Green Aura

Built Environment Sustainability & Transformation

GREEN & ENVIRONMENT AUDIT REPORT | 2020

ADICHUNCHANAGIRI UNIVERSITY

GREEN AUDIT REPORT - 2020

is presented to

ADICHUNCHANAGIRI UNIVERSITY

Nagamangala Taluk, BG Nagara – 571 448

has successfully demonstrated knowledge on Energy conservation, Water conservation, Bio diversity, Waste management, Indoor Environmental quality, Carbon footprint.

09.02.2021

DATE

NISCHAY N
GREEN BUILDING CONSULTANT

Green Aura
Built Environment Sustainability & Transformation

Acknowledgement

Green Audit Assessment team thanks the management of Adichunchanagiri University, for assigning this important work of Green Audit. We appreciate the cooperation to us for completion of study.

Firstly, we would like to pay my obeisance to the almighty and would like to start this audit with blessings of His Holiness **The Hon'ble Chancellor, Param Poojya Jagadguru Sri Sri Sri Dr. Nirmalanandanatha Mahaswamiji** an ardent disciple of His Holiness **Bhairavaikya Jagadguru Padmabhushana Sri Sri Sri Dr. Balagangadharanatha Mahaswamiji.**

Our special thanks are due to:
Hon'ble Vice Chancellor Dr M A Shekar, Pro Vice Chancellor Prof. K. Byrappa, Registrar Dr. C K Subbaraya, Principal Dr. B K Narendra, Prof & Head, Dept. of Civil Engg Dr. T Mahadevaiah

We are also thankful to other staff members who were actively involved in giving us necessary inputs to carry out this very vital exercise for Green Audit.

ADICHUNCHANAGIRI UNIVERSITY

Green Aura
Built Environment Sustainability & Transformation

Submitted to:
The Registrar,
Adichunchanagiri University,
Bengaluru – Hassan National Highway (NH-75),
Nagamangala Taluk, BG Nagara – 571 448,
Mandya District, Karnataka State, India.

Audited by:
Green Aura,
692F,12th A cross Bel layout,
Bengaluru- 560091.

Disclaimer

Green Audit team has prepared this report for Adichunchanagiri University based on input data submitted by the representatives of the University and is complemented with the best judgment capacity of the expert team. While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered. It is further informed that the calculations are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

The detailed Information and analysis presented in this report are valid as on the date of visit and period of study at the site. The work presented represents our best efforts and judgments based on the information available at the time this report was prepared. Green Aura makes no assurances as to the accuracy of any such information or any conclusions based thereon. The observations made in this report are only an indication of the performance of the facility based on our assessment and should not be considered as the comment on the functioning of the facility. The observation is purely based on the data recorded at that point of time.

Green Aura is not responsible for the reader's use of or reliance upon the report, nor any decisions based on the report. Readers of the report are advised that they assume all liabilities incurred by them, or third parties, as a result of their reliance on the report or the data, information, findings and opinions contained in the report.

Executive Summary

Universities and Institutions have broad impacts on the world around them, both negative and positive. A nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with the environment. The activities pursued by University can create a variety of environmental impacts. A clean and healthy environment aids effective learning and provides a conducive learning environment. Adichunchanagiri University is very sensitive to environmental factors as more concepts are being introduced to make them eco-friendly.

Adichunchanagiri University expresses its commitment to sustainability in many ways. It has taken a number of positive steps to reduce its environmental impact. But many areas remain in which substantial improvements can be made. This report serves to highlight Adichunchanagiri University's many accomplishments, and to make recommendations for improving the University's environmental sustainability. The University has conducted the Green Audit and Environment for the year **2020** and strives to maintain eco-friendly atmosphere on the campus.

The aim of the report is to identify scope for improvement and recommend implementable and economically viable solutions in achieving the most optimized utilization of energy and water in the campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Therefore, it is imperative that the University evaluate its own contributions toward a sustainable future.

The initiatives taken by the University to make the campus Ecofriendly:

1. Energy conservation
2. Water conservation
3. Efforts for carbon neutrality
4. Hazardous and E-waste waste management
5. Health and Well- Being
6. Plantation
7. Carbon neutrality and Institutional footprint

University and its constituent college have undertaken various activities through N.S.S. and other activity to create eco-friendly awareness among the students, University and its constituent arranges special programs by inviting the eminent personalities, who in turn train and educate public. Students are encouraged to participate in eco-friendly activities.

Table of Contents

Green Auditing

The term “Green” means eco-friendly or not damaging the environment. This can acronymic ally is called as **'Global Readiness in Ensuring Ecological Neutrality'** (GREEN). 'Green Audit' can be defined as 'systematic identification, quantification, recording, reporting and analyzing of components of ecological diversity and expressing the same in financial or social terms'. 'Green Auditing', an umbrella term, is known by another name 'Environmental Auditing'. To implement the green audit other important aspects such as objective of green audit, Drivers of green audit, future scope, benefits, and advantages are necessary to understand. The green audit practically involves energy conservation, use of renewable sources, rain water harvesting, and efforts of carbon neutrality, plantation. The concept of Green Audit, institutions are using it as a management tool to evaluate the environmental standards; Institution can perform better and better for the sustainable development of the organization. The experiments on the nature by avoiding natural rules, this can be a one major reason behind that is Green Audit.

Adichunchanagiri University - Campus.

Approach & Methodology

During the study, the entire university and its constituent University was visited and studied in detail. The audit involved carrying out various measurements and analysis covering all major energy, water and resource consuming sections, to realistically assess losses and potential for savings. The study focused on improving energy, water resource, waste management and other green initiatives and identifying other saving opportunities. A very simple indigenized system has been devised to monitor the environmental performance of Adichunchanagiri University. It comes with a series of questions to be answered on a regular basis. This innovative scheme is user friendly and completely voluntary. The aim of this auditing report is to help the university set environmental examples for the community and to educate the young learners.

The major areas of study are broadly categorized into:

1. Site Selection
2. Built Environment
3. Water Audit
4. Energy Audit
5. Good Health and Well-Being
6. Waste Management
7. Green Education
8. Transportation

During the audit, there was continuous interaction among the University officials, faculties and students to ensure that the suggestions made are realistic, practical and implementable to allow for possible concurrent implementation.

I. About Adichunchanagiri University

The University is situated in a Lush Green Unitary Campus of 67 acres at B.G. Nagara, Nagamangala Tq., Mandya District, Karnataka on the Bangalore – Mangalore National Highway No. 75, 105 Kms from Bangalore, the Capital City of Karnataka.

The University consists of six Constituent colleges in the disciplines of Medicine, Pharmacy, Nursing, Engineering, Management, Commerce and Education. The environment friendly campus has adequate infrastructure and physical facilities for Academics and Research. The campus possesses around 5000 students, 400 teachers and 1800 support staff.

The University employs a broad range of strategies to achieve its Vision, Mission and Objectives to expand the horizon of World Knowledge, provide instruction, Teaching-Learning, Training, Research and Development at the level of Higher Education in the faculties of Health Sciences, Engineering and Technology, Management and Technology, Humanities & Social Sciences and other Emerging and Thrust areas.

ADICHUNCHANAGIRI UNIVERSITY

Logo of Adichunchanagiri University

Logo of Adichunchanagiri University symbolizes its vision "Education for all with Value Systems of Empathy, Enrichment, Equity, Excellence, Empowerment, Entrepreneurship & Enlightenment to Serve the Society"**.**

i. Campus Details

The University consists of six Constituent colleges in the disciplines of Medicine, Pharmacy, Nursing, Engineering, Management, Commerce and Education. The environment-friendly campus has adequate infrastructure and physical facilities for Academics and Research. The campus possesses around 5000 students, 400 teachers and 1800 support staff.

Adichunchanagiri Institute of Medical Sciences (AIMS) was established in the year 1986 at BG Nagar, near Sri Adichunchanagiri Kshetra with a vision of providing medical education to aspiring students from rural areas. AIMS was inaugurated by the then Honorable Chief Minister of Karnataka, Sri Ramakrishna Hegde on 17th Jan 1986 in the holy presence of Padmabhushana Dr. Sri Sri Sri Balagangadharanatha Maha Swamiji. AIMS has evolved into a prestigious institution in the region since its inception

"Adichunchanagiri Institute of Medical Sciences"

BGS Institute of Technology (BGSIT) is a community that is dedicated for creating tomorrow's engineers and supporting today's pioneers. BGSIT is situated in a lush green and pollution-free environment, which is very much favorable and motivates the students to earnestly pursue their studies. The campus is 90 kilometers away from Bengaluru City known as Silicon Valley of India on the Bengaluru – Hassan – Mangalore National Highway (NH-75). BGS Institute of Technology (BGSIT), BG Nagar was established in 2005, The campus with 21 acres of land is unique in nature and located within a lush green environment. It is situated on Bengaluru-Hassan-Mangaluru National Highway (NH-75) (Alight: Bellur Cross, BG Nagar) and equidistant of 80 kilometers from Bengaluru, Mysuru, Mandya, Hassan and Tumkur.

Fresh oxygen rich air point of great attraction. BGSIT is approved by all Council for Technical Education, New Delhi; affiliated by Visveswaraya Technological University, Belagavi, and recognized by Government of Karnataka. It has the unique distinction of having learned faculty for teaching in respective disciplines. The dynamic and committed faculty and staff ensure high standards of learning and embedding social and ethical values.

"BGS Institute of Technology (BGSIT)"

Adichunchanagiri College of Nursing, The College of Nursing is a Part of Sri Adichunchanagiri Shikshana Trust (R). Adichunchanagiri College of Nursing(ACN) is one of the leading institutions in the country, offering Nursing education at the undergraduate, postgraduate and doctoral level.

Adichunchanagiri College of Nursing was started in the year 1995, Five years after the commencement of Diploma in Nursing Course (1991), Basic B.Sc.(Nursing)course was started in 1995, P.B.B.Sc. Nursing) started in the year 2008 and M.Sc.(Nursing) in Community Health Nursing started in the year 2011 and other M.Sc. Nursing Specialties started in the year 2015. PhD was started in the year 2019-2020 to meet the increasing demands for nursing Graduates in Hospitals, Nursing educational Institutions, Clinics, Industrial Nursing etc.

The success of ACN as an acknowledged institution for quality learning is an outcome of the various facets that give ACN its characteristic value – the faculty, enterprising students, infrastructure facilities and industry partnerships. The Institute is reputed for the outstanding students graduating from its undergraduate and postgraduate programmes. The alumni have distinguished themselves through their achievements and contributions to the industry, academics, research, business, government, and social domains.

"Adichunchanagiri College of Nursing"

Adichunchanagiri College of Pharmacy was started in the year 1981 by Sri Adichunchanagiri Shikshana Trust ® for providing an outstanding professional educational programme in pharmacy. Ten years after the commencement of Diploma course, B. Pharma degree course was started in 1992 to meet the increasing demand for Pharmacy graduates in Pharmaceutical Industries, Hospital Pharmacy, Drug Control Department and R & D department etc. SACCP has a distinctive atmosphere where the emphasis is on teamwork, cooperation, and friendly competition. Smaller student groups in classes lead to students developing closer supportive relationships with each other and faculty members. SACCP provides exceptional campus facilities to serve the needs of the student community.

"Adichunchanagiri College of Pharmacy"

BGS First Grade College, the primary objective of education is to create dynamic leaders in the corporate sector, entrepreneurs, and professionals who contribute to the development of society and nation at large. We are committed to maintaining high academic standards and preparing our students to secure rewarding employment on graduation. At the same time, we believe that S.F.G.C students should develop as individuals, gaining in self-confidence and developing a sense of enterprise.

"BGS First Grade College"

BGS College of Education (BGSCE), We at College of Education produce & develop value-added human resources. BGS College of Education ensures quality teacher education programme with ardent effort supported by high-level facilities of laboratories, library, classrooms, Auditorium, Seminar hall, Sports equipment, spacious playground & free hostel facilities for both male and female etc.

BGS College of Education is equipped with all necessary amenities for Teachers' Education Programme. There are Classrooms, Lecture Hall, Activity Room, Library with adequate number of books for use of the teachers and the students, Learning Resource Centre and rooms for Principal, Faculty, Office and Store. Equipment's for the Geography, Psychology and Work Education laboratories are in place. A full-fledged computer laboratory with all other accessories has also been setup.

"BGS College of Education"

ii. Site details

a. Master Plan

Adichunchanagiri University Campus map

b. Total built-up area of the university

AIMS College Block				
Sr. No	Building Name	Old Exiting Building Up Area (sqm)	New building Build up Area (sqm)	Total Building Build Up Area in (sqm)
1	AIMS College	12,505.20	11801	24,306.20
2	AIMS Library block	2750	4799	7,549
3	Auditorium Block	2882.62	0	2,882.62
4	AIIMS Forensic block	1103	2151	3,254
5	Animal house	372.67	0	372.67
6	AIMS Teaching block	6569.66	0	6,569.66
	Total AIMS college Buildup area			**44,934.15**

Hospital block				
Sl. No	**Building Name**	**Old Exiting Building Up Area (sqm)**	**New building Build up Area (sqm)**	**Total Building Build Up Area in (sqm)**
1	Hospital Block	3436.77	20343	57,779.77
2	Ward Block	0	16820	16,820
3	Casualty block	0	5792	5,792
4	OBG Block	0	1400	1,400
5	OT Block	0	3542	3,542
6	ICU Block	0	1987	1,987
7	OPD 2nd Floor	0	3018	3,018
8	OPD 2nd Floor	0	1138	1,138
9	Medical gas generator	0	374	380
10	OT block to ward block	0	604	604
11	ICU block to ward block	0	806	307
Total Build up Area				**92,767.77**

Residential Block				
Sl. No	**Building Name**	**Old Exiting Building Up Area (sqm)**	**New building Build up Area (sqm)**	**Total Building Build Up Area in (sqm)**
1	AIMS Boys hostel	5480.92	10981	16,461.92
2	AIMS Girls hostel	12246.47	0	12,246.47
3	K B Boys PG Hostel	4361.05	0	4,361.05
4	K B Girls PG Hostel	3647.58	0	3,647.58
5	AIMS Staff quarter	12601.76	0	12,601.76
6	Nursing staff quarter	0	6977	6,977

7	Principal quarter	1253.53	0	1,253.53
8	Vijnatha bhawan	1894.28	0	1,894.28
9	Manasa complex	2328.62	0	2,328.62
10	Bank building	507.99	0	507.99
11	Working women HO	3801.11	0	3,801.11
12	Hospital canteen	351.3	0	351.3
	Total hospital buildup area			**66,432.61**
	Total area in sq. mtr			**2,04,134.53**

BGSIT Building Details		
Sl.No.	**Building Name**	**Roof Top Area (m^2)**
1	CIVIL ENGG BLOCK 1	261.09
2	CIVIL ENGG BLOCK 2	261.09
3	CIVIL ENGG BLOCK 3	261.09
4	GUEST HOUSE BLOCK	266.79
5	STAFF BLOCK	266.79
6	BOYS HOSTEL 1 BLOCK	679
7	BOYS HOSTEL 2 BLOCK	887.58
8	LIBRARY AND ME BLOCK	801
9	WORKSHOP BLOCK	1542.5
10	TEACHING BLOCK	1420
11	CS EC BLOCK	1625
12	ADMIN BLOCK	1826.7
13	Mechanical BLOCK	763
TOTAL roof top area (m^2)		10861.76

II. Built Environment

i. Development Footprint and Green Cover

Adichunchanagiri University has retained some site features to minimize site damage and associated negative environmental impacts such as, greenery within the campus, thereby providing habitat and promoting biodiversity. Top Soil Preservation is done to protect the top soil and control soil erosion, thereby reducing negative impacts to the site and surroundings, Adichunchanagiri University is having a vegetated area of 31.5acre i.e. nearly 50% area in the university and is equally balanced with the building footprint.

Adichunchanagiri University campus development footprint and green cover

University has encouraged to retain the site features of the campus to minimize site damage and associated negative environmental impacts by retaining the existing trees, topography, landscape natural rock, water bodies and channels without any disturbance whatsoever.

ii. Day lighting

University has maintained that all regularly occupied spaces are daylit, thereby improving health and well-being of students & teachers.

Buildings with more opening for daylight

The institution is having more opportunity to save energy in buildings by maximizing the use of daylight there is no need for artificial lighting during daylight hours without causing variation in thermal comfort due to climate and building's design.

A passive architectural design with clerestory window for classrooms

Feeling of space and light in all the labs

It is maintained that all regularly occupied spaces are daylit, thereby improving health and well-being of students & teachers.

Sr.no.	Space	Prescribed Illumination Level (Lux)	Avg.Readings
1	Classroom	150-300	272
2	Lab/workshop	150-300	255
3	Library	200-300	320
4	Lobby	300	330

Please note that the illumination level is monitored only for daylight. Before starting the monitoring process, the artificial lighting fixtures were switched off. Measured with Digital Lux Meter.

Use of Natural light for library

iii. Outdoor Light Pollution Reduction

To Reduce light pollution to increase night sky access and enhance the nocturnal environment. The institute has designed exterior lighting such that no external light fixture emits more than 5% of the total initial designed fixture Lumens, at an angle of 90 degrees or higher from nadir i.e. straight down.

iv. Heat Island Reduction, Non-roof and roof

Urban heat islands" occur when cities replace natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. This effect increases energy costs (e.g., for air conditioning), air pollution levels, and heat-related illness and mortality.

Tree cover to reduce heat island effect

University has implemented measures by planting native, drought-tolerant shade trees and smaller plants such as shrubs, grasses, and groundcover wherever possible to reduce the heat islands to minimize impacts on microclimates and human and wildlife habitats.

Solar panels on roof top

Majority of exposed non-roof impervious areas are under tree cover with open grass pavers and more than 95% of the parking spaces are under cover.

Vertical greenery systems, used as a strategy for urban heat island mitigation.
Solar panels reduced the amount of heat reaching the roof by an incredible more than 35%, keeping a building's roof 5 degrees cooler than portions of a roof exposed to sunlight directly

Native grass for lawn at University to reduce heat island effect

v. Air quality

Air pollution has long term and short term impact on the biotic and abiotic component of the environment. The ambient air quality at the core zone of university was monitored. The study area represents it is very calm environment with very less pollutants which was recorded in portable air quality monitor pollution meter with PM 2.5 detector, the preliminary test PM2.5 range was around 5and it's within the required range of 12.0 so based on the reading Air quality testing was not suggested to the university as the vegetated area is more than the building footprint.

Based on the interaction with building occupants i.e. students and staff members there is no symptoms are often linked to poor indoor air quality such as Dryness and irritation of the eyes, nose, throat, and skin, headache, fatigue, dizziness.

Current Pollutants	Air Quality Scale	Over the past hour
PM_{10} **Excellent**	**Particulate Matter** are inhalable pollutant particles with a diameter less than 10 micrometers. Particles that are larger than 2.5 micrometers can be deposited in airways, resulting in health... **more**	6 6 µg/m³
$PM_{2.5}$ **Excellent**	**Fine Particulate Matter** are inhalable pollutant particles with a diameter less than 2.5 micrometers that can enter the lungs and bloodstream, resulting in serious health issues. The most severe... **more**	3 2 µg/m³
O_3 **Excellent**	Ground-level **Ozone** can aggravate existing respiratory diseases and also lead to throat irritation, headaches, and chest pain.	2 5 µg/m³
NO_2 **Excellent**	Breathing in high levels of **Nitrogen Dioxide** increases the risk of respiratory problems. Coughing and difficulty breathing are common and more serious health issues such as respiratory... **more**	1 2 µg/m³
CO **Excellent**	Carbon Monoxide is a colorless and odorless gas and when inhaled at high levels can cause headache, nausea, dizziness, and vomiting. Repeated long-term exposure can lead to heart disease	1 104 µg/m³
SO_2 **Excellent**	Exposure to Sulfur Dioxide can lead to throat and eye irritation and aggravate asthma as well as chronic bronchitis.	0 0 µg/m³

Air quality index and pollutants details

The values of air quality data are within permissible limits. Regular check on these parameters should be kept.

Teachers can be powerful advocates for creating healthy indoor environments, including improving University indoor air quality. As they are on the front lines, teachers can perceive when IAQ changes affect students and themselves. By being involved in creating a clean and healthy learning environment, teachers can promote health, wellness and academic productivity.

Top Actions Teachers Staff and Health Professionals Can Take to Address to improve Indoor Air Quality is by,

1. Keep ventilation units in classrooms free of clutter
2. Report any IAQ issues and maintenance problems occurring in classrooms and hallways immediately
3. Reduce the number of items made of cloth in your classroom, including furniture, draperies. These materials attract dust mites, which can negatively impact sensitive students
4. Practice chemical management in your classrooms, if appropriate
5. Keep Indoor plants which purifies Indoor air quality

Vegetation inside and outside the building to purify air

III. Water Audit

Water audit is an effective management tool for minimizing losses, optimizing various uses and thus enabling considerable conservation of water, the efforts of the institution in water usage and management is seen through following activities it is satisfactory and no unnecessary water wastage is noticed in the campus.

During the survey, no wastages were observed. The open grounds provide means for water percolation as they are not barren due to ample greenery on campus. The campus has a functional rain water harvesting unit and the water collected is used for campus needs. All the waste water from the campus is treated by a fully functional Sewage Treatment Plant and is reused for gardening purposes in the university.

i. Water Supply and Usage

Water source is bore water college has 5 bore well which satisfies the water demand. Currently water for the institution is sourced from nearby javaranahalli bore well.

ii. Water quality

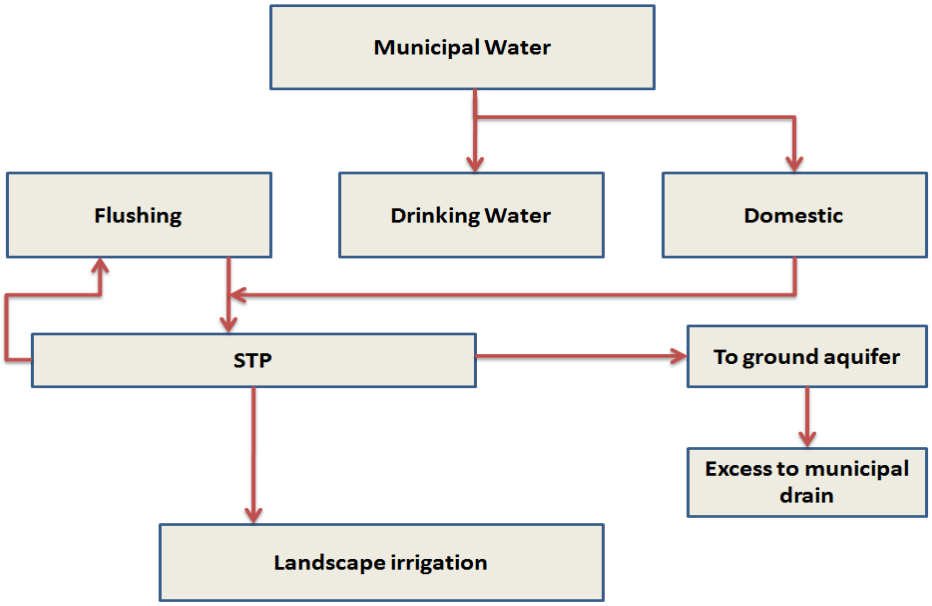
The quality of Bore well water meets the potable water standards. Institution has adopted UV and RO water filtration system in each floor in each block to provide drinking water to the staffs and students

RO water filtration system

iii. Campus Drinking Water quality analysis

Sl No	Parameter	Bureau of Indian Standards (10500-1983) for drinking water quality	Raw Water Quality Analyzed before Treatment	Water Quality Analyzed After RO & UV Treatment
1	pH	6.5-8.5	7.3	7.1
2	EC µmhos/cm at 25°C	2250	1090	550
3	Turbidity NTU	1.0 - 5.0	13	2.2
4	Total Dissolved Solids, (mg/L)	500-2000	720	350
5	Hardness, (mg/L)	200-600	660	340
6	Chlorides,(mg/L)	250-1000	318	220
7	Nitrates, (mg/L)	45	2.4	1.9
8	Sulphates, (mg/L)	200- 400	245	230
9	Iron, (mg/L)	0.3-1.0	0.7	0.6
10	Fluorides, (mg/L)	1.0-1.5	1.5	1.2
11	E.coli, no/100 ml water	Nil	Nil	Nil

iv. Water Balance Chart



v. Rain water harvesting

The institution has planned for rain water harvesting roof method to enhance ground water table and non-roof method is planned by channelizing the rain water to recharge pits.

Total roof run-off volume calculation:

Sr.no	Surface type	Runoff coefficient (c)	Area (m2) (a)	Impervious area (m2) I = (c × a)
1	Cemented roof	.95	10,861.76	10,317.95
Total impervious area in sq. m (Σ I)				10,317.95
Average normal rainfall in m (R)				0.014
Total roof run-off volume in cu.m (Σ I × R)				144.45

The institution has total roof run-off volume of 144.45 cu.m. Institution is having a rain water harvesting tank of capacity 1,50,000.

Rain water harvesting tank

vi. Rain water recharge pit

The institution is having rain water recharge pits to enhance ground water table and also by providing more vegetated area.

6 numbers of recharge pits 15 feet deep Recharge Pit are located in the institution the rain water recharge pit allows the rain water to restore ground water. Considering the catchment area, rate of percolation of the soil and depth of ground water level the recharge pit is made near to the bore well in order to recharge the underground aquifers and help water infiltration in one area. The recharge pit is filled with stones of different sizes at the bottom, from large gaps for the water to pass through a mesh between sand and stones and prevents the sand from escaping. A layer of soil and leaves of plant acts as a filter for pure water which percolates through soil layer and then into bedrock. Thus rain water used for recharging the ground water level

Rain water Recharge Pit

Rain water collection tank**.**

Rain water collection tank**.**

vii. Waste Water Treatment and Reuse

To reduce the dependence on potable water, Institute is having an on-site treatment system to handle 100% of waste water generated in the campus, to the quality standards suitable for reuse, as prescribed by Central (or) State Pollution Control Board, as applicable and Using treated waste water for at least 25% of the total water required for landscaping and flushing purpose. Institution is using 100% for landscaping.

viii. Operation and maintenance:

Proper operation & maintenance of rainwater drain facility has been implemented for their effective use. The following measures will be followed:

a. Inspection of Recharge Pit after every major storm for the first few months after construction. Annual inspection of filter and recharge pits will be conducted.
b. Quarterly cleanouts and removal of debris from all drainage inlets and outlets
c. Periodic removal and disposal of accumulated sediments from rainwater drains running all around the site.

480LPM capacity filter

ix. Quality Control

Measure considered for removal of total suspended solids from Storm water by Periodical cleaning process will be carried out to improve the TSS removal efficiency for both the rain water storage and Recharge Pit.

x. Water Management, as per university green policy

1. The geographic location of the university provides it with unique opportunities and constraints. Being situated in a wetland ecosystem where the rainwater level is very high means plenty of water during the monsoon seasons, presence of rich wetland ecosystem, but with possibilities of flooding and contamination of the existing water sources. At the same time the university faces water shortage during the summer season. The water management policy of the university should reflect these dilemmas.

2. Rainwater harvesting, the buildings constructed in the university should be provided with rain water harvesting facilities and after proper filtration the rainwater could be utilized for ground water recharging and could be stored in shallow ponds. Decentralized storage should be attempted for a university like ours where large underground storage tanks would become impractical.

3. Drainage map of the university should be prepared which would be basis for water shed management and landscaping.

4. Awareness campaigns on reducing the water wastage in the university.

5. Waste water generated by the university should be calculated and treatment plants should be installed. As a beginning, temporary waste water treatment ponds could be constructed for treating grey water, which could be used for gardening purposes.

6. Toilet waste treatment plants should be there in the long terms plans of the university. The presently used concrete toilet pits are unsustainable in this geography and any crack in this construction would lead to the contamination of fresh water sources leading to serious health hazards for the students and staff.

7. The ponds within the campus and the ecosystem around them should be protected. Nets could be installed over the ponds to avoid falling of dead leaves.

IV. Good Health and Well-being.

i. Campus design caters to differently able people

The campus design ensures to caters differently abled and senior citizens. Following measures are being implemented for differently abled and senior citizens,

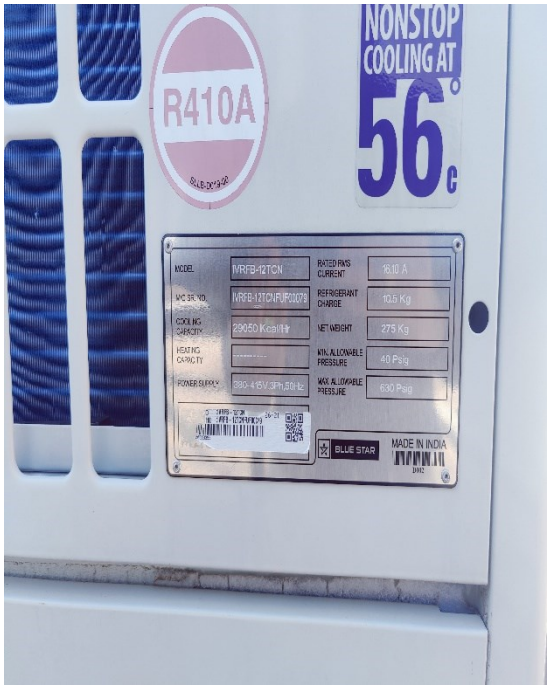
- Non-slippery ramps.
- Lifts with braille assistance.
- Preferred parking for differently abled.
- Wheel chair.
- Uniformity in floor level for hindrance-free movement in exterior common areas
- Easy access to the main entrance of the buildings
- Appropriately designed preferred car park spaces having an easy access to the building's main entrance or closer to the lift lobby

ii. Tobacco Smoke Control

The institution has taken care to eliminate exposure of students & teachers to tobacco smoke thereby reducing health impacts caused due to passive smoking.

iii. Ozone Depletion

The refrigerant selected for the Air Conditioning System eliminates the emission of compounds that contribute to ozone depletion and global warming. The Air conditioning equipment has been selected with HFC based refrigerant R 410A.



iv. Fire suppression system

The main fire suppression system used is hand held fire extinguishers and are Halon free. Institution has not used any Halon based fire suppression system. Carbon dioxide B C Fire Extinguisher.

v. Basic Amenities

Institution has Provide access to basic amenities, so as to reduce negative impacts caused from automobile use and also make it easy for students, basic amenities such as bank, cafeteria, canteen, bus stop in front of the college, railway station within 1.5km and several other basic amenities, within a walking distance of 1 km from the building.

Railway station

vi. Breakout spaces

To enhance physical, emotional and spiritual well-being of campus occupants, the campus has breakout spaces by providing facilities such as, but not limited to gymnasium, yoga, meditation, indoor games, outdoor games, playground, etc.,

Tennis Ground

V. Waste Management Audit.

Institution facilitate segregation of waste at source to encourage reuse or recycling of materials, thereby avoiding waste being sent to landfills. The waste management is in order with the installation of dust bins. The waste is segregated at source by providing separate dust bins for Biodegradable and Plastic waste. Daily cleaning is carried out and most of the non-biodegradable waste is lifted by the City Municipal service.

Various types of chemical waste are collected and disposed by the Department of Chemistry.

The E-waste and defective item from computer lab is being stored properly. The institution has decided to contact approved E- waste management and Disposal facility in order to dispose E-waste in scientific manner. Hazardous Waste, Radioactive Waste not found.

Institution strongly believes in 3R's **Reduce, Reuse** and **Recycle** of waste as follows,

Reduce: Institution has replaced the use of paper in admissions of the candidates, filling of the examination forms, cash book etc. This has drastically helped in reduction of use of paper. The students also encouraged to use both the sides of the paper for writing tests and are asked to use the paper binding for their academic practical records instead of plastic. Notice and circulars are shared to faculty through email.

Reuse: The E-waste and defective item from computer lab is being stored properly. The institution has decided to contact approved E- waste management and Disposal facility in order to dispose E-waste in scientific manner, which can be reused.

Electronic goods are put to optimum use; the minor repairs are set right by the Laboratory assistants and teaching staff; and the major repairs are handled by the Technical Assistant and are reused. BGSIT has entered into MoU with SOGO Synergy which buys our damaged computers and other non-reparable e-waste and issues a Recycling certificate. SOGO Synergy has a State-Of-The-Art Warehouse measuring 20,000 sq. feet meant for storage, dismantling and recycling of electronic waste with the support of latest technology. The equipment which cannot be refurbished for re-use is dismantled and remanufactured into raw materials (i.e. metals, plastics, glass) to be marketed as recyclable. The company assures that the E-waste does not end up in a landfill. It is sent to an agency authorized by Karnataka State Pollution Control Board (KSCB) for disposal, which processes E-waste in a Zero dumping technology. UPS Batteries are recharged / repaired / exchanged by the suppliers. The waste compact discs and other disposable non-hazardous items are used by students for decoration.

The Wet Waste generated from the institution has entered into an arrangement with a local farmer, who collects wet waste and left over food every evening and uses the same as fodder to his live stock.

Farmer collecting the wet waste from the college canteen.

Recycle: The waste management is in order with the installation of dust bins. The waste is segregated at source by providing separate dust bins for Biodegradable and Plastic waste. Students and staff members are given sufficient information regarding the effective management of the waste generated in the campus.

Organic Waste Management

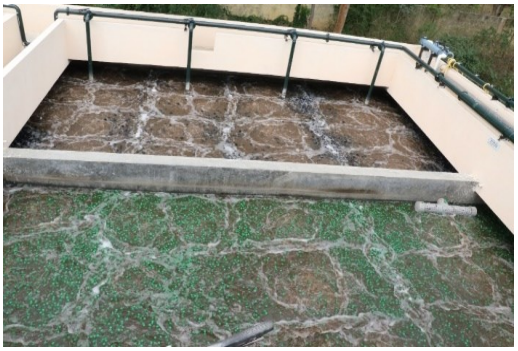
To ensure effective waste management, so as to avoid organic waste being sent to landfills and to improve sanitation & health. Institution has Installed an on-site waste treatment system for handling organic (food and garden) waste generated in the campus, including buildings. The generated manure or bio-gas will be utilized as appropriate.

Institution is practicing organic waste composting method by implementing the pipe composting undertaken to compost the biodegradable waste collected from Boy's Hostel. The raw waste was put to active composting without any source separation and pulverization. It is a kind of vermi-composting, often called Tube Composting, carried out within a PVC tube.

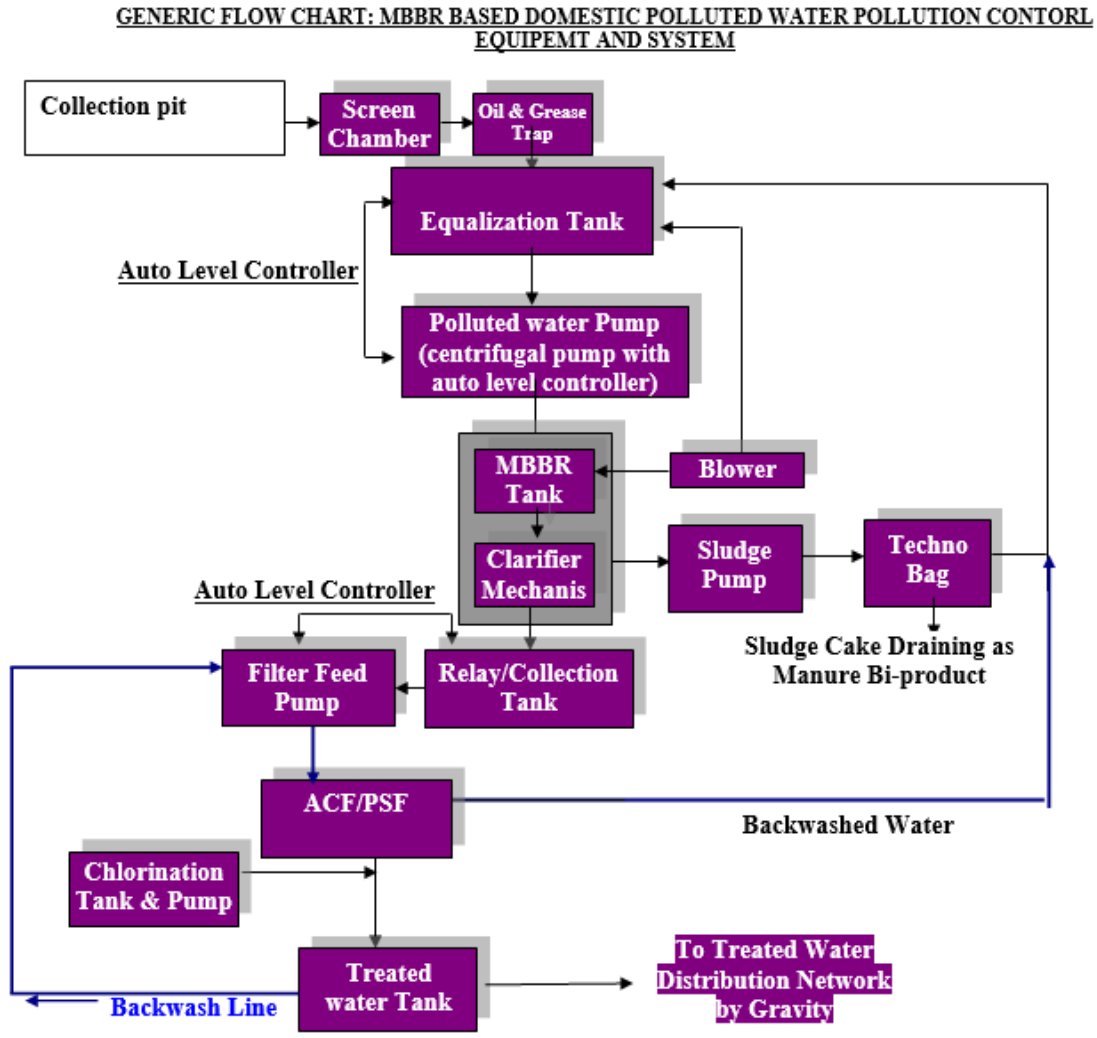
Tube Composting

Sewage Treatment Plant

Institution has designed a sewage treatment plant and will treat waste water to tertiary standards, so as not to pollute the water streams, Sewage treatment plant is provided for 750 KLD capacity of Sewage Treatment Plant advanced technology of MBBR wastewater treatment plant.



MBBR unit in Sewage Treatment Plant. Screening unit in Sewage Treatment Plant.



Hydraulic Flow Drawing for 750kld Sewage Treatment Plant.

Characteristics of Raw Sewage Water

Sl No	Description	Raw Water	Treated Water
1.	Design Capacity	750 KLD	750 KLD
2.	Average Feed Flow	18KL	18KL
3.	Peak/Max. Feed Flow	50KL	50KL
4.	Operating Hours	24 Hours	24 Hours
5.	PH	6.5 – 8.5	6.5 – 8.5
6.	BOD	250 – 400 mg/l	< 20 mg/l
7.	COD	400 – 600 mg/l	< 100 mg/l
8.	TSS	150 – 250 mg/l	< 50 mg/l
9.	Oil & Grease	30 – 80 mg/l	<10

Waste Management plan

Waste Management plan as per university green policy, building up a system though university has implemented Green Protocol and started segregation of wastes, it has still not become fully functional. Efforts should be taken for building up a fully functional system for waste management which should rest on the principles of reduce, reuse, repair, redesign, replenish, refuse, reconsider and recycle.

1. Awareness should be given to the entire university community on waste management and waste segregation.
2. Waste auditing: wastes generated by the university should be audited to ascertain the source, type and amount of waste generated in a year. The yearly action plans should address ways to reduce this waste.
3. The cleaning staff should be authorized to report the increase or decrease in the waste generated by each department and the departments who are able to demonstrate reduction in their levels of waste produced should be honored.
4. The system for waste segregation and storing should be put firmly in place. Segregations should be reorganized into different chambers for storing plastic wastes, e-wastes and other non biodegradable wastes, which could be sold to the vendors during periodic intervals.
5. A panel of vendors, including those who are capable of managing e-waste should be contacted and their periodic removal should be ensured.
6. The fine arts University departments could be approached to find out possibilities of creating works of art from the waste generated from within the

university like, installations, gardens which would ensure the up-cycling of solid wastes.

7. Start reducing the paper wastes (paper recycling unit) through relying more on electronic devices at all levels including governance, examinations, admission, and finance etc. e-governance should be ensured.
8. Bio-gas plants established at the canteen and university hostel premises should be well maintained. The staffs who are managing those plants should be given training about its maintenance. The capacity to create gas from degradable wastes should be explored fully and used in the canteen or hostels.
9. Thumburmuzzhi Model Aerobic composting pit could be constructed to manage the biodegradable waste that could not be put into biogas plants.
10. Incinerators should be installed into all women's toilets and properly maintained. The female students should be given awareness on the use of alternative eco-friendly ways of managing menstruation.

VI. Biodiversity Audit.

A scientific survey of flora and fauna of the campus is carried out covering rainy, winter and summer seasons during 2019-20, this biodiversity audit has revealed more than 1200 trees, various species of Mammals, Aves, Arthropods and Annelids were also recorded. This indicated excellent composition of Flora and Fauna. Many birds are reported in the campus seasonally. Institution has started naming the trees and plants with their botanical name and numbering. Biodiversity audit has revealed different species as follows,

Sr.no	SCIENTIFIC NAME	LOCAL NAME
1	Grevillea robusta	Silver oak
2	Millettia pinnata	Honge
3	Saraca asoca	Ashoka tree
4	Artocarpus Heterophyllus	Jack fruit
5	Rose wood	Beetae
6	Peepal(bodhi)	Arali
7	Phyllanthus	Nelli
8	Mangifera indica	Mango
9	Azadirachta indica	Bevu
10	Melia dubia	Hebevu
11	Swieteniamacrophylla	Mahogany
12	Rubiaceae	Tega
13	Magnolia Champaca	Sampige
14	Citrus x sinensis	Ketale
15	Indian almond	Kadu badami
16	Mulberry	Neralae
17	Ficus drupacea	Goni mara
18	Peltophorum pterocarpum	Copperpod Tree
19	Delonix regia	Royal Poinciana Tree
20	Pithecellobium dulce	Manila Tamarind Tree
21	Azadirachta indica	Neem Tree
22	Moringa oleifera	Drumstick Tree
23	Eucalyptus globulus	Eucalyptus Tree
24	Millingtonia hortensis	Indian Cork Tree
25	Emblica officinalis	Indian Gooseberry Tree (Amla)
26	Dalbergia sissoo	Indian Rosewood Tree
27	Tamarindus indica	Tamarind Tree
28	Tectona grandis	Teakwood Tree
29	Ficus recemosa	Cluster Fig Tree
30	Ficus religiosa	Peepal Tree
31	Ficus benghalensis	Banyan Tree
32	Samanea saman	Rain Tree

Various species of Mammals, Aves, Arthropods and Annelids were also recorded. This indicated excellent composition of Flora and Fauna quite unique considering that the campus is situated in the heart of the city. Many birds are reported to breed in the campus seasonally. Animals and Birds most observed are as follows:

	Sr. No.	Common Name	Species
Birds	1	House Sparrow	Passer domesticus
	2	Great Egret	Ardea alba
	3	Rosy Starling	Paster roseus
	4	Large Grey Babbler	Turtoides malcolmi
	5	Alpine swift	Apus melba
	6	Common Cuckoo	
	7	Common Myna	
	8	Pigeon	Columbidae
Reptiles	1	Indian cobra	Naja naja
	2	Graceful racer	Platyceps gracilis
	3	Indian saw scaled viper	Echis carinatus
	4	Indian python	Python molurus
	5	Indian Green Keelback	Rhabdophis plumbicolor
	6	Common Bronzebeck tristis	Dendrelaphis tristis
	7	Indian Chamaleon	Chamaelaeo zeylanicus
	8	Oriental rat snake	Ptyas mucosa
	9	Common cat snake	Boiga trigonata
	10	Indian Palm Squirrel	
Arachnids	1	Scorpion	Heterometrus fulvipes
	2		Hottentota tamulus
Insects	1	Sphinx moths	
	2	Common Gull	Cepora nerissa
	3	Common grass yellow	Eurema hecabe
	4	Lemon migrant	Catopsilia Pomona
	5	White orange tip	Ixias Marianne
	6	Common Jay	Grapium doson
	7	Peacock pancy	Junonia almanac
	8	Common crow butterfly	Euploea core
	9	Lesser grass blue	Zizina otis
	10	Forget Me Not	Catochrysops Strabo
	11	Common Mormon Swallowtail	Papilio polytes
	12	Lime Swallowtail	Papilio demoleus
	13	Lime blue	Chilades lajus
	14	Grasshopper	Poekilocerus pictus
	15	Blue Tiger	Tirumala limniace
	16	Common evening brown	Melanitis leda
	17	Ants, Bees and Wasps, Sawflies etc	

VII. Transportation.

Vehicles are one of the largest contributors to both energy use & environmental pollution. The institute has encouraged students & teachers to adopt environment friendly transit systems to minimize Environmental impact from automobile use.

i. Pedestrian Network

To Encourage safe and comfortable walking experience by providing well designed interconnected pedestrian network within the campus between main buildings and basic amenities, with proper shading and adequate illumination levels.

Keeping campus occupant's safety as a priority, considering National highway as a risk factor while commuting between campus. Institution has come up with subway, which is an alternative route which avoids main road also it is less congested, environmental friendly and simply more scenic and enjoyable.

ii. Sustainable Transportation

Institution has provided access to Sustainable Transportation by providing Shuttle service and Public transport.

Sustainable transportation through Electric car, to travel inside the campus.

VIII. Observation and Recommendation

Observations of the Green Audit

1. Signages have been well maintained at all applicable places in all campuses
2. Paper consumption is monitored in all buildings
3. Waste bins/containers are available at appropriate places. Separate bins are kept for different types of wastes. Waste quantity is monitored
4. E-waste is returned to suppliers for disposal
5. Used Lead-acid batteries are returned to manufacturers or their agents during replacement
6. More 500 number of saplings are planted as a part of NSS and other activity in and around the campus
7. Environment friendly cleaning agents were used for cleaning of floors and toilets at all the campuses
8. Oil cans stored are provided with secondary containment in all campuses
9. Fire-extinguishers are periodically refilled in all campuses
10. Mock drills are carried out towards fire emergencies
11. First aid kits are available in all campuses on each floor at convenient places and monitored for availability of all the items
12. University is successfully implementing majority of the suggestions and recommendation provided in previous 3 years' audit.

Recommendation

1. Training on sustainability should be provided.
2. Mock drills are carried out for other emergencies (snake bite, fall from height, electric shock)
3. Energy monitoring to be done strictly by conducting energy auditing every year.
4. Energy saving measures to be followed by using LED instead of T12 tube & T8 tube light
5. Energy star rated appliances usage to be made mandatory
6. Every year Environmental Day, Earth Day and Water Day to be celebrated to create awareness about Environment.
7. Plantation activities to be followed in regular intervals to increase the green coverage area in and around the campus.
8. Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.
9. Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations
10. Renovation of cooking system in the canteen to save gas by installation solar water heater system with heat pump.
11. Ensure participation of students and teachers in local environmental issues.
12. Tree ownership can be given to employees


Green
Aura
Built Environment Sustainability & Transformation