GLA UNIVERSITY
MATHURA

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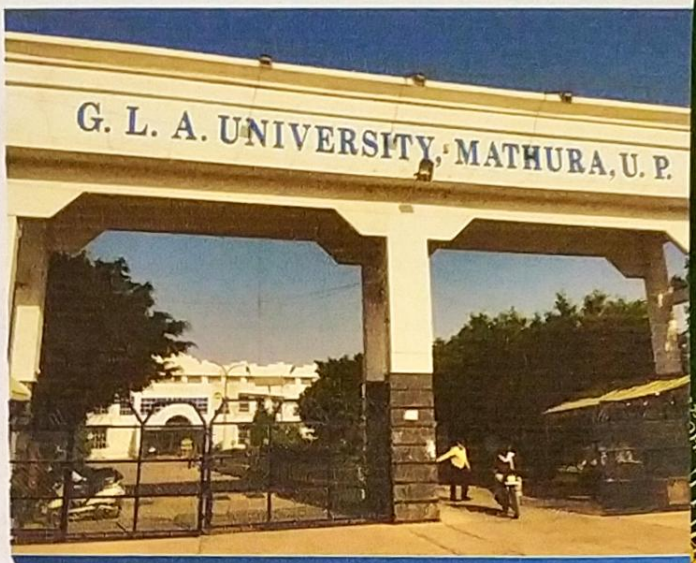

GREEN AND ENVIRONMENT AUDIT

2020

A-Z ENERGY ENGINEERS PVT. LTD.

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For A-Z Energy Engineers Private Limited

Director

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1. Executive Summary

A nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. A clean and healthy environment aids effective learning and provides a conducive learning environment. Educational institutions now a day are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly. To preserve the environment within the campus, various viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc. The activities pursued by university can also create a variety of adverse environmental impacts.

Environmental auditing is a process whereby an organisation's environmental performance is tested against its environmental policies and objectives.

Green audit is defined as an official examination of the effects a university has on the environment. As a part of such practice, internal environmental audit (Green Audit) is conducted to evaluate the actual scenario at the campus.

Green audit can be a useful tool for a university to determine how and where they are using the most energy or water or resources; the university can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Green auditing and the implementation of mitigation measures is a win-win situation for all the university, the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. Green auditing promote financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers.

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. Thus it is imperative that the university evaluate its own contributions toward a sustainable future. As

environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

In GLA university-Mathura the audit process involved initial interviews with management to clarify policies, activities, records and the cooperation of staff and students in the implementation of mitigation measures.

This was followed by staff interviews, review of records, observation of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the green auditing process in the university.

The baseline data prepared for the GLA University will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development of the university. Existing data will allow the University to compare its programmes and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects. We expect that the management will be committed to implement the green audit recommendations.

Water is a very precious commodity and merely by un-restricted drawing of water from bore wells and its very low subsidized tariff from municipal authority is a main impediment in water conservation in India.

Though, water is renewable and is replenished through water cycle but increasing population and industrial requirement are posing a very serious threat on availability of water for all on the Earth.

It is excellent that the management of GLA University and other staff has great respect for sustainable living and are always acting at the right time for remedial measures for protection of Environment and ultimately caring for Society by reduction of resource use.

The Mantra followed is ***REDUCE-REUSE AND RECYCLE.***

Water Use Study

During audit, it has been seen that a lot of work for conservation of water has already been taken. It has been observed that annual water used in university is well within limits as per National Building code in vogue. After going through detailed use pattern it has been found that though NBC-2016 standard use pattern are met but there is still potential for reduction of water use to an extent of 50% for reaching typical peer practice and it can be further reduced to an extent of 70 % for reaching best practiced water use standards.

The following points needs attention and required to be addressed. The saving targets should be fixed for next 12 months and practice of recording and reviewing of water use on day to day basis for pointing out any sudden variation.

- All plumbing fixtures should be replaced with water efficient fixtures.
- All cisterns be replaced with dual mechanism cisterns so that water can be used efficiently as per requirement.
- Awareness program should be started for staff as well as students through seminars and workshops.
- Rain Water harvesting system be improved as per Ground water board standards
- Training of maintenance staff should be periodically conducted.
- Water Meters should be got provided for individual uses.
  a. At Water Bore well
  b. Chemistry Lab and other Lab.
  c. Canteen
  d. Water used for Landscaping.
  e. Individual Hostels
- Turf area need to be optimized for reducing water consumption.
- Water conservation target over the present consumption should be fixed by top management and action for meeting these reductions be initiated.
- There should be stickers and bills for water conservation pasted in university premises.
- Students should also be involved along with all stake holders for water conservation.
- Double stack system should be used, that is water used for hand wash and sinks etc. should be collected in underground tanks and then should be re-used for flushing and other requirements.

2. Introduction

VISION

GLA university envision itself as a pace-setting university of Academic Excellence focused on education, research and development in established and emerging professions.

MISSION

To impart quality professional education, to conduct commendable research and to provide credible consultancy and extension services as per current and emerging socio-economic needs.

To continuously enhance and enrich the teaching/learning process and set such standards, education and otherwise, that other institutes would want to emulate.

To be totally student-centric, thus promoting the overall growth and development of intellect and personality of our prime stakeholders, namely students, so that our alumni are worthy citizens and highly sought-after professionals worldwide.

To empower the members of faculty and staff so that the university's ambience is one of harmony, mutual respect, cooperative endeavour and receptivity towards positive ideas.

To proactively seek regular feedback from all the stakeholders and take appropriate measures based on them thus leading to excellent learning process be totally student-centric, thus promoting the overall growth and development of intellect and personality of our prime stakeholders, namely students so that alumni of GLS are worthy citizens and most sought after-professionals worldwide.

Presently there are more than 10000 students studying in different streams with 650 staff, teaching and non-teaching. It is with great efforts of management, that efforts towards improved environmental sensitization and sustainable practices are given consideration and the consistent efforts are there for due consideration of Society and environment or can be said that every decision is taken in a way that there is minimum impact on people and planet by the activities GLA university.

3. Environmental & Green Policy

Policy Statement

The GLA University, Mathura is committed to managing its estates in accordance with responsibilities to the environment. These responsibilities shall be demonstrated within the following areas as a minimum:

1.1 **Tobacco Free premises:** The university administration pledges to make the premises totally tobacco free. No tobacco products shall be allowed to inside the University campus.

1.2 **Purchasing:** In purchasing its services, materials, equipment and consumable items, the university will, where possible, purchase items produced in ways which do least environmental harm, which are not supplied with excessive packaging; which are benign or at least harmless in their effect on the environment. Where possible, preference will be given to local or regional suppliers to maximize the university input to the local community as well as reduction of environmental impact due to transportation.

1.3 **Cleaning**: The GLA University shall use cleaning products based on environmental considerations as well as cost and suitability. It will monitor its working practices with a view to administering dosages so as to reduce the risk of over concentration and excess residue of unused cleaning mixtures finding their way into piped waste disposal systems.

1.4 **Waste Disposal and Recycling:** The University, will seek to minimize its generation of waste by reduction of purchased materials where this does not compromise its primary functions, or by re-use of materials within or outside the university campus. Where reduction or re-use is not feasible, materials will be recycled wherever possible.

1.5 **Energy**: The University is environmentally responsible for its use of energy, and will therefore consider the sources, type, origin and destination of energy input and output throughout the University. This will require careful monitoring of consumption, the elimination of excessive or unnecessary use, and an ongoing program of energy conservation. Renewable energy solar PV plants shall be installed and in future also efforts shall be made to use renewable energy to the extent possible for mitigation of impact of energy use by university on environment.

1.6 **New Build and Building Refurbishment:** The University will ensure that whenever new construction or refurbishment, work is planned and executed in a manner which reflects environmentally-responsible approaches defined by the National Building Code-2016.

1.7 **Green Travel Plan**: The University actively promotes the use of public transport, walking and cycling. The University, owns vehicles and requires staff where possible to use public transport when on University assignments. This plan is regularly reviewed. The travel of students shall also be encouraged through public transport for those who are not using shared university buses for commuting to and from university.

1.8 **Food Policy** : The University, will ensure that decisions pertaining to the purchase of food, together with the use and disposal of plastic crockery/cutlery, should at all times include environmental implications as well as such factors as cost and nutritional value.

1.9 **Environmental Rules and Guidelines**: The University commit to ensure compliance to extant pollution control and other applicable environmental guidelines.

1.10 **Water Use**: The University intends to promote optimization of water use by avoidance of wastage, treatment and re-use of black water for other possible uses.

1.11 **The university also commits for Plastic free environment in university premises.**

The policy shall be reviewed annually or as per requirement.

4. Description of Campus

Total Campus Area

Covered Area Chart for GLA University			
S. No.	**Building type**	**Area**	**Unit**
1	Academic Buildings	81770.26	Sq.mts
2	Hostel Area	112241.31	Sq.mts
3	Residential Area	13681.54	Sq.mts
	Total Built up Area	**207693.11**	

GLA UNIVERSITY DETAIL OF BUILDING			
(A) ACADEMIC AREA			
S.NO.	BUILDING NAME	COVD.AREA SQM.	STATUS
01	Administrative Block	2660.00	Complete
02	Academic Block I	8502.42	Complete
03	Academic Block II	6286.56	Complete
04	Academic Block III	7153.51	Complete
05	Academic Block IV	6342.80	Complete
06	Academic Block V	3820.00	Complete
07	Academic Block VI	4533.24	Complete
08	Academic Block VII	5684.80	Complete
09	Academic Block VIII	7103.96	Complete
10	Academic Block IX	9312.72	Complete
11	Academic Block X	9312.72	Complete
12	Auditorium Hall	2787.09	Complete
13	Workshop	1708.34	Complete
14	General Nursing & Midwifery Prog.	4576.92	Proposed
15	Nurse & Midwives Prog.	1985.18	Proposed
	TOTAL	81770.26	

(B) HOSTEL AREA			
S.NO.	BUILDING NAME	COVD.AREA SQM.	STATUS
01	Office of Catering manag.	256.23	Complete
02	A Block Hostel	3675.00	Complete
03	A Block Mess	211.01	Complete
04	B Block Hostel	3675.00	Complete
05	B Block Mess	211.01	Complete
06	C Block Hostel	3675.00	Complete
07	C Block Mess	211.01	Complete
08	D Block Hostel	4566.33	Complete
09	D Block Mess	211.01	Complete
10	E Block Hostel	6394.76	Complete
11	E & F Block Mess	1796.40	Complete
12	F Block Hostel	6394.76	Complete
13	G Block Hostel	7354.16	Complete
14	H Block Hostel	7354.16	Complete
15	G & H Block Mess	2384.69	Complete
16	I Block Hostel	7354.16	Complete
17	J Block Hostel	7354.16	Complete
18	I & J Block Mess	2384.69	Complete
19	Godawari Hostel	6208.88	Complete
20	Kalpana Chawla Hostel	3580.14	Complete
21	Yamuna Girls Hostel	6391.92	Complete
22	Ganga Girls Hostel	6391.92	Complete
23	Yamuna & Ganga Mess	2059.36	Complete
24	Boys' Hostel Wing-1	2472.48	Complete
25	Boys' Hostel / Dor. Wing.-2	3178.93	Complete
26	Boys' Hostel/Mess Wing-3	5223.16	Complete
27	Boys' Hostel Wing-4	3614.96	Complete
28	Boys' Hostel/Mess Wing-5	7656.02	Complete
	TOTAL	112241.31	

(C) RESIDENTIAL AREA

S.NO.	BUILDING NAME	COVD.AREA SQM.	STATUS
01	Vice - chancellor	198.44	Complete
02	Servant & Driver Room	113.02	Complete
03	Residential Block I	527.31	Complete
04	Residential Block II	527.31	Complete
05	Residential Block III	527.31	Complete
06	Class 3rd Staff Building	243.49	Complete
07	Residential Block IV	401.25	Complete
08	Residential Block V	752.52	Complete
09	Residential Block VI	816.42	Complete
10	Residential Block VII	1363.52	Complete
11	Residential Block VIII	1596.24	Complete
12	Residential Block IX	1596.24	Complete
13	Residential Block X	1591.28	Complete
14	Staff Office Block	543.70	Complete
15	Canteen	411.20	Complete
16	Canteen - 2	992.48	Complete
17	Generator Room	52.54	Complete
18	Generator Room - 2	211.50	Complete
19	Generator Room - 3	446.27	Complete
20	Faculty	769.50	Complete
	TOTAL	13681.54	
	GRAND TOTAL		
	(A+B+C)	207693.11	

Pre Audit meeting

A pre-audit meeting provided an opportunity to reinforce the scope and objectives of the audit and discussions were held on the practicalities associated with the audit. This meeting is an important prerequisite for the green audit because it is the first opportunity to meet the University concerned personnel for audit and deal with any concerns.

Management's Commitment

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

Scope and Goals of Green Auditing

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of economical, financial, social, environmental factor. It is necessary to conduct green audit in university campus because students become aware of the green audit, its advantages to save the planet and they become good citizen of our country. Thus Green audit becomes necessary at the university level.

A very simple indigenized system has been devised to monitor the environmental performance of GLA University. It comes with a series of questions to be answered on a regular basis. This innovative scheme is user friendly and totally voluntary. The aim of this is to help the institution to set environmental examples for the community, and to educate the young learners.

5. Benefits of the Green Auditing

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

6. Target Areas of Green Auditing

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

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

Auditing for Water Management

Water is a natural resource; all living matters depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. We need to use water wisely to ensure that drinkable water is available for all, now and in the future.

A small drip from a leaky tap can waste more than 180 litters of water to a day; that is a lot of water to waste - enough to flush the toilet eight times! Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water. It is therefore essential that any environmentally responsible institution examine its water use practices.

7. Water Audit

About Audit Location

Water audit was conducted in GLA University campus. There are nearly 10000 students studying in campus and out of which 5000 students residing in hostel.

There is ample awareness of management of university campus towards sustainability. Management of university is very instrumental in spearheading movement of sustainable practices in running of university and also facilitating dissemination of these practices to all students studying in this campus. It is through support of management and active involvement of other stake holders and staff members that this university has many accolades to be a matter of pride for all concerned.

In all matters of resource use, there is effective implementation of 3R's. Reduction of resource use, recycling of resources and also re-use. It is for attaining objectives of sustainability.

Introduction

Why conserve water:

Water is the most precious of all resources, to sustain it, is to preserve life. However, the careless attitude towards the misuse of fresh water linked with its growing scarcity caused by population growth and climate change, suggests that rational use of water and the adoption of conservation measures are urgently needed.

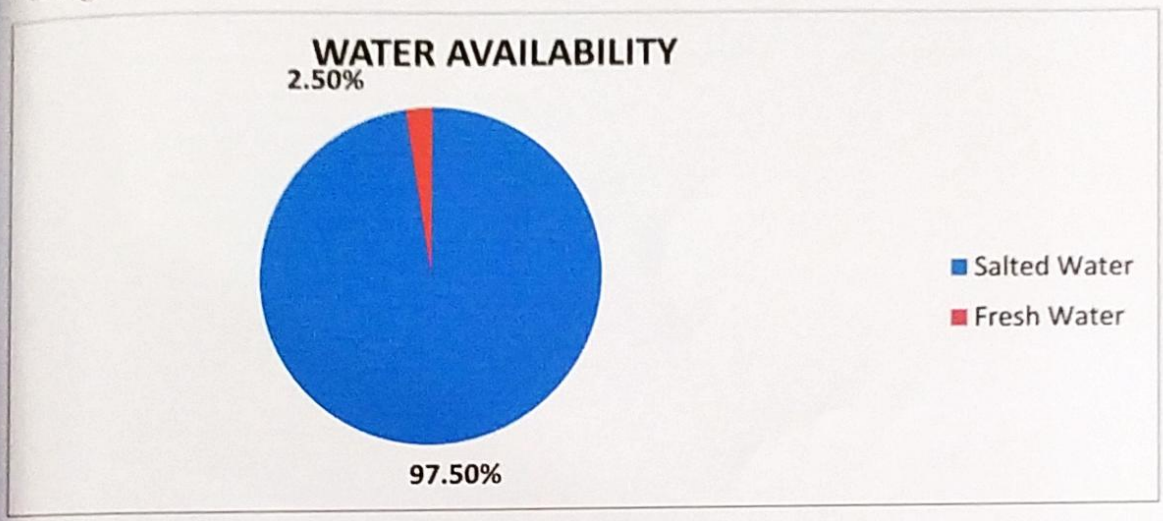
To sustain this valuable resource, it is imperative to first understand how and where water is used in university buildings and compare this consumption with benchmarks. This would enable the sector to realize the water saving potential that exists and help in devising effective strategies to achieve it.

For years freshwater supplies have been assumed to be an inexhaustible resource, strongly depending on its regenerative capacity offered by the naturally occurring water cycle. Our planet contains a finite quantity of water, where 97.5% of the supply can be found within the oceans in the form of saltwater and only 2.5% is fresh.

Most of this freshwater is difficult to access, in the form of ice within the Polar Regions and mountains or groundwater. Only 0.01% of all water on Earth is useable by ecosystems and humans

There are also a number of human-induced factors which are affecting the quality and quantity of global freshwater resources.

- Increase in demand due to population growth leading to over exploitation of water sources.
- Degeneration of water quality due to human activities such as deforestation, urban growth, industrial and agricultural practices.
- Change in rainfall patterns due to global warming and climate change.



Why consider water conservation in university buildings?

- Environmental conservation: Reducing dependence on mains water supply can reduce the strain on an increasingly scarce resource.
- Future legislation: The government is currently reviewing its policy for setting targets for water consumption. It is only a matter of time before mandatory regulations are introduced.
- Social responsibility: Universitys have a role to play and can lead by example.
- Reduced water bills: Efficient use of water within university buildings will lead to reduced water bills as well as low energy bills.

Hence, all new and existing university buildings/university campuses should attempt to close the loop within the water cycle.

- Precipitation falling on sites should in theory re-charge aquifers and natural waterways.
- Water entering a university building should be used efficiently, in order not to diminish its source, and returned to the natural environment in a state that enhances aquatic habitat.
- If contamination occurs, the building should provide the necessary treatment to remove pollutants.

To achieve the above objectives, it is essential to understand where and how much water is used within the university buildings.

Table 1 Water Requirements for Buildings Other than Residences
(*Clause* 4.1.2)

Sl No.	Type of Building	Domestic Per Day litre	Flushing Per Day litre	Total Consumption Per Day litre
(1)	(2)	(3)	(4)	(5)
i)	Factories including canteen where bath rooms are required to be provided	30 per head	15 per head	45 per head
ii)	Factories including canteen where no bath rooms are required to be provided	20 per head	10 per head	30 per head
iii)	Hospital (excluding laundry and kitchen) (see Note 2):			
	a) Number of beds not exceeding 100	230 per head	110 per head	340 per head
	b) Number of beds exceeding 100	300 per head	150 per head	450 per head
	c) Out patient department (OPD)	10 per head	5 per head	15 per head
iv)	Nurses' homes and medical quarters	90 per head	45 per head	135 per head
v)	Hostels	90 per head	45 per head	135 per head
vi)	Hotel (up to 3 stars excluding laundry, kitchen, staff and water bodies	120 per head	60 per head	180 per head
vii)	Hotel (4 star and above) excluding laundry, kitchen, staff and water bodies	260 per head	60 per head	320 per head
viii)	Offices (including canteen)	25 per head	20 per head	45 per head
ix)	Restaurants and food court including water requirement for kitchen			
	a) Restaurants	55 per seat	15 per seat	70 per seat
	b) Food court	25 per seat	10 per seat	35 per seat
x)	Clubhouse	25 per head	20 per head	45 per head
xi)	Stadiums	4 per head	6 per head	10 per head
xii)	Cinemas, concert halls and theatres and multiplex	5 per seat	10 per seat	15 per seat
xiii)	Schools (Educational institutions:			
	a) Without boarding facilities	25 per head	20 per head	45 per head
	b) With boarding facilities	90 per head	45 per head	135 per head
xiv)	Shopping and retail (mall)			
	a) Staff	25 per head	20 per head	45 per head
	b) Visitors	5 per head	10 per head	15 per head
xv)	Traffic terminal stations (see Notes 3 and 4)			
	a) Airports	40 per head	30 per head	70 per head
	b) Railway stations (Junctions) with bathing facility	40 per head	30 per head	70 per head
	c) Railway stations (Junctions) without bathing facility	30 per head	15 per head	45 per head
	d) Railway Stations (Intermediate) with bathing facility	25 per head	20 per head	45 per head
	e) Railway Stations (Intermediate) without bathing facility	15 per head	10 per head	25 per head
	f) Interstate bus terminals	25 per head	20 per head	45 per head
	g) Intrastate Bus Terminals Metro Stations	10 per head	5 per head	15 per head

NOTES

1 For calculating water demand for visitors, consumption of 15 litre per head per day may be taken.

2 The water demand includes requirement of patients, attendants, visitors and staff. Additional water demand for kitchen, laundry and clinical water shall be computed as per actual requirements.

3 The number of persons shall be determined by average number of passengers handled by stations, with due considerations given to the staff and vendors who are using these facilities.

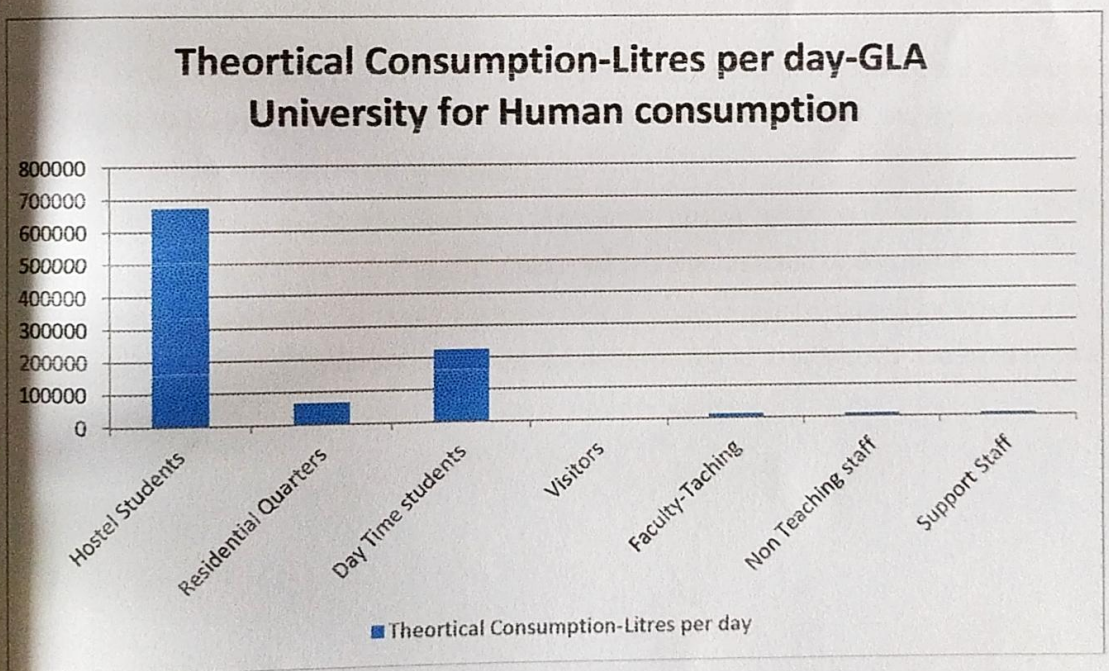
4 Consideration should be given for seasonal average peak requirements.

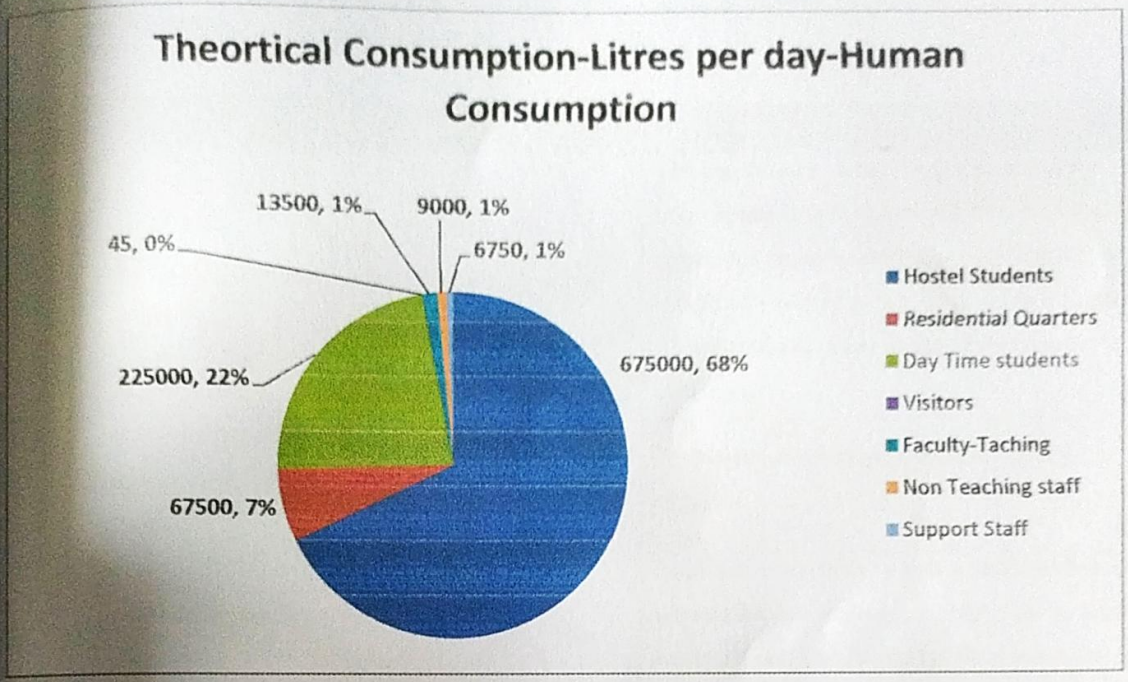
5 The hospitals may be categorized as Category A (25 to 50 beds), Category B (51 to 100 beds), Category C (101 to 300 beds), Category D (301 to 500) and Category E (501 to 750 beds).

4.1.5.2 The water demand for landscaping purposes is generally taken as 6 to 8 litre/m^2/day for lawns. For shrubs and trees the above value can be reduced considerably.

Theoretical daily and annual Consumption of water -GLA University

S. No.	Type of Occupants	Stay - Hrs.	No. of Occupants / Visitors	Full Time Equivalent	Water Consumption as per NBC-Norms	Theoretical Consumption -Litres per day	No. of days in year	Annual Consumption in kL
1	Hostel Students	24	5000	5000	135	675000	275	1,85,625.00
2	Residential Quarters	24	500	500	135	67500	365	24,637.50
3	Day Time students	8	5000	5000	45	225000	250	56,250.00
4	Visitors	1	24	3	15	45	250	11.25
5	Faculty-Teaching	8	300	300	45	13500	275	3,712.50
6	Non Teaching staff	8	200	200	45	9000	300	2,700.00
7	Support Staff	8	150	150	45	6750	300	2,025.00
			Total			**996795**		**2,74,961.25**





From Pie Chart it is observed that 68 % of total annual water consumption-Theoretical allowance is in Hostels due to 24 hour stay of students and it is followed by day time occupants like students and faculty members and residential quarters consumption.

The maximum conservation opportunities lie in these areas. Special attention should be given in Hostel and there should be regular water leak audits conducted and report should be documented.

As presently data for extraction of water is not available, it is recommended that all input source of water should be metered and the consumption pattern should be reviewed daily/weekly and monthly and any significant deviation in consumption should be immediately addressed.

8. Observations

Sr.No.	Observation/Parameters	Yes/No	Recommendations
1	Is there any bench mark for water use	No	The bench mark should be got prepared for improvement on the basis of NBC-2016 and fixing targets for improvement. The consumption of water should be adjusted as per variation in occupancy whenever there is any change in occupancy is envisaged.
2	Is consumption of water as per NBC-2016 standard for use of water as applicable	DNA	Further reduction targets should be fixed for reduction
3	Is the water use monitored and recorded.	No	Establish procedures so that a staff member is responsible for reading your meter daily, analyzing water use and knows what to do if water use changes unexpectedly. Record the data.
4	Is the water conservation opportunities identified	No	The water audit recommendations should be followed for exploring opportunities.
5	Are there any signs, posters or stickers in university premises to encourage water efficiency and remind students to report leaks?	No	Suitable water conservation stickers and bills should be displayed conspicuously for creating awareness
6	Is there any system in place where leaks are specifically checked during special drives for any leaking /damaged pipes, taps or cisterns etc.	No	There should be a written periodical program for addressing any type of leaks in water lines.
7	Is there any water management team to review water use?	No	Establish a water management team and meet regularly to review use and identify water saving opportunities. Consider involving students, teachers, administrative staff and even parents, visitors and volunteers.

8	Have you developed a water management plan?	No	Use the results of this checklist and your water audit to develop a water action plan, set goals for water savings and promote this throughout the university.
9	Have you installed sub-meters in high water using areas?	No	Consider installing sub-meters in high water using areas and monitor regularly to know accurately where water is used and identify any problems specially for external water use, individual hostels, kitchen/canteen such as leaks or other anomalies
Sr.No.	**Observation/Parameters**	**Yes/No**	**Recommendations**
	Amenities		
1	Is the water efficient showers installed in toilets?	No	install flow regulators to reduce flow to at least 9L/min Also consider shower timers by restricting the time of shower used by students through awareness and displaying stickers and bills and regular briefing through concerned members of staff.
2	Are the taps in hand basins are water efficient?	No	Install flow regulators to reduce flow to at least 4.5L/min: If taps are used only for hand washing, consider a flow rate as low as 1.7L/min for super efficiency.
3	Do cleaners hose down amenity areas?	No	If you must use a hose ensure it has a water efficient trigger nozzle.
4	Does your University have single flush toilets?	Yes	consider replacing single flush toilets with 6/3L or 4.5/3 L dual flush models, specially being a girls university there is always a huge saving potential because through awareness students can be encouraged to use low quantity flushing only in case of using WC as urinal as is the case most time of use of toilet.
5	Does your University have dual flush toilets?	No	Same as point No.4 above.

6	Do you have a single tank on the wall or urinal flusherette system?	yes	Ask maintenance staff to check the flow rate and flush timing. Over time wear will cause excessive flush volumes. Insert flow regulators into valve bodies to reduce flow.
7	Does your University have any cyclic flushing urinals?	No	Still considering replacement with manually flushing urinals, automatic sensor units or ultra-low-flow or waterless urinals for Gents toilet.
Sr.No.	**Observation/Parameters**	**Yes/No**	**Recommendations**
	Canteen, Mess, Hand Wash Area		
1	Are taps in kitchens water efficient?	No	If No, install 7.5L/min flow restrictors on kitchen/art room sinks. **Tip: Pre-rinse spray nozzles in kitchens can use less than 6L/minute and make it easier to rinse and clean dishes.**
2	Do Kitchens have water efficient dishwashers?	No	Consider using water efficient model dish washer. You will save money through water and energy savings.
3	Do staff leave taps running while they are cooking and cleaning?	No	Still, install stickers to remind staff to turn off taps. Consider installing sensor taps.
	DNA : Data not available		
Sr.No.	**Observation/Parameters**	**Yes/No**	**Recommendations**
	Outdoor areas		
1	Has appropriate staff completed the Water Conservation training	No	Ensure appropriate staff complete the Water conservation training.
2	Do campus sub-meter irrigation water supply?	No	Consider installing sub-meters to determine water use and identify any leaks, and monitor regularly.
3	Are you watering on your allocated watering days?	No	If No, make sure you are watering on your allocated watering days. Make schedule of watering
4	Do you improve your soils? Y	No	Improving soil quality can improve plant growth and water retention.
5	Do you use an alternate water source to irrigate your landscape?	yes	Water rejected from RO is stored and used for irrigation purpose but not metered. Meters should be

			installed. STP treated water is also used for Horticulture application.
6	Do you have Water wise /Water efficient Plants in your garden?	Yes	A lot of native species have been planted there by reducing water requirement.
7	Is your irrigation system Water wise?	Yes	Only staff is to be educated that they should be careful to ensure that water is not falling on hard scape.
8	Do you have mulch on your garden beds?	No	Use water wise mulch to reduce evaporation and save water.
9	Do you have under utilised areas of lawn in your landscape?	Yes	Consider replacing lawn in these areas with water wise gardens to reduce water use.
Sr.No.	**Observation/Parameters**	**Yes/No**	**Recommendations**
	Training and Awareness		
1	Whether staff in general are aware about importance and need of water conservation	No	The awareness should be created amongst all maintenance and operation staff.
2	Whether there are training modules/sessions for training of staff on topic of importance of water conservation.	No	Regular training should be conducted
3	Whether there is a program for sensitizing students through workshop/seminars to educate them regarding scarcity of water and its conservation	No	There should be some program to create awareness amongst students through training
4	Whether there is a program in place to involve students in water conservation targets.	No	There should be active involvement of students, they being helpful in university as well as it shall be useful for them during their life time in future.

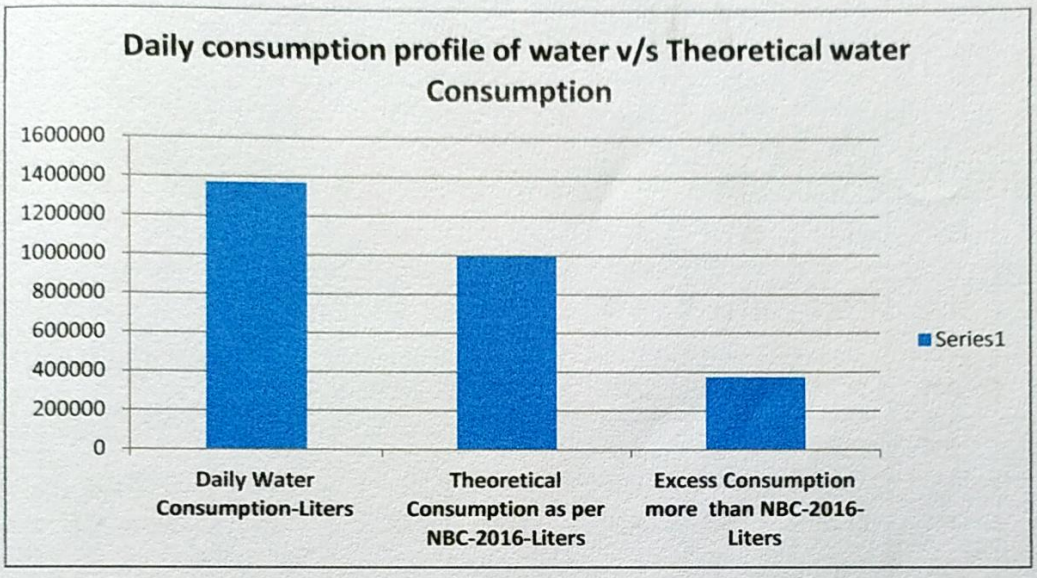
Bench Marking as per NBC-2016

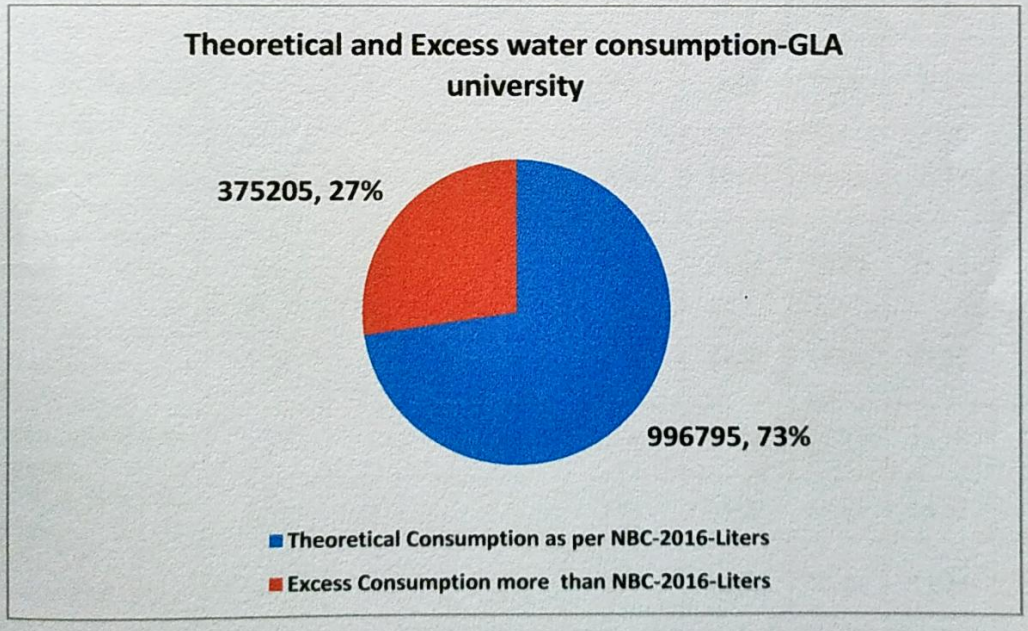
Sr. No.	Type of Use	Per Capita -Litres per Day-As per NBC-2005	Total Daily requirement-Litres-Best Practice	Total Daily requirement-Litres- Typical use
1	Day Time use	45	To be decided by Management	
2	Hostel Stay	135	To be decided by Management	
3	Visitors	15	To be decided by Management	

At a Glance Water Availability & Water Consumption as per information furnished by university

- **Primary Water Storage Tank (UGT + OHT 2 Lac Ltr.)- 10,00,000 Liter**
- **Secondary Water Storage Tank (Over The Building) – 8,48,000 Liter**
- **RO Water Primary Storage Tank (Within RO Plant) – 25,000 Liter**
- **RO Secondary Storage Tank (Over The Building) – 1,08000 Liter**
- **Capacity of RO Plant – 12,000 Liter / Hours**
- **Water Consumption Calculation As Per NBC Part 9-4.1.1.1-2016**
- **For One Person : Bathing -55 liters, Washing of cloths-20 liters, Flushing of WC- 30 liters, Washing of house- 10 liters, Washing of utensisls-10 liters, Cooking-5 liters, Drinking- 5 liters –Total -135 liters/head/day**
- **If we consider 10000 Users means i.e. 13,50,000 Liter/day "Safe"**
- **In Case STP Capacity Calculation: 10000*135/1000=1350 KLD "Safe"**
- **Raw Water (Peak Hours) in the M/o Jan-2020**
- Total Water Consumption i.e. 4, 16, 20,000 Liter
- Average consumption per day i.e. 13, 42,580 Liter
- **Raw Water (Non-Peak Hours) in the M/o Sep-2020**
- Total Water Consumption i.e. 2, 13, 70000 Liter
- Average consumption per day i.e. 7, 12,333 Liter

S.No.	Water requirement Calculation and actual daily consumption	
1	Daily Water Consumption-Litres	1372000
2	Theoretical Consumption as per NBC-2016-Litres	996795
3	Excess Consumption than NBC-2016-Litres	375205





Inventory of Toilets-GLA University : The inventory is required to be prepared and kept updated

9. Flow Rate of Fixtures Measured

Water Flow Detail and Toilets Inventory Tap Flow seconds/liter and Liters per minute flow									
Sno	Location	Wash Basin-Time taken in seconds for one litre	W.C. Point-time taken in seconds for one litre	Bath Room Taps-time taken in seconds for one litre	Kitchen Sink-time taken in seconds for one litre	Wash Basin-Flow rate litres per minute	W.C. Point-Flow rate litres per minute	Bath Room Taps-Flow rate litres per minute	Kitchen Sink-Flow rate litres per minute
1	Guest House 101 at Block-10	4.53	4.2	3.12	2.28	13.25	14.29	19.23	26.32
2	Dr. Rajinder Prasad Boys Hostel	4.2	4.7	4.42	NA	14.29	12.77	13.57	NA
3	Block-8 Civil Wing	4.7	1.56	NA	NA	12.77	38.46	NA	NA
4	Block-7 Staff Toilet	7.06	4	NA	NA	8.50	15.00	NA	NA
5	Admin Block-1 near Maintenance Office	4.02	5.75	NA	NA	14.93	10.43	NA	NA
6	Admin Block Near Reception	14.47		NA	NA	4.15	NA	NA	NA
7	Mechanic Engineering Block G. Toilet	3.41	8.19	NA	NA	17.60	7.33	NA	NA
8	Mechanic Engineering Block Students Toilet	3.1	4.1	3.8	NA	19.35	14.63	15.79	NA
9	Shyama Prasad Mukherji Boys Hostel	4.6	4.2	3.9	NA	13.04	14.29	15.38	NA
10	Pt. Lok Mani Sharma Boys Hostel	4.16	4.6	3.45	NA	14.42	13.04	17.39	NA
11	Vishavsaria Boys Hostel	5.1	4.85	3.69	NA	11.76	12.37	16.26	NA
12	C V Raman Boys Hostel	4.38	4.26	4.1	NA	13.70	14.08	14.63	NA
13	Dr. B R Ambedkar Boys Hostel	4.8	4.9	4.53	NA	12.50	12.24	13.25	NA
14	Boys Hostel wing -5	4.7	3.85	3.84	NA	12.77	15.58	15.63	NA

Based on the measurement of water flow measured very high flow liters per minute is Observed 4.15 liters to 38.46 liters per minute that is on very high side. At most of locations it is around 15 liters.

It is recommended that water fixtures be replaced with low flow/ultra low flow fixtures for savings of water as the consumption of water is on higher side in comparison to NBC-2016 requirement. Savings in water is very essential and it also leads to cost savings through reduction of electricity bill

RECOMMENDATIONS-Observations

	ACTION STEPS – Design and Construction
A	**Reduce** water consumption through efficient fixtures and plumbing Design.
1	Efficient plumbing design. Two stack system design for future to reduce STP energy consumption and pumped water energy
2	Sub metering of water for separate uses.-Bore well, Landscaping, Labs
3	Efficient fixtures such as low flow taps, shower heads and toilets and Water less urinals as per applicability in Gents Toilet.
4	Efficient appliances for catering and other uses with specified water efficiency standards.
5	**Recycle** water using **Grey Water** systems. Being done –recycled water data be maintained.
6	**Rain water is captured in rain water harvesting pits- Maintenance of RWHS is required to be done periodically.**
7	Landscaping and site layout should avoid run-off by creation of **Sustainable Urban Drainage Systems. Design documentation is required for establishing zero run off from premises during rain based on rain fall pattern.**
8	Automatic shut off of Pump should be installed so that there is no wastage of water and Energy.
9	Log Book for running of Pump to be maintained
10	Check Leakage through internal audits-Weekly

B	**OPERATION & MAINTENANCE**
1	As the building is operational, further reductions in water use can still be made depending on how efficiently the building is run. Efficient fixtures and fittings reduce the amount of flow of water; however, it is equally important that water use is periodically assessed or audited to detect wastage caused either by the users or due to leakage. This will also help the building management in devising appropriate strategies for water conservation.
2	Campus do not have actual metered data to know exactly how much water is being consumed by them. Due to normally institutions end up spending more on energy on bore well water as in this case and pose a threat to sustainability through wastage of water. The record of extraction/consumption be prepared. STP data is furnished.
3	There is a potential for reduction and optimization of water simply and inexpensively by internally auditing water use and identifying appropriate water-saving measures
4	Install push button type individual manual urinal flushing system, Provide dual flushing systems and make users aware of the use of such installed systems.
5	Repair, replace leaking taps.

Recommendations for Planning Successful Water Management

1. Water management plans must be part of an integrated approach that examines how changes in water use will impact all other areas of operation.
2. Water conservation involves two distinct areas: technical and human. The technical side includes collecting data from water audits and installing water- efficient fixtures and procedures. The human side involves changing behaviors and expectations about water usage and "the way things should be done." Both areas must be addressed for a water conservation program to succeed.
3. A water conservation plan depends upon accurate data. Before water saving measures are implemented, a thorough water audit should be conducted to determine where water is being used. Then, water use can be monitored to track conservation progress.
4. A successful water conservation plan follows a logical sequence of events. Implementation should be conducted in phases, starting with the most obvious and lowest-cost options.

5. An effective plan examines not just how much water is being used, but how it is used and by whom. When analyzing a water audit, ask the next question: "Can this process be done as well or better using less water? "
6. The quality of water needed should be matched with the application. Many commercial, institutional, and industrial applications do not require the use of potable water. Whenever possible, substitute recycled water used in one process for use in another.
7. The true cost of water must be considered when conducting a cost analysis. The true cost of water is the amount on the energy PLUS the expense to heat, cool, treat, pump, and dispose of/discharge the w a t e r.
8. Life-cycle costing is the key to evaluating water conservation options. Don't just calculate the initial investment. Many conservation retrofits that appear to be prohibitively expensive are actually very cost-effective when amortized over the life of the equipment.

Rain Water Harvesting system

The following number of Rain Water harvesting system pits have been installed.

Inventory of Harvesting in GLA, University Campus		
Sl	**Area**	**Qty**
1	GLA Canteen Gate No 01	1
2	Generator Park Gate No 01	1
3	Near ATM Admin Block	1
4	Admin Block Behind Treasurer Sir Office	1
5	Between Kalpan & Yamuna Girls Hostel	1
6	Back Side of Kalpana Chawla Girls Hostel	1
7	Back Side of Kalpana Chawla Visitors Room	1
8	Stage Ground Near Academic Block 3rd.	1
9	Ninad Club Park	1
10	Green House Near Academic Block 4th.	1
11	Basket Ball Court	1
12	Back Side of Academic Block 6th.	1

13	A Block Hostel	1
14	UTM Lab at Academic Block 8th	1
15	Back Side of ABCD Mess.	1
16	Between B Block & C Block Hostel	1
17	Towards Under Ground Water Tank of F Block Hostel	1
18	In Front of Academic Block Lawn	1
19	Children Park	1
20	Foot Ball Ground	1
21	Between Residence Block 7th,8th,9th,10th	1
22	Godawari Hostel Lawn	1
23	Hand Ball Ground Near Wing 4 Mess	1
24	Road Side of Agriculture Farm	1
25	Corner of Wing 4	1
26	In Front of Wing 3 Mess	1
27	Near Wing 2	1
28	Behind I Block Hostel	1
29	Behind J Block Hostel	1
30	Corner of I & J Block Mess	1
31	Behind G Block Hostel Side	1
32	Behind H Block Hostel Side	1
33	Behind Generator No 03	1
34	Towards Sports Room Side Generator No 03	1
	Total No. of Rain water harvesting system pits	**34**

As per the data furnished, there are 34 nos. Rain water harvesting pits have been provided. There is requirement of regular maintenance of these pits to clear these of any silt deposit etc. so that capacity of these pits is not reduced.

The sufficiency of these pits for capture of total rain water even during peak rains is required to be re visited and it should be ensured and certified for next audit that there is zero water run-off from site.

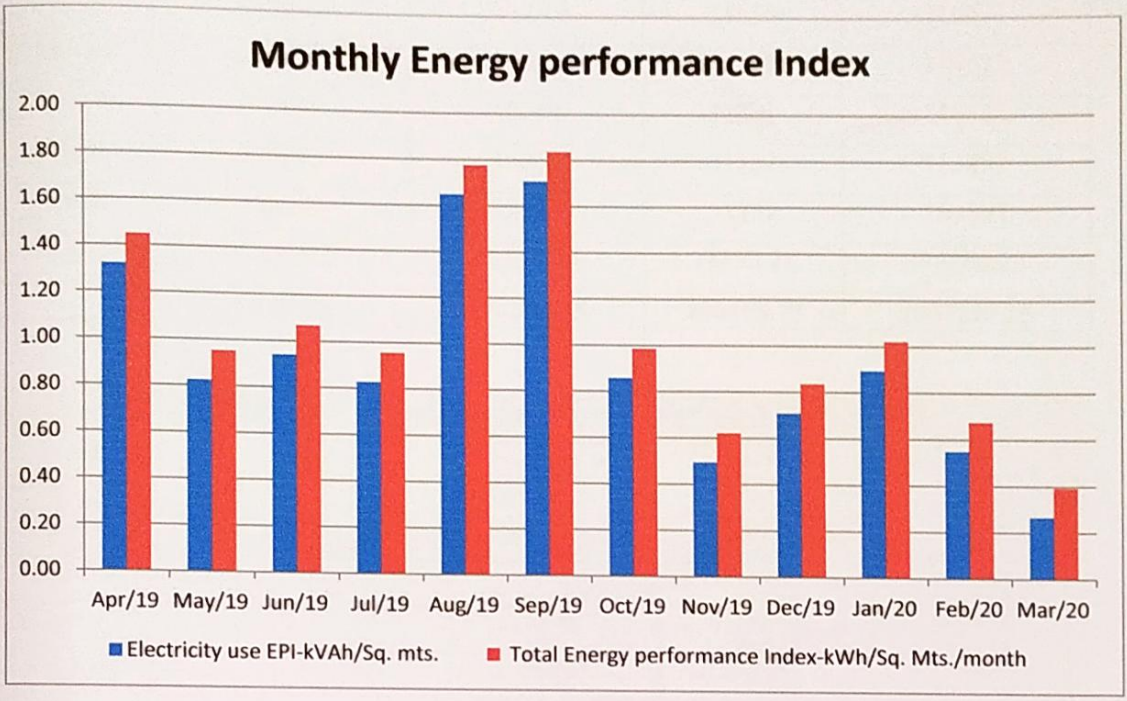
10. Auditing for Energy Management

Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent bulb uses approximately 60W to 100W while an energy efficient light emitting diode (LED) uses only less than 10 W. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices. **LED use also has a peculiar advantage towards environment that LED's are not using any mercury as the case of CFL's or Fluorescent tubes.**

Energy use and Energy performance Index-Energy Performance Index

Annual Energy consumption						
Month	Grid Supply-kVAh	Average per month consumption-HSD in liters	Equivalent kWh for HSD	Energy consumption Electricity plus HSD	Total Area-Sq.mts.	Energy performance Index
Apr-19	534410	4364.5	51765	586175	404704	1.4484
May-19	333850	4364.5	51765	385615	404704	0.9528
Jun-19	380598	4364.5	51765	432363	404704	1.0683
Jul-19	335260	4364.5	51765	387025	404704	0.9563
Aug-19	667490	4364.5	51765	719255	404704	1.7772
Sep-19	691810	4364.5	51765	743575	404704	1.8373
Oct-19	347270	4364.5	51765	399035	404704	0.986
Nov-19	200080	4364.5	51765	251845	404704	0.6223
Dec-19	286860	4364.5	51765	338625	404704	0.8367
Jan-20	362340	4364.5	51765	414105	404704	1.0232
Feb-20	222080	4364.5	51765	273845	404704	0.6767
Mar-20	107710	4364.5	51765	159475	404704	0.3941
Total	**4469758**	**52374**	**621180**	**5090938**	**404704**	**12.58**

Energy Performance Index



Annual EPI is 12.58 kWh per Sq. Mts /Annum for the period April-2019 to March-2020.

This can be reduced to the extent of 30 to 40 % with implementation of Energy audit recommendations.

RENEWABLE ENERGY

SOLAR POWER PLANT GENERATION				
Month	Solar Inverter Capacity in 50 kVA	Solar Inverter Capacity in 27.5 kVA	Solar Inverter Capacity in 25.0 kVA	Total Generation-kWh
Apr-19	168737	20539	37180	226456
May-19	220110	35875	57375	313360
Jun-19	70210	10605	33511	114326
Jul-19	112199	19065	33511	164775
Aug-19	118186	20728	36256	175170

Sep-19	151186	19355	36945	207486
Oct-19	83716.5	11324.5	24630	119671
Nov-19	83716.5	11324.5	24630	119671
Dec-19	77472	10049	22801	110322
Jan-20	116393	16372	31132	163897
Feb-20	116393	16372	31132	163897
Mar-20	130318.8	16594.75	31352.75	178266.25
	1448638	**208203.75**	**400455.75**	**2057297.25**

Solar Power Plant Generation Detail 2019,2020				
Month	Solar Invrtor Capacity in (50 KVA)	Solar Invrtor Capacity in (27.5 KVA)	Solar Invrtor Capacity in (25 KVA)	Total Generation (KWH)
Jan-19	129678	20539	37180	187397
Feb-19	77746	11956	21401	111103
Mar-19	156396	24073	43553	224022
Apr-19	168737	50124	43848	262709
May-19	220110	35875	57375	313360
Jun-19	70210	10605	20340	101155
Jul-19	112199	19065	33511	164775
Aug-19	118186	20728	36256	175170
Sep-19	151186	19335	36945	207466
Oct-19	167433	22649	49260	239342
Nov-19				
Dec-19	77472	10049	22801	110322
Jan-20	232786	32744	62264	327794
Feb-20				
Mar-20	521275	66379	125411	713065
Apr-20				
May-20				
Jun-20				
G. Total	2203414	344121	590145	3137680

There is already a Solar PV plant installed and the generation for April-2019 to March-2020 is 2057297.25 kWh.

Presently the Solar PV plant is Grid connected and generation is lost or stopped due to islanding in case of non-availability of Grid.

An arrangement can be installed where in case of non-availability of Grid through arrangement of PLC Solar PV can continue to generate energy for its internal use subject to sufficient load on system.

CO_2 reduction -Annual with installation of Solar PV system-1645 MT

11. Auditing for Waste Management

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

This indicator addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste can be divided into two categories:

General waste and hazardous waste. General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and petrol. Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change.

Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair, and reuse. Thus the minimization of solid waste is essential to a sustainable campus. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems. It is therefore essential that any environmentally responsible institution examine its waste processing practices.

E-Waste : The old computers are sold back to vendor which is again put to beneficial use by repairing and it is good sustainable practice.

Key Boards and mouse: which become un-serviceable are also disposed off. It is required to be ensured that vendor dealing with E-waste is authorised to collect E-waste.

Hazardous Waste: Lead Acid Cell Batteries are returned to Vendors for re-cycling of lead and other constituents.

Fluorescent tubes are handed over to Junk dealer who in turn should send them to Local re-cycling units. Storage of Fluorescent tubes in university should be as per recommended practice.

Waste Mobil oil is stored and used for lubricating door hinges and oiling of shuttering material

Auditing for Green Campus Management

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

WASTE- Types of waste generated in campus

- E-waste-Yes

Details of Computers installed and disposed

e Of Purchase	24/09/2004 30/10/2004	12-05-2005	23/05/2006	30-01-2007	27-01-2007	08-11-2008	10-12-2008	08-11-2009	14/10/2009	14-10-2009	10-06-2010	20/09/2011	13-11-2013	15-09-2014	15-09-2014	12-08-2015 31-08-2015	26-07-2016 03-10-2016	14-08-2017	05-09-2017	25/9/2018 26/07/2019	08-05-2019	
al Purchased	103	100	180	50	100	65	##	##	28	12	##	##	74	73	170	##	##	195	95	201	100	3292
Sold Out / Donate	102	86	130	37	65	19	56	34	5	0	15	21	4	0	0	2	4	0	1	0	0	581
Remaining	1	14	50	13	35	46	194	166	23	12	291	##	70	73	170	##	431	195	94	201	100	2711
tion / Room No.	IBM	HP 6120	HP 2180	HCL Alfa	HP 2700	HP 2280	DELL Optiplex 33	DELL Vostro 22	HP 2480	HP 7480 C2D	HP 3090 C2D	HP 6200 Pro i5	HP 3330 i5	HP 202 G2 i5	HP 202 G2 i3	HP 280 G1 i5	HP 280 G2 i5	HP G3 280 i5	DELL 3050 i5	HP 280 G4 i5	DELL 3060 i5	Total
(Admin Block)	0	0	0	0	0	0	1	0	0	0	0	0	1	1	4	0	0	0	1	0	1	9
(Ground Floor)	0	0	1	0	0	0	2	10	0	1	7	22	10	0	10	3	125	2	1	4	0	198
(First Floor)	0	2	2	0	0	0	4	2	0	0	9	26	6	9	18	3	99	97	3	111	1	392
(Second Floor)	0	5	8	0	0	0	6	2	0	0	2	4	0	1	7	0	6	67	50	54	0	212
(Third Floor)	0	0	0	0	0	0	11	0	0	0	9	2	0	0	0	0	0	0	0	0	0	22
(EC)	0	0	5	0	1	0	7	1	0	0	30	32	2	0	0	19	15	0	0	31	0	143
(EE/EN)	0	0	6	0	0	0	1	7	0	0	3	39	4	0	0	5	11	0	10	0	5	91
	0	0	0	0	1	0	0	27	0	0	13	10	2	36	0	59	4	0	0	0	40	192
	0	1	9	0	0	0	4	1	0	0	6	0	0	29	9	7	5	0	0	0	1	72
(MBA)	0	0	0	0	1	0	58	3	4	0	45	28	0	0	23	10	0	0	0	0	5	177
(BBA)	0	0	0	0	0	0	23	15	1	0	0	34	2	0	21	50	0	0	27	0	0	173
(Biotech)	0	0	0	0	13	0	1	3	0	0	0	20	0	0	2	0	14	0	0	1	0	54
(Agriculture)	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5
	0	1	3	0	0	0	0	25	0	0	16	1	4	1	3	14	60	19	0	0	0	147
	0	0	0	0	0	23	1	13	18	0	33	0	1	8	2	4	6	0	1	0	41	151
(Polytechnic)	0	3	4	0	12	15	7	9	0	5	40	25	5	0	20	34	45	0	0	0	5	229
(B. Ed)	0	0	0	0	0	0	34	4	0	0	0	1	0	0	0	0	1	0	0	0	0	40
(Polytechnic)	0	2	8	0	4	2	1	5	0	0	0	7	2	0	0	1	30	0	0	0	0	62
(BBA)	0	0	0	0	0	0	11	4	0	1	54	0	6	0	0	0	0	0	0	0	0	76
(BCA)	0	0	3	0	0	0	0	3	0	0	4	7	27	3	32	26	0	0	0	0	0	105
(LAW)	0	0	0	0	0	1	2	2	0	0	0	6	1	0	0	1	8	10	0	0	0	31
ial	0	0	1	0	1	4	17	24	0	2	19	7	2	1	12	0	0	0	1	0	1	92
(Hardware Lab)	0	0	1	0	0	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	8
																						0
Total	**0**	**14**	**51**	**0**	**37**	**46**	**194**	**163**	**23**	**9**	**291**	**271**	**75**	**89**	**163**	**##**	**##**	**195**	**94**	**201**	**100**	**2681**
																						0
rkshop-Faulty)	1	0	0	0	0	0	0	2	0	0	0	9	1	1	4	1	0	0	0	0	0	19
rkshop-OK)	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	4
ap Room	**0**	**0**	**0**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	13
																						0
																						0
Grand Total	**1**	**14**	**51**	**13**	**37**	**46**	**194**	**166**	**23**	**9**	**##**	**##**	**76**	**90**	**167**	**##**	**##**	**195**	**94**	**201**	**100**	**2717**

E-Waste disposal

The record of use and handling of E-waste is maintained .While disposing/Auction or sale of E-waste credential of purchaser should be documented to ensure that vendor is authorised for collection and ensuring re cycling of E-waste as per extant guidelines.

- Hazardous waste (toxic)-yes

  For safe handling and management of hazardous waste in an environmentally sound manner, Govt. of India has notified the Hazardous Waste (Management & Handling) Rules, 1989, under the Environment (Protection) Act, 1986. However, these Rules were suppressed with re notification of the Hazardous Wastes (Management, Handling and Trans boundary Movement) Rules, 2008. Under the said Rules, hazardous waste has been defined as those wastes which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances, and shall include wastes as specified in Schedules of the Rules.
- Solid waste-yes-Extra waste removed weekly through truck and disposed in municipal waste collection points
- Dry leaves-Yes-Used in university for making manure/composte
- Canteen waste-yes-Used for Compost in university
- Liquid waste-yes-Preserved and used in university
- Glass-Yes
- Unused equipment-yes-Returned to vendors through sale
- Napkins-Yes-Handling not established
- Plastic waste-Yes-Segregated and removed

How is the waste generated in the university managed?

Methods

1 Composting
2 Recycling
3 Reusing

Health Audit:

There are no health issues experienced by staff and students by virtue of their presence in campus.

Consumer Level:

As per the present observed practice at consumer level in the society at large, often, the used lamps are collected by the kabari from the households and collectively handed over to the glass recyclers for the recovery of glass material.

This is all operative in a highly unorganized sector. It has, also, been observed that, the used lamps are thrown in the garbage bins and finally into the municipal garbage dumpsites, contaminating air, water and soil. Most of the used lamps are broken either at transit solid waste bins (provided by local civic authority) or broken during the transport to the final disposal site.

A portion of the mercury, in vapor form, is released into the air; whereas rest of the mercury is released onto the soil with further possibility of getting into the surface and/or ground water bodies through the leachate from soil.

CONSUMER LEVEL- Handling of Used/Broken Fluorescent Lamps (FLs): The consumers may handle and dispose the used lamps as described below: Domestic Consumers:

(i) The consumer must ensure that (s)he does not throw used lamps in the general trash bin but hands them over (in a properly packed form) to a kabari (an individual) or a collection agency identified by an authorized Lamp Recycling Unit for proper recycle / disposal of used FLs.

(ii) The used intact FLs may be stored either in the same boxes in which new lamps are brought or other boxes of similar size. They should be stored upright. The due precaution may be taken while packing more than one used lamp, so as not cause the possibility of breakage during the storage and transportation.

(iii) Even, the broken FLs, after due clean up may be handed over for safe recycling and disposal.

Here are some guidelines for cleaning up a broken CFL:

(i) Open a window and leave the room (restrict access) for at least 15 minutes. If you have fans, place the fans in the windows and blow the air out of the room. Note: If the room has no windows, open all doors to the room and windows outside the room and use fans to move the air out of the room and to the open windows.

(ii) Remove all materials you can without using a vacuum cleaner

(iii) Wear disposable rubber gloves, if available (do not use your bare hands) • Carefully scoop up the fragments and powder with stiff paper or cardboard

(iv) Wipe the area clean with a damp paper towel or disposable wet wipe

(v) Sticky tape (such as duct tape) can be used to pick up small pieces and powder

(vi) Place all cleanup materials in a plastic bag and seal it, and then place in a second sealed plastic bag, dispose it properly and wash your hands after disposing of the bags.

(vii) The first time you vacuum the area where the bulb was broken, remove the vacuum bag once done cleaning the area (or empty and wipe the canister) and put the bag and/or vacuum debris, as well as the cleaning materials, in two sealed plastic bags in the outdoor trash or protected outdoor location for normal disposal.

Consumer Awareness: All the consumers, individual domestic consumers and bulk consumers (offices, institutions, large residential complexes, etc.) should get fully aware about the potential health impact of mercury-bearing lamps, through audio-visual media and the product leaflets. The precautions, to be taken while cleaning up the broken FLs should, also, be known to the consumers. As a part of such awareness programs, the consumers, even at individual level, are expected to participate actively with constructive suggestions and provide the feedback, for the overall success of mercury management in fluorescent lamp Collection: The collection of used lamps may be done mainly by two ways: (i) Collection of used lamp (FLs) from bulk consumers may either be arranged by the management of above set-up (institutions, etc.) for direct disposal to LRU or by the LRU which may arrange to pick up used lamps from such collection sites through an identified collection agency. (ii) Collection of used lamps (FLs) from individual domestic consumer may be arranged by the LRU, either through kabaris (individuals appointed for the purpose by LRU) or an identified collection agency for door to door pickup. Transportation: (i) The Handler (e.g. Kabari or representative of LRU) of used FLs in transit should take care of selection of proper vehicle and carriage so as to minimize breakage of used FLs.

(ii) There should not be any intermediate transfer of materials in the transit stage. The collected used FLs should be straight transported to the LRF for further processing. (iii) The Handler should be trained to take care of mercury spills, if any, that takes place en-route the journey to LRU.

12. Noise Pollution

1. **Sounds of Normal Conversations:**

   Sound Intensity: 40-60 dB

   Health Hazard: Sound less than 80 dB is safe for the ear.

2. **Sounds emanating from Tape recorders or an Orchestra:**
   Sound Intensity: 70 dB

   Health Hazard: It is safe for ear.

3. **Sounds of Heavy Traffic:**
   Sound Intensity: 90 dB

   Health Hazard: Constant exposure to sound greater than 80 dB causes temporary hearing loss and if they are not treated immediately, causes permanent impairment

4. **Sounds of Pneumatic drills and other machines:**

   Sound Intensity: 100 dB

   Health Hazard: Constant exposure causes temporary hearing loss and if they are not treated immediately, causes permanent impairment.

5. **Sounds of Aircraft engine:**

   Sound Intensity: 100-200 dB

   Health Hazard: Higher noise level of 160 dB cause total deafness, rupturing eardrums, damaging inner ear. It also causes high blood pressure, ulcer in stomach, palpitation, nervous problems, irritation, anger, and affects pregnant women's embryo.

6. **Sounds of Rockets during Take off:**

   Sound Intensity: 200 dB

   Health Hazard: It is dangerously causing total deafness by rupturing the eardrums and damaging the inner ear. It also causes high blood pressure, ulcer in stomach, palpitation, nervous problems, irritation, anger, and affects pregnant women's embryo.

Measurement of Decibel level at GLA university

Sr. No.	Location	Decibel Level	Remarks
1	Mr. Hari Om Sharma's Office	52	Satisfactory
2	Civil Conference Room no 121	41	Satisfactory
3	Between Two Blocks	44	Satisfactory
4	Dr. Rajinder Prasad Hostel	43	Satisfactory
5	S P Mukharji Hostel	42	Satisfactory
6	Pt. Lok Mani Sharma Hostel	41	Satisfactory
7	Under Light	42	Satisfactory
8	Sir Vishvasaria Hostel	41	Satisfactory
9	Road in front of Residential Block - 9	42	Satisfactory
10	Between Two Poles-Residential Block	41	Satisfactory
11	C V Raman Boys Hostel	41	Satisfactory
12	Dr. B R Ambedkar Hostel	40	Satisfactory
13	In front of Catering Office	61	Satisfactory
14	Dr. APJ Abdul Kalam Boys Hostel	43	Satisfactory
15	Bhagwan Das Agrawal Boys Hostel	42	Satisfactory
16	S. Radha Krishnan Boys Hostel	41	Satisfactory
17	Hari Das Agrawal Boys Hostel	42	Satisfactory
18	Godawari Girls Hostel	41	Satisfactory
19	University Polytechnic	42	Satisfactory
20	Faculity of Education	41	Satisfactory
21	Boys Wing - 1	40	Satisfactory
22	Boys Wing - 2	40	Satisfactory
23	Boys Wing - 3	40	Satisfactory
24	Boys Wing - 4	40	Satisfactory
25	Boys Wing - 5	40	Satisfactory
26	Residential Block - 6	52	Satisfactory
27	Residential Block - 7	48	Satisfactory
28	Residential Block - 8	53	Satisfactory
29	Residential Block - 9	55	Satisfactory
30	Residential Block - 10	51	Satisfactory

31	Guest House - 3	42	Satisfactory
32	Academic Block	49	Satisfactory
33	Deptt. Of Computer Science	45	Satisfactory
34	VIP Guest House	42	Satisfactory
35	Ganga Girls Hostel	41	Satisfactory
36	Yamuna Girls Hostel	41	Satisfactory
37	Kalpana Chawla Girls Hostel	41	Satisfactory
38	Staff Residence Block - 1	48	Satisfactory
39	Staff Residence Block - 2	53	Satisfactory
40	Staff Residence Block - 3	45	Satisfactory
41	Institute of Applied Science	41	Satisfactory
42	Civil Engineering	40	Satisfactory
43	Proposed Auditorium	47	Satisfactory
44	Mechanical Engineering Block	45	Satisfactory
45	Polytechnic Block	42	Satisfactory
46	B.Ed. and Polytechnic Block	43	Satisfactory
47	Biotech and Agreecalture Block	41	Satisfactory
48	MBA Deptt.	41	Satisfactory
49	IDR / Pharmacy Block	41	Satisfactory
50	Mess	64	Satisfactory

Sound/Decibel level measured is satisfactory and there is no adverse impact of the same on occupants.

CUSTODIAL CHEMICAL USE

Chemical for one year requirement are used in Labs and these are stored in a separate store. The store requires to be ventilated and hazard analysis should be got done through Material Specification Data Sheet and record should be maintained. Proper ventilation with hoods should be designed.

TRANSPORTATION

Most of students are using shared transport which is sustainable. Students are using Buses, Shared auto. There is no buses owned by the university. The consumption of HSD by buses is monitored for optimised consumption.

Teaching and Non-Teaching faculty is also sensitized for using pooled transportation for working towards sustainability and reducing resource use and encouragement of resource conservation.

Procurement Process

Procurement team is required to be made aware regarding procurement of good and services that are sustainable. The sensitization is required for all purchases in a way that optimized utilisation of natural resources is possible.

1 Paper with Recycle content

2. AC's with Zero ODP Refrigerant

3. Environmental friendly Housekeeping Chemicals

4. Paints. Adhesives, sealants with recommended percentage of volatile organic compound.

Rain water harvesting System

There are no rain water harvesting system installed but there is an arrangement for capturing rain water and storing them in underground tanks. The water is then re-used. The calculations for documenting no run off during peak rains is not established.

CPCB GUIDELINES

Exhaust of DG Sets are required to be raised as per CPCB requirement.

PAPER USE AND PRINTING GOALS

1. There are efforts already directed through use of E-Books for reducing the use of paper.
2. There are instructions to staff and student to resort to printing only if it is absolutely unavoidable.
3. Papers should be purchased that have recycled content.

What Happens To Paper after It Is Recycled

When pulped paper is recycled, it is used to help manufacture new products. There are many different uses for recycled paper, and the products made from recycled paper actually cost about the same as those made from other resources. You can do your part for the environment by purchasing recycled goods, and you won't be spending much, if any, extra money to do so. What are some of the products made from recycled paper?

1. **Office Paper**. This is probably the most obvious use for recycled paper. It can be found in several different colours and weights at most office supply stores.
2. **Toilet Paper and Tissues**. These items are made from white and coloured recycled papers. Processors rinse them several times to remove dyes and then sanitize them. Many are also bleached, which is not particularly environmentally-friendly. However, you can buy natural coloured toilet paper and tissues.
3. **Paper Towels and Napkins**. Yes, your recycled confidential documents can become a paper napkin to be used at someone's birthday party.
4. **Greeting Cards**. Greeting card companies are getting into the recycling game more and more. Recycled paper is used for everything from birthday cards to invitations. If you want to buy cards made from recycled office paper, check the back of the card. It should say whether or not it is made from recycled paper.
5. **Cardboard**. This handy material is used to package many different items, including cereal, eggs, pizza and your latest online order. And yes, cardboard is made with recycled office paper. Take a look at the carton of eggs next time you shop – if it's made from recycled paper, it will be labelled.
6. **Magazines and Newspapers**. Many of these reading materials are printed on recycled paper. Not sure if your daily newspaper is using recycled materials? Give them a call! And make sure to throw that newspaper into the recycling bin when you're finished with it.

Paper use and Printing Goal

1. Distribute memos, reports, purchase orders and brochures electronically. Research electronic Purchase Orders for small amounts of money and "electronic signatures" for larger Pos
2. Encourage re-use of scrap paper for printing and note taking. Larger printers should have one dedicated tray for the reuse of scrap paper.
3. Print on letterhead paper only as needed; use electronic letterhead whenever possible
4. Network all printing to shared copiers/printers and eliminate stand-alone printers where possible

5. Discourage reckless printing and copying by requiring use of an account/password
6. Promote a 'Think before you Print' culture
7. Desktop drafting and editing of documents
8. Reduce default margin settings
9. Use toner-saving fonts (eg. EcoFont) or smaller-sized fonts
10. Single-spaced formatting on all documents - Include the "think before you print" message in the "green" PR Campaign
11. Encourage increased use of Blackboard as a paper-free resource
12. Training and Adherence - Distribute (an) email(s) with detailed instructions, including "screen shots" on how to change settings on computers, copiers, faxes, printers
13. Establish duplex (two-sided) copying and printing as standard
14. Phase out meeting handouts and distribute/project them electronically (this needs to be better defined).
15. Digitize forms and administrative processes. Continue replacing paper based processes and administration.
16. Widespread adoption of print management / print-saving software (eg. GreenPrint). Identify volunteers (including Sustainability Council and VP for Finance and Admin) to participate in a 30 day trial to explore the benefits (savings, functionality and ease of use) of GreenPrint Software. Find ways to test this in student labs & other high-volume print areas
17. Double-sided student assignments as standard (with electronic submission, grading & return)
18. Faxes: phase out fax machines, utilize computer faxing, end use of fax cover pages (research applicable technology/software: Win fax? E-fax?)
19. Increase electronic archiving and record keeping (this needs to be better defined and targets identified; work with Purchasing, Personnel, Academic Department and/or Student Records to be determined)

13. E-Library

E-books vs Traditional books data and year wise history to moving from traditional to E-system.

E-Books (2017-2020)

S. No.	Publishers	Year	No. of E-Books	Price	No. of Online Books Views
1	Digibook Technologies Pvt. Ltd. (Copy Kitab)	2017-2018	49	94627.17	2987
2	Eduport Global Pvt. Ltd. (CBS Publishes)	2018-2019	13	47124	1088
3	Mc-Graw Hill	2019-2020	13	83049.12	49
4	Pearson Education	2019-2020	12	88096.68	17
5	Emerald Insight	2019-2020	614	819528	2635
Total			**701**	**1132424.97**	**6776**

Print Books (2017-2020)

S. No.	Publishers	Year	No. of Books	Price	No. of Books Issue
1	Various Publishers	2017-2018	5100	2505403	93622
2	Various Publishers	2018-2019	4517	2320193	76005
3	Various Publishers	2019-2020	6605	2628344	53752
Total			**16222**	**7453940**	**223379**

Despite fewer in numbers the e-books have advantage of being used by multiple students/ faculty simultaneously and thus creating better impact on sustainability in contrary to hard copy that can be read by only one person at a time.

The following recommendations are made

1. Use of E-books be promoted for students and faculty members specially in present Covid situation.
2. No. of E-books made available should be increased continuously.

3. Training on sustainability should be provided.
4. Adaption be promoted considering it to be a new normal.
5. Targets for increasing E-books should be fixed on continual basis.

Training and Awareness

The university is regularly conducting awareness program for students and faculty members.

Governance

Through enactment of Environmental and Green policy and its circulation to all stake holders, sustainability can be achieved. The results are regularly required to be verified at annual intervals. These can be managed through internal or external audits.

14. Plantation Policy of GLA University

We at GLA University are committed for continual improvement of Environment. As Trees planted contribute for improving Environment, University has enacted the policy of plantation for the benefit of people and Society.

Planting a tree has long been a suggestion to better the earth, whether it is outcry and warning of global warming, water crisis or something else. Trees offer many environmental as well as economic and social benefits.

University with strategic vision of top management and active participation of students, Faculty members, Non-teaching staff and other staff shall with solemnly promise to always work and participate for betterment of environment through continual plantation programs.

There shall be regular awareness program and through face to face interaction all stake holders shall be apprised of the benefits of plantation

The students of GLA university very well understand the importance of trees in our life and have taken a pledge to contribute their bit in making the university, Cities, nation and world a better place to live. They all pledged to plant more and more trees with the time and take care of the plants and to provide with basic needs as and when needed.

University has a policy to celebrate **Tree Plantation week in university premises twice annually and commits to set a target to add 1 % to the existing plantation annually.**

Through these plantations of trees life shall improve and essential needs of mankind will also be easily managed. Besides absorption of Carbon Dioxide, trees also support life by providing habitat to different species such as squirrels, bees and birds. Trees cleanse the climate by absorbing carbon dioxide from the environment and releasing oxygen. The trees cool the environment and also effects of global warming are mitigated.

We at GLA university once again vows to plant trees as per policy, assure survival of trees by adequate maintenance and watering practices and species selected for plantation shall be such that have very minimal water requirement. We also shall decide optimally to have turf (Grass area) as per barest requirement for reduction of water foot print for horticulture use in university premises.

Plantation Inventory:

List of Plants less than 2 years old

Sno	Name of Plant	Qty
1	Phycus	250
2	Gula cheen	20
3	Gulad mohar	20
4	Ashoka	20
5	Flansh	2
6	Chinar	2
7	Amaltas	1
8	Kesia	2
9	Finstal pam	24
10	Kapoor	1
11	Hari champa	2
12	Moor pankhi	12
13	Australia fikar	1
14	Jamun	8
15	Kachnar	1
16	Mahua	10
17	Belpather	3
18	Rakhi bel	20
19	Amelia	40
20	Kemlia	1
21	Bindhara vel	10
22	Almunda vel	10
23	Deshi Gulab	50
24	Termenralia	7
25	Sauni	5
26	Makhan Katori	1
27	Vigonia	5
28	Karonda	1
29	Aandu	1
30	Haar singar	3
31	Lota baans	1
32	Nimbu	5

Inventory of Plants

Sr. No.	Particulars	Quantity
1	Total Nos. of Plants in GLA Campus since start	12352
a	Total Nos. of Plants in 01 to 5 years old	9826
b	Total Nos. of Plants in 06 to 10 years old	1691
c	Total Nos. of Plants in above 11 years old	835
2	No. of Water sprinklers for Gardening	11
3	Total Nos. of Plants of low WPI	7290

Plantation Program

- GLA University has regular plantation program and given above is the plantation policy and Inventory of different type of plant and trees.
- There is regular addition of tress/plants.
- Total Trees and Plants presently existing in GLA University is as above.

15. Air Quality

There is no record of air quality testing done earlier. Generally the dust level is found to higher than normal and is causing abnormal conditions.

As per WHO guidelines the following should be the limits for Air Quality

Particulate matter

Guidelines

$PM_{2.5}$: 10 µg/m³ annual mean
25 µg/m³ 24-hour mean

PM_{10}: 20 µg/m³ annual mean
50 µg/m³ 24-hour mean

Measurement of Air Quality Parameters					
Sno	Location	PM-2.5-Micrograms/ Cu.Mt	PM-10-Microgram/ Cu.Mt.	CO2-PPM	NCHO-Formaldehyde
1	Mr. Hari Om Sharma's Office	778	218.9	335	0.002
2	Civil Conference Room no 121	890	217	327	2.245
3	Between Two Blocks	777	216.8	327	0.003
4	Dr. Rajinder Prasad Hostel	787	219.3	341	0.007
5	S P Mukharji Hostel	789	220.1	328	0.01
6	Pt. Lok Mani Sharma Hostel	790	224	325	0.02
7	Under Light	755	223	327	0.009
8	Sir Vishvasaria Hostel	763	218	324	0.008
9	Road in front of Residential Block - 9	770	217	321	0.02
10	Between Two Poles	795	219	320	0.007
11	C V Raman Boys Hostel	781	220	321	0.006
12	Dr. B R Ambedkar Hostel	777	222	324	0.007
13	In front of Catering Office	783	224	329	0.004
14	Dr. APJ Abdul Kalam Boys Hostel	777	220	328	0.008

15	Bhagwan Das Agrawal Boys Hostel	777	221	341	0.004
16	S. Radha Krishnan Boys Hostel	777	224	328	0.004
17	Hari Das Agrawal Boys Hostel	777	221	325	0.006
18	Godawari Girls Hostel	777	222	327	0.002
19	University Polytechnic	787	223	324	0.004
20	Facility of Education	789	219	321	0.006
21	Boys Wing - 1	790	220	327	0.007
22	Boys Wing - 2	755	218	341	0.004
23	Boys Wing - 3	763	220	328	0.008
24	Boys Wing - 4	770	224	325	0.004
25	Boys Wing - 5	795	221	327	0.004
26	Residential Block - 6	781	228	324	0.006
27	Residential Block - 7	777	227	328	0.002
28	Residential Block - 8	783	226	325	0.004
29	Residential Block - 9	777	221	327	0.004
30	Residential Block - 10	789	224	324	0.008
31	Guest House - 3	790	221	320	0.004
32	Academic Block	755	223	321	0.004
33	Deptt. Of Computer Science	763	218	324	0.007
34	VIP Guest House	770	217	329	0.006
35	Ganga Girls Hostel	795	219	328	0.007
36	Yamuna Girls Hostel	781	217	341	0.004
37	Kalpana Chawla Girls Hostel	784	219	328	0.008
38	Staff Residence Block - 1	786	220	325	0.004
39	Staff Residence Block - 2	791	222	327	0.004
40	Staff Residence Block - 3	782	224	324	0.006
41	Institute of Applied Science	754	221	328	0.002
42	Civil Engineering	786	228	327	0.02
43	Proposed Auditorium	791	227	324	0.009
44	Mechanical Engineering Block	782	226	328	0.008
45	Polytechnic Block	790	220	325	0.02
46	B.Ed. and Polytechnic Block	755	221	327	0.004
47	Biotech and Agreecalture Block	763	224	324	0.006
48	MBA Deptt.	770	221	324	0.002
49	IDR / Pharmacy Block	795	222	321	0.006
50	Mess	781	218	327	0.007

The values of PM-2.5 and PM-10 are very high and limits are dangerous for human beings. Values of CO2 and Formaldehyde are Good generally. Formaldehyde reading taken indoor is on higher side.

16. Significance of Refrigerant for Environment

Refrigerant	Global Warming Poetential	Ozone Depletion Potential
R 22	1810	Medium
R 410A	2088	Nil
R 32	675	Nil
R 134A	1430	Nil
R 290	3	Nil
R 600A	3	Nil

Refrigerant	Type	ODP	GWP	Atmospheric lifetime (years)
R12	CFC	0.9	8500	102
R22	HCFC	0.06	1700	13.3
R134a	HFC	0	1300	14
R407C	HFC blend	0	1610	36
R410A	HFC blend	0	1900	36
Ammonia (R717)	Natural compound	0	0	< 1
Propane (R290)	HC	0	3	< 1
R1234yf	HFC unsat.	0	6	Very low
R1234ze	HFC unsat.	0	6	Very low

Detail of Refrigerant used in installed Air Conditioners

S No.	LOCATION	Year of Installation/ year old	1.5 TR Non Str W. AC	1.5 TR Non Str Split	2 TR Non Str SPLIT	2 TR 3 Str SPLIT	1.5 TR 3 Str SPLIT	1.5 TR 2 Str W. AC	Refrigerant
1	**AB - VI BLOCK**	10	1						Not Known
2		10		1					Not Known
3		10			1				Not Known
4		2				1			Not Known
5		2					1		Not Known
6		4						1	Not Known
7		4							Not Known
8	**AB - IInd**	8							Not Known
9		8							Not Known
10		10	1						Not Known
11	**AB - IIIrd**	3							Not Known
12		3							Not Known
13		10			1				Not Known
14		10	1						Not Known
15		5					1		Not Known
16		10	1						Not Known
17		4							Not Known
18		10							Not Known
19	**7th Block**	2							Not Known
20		10			1				Not Known
21		8					1		Not Known
22		8							Not Known
23	**8th Block**	7							Not Known
24		10			1				Not Known
25		5							Not Known
26		7				1			Not Known
27		7					1		Not Known
28	**9th Block**	4						1	Not Known
29		10	1						Not Known
30		5							Not Known
31		4					2		Not Known
32	**10th Block**	4						1	Not Known
33		10	1						Not Known
34		5							Not Known
35		4				1			Not Known
36		4							Not Known

		3					1		Not Known
37	AB - Ist	4				1			Not Known
38		4					1		Not Known
39		8				1			Not Known
40		10			1				Not Known
41		8							Not Known
42		8				1			Not Known
43		10							Not Known
44		4							Not Known
45		10	1						Not Known
46		8							Not Known
47		10							Not Known
48	AB - IV IPR	10	1						Not Known
49		4							Not Known
50		10			1				Not Known
51		4				1			Not Known
52	AB - V	10	1						Not Known
53		4						1	Not Known
54		3							Not Known
55		2				1			Not Known
56		4							Not Known
57		10			1				Not Known
58		10	1						Not Known
59		10							Not Known
60	**TOTAL**		**10**	**1**	**7**	**8**	**8**	**4**	Not Known

Sno	LOCATION	Year of Installation/ year old	1 TR 3 Str SPLIT	1.5 TR 5 Str SPLIT	2 TR 5 Str SPLIT	3 TR 4 Str SPLIT	1 TR NonStr SPLIT	1 TR 5 Str SPLIT	Refrigerant
1	AB - VI BLOCK	10							Not Known
2		10							Not Known
3		10							Not Known
4		2							Not Known
5		2							Not Known
6		4							Not Known
7		4	1						Not Known
8	AB - IInd	8		3					Not Known
9		8			1				Not Known
10		10							Not Known
11	AB - IIIrd	3			1				Not Known

12		3				1			Not Known
13		10							Not Known
14		10							Not Known
15		5							Not Known
16		10							Not Known
17		4	1						Not Known
18		10					1		Not Known
19	**7th Block**	2			1				Not Known
20		10							Not Known
21		8						1	Not Known
22		8							Not Known
23	**8th Block**	7							Not Known
24		10							Not Known
25		5			1				Not Known
26		7							Not Known
27		7							Not Known
28	**9th Block**	4							Not Known
29		10							Not Known
30		5							Not Known
31		4							Not Known
32	**10th Block**	4							Not Known
33		10							Not Known
34		5							Not Known
35		4							Not Known
36		4	1						Not Known
37		3							Not Known
38	**AB - Ist**	4							Not Known
39		4							Not Known
40		8							Not Known
41		10							Not Known
42		8							Not Known
43		8							Not Known
44		10					1		Not Known
45		4							Not Known
46		10							Not Known
47		8							Not Known
48		10							Not Known
49	**AB - IV IPR**	10							Not Known
50		4							Not Known
51		10							Not Known
52		4							

53	AB - V	10							Not Known
54		4							Not Known
55		3							Not Known
56		2							Not Known
57		4							Not Known
58		10							Not Known
59		10							Not Known
60									
	TOTAL		3	3	4	1	2	1	

Sno	LOCATION	Year of Installation/ year old	.75 TR 5 Str SPLIT	2 TR 4 Str SPLIT	.75 TR NonStr SPLIT	1.5 TR 2 Str W. AC	3.5 TR NonStr W. AC	3.5 TR Non tr Split	Refrigerant
1	AB - VI BLOCK	10							Not Known
2		10							Not Known
3		10							Not Known
4		2							Not Known
5		2							Not Known
6		4							Not Known
7		4							Not Known
8	AB - IInd	8							Not Known
9		8							Not Known
10		10							Not Known
11	AB - IIIrd	3							Not Known
12		3							Not Known
13		10							Not Known
14		10							Not Known
15		5							Not Known
16		10							Not Known
17		4							Not Known
18		10							Not Known
19	7th Block	2							Not Known
20		10							Not Known
21		8							Not Known
22		8	1						Not Known
23	8th Block	7	1						Not Known
24		10							Not Known
25		5							Not Known
26		7							Not Known
27		7							Not Known
28	9th Block	4							Not Known

		10							Not Known
29		5		1					Not Known
30		4							Not Known
31		4							Not Known
32	**10th Block**	10							Not Known
33		5		1					Not Known
34		4							Not Known
35		4							Not Known
36		3							Not Known
37		4							Not Known
38	**AB - Ist**	4							Not Known
39		8							Not Known
40		10							Not Known
41		8			1				Not Known
42		8							Not Known
43		10							Not Known
44		4				1			Not Known
45		10							Not Known
46		8					1		Not Known
47		10						1	Not Known
48	**AB - IV IPR**	10							Not Known
49		4							Not Known
50		10							Not Known
51		4							Not Known
52	**AB - V**	10							Not Known
53		4							Not Known
54		3		1					Not Known
55		2							Not Known
56		4							Not Known
57		10							Not Known
58		10							Not Known
59		10							Not Known
60									

Sno	LOCATION	Year of Installation/ year old	1 TR 4 Str SPLIT	1.5 TR 4 Str SPLIT	7.5 TR Non Str Duct. AC	Refrigerant
1	**AB - VI BLOCK**	10				Not Known
2		10				Not Known
3		10				Not Known
4		2				Not Known
5		2				Not Known

		4				
6		4				Not Known
7	AB - IInd	8				Not Known
8		8				Not Known
9		10				Not Known
10	AB - IIIrd	3				Not Known
11		3				Not Known
12		10				Not Known
13		10				Not Known
14		5				Not Known
15		10				Not Known
16		4				Not Known
17		10				Not Known
18	7th Block	2				Not Known
19		10				Not Known
20		8				Not Known
21		8				Not Known
22	8th Block	7				Not Known
23		10				Not Known
24		5				Not Known
25		7				Not Known
26		7				Not Known
27	9th Block	4				Not Known
28		10				Not Known
29		5				Not Known
30		4				Not Known
31	10th Block	4				Not Known
32		10				Not Known
33		5				Not Known
34		4				Not Known
35		4				Not Known
36		3				Not Known
37	AB - Ist	4				Not Known
38		4				Not Known
39		8				Not Known
40		10				Not Known
41		8				Not Known
42		8				Not Known
43		10				Not Known
44		4				Not Known
45		10				Not Known
46						

47		8				Not Known
48		10				Not Known
49	**AB - IV IPR**	10				Not Known
50		4	1			Not Known
51		10				Not Known
52		4				Not Known
53	**AB - V**	10				Not Known
54		4				Not Known
55		3				Not Known
56		2				Not Known
57		4		1		Not Known
58		10				Not Known
59		10				Not Known
60		10			1	Not Known
	TOTAL		**1**	**1**	**1**	

Observations

1. In the table given above is the inventory of all AC's installed has been given.
2. The refrigerant details have not been provided in inventory

Recommendations

1. It is recommended that in future care should be taken to purchase Air conditioners with refrigerants for which GWP is low and ODP is nil.
2. Life cycle cost should be considered for making decision about purchase of Air Conditioners.
3. All AC's that were procured more than 8 years ago should be replaced with best in class energy efficient Air Conditioners after taking into consideration Life Cycle Cost. This will eliminate existing AC's impact on environment through low impact refrigerant and also with low consumption of Electricity thus reducing

17.ECO Friendly Housekeeping Materials

Green Seal -37 compliant an International standard or Green Pro-CII certification

1

CII
Confederation of Indian Industry

GreenPro Certification Standard for

Cleaning Chemicals

Version 1.0

2. *GreenPro Certification – Life Cycle Approach*

The Green Products Rating adopts a holistic approach based on the 'Life Cycle' of the product. The rating system encourages the product manufacturers to implement measures that would result in environmental, health and wellbeing benefits at the following stages of the life cycle of the products.

1. Product Design
2. Raw materials
3. Manufacturing Process
4. Product Performance during use
5. Disposal / Recycling

For Users

Use of rated Green products leads to significant tangible and intangible benefits for the end users.

Some of the benefits for the users are highlighted as below:

1. Time and effort in carrying out due diligence in selecting a green product is saved
2. The user is assured of the performance of the product and equipment
3. Ensures Toxic and hazardous substances free products which in turn decrease "health and wellbeing" risks of the users
4. Improved product performance during use to reduce resource consumption and environmental impacts
5. Recognition and credits for achieving national and international Certification for the buildings

4. National Priorities addressed in Certification

GreenPro Certification addresses the following which are priorities of the Government at the National level:

Water:

Water is a major concern in most part of the country. Implementation of water efficiency measures and "zero Liquid Discharge" are being encouraged to address the water related issues.

Land:

Availability of land and increase in land pollution are major areas of concern. The Certification system demands for increased recycling of material after use which would result in reduction in landfills and hence reduction in land pollution.

Energy Efficiency:

The Certification system encourages the product manufacturers to adopt energy efficiency improvement measures and reduce their energy consumption which is in line with the National Mission on Enhanced Energy Efficiency. This also addresses

The key objective of the council is to facilitate Green product market transformation in India through 'Green Product Certification'.

The initial focus of the council will be on Green building products and related technologies. Over a period of time, the council will expand its focus to other areas such as Industrial products, consumer items, services etc.

Why GreenPro Certification?

The GreenPro Certification is a tool for facilitating Green Product market transformation in the country. The GreenPro Certification is expected to:

1. Enable green building projects in selecting the right product and equipment
2. Increase the market demand for the Green products
3. Put a system in place for a product to be called 'green'

Eliminate exposure to prohibited substances that can lead to long term health effects either through respiration / direct contact.

Mandatory Requirement Manufacturer to provide Material Safety Data Sheet (MSDS) for the products.

The MSDS should have the following details:

1. Chemical Identify
2. Manufacturer's information
3. Hazardous ingredients / Identify information
4. Physical, Chemical characteristics
5. Fire and explosion hazard data
6. Reactivity data
7. Health hazard data
8. Precautions of safe handling and use
9. Control measures
10. Emergency and first aid procedures

General Purpose Cleaners

Presently there is no practice for procurement of Eco Friendly Chemical.

Eco friendly housekeeping materials are recommended to be used for all cleaning application should be Green Pro or any similar Indian standard should be procured in future and records of such procurement b documented for future references.

The cleaning material may be required for following applications and also may be some other in addition to these.

1. Glass Cleaners
2. Bathroom Cleaners
3. Disinfectants and Sanitizers
4. Cleaner/Degreasers
5. Carpet and Upholstery Cleaners
6. Floor Cleaners
7. Liquid Hand Soap
8. Furniture Polish

Ventilation Assessment

The areas constructed have been provided with adequate windows and ventilators have been provided @ more than 6% of floor area.

Fire Safety:

No halon based fire extinguishers have been used. It is recommended that of fire suppression system is to be used for any fire extinguishing system, only clean agents with minimum environmental impact should be installed.

Canteen Waste-Handling practice

18TH MONTH MESS WASTAGE REPORT ALL MESS — **SESSION(2019-2020 & 2020)**

S/NO	Mess	May-19	Jun-19	Jul-19	Aug-19	SEP.19	OCT.19	NOV.19	DEC.19	JAN.202	FAB.202	Mar-20	Apr-20	MAY.202	Jun-20	JUL.2020	AUG.202	SEP.202	OCT.202	TOTAL
1	MESS - A	93.7	0	0	356.8	451.7	246.3	412.9	337.1	506.3	515.3	111.7	0	0	0	0	0	0	0	3031.8
2	MESS - B	89.3	0	0	431.4	447.4	329.5	443.6	436	559.8	553.3	524.7	381.4	385.7	337.9	291.9	212	187.9	121.2	5733
3	MESS - C	95.8	0	0	249	256	294.7	252.3	190.2	322.4	371.4	107.8	0	0	0	0	0	0	0	2139.6
4	MESS - D	91.8	0	0	394.7	387.1	224.2	259.2	238.5	293.8	385.7	107.5	0	0	0	0	0	0	0	2382.5
5	MESS - E	589	168.7	0	629.2	687.2	468.1	638.3	477.7	617.9	614.5	144.6	0	0	0	0	0	0	0	5035.2
6	MESS - F	233.4	433	465.4	616.8	652.1	465.9	596.6	431.7	578.9	608.7	118.5	0	0	0	0	0	0	0	5201
7	MESS - G	35.5	675.4	426.3	580.4	642.7	416.2	558.1	435.3	495.3	488.2	95	0	0	0	0	44.9	57.9	0	4951.2
8	MESS - H	277.5	0	30.8	464.3	644.01	417.1	453	299.5	402.5	493.5	94.7	0	0	0	0	0	0	0	3576.91
9	MESS - I	340.2	0	0	574.9	879.9	868.3	1003.6	618.9	1197.9	661.9	180	0	0	0	0	0	0	0	6325.6
10	MESS - J	25.1	0	0	451.75	277.4	749.4	792.74	574	530.7	470.3	210	0	0	0	0	0	0	0	4081.39
11	MESS - GODAWARI	132.6	0	9.8	282.7	339.3	297.7	338.4	266.6	291.3	400.4	79.9	0	0	0	0	0	0	0	2438.7
12	MESS - GANGA	127.9	0	0	315.4	594.84	387.6	443.8	333.6	360.8	418	91.7	0	0	0	0	0	0	0	3073.64
13	MESS - YAMUNA	332.3	580.1	563	649	692.9	483.9	548.8	395.8	450.8	560.3	147.4	0	0	0	0	0	0	0	5404.3
14	MESS - KALPANA	43.55	0	5	162.9	258.4	186.6	203.9	132.6	148.4	206.5	51.5	0	0	0	0	0	0	0	1399.35
15	MESS - WING - J	257.4	532.1	656.2	561.2	569	437.9	580.7	432.1	519.5	493.4	92.6	0	0	0	0	0	0	0	5132.1
16	MESS - WING - S	214.7	0	29.7	620	603.7	446.6	574.5	473.1	541.9	506.2	87	0	0	0	0	0	0	0	4097.4

There are no signs provided in Mess and Cafeteria for avoiding food wastage and take food as per requirement and there should not be any food wastage. These signage are required to be provided in all area where food is served or consumed.

1. All Hostel Mess
2. Canteen
3. Cafeteria

FOOD PROCUREMENT AND DISPOSAL

1. Food is prepared in Canteen/Mess and any food waste that is generated is filled in compost pits for preparation of natural manure.
2. A good effort has been made to maintain all waste data for food. Record for all other types of wastes is also required to be maintained for better management.
3. Effort should be made for reduction of onsite wastages.

18.Sustainable Development

Sustainable development should always be practiced in all activities of university.

UNDESSA

> **Sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"** –World Commission on Environment and Development, 1987

Basically, sustainable development is a long-term solution to how we plan our indefinite progress in the future without causing damage to the environment so as to guarantee a safe habitat for the next generations, who will continue to develop their economies, societies, and care for the environment with a similar ideal in mind. It satisfies our needs without sabotaging the opportunities of others. The concept covers a broad scope of matters such as environmental, social, and economic development which continues to prove its importance in our lives as it affects all aspects of them. The United Nations have set out a number of Sustainable Development Goals and targets to serve as guidelines for the future and optimal conscious development.

For design of any new future construction the following points should be given consideration and weight age

1. Siting, form and design of building
2. External Development and Landscape
3. Envelope optimization
4. Shading of Building
5. Cool Roof practices
6. Sustainable Material
7. Water and Waste management
8. Building Services Optimization

The following construction practices should be followed for future construction

The framework for sustainable construction practices includes the following issues:

1. Pre-construction pre-requisites;
2. Planning for sustainable construction; demolition.
3. Planning, monitoring and control of environmental descriptors;
4. Sustainable work execution procedures;
5. Effective use of water;
6. Construction waste management ;
7. Post-construction closeout;
8. Alternative use, de-construction, dismantling
9. Procurement Policy
10. Contractual Obligations towards Sustainable Construction
11. Identification of Sustainability Issues During Construction
12. Construction methods review and impact on sustainability
13. Consideration to environmental impact assessment

Considerations to social impact assessment

1. Prevention and management of construction accidents
2. Establishing Energy Consumption Data
3. Collection, Analysis, Documentation System and
4. Creating Benchmarks
5. Monitoring of performance of management systems and
6. Location of Infrastructure for Labourers
7. Providing fire and life safety measures during construction

Water and Waste Management During Construction

1. Water Use During Construction
2. Control and Use of De-Watering Output
3. Management of Waste Water

Recycling Rate of R-cycling should be monitored and maximised to extent possible.

Conservation and Restoration Activities should always be preferred.

Use of natural resources and replacement of chemicals as much as possible

As far as possible avoid use of Chemicals and use natural resources.

Encourage use of local materials Always encourage use of locally available material. With this we will help local population and their Social Development Index will get a boost. Also low energy shall be expanded on transportation that will ultimately save fossil fuels and make decision of an organization more sustainable.

Low VOC (Volatile organic compound)%

The following material contains VOC

1. Paints
2. Adhesives
3. Sealants
4. Other materials

It should be ensured that while procurement or issuing PO's for work it should be ensured that only material with permitted percentage of VOC are procured or used in of works awarded. Special conditions in contract/specifications shall be incorporated.

Team responsible for PMC shall ensure that material brought to site and used in execution of work is in compliance to Green specifications.

Use of Low Impact material and Zero ODP material Where ever relevant and applicable care should be taken to include in specifications use of low impact material and only zero ODP material shall be procured or used in execution of works by contractors/Vendors.

Annexure I

VOC limits of materials

Type of Material	VOC Limit (g/L less water)
Paints	
Non- Flat (Glossy) paint	150
Flat (Mat) paint	50
Anti- corrosive/ anti-rust paints	250
Varnish	350
Adhesives	
Glazing adhesives	100
Tiles adhesives	65
Wood adhesive	30
Wood flooring adhesive	100

Annexure II

Minimum Ventilation Rates in Various Functional Zones*

Occupancy Category	People Outdoor Air Rate	Area Outdoor Air Rate
	Cfm/person	Cfm/ sq.ft
Correctional Facilities		
Dayroom, Guard station	5	0.06
Booking/ waiting	7.5	0.06
Education Facilities		
Daycare (through age 4), daycare sickroom, Art Classroom, science laboratories, college laboratories, wood, metal shop	10	0.18
Classrooms (ages 5-8), (age 9+), computer lab, media centre	10	0.12
Lecture Room/ hall (fixed seating)	7.5	0.06
Music/ theater/ dance,	10	0.06
Multi use assembly	7.5	0.06
Food & Beverages Services		
Restaurant dining rooms/ cafeteria/ fast food dining/ Bars/ Cocktail Lounges	7.5	0.18
General		
Break Rooms, Coffee stations, conference/ meeting	5	0.06
Corridors	-	0.06
Storage Rooms	-	0.12
Hotels, Motels, Resorts, Dormitories		
Bedroom/ living room, barracks sleeping areas	5	0.06
laundry rooms	5	0.12
Lobbies/ prefunction	7.5	0.06
Multipurpose assembly	5	0.06

Occupancy Category	People Outdoor Air Rate	Area Outdoor Air Rate
	Cfm/person	Cfm/ sq.ft
Office Building		
Office Spaces, Reception Areas, Telephone, data entry, Main entry Lobbies	5	0.06
Electrical Equipment rooms	-	0.06
Elevator machine rooms	-	0.12
Pharmacy (prep area)	5	0.18
Photo Studios	5	0.12
Shipping/ receiving	-	0.12
Telephone closets	-	0.00
Transportation waiting	7.5	0.06
Warehouses	-	0.06
Public Assembly Spaces		
Auditorium seating area, Place of religious worship, Courtrooms, Legislative Chambers, Lobbies	5	0.06
Libraries	5	0.12
Museums (children's)	7.5	0.06
Museum/ galleries	7.5	0.06
Retail		
Sales	7.5	0.12
Mall common Areas	7.5	0.06
Barber Shop	7.5	0.06
Beauty & nail salons	20	0.12
Pet Shops (animal areas)	7.5	0.18
Super Market, Coin operated Laundries	7.5	0.06

Occupancy Category	People Outdoor Air Rate	Area Outdoor Air Rate
	Cfm/person	Cfm/ sq.ft
Sports & Entertainment		
Sports arena (Play Area), Gym, stadium (play area)	-	0.30
Spectator area	7.5	0.06
Swimming (pool & deck)	-	0.48
Disco/dance floor/ health club/ aerobics room/ weight rooms	20	0.06
Bowling alley (seating)	10	0.12
Gambling casinos/ game arcades	7.5	0.18
Stages, studios	10	0.06

* *Total outdoor air flow in functional zone =*

$$\left\{\begin{array}{c}\textit{Outdoor air flow rate required per person as per the above table}\\ \times\\ \textit{Zone population}\end{array}\right\} + \left\{\begin{array}{c}\textit{Outdoor air flow rate required per unit area as per the above table}\\ \times\\ \textit{Net occupiable zone area}\end{array}\right\}$$

APPENDIX 5B: LANDSCAPE WATER DEMAND REDUCTION

Table 1 Plant factor for various species

Plant species	Plant factor
Lawns	1
Native grass	0.45
Existing native trees	0
Newly planted native shrubs	0.3
Newly planted exotic shrubs	0.9
Newly planted native trees	0.15
Newly planted exotic trees	1.65

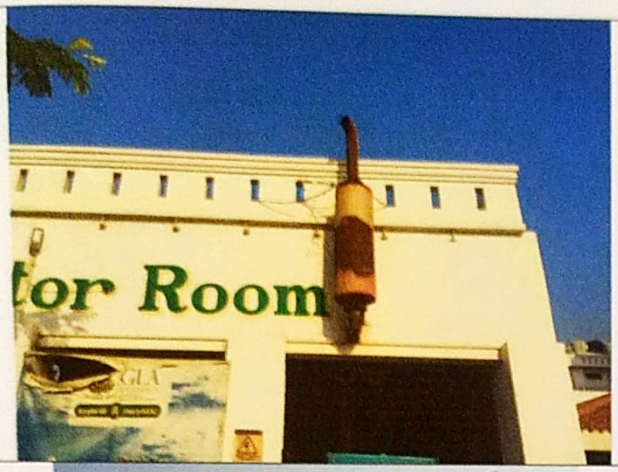
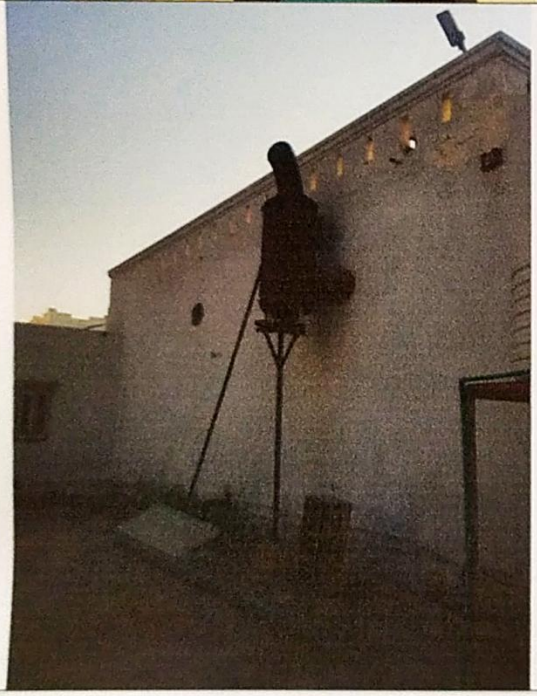
Plant species	Plant factor
Vertical gardens	0.35
Newly planted native shrubs on podium	1.3
Newly planted exotic shrubs on podium	1.9
Newly planted native trees on podium	1.15
Newly planted exotic trees on podium	2.65
Note: For potted plants, calculate the water requirement as volume of pot and divide it by 4.	

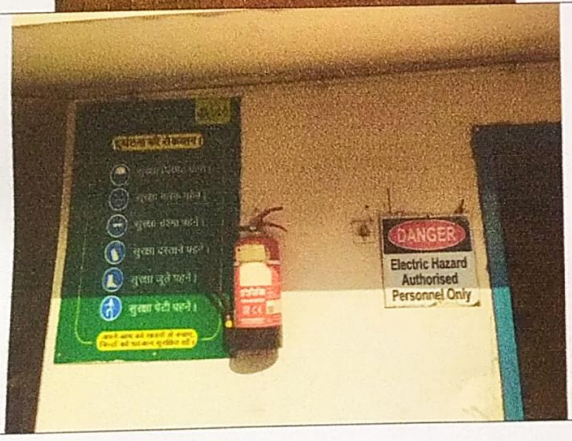
Table 2 Irrigation system efficiency

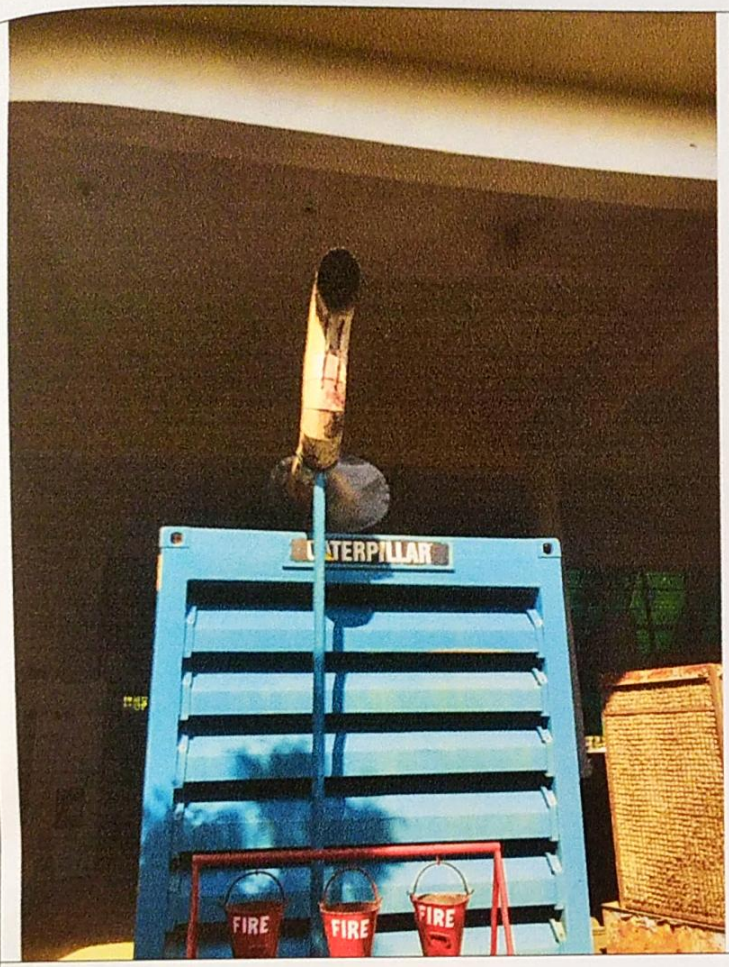
Type of irrigation system	Efficiency (%)
Flood	65
Furrow	80
Sprinkler	85
Drip	90

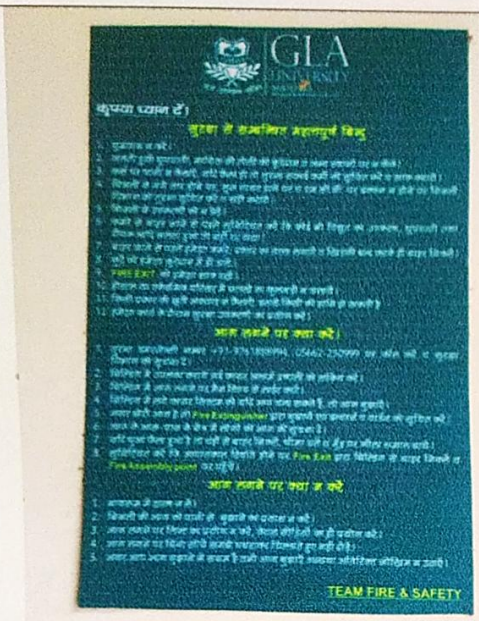
19.Photographs-Environmental Concerns

Photographs of Green and Environmental Audit

	DG Set exhaust not provided as per CPCB requirement. It should be raised to a height required as per norms
	DG Set exhaust not provided as per CPCB requirement. It should be raised to a height required as per norms

	Two types of Bins provided for segregation of waste at source.
	PREFERRED BINS
	Signage installed for social welfare

	DG Set exhaust not provided as per CPCB requirement. It should be raised to a height required as per norms
	STP installed for requisite capacity

	Signage with first line for no smoking installed in campus
	DG Set exhaust not provided as per CPCB requirement. It should be raised to a height required as per norms