and legal literacy in the state are the main objectives and at the same time bring graduation in the discipline of law to the youths at their

doorstep so that local students need not go outside the state as earlier. Now, it is no doubt that the college serves its purposes.

For the smooth functioning of the College, the following Cells and Committees have constituted:

(i) Student Bar Council

(ii) Alumni Cell

(iii) Placement Cell

(iv) Internal Quality Assurance Cell (IQAC)

(v) Legal Aid Clinic

(vi) Building Committee

(vii) Planning Board, Mizoram Law College

(viii) Remedial Coaching for SC/ST (excluding creamy layer)

(ix) Advisory Committee

(x) Purchase Committee

(xi) Library Committee

(xii) Career Counseling Cell

(xiii) Implementation of Development Grants

(xiv) Anti Ragging Cell

(xv) Staff Welfare Committee

(xvi) UGC Network Resource Centre

Programmes and Co-curricular Activities

(i) Conducting LL.B. Course, which is the main programme of Govt. Mizoram Law College. 189 students enrolled in this current Academic Session i.e. 2023 - 2024

(ii) Organizing State and Local Level Seminar on legal matters.

(iii) Running both Legal Aid Clinic in the College and 4 different Police Station in Aizawl City.

(iv) Red Ribbon Club of GMLC organized Voluntary Blood Donation Camp once in a year, usually this programme is fell on the Foundation Day of the College i.e. 25th August.

(v) Under National Service Scheme (NSS), the College has an adopted village, such villages are given a special care in the field of cleanliness and legal awareness.

(vi) The College introduced Semester System since 2009-2010 Session.

(vii) The Govt. Mizoram Law College follows the required norms of BCI especially in the field of Admission Age Barred, Compulsory and Optional Subjects in Syllabus.

TASK II: Other Infrastructure

The college is located in a peaceful environment and the provision of funds allocated for the Academic Building has been utilized as per the blue print drafted by the architect; Classrooms, Teaching Faculty Department Rooms, Canteen, Seminar Hall, Multipurpose Hall, Language Lab, ICT, Medical Centre, separate Toilets Units for males and females (Faculty and Students), Computer Center, Counselling Center, Women Center, Gym & Yoga Center.

The Library is equipped with reading area. The library is upgraded from time to time and updated to meet the latest curriculum updates. Stakeholders have open access to the book shelves, journals/magazines and research cubicles with internet connections to cater to their personal needs. CCTV equipment for monitoring attendance, marks and surveillance.

All Departments are located within the college building with different rooms allotted for each department. Information technology system adopted in the College is found to be quite good. Each room in the college is provided with a power point to improve the learning skills of the students.

Land availability is reproduced in the table below:

Land		
	Area (in Sq. ft)	**Percentage**
Occupied	**556.13**	**0.92**
Unoccupied/green areas	**17970**	**29.73**
Developed	**41926**	**69.3**
Total	**60451.69**	**100**

Table1: Land availability in the College

The total points gained under this category may be summarized as below:

TASK	**POINTS**	
	ALLOTED	**GAINED**
1) Land use	**10**	**9.5**
2) Other Infrastructure	**10**	**9**
TOTAL	**20**	**18.5**

Table 2: Total points gained under Land & Infrastructure

B. AIR QUALITY

The Air quality around the campus has been studied by considering four (4) points like transport survey, CO_2 emission, Ambient Air quality, and Ventilation provided in the room.

Data Collection Method:

A walk through surveys and interviews were conducted to find out the number of students coming & going by vehicles, survey of rooms to ensure area of ventilation provided, number of vehicles and distance covered used for transport to find CO_2 emissions, ambient air quality and other information needed for the air audit.

TASK I: Mode of Transportation to Campus

From the survey results it was concluded that 9.9 % of students and staff come by 2-wheelers and the remaining 90.1% come on foot or other public transport such as city bus, taxi as the college is situated at the heart of the city.

Assuming that, each two-wheeler, car travels and Bus 5 km, 10 km, 10 km every day respectively. This implies that for 30 2- wheelers, about 150 km is travelled and 10 km is travelled by car (1 car) and 10 km is travelled by Bus.

Therefore, the total number of kilometers travelled by all vehicles is

= 150 + 10 +10= 170 km

The survey can be summarized in the table below:

Table 3

Mode of travel	No.s of Km covered	Points alloted	Points gained
Bus	10	6.25	6
LMV	10		
2 wheeler	150		
TOTAL	170		

Points gained for mode of Travel

TASK II: Contribution to Climate Change

Carbon Dioxide (CO^2) is one of most common Greenhouse Gas emitted into our environment. Global emissions of carbon dioxide (CO^2) - the most important heat-trapping gas in the atmosphere are the main cause of global warming. India being a developing country does not yet adopt binding emission that is decreasing global emissions to 50% by 2050. However, owing to global warming and climate change issues, efforts must still be given by all officials so that community plans and regional growth strategies include greenhouse gas emission reduction strategies and targets.

The main source of CO^2 of the College is from the combustion of fossil fuels such as gasoline and diesel to transport people and goods which in short may be called as vehicular emission. The amount of CO^2 from these sources is considered negligible as compared to vehicular emissions.

CO^2 emissions:

1) **Diesel run vehicles:**

In plain areas average diesel consumption is rated as 21.1 liter per 100 km or 4.7 km per liter. Owing to the hilly terrain, huge traffic jam and use of adulterated fuel, the average diesel consumption is assumed at 25 liters per 100 km or 4 km per liter. Therefore, on average, the College bus consumed 2.2 litres of diesel to cover 10 km per day. The amount of CO^2 emission is given in table 5.

2) **Petrol run Vehicles:**

i) Consumption by car or LMV:

In plain areas, the average petrol consumption **by car** is assumed at 1 liter per 12 km. Owing to the hilly terrain and huge traffic jam the average petrol consumption is assumed at 8 km per liter. Therefore, on average, 4 cars consumed 1.1 litres of petrol everyday to cover 10 km. The amount of CO2 emission is given in **table 4.**

ii) Consumption by 2-wheelers:

Similarly, petrol consumption by **2-wheelers** is assumed at 20 Km per liter. Then average consumption of petrol by 30 two wheelers is 7.6 litres everyday to cover 192 km. The amount of CO2 emission is given in table 5 below:

The emissions of CO_2 are calculated as shown in the table 5 below:

Mode of travel	Distance travelled (in km)	Points allotted	Points gained
Bus	10	**6.25**	**6**
LMV	10		
2 wheeler	150		
Total	**170**		

Table 4. CO^2 Emission Chart

From the table above, a good score is observed in this task due to the large number of people coming on foot and by two wheelers, thus decreasing the number of vehicles. On the other hand, it is rarely noted that a car greater than 15 years old are plying. All the vehicles used for transportation by the students and faculties of the College also comply with the Central Motor Vehicle Acts and Rules by obtaining valid Pollution under Control Certificates (PUCC). The practice of turning off lights and electronics appliances like computers when not in use reduces electricity demand.

TASK III: AMBIENT AIR QUALITY AROUND THE CAMPUS:

The ambient air quality of the college was taken for continuous eight hours in the college campus. Analysis report for monitoring conducted for three parameters like Respiratory Particulate Matter of size less than or equal to 2.5µ (PM2.5), Particulate Matter of size less than or equal to 10µ (PM10), Sulphur dioxides (SO_2), Carbon Monoxide (CO) and Nitrogen Oxides (NOx) during May 2023 is shown in **table 5**.

Table 5. Ambient Air Quality on 20th May 2023

Pollutants monitored	National Standard (µg/m3)	Measured (µg/m3)	Points allotted	Points gained
PM2.5	**60**	**13**	**6.25**	**6.00**
PM10	**100**	**42**		
NOx	**80**	**8.2**		
SO2	**80**	**1**		
CO	**50**	**8**		

TASK IV: VENTILATION OF THE ROOMS

Because of the effects it has on health, comfort, and serviceability, indoor air quality in our homes is becoming of increasing concern to many people. The Environmental Protection Agency lists poor indoor air quality as the fourth largest environmental threat to America. Mechanical ventilation can improve many of the problems arising from poor indoor air quality.

To find out whether the indoor air is sufficient in all rooms, data on the area of classrooms and mechanical ventilation system was collected through measurements and the administration files. Apart from the already documented length and width of classrooms, the height was assumed from the blue print drawing of the building.

The table below is a summary of the data collection and calculations done.

Room	Floor area (Sq. ft.)	Area of Vent (Sq. ft.)	Opening size (%)	Points allotted	Points gained
Faculty Rooms	1536.00	550	35.80	**6.25**	**6.00**
Class rooms	8843	3156	35.68		
Library	4102	863	21.03		
Seminar Hall	1109	360	32.46		
Total	**15,590**	**4929**	31.61		

Table 6: Ventilation chart

According to standards adopted in America, a room having 4% of the floor area as operable openings is considered to meet requirement of natural ventilation.

TABLE 7: OVERALL RANKING UNDER AIR QUALITY

TASK	POINTS	
	ALLOTED	GAINED
1) Transport	**6.25**	**6.00**
2) CO2 emissions	**6.25**	**6.00**
3) Ambient air Quality	**6.25**	**6.00**
4) Ventilation	**6.25**	**6.00**
TOTAL	**25.00**	**24.00**

B. WATER

TASK I: SOURCES OF WATER

Study was conducted in various ways like sources of water, its uses and disposal. Like other aspects, data were collected through questionnaire, walk through and interviewing the person concerned in each Department.

The College has 2 nos. of water connection from the Public Health Engineering Department, Government of Mizoram which is the main source of water in the College along with rain water. During dry season, when rain pour and public water supply is less, the College utilizes the water from the large tank which is used for storing the rain water. Water bills for three consecutive months were obtained through the authority concerned and the average quantity supplied per month was calculated. Although the water supplied is now known for each month throughout the year, the average was taken in order to determine the requirement per capita per day. On average the College received 31,014 liters of water per month from public supply which is 1033.8 l/day.

Assuming monsoon period to last for 4 months during which rain water is harvested in full capacity. It would therefore be approximated that amount of rain water harvested per months is 1,16,250 liters.

TASK		Amount of water received per month (in L)	POINTS	
			ALLOTED	GAINED
Sources of Water	1) Public Supply	31,014.00	7.5	6.5
	2) Rain Water	1,16,250.00		
	TOTAL	**1,47,264.00**	**7.5**	**6.5**

Table 8. Sources of Water

TASK II: WATER HARVESTING/ STORAGE

The College has five plastic tank of two 2000L capacity each which stores water from public supply and two water tanks (concrete) of 30000L capacity each where all rain water are stored. Thus, a total of 64000 L capacity of water tanks is available within the College.

Although the water supply received by the College seems adequate, however, as per WHO, a higher quantity of about 20 litres per capita per day should be assured to take care of basic hygiene needs and basic food hygiene. As such, the water requirement per capita per day is taken as 20 l, it is estimated that the total requirement of water in the campus is 4320 liter/capita/day in which 4908.8 liter/day is supplied. The college has adequate water supply and storage capacity as per WHO standard.

Though great efforts have been given for the conservation of water, the water harvesting storage needs to be enlarged and a provision for harvesting more rain water needs consideration.

Water Tank Type	**Nos.**	**Capacity (L)**	**Total (L)**	**Points allotted**	**Points gained**
Large	2	30000 X 2	60000	**7.5**	**6**
Medium	2	2000x2	4000		
Total	**4**		**64000**		

Table 9: Capacity of Water harvesting facility in the College:

TABLE 10: OVERALL RANKING UNDER WATER SOURCES

TASK	POINTS	
	ALLOTED	GAINED
1) Sources	**7.5**	**6.5**
2) Water harvesting/ Storage	**7.5**	**6.5**
TOTAL	**15**	**13**

C. ENERGY MANAGEMENT AND ADMINISTRATION

An assessment of energy consumption, energy sources used, energy management, lighting devices used and other appliances used by the campus community is an important aspect of sustainability of the community. Hence this is a relevant aspect of the assessment. Sources, consumption pattern and mode of conservation of Energy being practiced in the

College was studied and related data were collected through inspection, office records and by interacting with the person in charge.

TASK I: SOURCES OF ENERGY IN COLLEGE

The College mainly depends on two sources of energy which are as follows:

Renewable Source:

a) Electricity through public supply
b) Solar energy

Non-Renewable Source:

a) Gas: Merely for cooking in College.

b) Diesel: For college buses

c) Petrol: For staff and student cars/ vehicles and generator.

The College greatly depends on public electricity supply and but the college have solar power for backing up the public electricity supply. **Hence, 4.5 points out of 5 is credited.**

TASK II: ENERGY CONSUMPTION

Electricity bills for the previous month were obtained through the authority concerned, and the value of electric consumption in kilowatts per hour for some months was obtained from the charts in the bills. The average quantity consumed per month was calculated. Although the energy consumption is now known for each month throughout the year, the average was taken in order to determine the consumption per capita per day. It was observed that though the College depends much on public electricity supply, the average monthly consumption is low.

In terms of the consumption of non-renewable energy such as petrol, diesel, gas etc. it was found that petrol and diesels were mainly used for vehicles. Gas amounts consumed are very insignificant as the school uses it only for a few in college office.

The total energy consumption per capita i.e.22.75 MJ is low as compared to the per capita consumption in Mizoram during 2011 census which is 788 MJ (2.88%). As such a good score is credited.

The college has roof top solar grid i.e., 10 KVA in which the surplus is supplied to the Mizoram government.

Type	Sources	Amount (KWH)	per capita consumed	Points allotted	Points gained
Renewable	Electricity	3058	1.357	**5**	**4.5**
Non- renewable	Petrol (L/Month)	408.3	10.28		
	Diesel (L/Month)	359	10.55		
Total		**3325.3**	**22.18**		

Table 11: Energy Consumption

TASK III: ENERGY CONSERVATION:

Through interview among staff & students, it was found that though the College does have any policy statement on energy conservation, each department was found to practice energy conservation on a large scale by turning off the lights when not required, turning off other electrical appliances and computer monitors when they are not in use.

Since, the College relies on electric supply from municipal connection; the College utilizes large quantity of energy however, the usage it greatly reduced by using LED bulbs and tubes in almost all the rooms in the campus and hostel. Besides, it was also found that most staffs and students (97.63%) commuted via on foot and by public transport and while 1.72% of the population resided in the College hostel which has greatly reduced the quantity of the energy consumed. **Therefore, 4.5 out of 5 points is credited to these the tasks.**

TABLE 12: OVERALL RANKING UNDER ENERGY MANAGEMENT AND ADMINISTRATION

TASK	POINTS	
	ALLOTED	GAINED

1) Sources	**5**	**4.5**
2) Consumption	**5**	**4.5**
3) Conservation	**5**	**4**
TOTAL	**15**	**13**

D. WASTE MANAGEMENT

Wastes management in the College campus is studied by considering four aspects solid, liquid, electronic wastes management and drainage system. Like other parts, information was obtained through walk-through and interview.

TASK I: SOLID WASTE MANAGEMENT:

Solid wastes generated by the College consist of all types of wastes like left-over food from school canteens, bio-degradable and non-biodegradable wastes from classrooms, and administrative offices. These wastes are segregated at the point of generation and are disposed through PPP mode. Biodegradable wastes are kept in decompose bin and used to fertilize plants. E-wastse are segregated form other waste and are collected by public partner separately.

During the survey, it was found that efforts were given for maintaining the cleanliness of the campus by providing separate dust bins for biodegradable and non-biodegradable waste, brooms, etc., in each classroom. Garbage bins are provided in each classroom and segregation were found to be good enough. All kinds of wastes are thrown altogether including waste paper, plastic bottle, tin container which are separated for recycling or reuse.

Status of solid waste generation, collection, treatment and disposal are summarized in the table below:

Quantity of waste generated/month (Kg)	**Per capita/day generation (Kg)**	**Segregation & Treatment/ recycling**	**Points allotted**	**Points gained**
600 kg	0.069 kg	20kg	**6.25**	**6**

Table 13: Status of solid waste

Amount of solid wastes generated per month = 600 kg Solid waste generated per day basis = 20 kg Amount of waste treated & segregated= 10 kg **College points gained= 6.**

The survey shows that the college students and staff participate in waste management by segregation the waste. The eco-club of the college set up their own compost bin for decomposing their bio-degradable waste. Therefore, **6 out of 6.25 points is credited to these the tasks.**

TASKS II: LIQUID WASTES MANAGEMENT

The main source of waste water discharge is from cleaning and sanitary purposes in all Departments and offices and cooking and cleaning from Canteen.

The total water supply into the Campus as calculated in the Water Chapter is about **1,47,264** l/month. Water is mainly consumed for drinking and toilet purpose, the percentage of wastes water discharged is averaged at 80% of the supply which is 1,17811.2 l/m. Thus, the per capita per day waste water discharge is 1.47 l which is very less as compare to the per capita per day requirement outlined by WHO.

During the survey, **Waste water arising from various sources except for lavatory was found to be discharged into drains untreated**.

The Summarized status of liquid waste management is shown below:

Quantity of waste water (liter/month)	**Reused/ recycled (liter)**	**Points allotted**	**Points gained**
1,47,264	0	**6.25**	**5**

Table 14: Points allocated for liquid wastes

TASKS III: ELECTRONIC WASTES MANAGEMENT:

During the physical inspection no- e waste were stored in the college campus. Though the E- waste generated was disposed off with the public partner, the E- waste and defective item from Computer Laboratory is being stored properly and were collected as per requirement. The discarded/ written off computers, if repairable, are given at the servicing station and donated to schools in rural area.

Hence, 6 out of 6.25 is credited

TASKS IV: DRAINAGE SYSTEM:

During the inspection, no overflow of water was found in the College. The drainage system is found to be properly maintained especially in the toilets of the first floor. All the waste water is being discharge properly to public drainage system using pipeline on the other side of the College. **Therefore, 6 out of 6.25 is credited.**

TABLE 15: OVERALL RANKING UNDER WASTE MANAGEMENT

TASK	POINTS	
	ALLOTED	GAINED
1) Solid waste management	**6.25**	**6**
2) Liquid waste management	**6.25**	**6**
3) E- Waste Management	**6.25**	**6**
4) Drainage System	**6.25**	**6**
TOTAL	**25**	**24**

B. CARBON FOOTPRINT

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. Each human being is contributing towards adding green-house gases to the atmosphere depending upon his day to day activities and usage of instruments and machineries for different purpose. Release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon footprint. An understanding about the same of any institute where large number of anthropogenic activities are happening is important to assess the contribution of emission of

gases that are responsible for Green House Effect. Auditing for carbon footprint of Mizoram Law College Campus was done using their detailed information, so that the impact of the community on global environment can be assessed.

Major Findings

1. Total number of Students – 189
2. Total number of Teachers – 11 + 17
3. Number of persons using cars - 1 (1.8L fuel per day)
4. Number of persons using two wheelers - 30 (1.2L fuel per day)
6. Number of persons using public transport – 186, 21 km per day, average (1.8L of fossil fuel per day)-50
7. Number of cycles used in the campus– 0
8. LPG usage - 1 Cylinders per month

It is evident that majority of the campus community are relying on public transport system for commutation leading to the expense of 98.6 L of fuel per day. This shall be considered as a very conservative approach. Assuming that 20 persons travel together combined with number of motorcycles and cars lead to the usage of 260L of fuel per day. This causes the emission of about 702kg of CO2 per day. This measurement is excluding the natural emission of CO^2 by human by breathing (ie. 1140g/day). Consumption of one litre LPG releases about 1.5kg of CO2. At the rate of 77.5 cylinders per month the college is using about 3 L of LPG that releases 30kg CO2 per month. The estimated carbon footprint is about 3299 kg per day.

Hence, for this task the college gain 9 out of 10

TABLE 16: OVERALL RANKING OF THE COLLEGE

TASK	POINTS		OVERALL RANKING
	ALLOTED	GAINED	
Land & other infrastructure	**20**	**18.50**	**A+**
Air Quality	**25**	**24**	
Water	**15**	**13**	
Energy Management	**15**	**13**	
Waste management	**25**	**24**	
Carbon Footprint	**10**	**9**	
TOTAL	**110**	**94**	

FINDINGS

SECTION III
GOVT. MIZORAM LAW COLLEGE
WOMEN HOSTEL

A. Land & Other Infrastructure
Task I : Land Survey
Task II : Other Infrastructure

B. Air Quality
Task I : Mode of Transportation
Task II : Contribution to Climate Change
Task III : Ambient Air Quality
Task IV : Ventilation of the rooms

C. Water
Task I : Water harvesting/ Storage

D. Waste Management
Task I : Solid Waste Management
Task II : Liquid Waste Management
Task III : Drainage system

E. Energy Management & Administration
Task I : Sources of Energy in the hostel
Task II : Energy Consumption
Task III : Energy Conservation

A. LAND & OTHER INFRASTRUCTURE TASK I: LAND SURVEY

During the survey, it was informed that planning for development of compost pit for segregation of wet solid wastes and the rain water harvesting is implemented in new building that is under construction. Also, plantation is suggested to be carried out for maintaining the greenery of the facility. Adequate ventilation was provided in the building for proper circulation of air. ETP was also proposed to be constructed for waste water treatment.

TASK II: OTHER INFRASTRUCTURE

There are at present 29 nos of rooms consisting of various sizes and thus differentiated into Type I, II and III respectively with Warden room, Common room, Dining room etc. The

Hostel building is constructed to accommodate about 32 nos. of student. The rooms are provided with adequate number of windows and ventilators to provide the circulation of air and light into the rooms.

Grading for the facility was given based on the present observation, which includes the following criteria ***i.e.,*** building material, and infrastructure, ventilation, maintaining the greenery of the facility, water conservation and drainage system.

TABLE 30: OVERALL RANKING UNDER LAND & OTHER INFRASTRUCTURE

TASK	POINTS	
	ALLOTED	GAINED
1) Land	**10**	**9**
2) Infrastructure Development	**20**	**18**
TOTAL	**30**	**27**

B. AMBIENT AIR QUALITY TASK I: AMBIENT AIR QUALITY:

As the facility is under construction the air quality was monitored on 21st May 2023 and taken as a base line for calculating the ambient air quality of the facility and grading was given based on the result of the ambient air quality days during the above days.

Table 31: Ambient Air Quality during 20th & 21st May 2023

Pollutants monitored	National Standard (µg/m3)	Measured (µg/m3)	Points allotted	Points gained
PM 2.5	100	8	**10**	**9**
PM10	100	11		
NO2	80	4		
SO2	80	1		
CO	11	8		

From the analysis report and the table above, the ambient air quality around the Hostel is below National Standard even during construction stage. As such a good score of **9 out of 10 is credited.**

TASK II VENTILATION:

As stated in the previous sections data on the area of various rooms such as Warden room, Hostel rooms, Dining rooms, Reading room, Common room etc and mechanical ventilation system was collected through measurements in order to find out whether the indoor air is sufficient in all the room.

Table 32 : Ventilation chart

ROOMS	Floor Area (sq. ft)	Vent area (sq.ft)	Opening size (%)
Reading room	192	36	18.75
Warden Room	480	72	15.00
Hostel Room	150	36	24.00
Kitchen & Dining Room	512	108	21.09
Common Room	320	54	16.88

As stated earlier, the opening size of all the rooms are greater than 4%, therefore a score of **9 out of 10 is credited**.

TABLE 33 : OVERALL RANKING UNDER AIR QUALITY

TASK	POINTS	
	ALLOTED	GAINED
1) Ambient air Quality	**10**	**9**
2) Ventilation	**10**	**9**
TOTAL	**20**	**18**

C. WATER

TASK: WATER HARVESTING/ STORAGE

As the facility is under construction, data on the quantity of water supplied via public supply could not be calculated. Four plastic water tank of 2000 L capacity each is installed. **Hence, a score of 13 out of 15 is credited.**

D. WASTE MANAGEMENT

TASK I: SOLID WASTE MANAGEMENT:

It was reported that a compost pit is constructed for the facility for disposal of wet solid wastes within the premises. **The hostel has separated dry waste disposal facility for composting and non-biodegradable waste disposal.**

Points were allotted taking into consideration the construction of the compost pit only.

TASK II: LIQUID WASTE MANAGEMENT & DRAINAGE SYSTEM:

The drainage system was not constructed at the time of the survey. It was found that a soak pit/ septic tank were available for treatment of waste sanitary water. **It is recommended that proper drainage system may be constructed along with Effluent Treatment plant for treatment and disposal of the waste water**.

OVERALL RANKING UNDER WASTE MANAGEMENT

TASK	POINTS	
	ALLOTED	GAINED
Solid waste management	**9**	**7**
Liquid waste management	**9**	**7**
Drainage System	**7**	**6**
TOTAL	**25**	**20**

Table 34 : Overall Ranking in Waste Management.

E. ENERGY / ENVIRONMENTAL MANAGEMENT

It was reported that solar power panels are to be installed in the facility to reduce the consumption of electricity vide public supply**.** Also, the amount of renewable and non- renewable energy consumed could not be calculated as the facility is not inhabited.

During the survey, it was reported that a garden will be developed around the facility to maintain the greenery of the facility. However, at present only natural vegetation covers were found. The Audit team found the land use and infrastructure development of Women Hostel is very satisfactory. As a result, the following points were allotted to each tasks based on physical inspection**.**

TABLE 35: OVERALL RANKING OF THE FACILITY AT WOMEN HOSTEL

TASK	POINTS		OVERALL RANKING
	ALLOTED	GAINED	
1) Land & Infrastructure Development	**30**	**27**	**A+**
2) Ambient Air Quality	**20**	**18**	
3) Water	**15**	**13**	
4) Waste Management	**25**	**20**	
5) Energy & Environmental Management	**10**	**8**	
TOTAL	**100**	**86**	

List of trees:

Sl.No	Scientific name	Local Name
1	*Albizia chinensis*	Vang
2	*Artocarpus lakoocha*	Thei-tat
3	*Averrhoa carambola*	Thei-her-awt
4	*Bacaura ramniflora*	Pang-kai
5	*Bauhinia scandens*	Vau-be
6	*Citrus aurantifolia*	Ser-tawk
7	*Delonix regia*	April
8	*Dendrocalamus sp.*	Raw-nal
9	*Ficus geniculata*	Ri-hnim
10	*Firmiana colorata*	Khau-khim
11	*Gmelina arborea*	Thlan-vawng
12	*Lagerstromia speciosa*	Thla-do
13	*Macaranga denticulata*	Hnah-khar-pa
14	*Macaranga indica*	Hnah-kiah
15	*Mangifera indica*	Thei-hai
16	*Mesua ferrae*	Herh-se
17	*Michelia champaca*	Ngiau
18	*Musa sp.*	Chang-el
19	*Parkia timoriana*	Zawng-tah
20	*Persea americana*	Butter-fruit
21	*Prunus cerasoides*	Tlai-zawng
22	*Schima wallichii*	Khiang
23	*Sterculia villosa*	Khau-pui
24	*Tectonia grandis*	Teak

PHOTO PLATES