ENVIRONMENTAL AUDIT REPORT

2021-2022

ADITYA ENGINEERING COLLEGE (AEC)

Prepared BY

Global Green Solutionz
Greening the globe

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Acknowledgement

Global Green Solutionz (GGS) is thankful to the management and staff of Aditya Engineering College for awarding Environmental Audit for their college at Surampalem, East Godavari, Andhra Pradesh.

The Study team members of Global Green Solutionz would sincerely like to thank all the Department Heads and support staff members of Aditya Engineering College for providing the necessary support in order complete the Environmental audit.

For Global Green Solutionz

M. Srikanth

GLOBAL GREEN SOLUTIONZ HYDERABAD

Srikanth Meesa,
CEO, Global Green Solutionz

ABOUT THE COLLEGE

Aditya Engineering College was founded as the premier promoter of quality education in coastal districts of Andhra Pradesh during 2001-02 under the aegis of Aditya Academy. Sri N. Sesha Reddy, as a founder chairman, promoted the educational institution, with a mission, to offer the best engineering education with unmatched innovations in the process of teaching and learning by aiming at the all-round development of the students.

The College is situated in an eco-friendly area of 180 acres with thick greenery at Surampalem, Gandepalli Mandal, East Godavari District, Andhra Pradesh. The College is 15 KM away from Samalkot Railway Station on Howrah-Chennai Railway line in South Central Railway. The College is 35 Km away from Kakinada and Rajahmundry on ADB Road.

The College has six academic blocks with a total carpet area of 35,425 Sq. Mts. apart from two boys hostels and one girls hostel building. The particulars of academic buildings and the departments / offices accommodated are as follows.

S.No	Building Name	Department/Office
1	Cotton Bhavan	Administrative Office, Examination Cell, Accounts, Admission Office, ECE.
2	K.L. Rao Bhavan	Mechanical, Electrical, Petroleum Technology, Mining Engineering and Agricultural Engineering
3	Bill Gates Bhavan	CSE, IT, H&BS, Civil, Management Sciences
4	Abdul Kalam Bhavan	MCA

The college proudly offers 11 UG and 9 PG programmes in engineering, MCA, MBA and MBA (Integrated) with 20 years of rich standing in the educational era. Besides, the college has added many feathers in its cap which include AA+ Grade by Careers 360, South India 4th rank by Digital Mailers, South India 6th rank by Silicon India, 13th rank out of top 25 engineering colleges by 4Ps, a niche in Asia top 100 colleges by WCRC leaders, Best Placement Award by ASSOCHAM, All India 98th rank-DQ CMR top T-School survey by DATA Quest and 13th position in Top 20 colleges of India by the Sunday Indian. These districts recognitions speak volumes of the institute's objective to promote engineering excellence. The total student strength is 4986 with faculty strength of 264 thus giving rise to healthy faculty student ratio.

It is approved by AICTE, recognized by Govt. of Andhra Pradesh, Permanently affiliated

to Jawaharlal Nehru Technological University Kakinada (JNTUK) and is accredited by National Assessment and Accreditation Council (NAAC) with 'A Grade. The college also received UGC recognition under Sections 2(f) & 12(B) of the UGC Act.

Aditya Engineering College will do its best to offer an innovative environment wherein your dreams will be realized: dreams for higher knowledge, dreams for scientific inquiry, dreams for technology creation, dreams for co-curricular activities, and dreams to change the world.

Under Graduate Courses:

- B.Tech Civil engineering
- B.Tech Electrical and Electronics Engineering
- B.Tech Mechanical Engineering
- B.Tech Electronics and Communication Engineering
- B.Tech Computer Science and Engineering
- B.Tech Information Technology
- B.Tech Petroleum Technology
- B. Tech Agriculture Engineering
- B. Tech Mining engineering
- B.Tech Artificial Intelligence & Machine Learning
- B.Tech Computer Science and Engineering (Data Science)

Post Graduate Courses:

- M.Tech Structural Engineering
- M.Tech VLSI Design
- M.Tech Computer Science & Engineering
- M.Tech Power Electronics &Drives
- M.Tech Thermal Engineering
- M.Tech Petroleum Engineering
- M.B.A Master of Business Administration
- Integrated M.B.A Integrated Master of Business Administration
- M.C.A Master of Computer Applications

LAND USE ANALYSIS, AEC COLLEGE, SURAMPALEM, ANDHARA PARADESH (2022)

GENERAL OVERVIEW OF THE CONCEPT OF LANDUSE:

Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. It refers the activities and the various uses which are carried on and derived from land. Viewing the earth from space, it is now very crucial in man's activities on natural resource. In situations of rapid changes in land use, observations of the Earth from space give the information of human activities and utilization of the landscape (Howarth 1981).

The collection of remotely sensed data facilitates the synoptic analyses of earth system, functions, patterning, and change in the local, regional as well as at global scales over time. Satellite imagery particularly is a valuable tool for generating land use map using google maps.

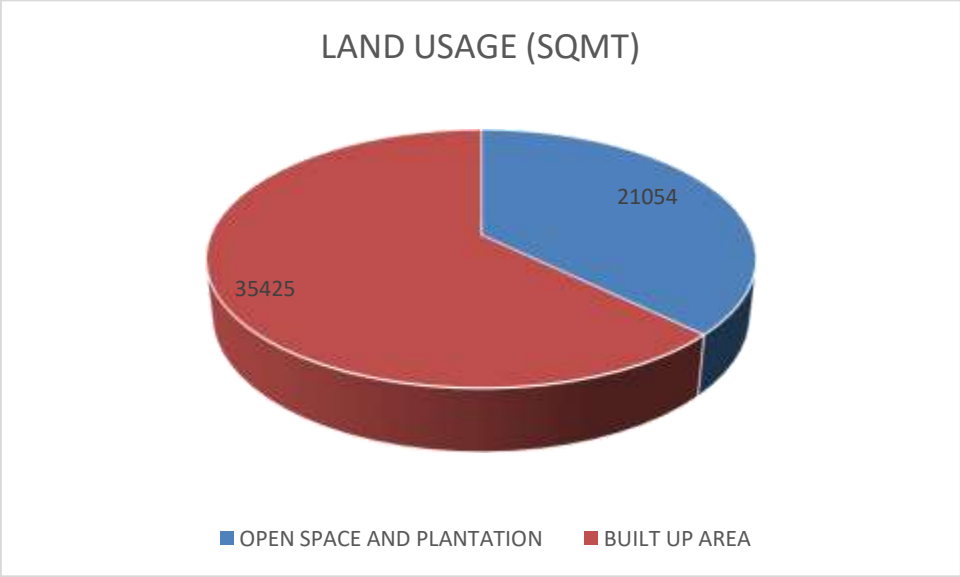
Site layout map of Aditya Engineering College (AEC)

METHODOLOGY ADOPTED FOR LAND USE MAPPING

Three types of data that are GPS points, field survey data and Google earth data for Georeferencing have been used in this study. Land use map of the study area have been prepared using the above three types of data with the help of google maps.

LAND USE DATA OF AEC, Surampalem

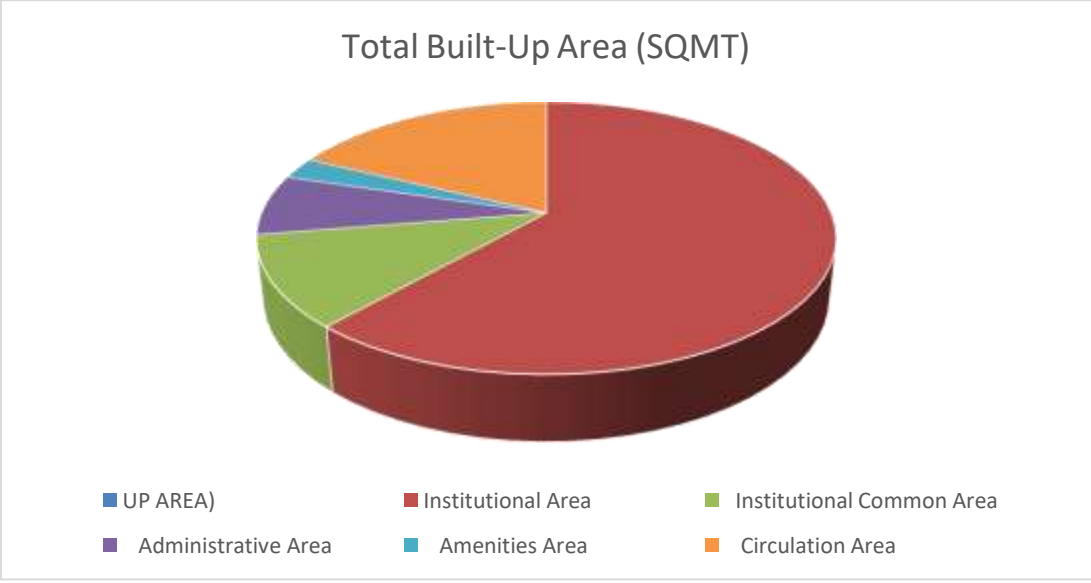
CATEGORIES OF LAND USE	AREA IN SQ METRES
OPEN SPACE AND PLANTATION	21054
BUILT UP AREA	35425
TOTAL AREA	56,479



The total area of AEC College is 56,479 sq. meters out of which the built-up area is 63% (i.e., 35425 sq. meters) and open space & plantation area is 37% (i.e., 21054 sq. meters).

LAND USE (BUILT UP AREA) ANALYSIS:

CATEGORIES OF LAND USE (BUILT UP AREA)	AREA IN SQ METRES
Institutional Area	21809.3
Institutional Common Area	3848.7
Administrative Area	2544
Amenities Area	903
Circulation Area	6320
TOTAL AREA	**35425**



The institutional area sums up to 21809.3 sq. meters, followed by circulation area 6320 sq. meters. Institutional common area is 3848.7 sq. meters. Administrative Area is 2544 sq. meters and the amenities occupy about 903 sq, meters.

AEC, which was established during the year 2001-02, has an eco-friendly environment. It has a long legacy of healthy environmental practices including periodic plantation, their preservation and maintenance. Its land use is such that about 24 % of the total area is occupied by open land and plantation that generates a better and sustainable campus environment.

TREE DIVERSITY OF AEC COLLEGE, Surampalem

AEC is within the geo-position between latitude 17.08967 N, and longitude 82.06680 E at Surampalem, 30 Km from Kakinada city India. It encompasses an area of about 180 acres of greenery in Surampalem. The area is immensely diverse with a variety of tree species performing a variety of functions. Most of these tree species are planted in different periods of time through various plantation programmes organized by the college management and have become an integral part of the college.

The trees of the college have increased the quality of life, not only the college fraternity but also the people around of the college in terms of contributing to our environment by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, controlling climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer. We often make an emotional connection with these trees and sometime become personally attached to the ones that we see every day. Thus, the college has been playing a significant role in maintaining the environment and its surrounding areas.

AEC campus is having total green area of **21,054 m²**

S.No.	component	Area in m²
1	Lawn	5585
2	Tree cover	6767
3	Potted plants	1426
4	Shrubs and hedges	7276

Below stated information is provided by the college management team:

- AEC campus has Garden on 21,054 square meters area. The garden has different sections in which specific types of plants are planted with respect to their medicinal importance and Vedic reference. Boards are displayed for each section and plants names. Sprinkler system is provided in herbal garden.
- Large trees and potted plants were seen in the campus. Plantation improves aesthetics and helps as buffer in reducing noise level, maintaining temperatures of the area. As informed by the garden supervisor, around 80 trees are present in the campus.
- Garden is managed by gardener. Organic fertilizers and pesticides are used for plants if necessary.

ELECTRICAL POWER CONSUMPTION AT AEC COLLEGE

Total Energy consumption: At AEC College, being one of the reputed colleges in the Andhra Pradesh consumed on an average 393948 kWh (units) of electricity per month which turns out to be 32829 kwh during 2021.

Transformer capacity : 500KV

Diesel generator, if any and capacity : 160KV

No. of pumps – 25 Borewell and sump pumps –10+15 HPs -10

Borewell	10
Sump pump	15

No. of building – Names with no. of rooms in each building

S.No.	Name of the Building	No. of Rooms
1	Cotton Bhavan	40
2	KL Rao Bhavan	73
3	Bill Gates Bhavan	91
4	Abdul kalam Bhavan	59
5	Abdul kalam Bhavan Extension	19
6	Ratan Tata Bhavan	-

Hostel details, no. of rooms, no. of students staying – inventory of lights, fans, ACs and geysers, if any

S.No	Hostel Block	Rooms	Students	Fans	C.F.L	Tube Lights	LED
1.	**B**	**152**	**291**	**324**	**-**	**317**	**331**
2.	**D**	**255**	**160**	**335**	**-**	**336**	**374**

Building wise inventory details
Type of tube lights, wattage, no. of fans, no. of ACs,

S.No.	Name of the Building	Fans each 50Watt	C.F.L 10Watt	Tube Lights 20Watt	AC 1.5 Ton
1	Cotton Bhavan	**269**	**62**	**161**	**19**
2	KL Rao Bhavan	**435**	**44**	**324**	**5**
3	Bill Gates Bhavan	**587**	**21**	**376**	**22**
4	Abdul kalam Bhavan	**384**	**83**	**244**	**2**
5	Abdul kalam Bhavan Extension	**134**	**16**	**97**	**-**
6	Ratan Tata Bhavan	**-**	**-**	**-**	**-**

Renewable energy: There is a Rooftop solar PV System of 500 KW capacity has been installed to cater to the energy needs of the college.

The college has also started using clean energy since 2018 from the 500 KW solar power plant installed near the college. It has produced 488434 units of clean energy during the financial year 2021-22.

WEATHER DATA OF Kakinada: AEC COLLEGE

Month-wise weather data of Kakinada City (30 Km from Surampalem AEC) For the year 2021

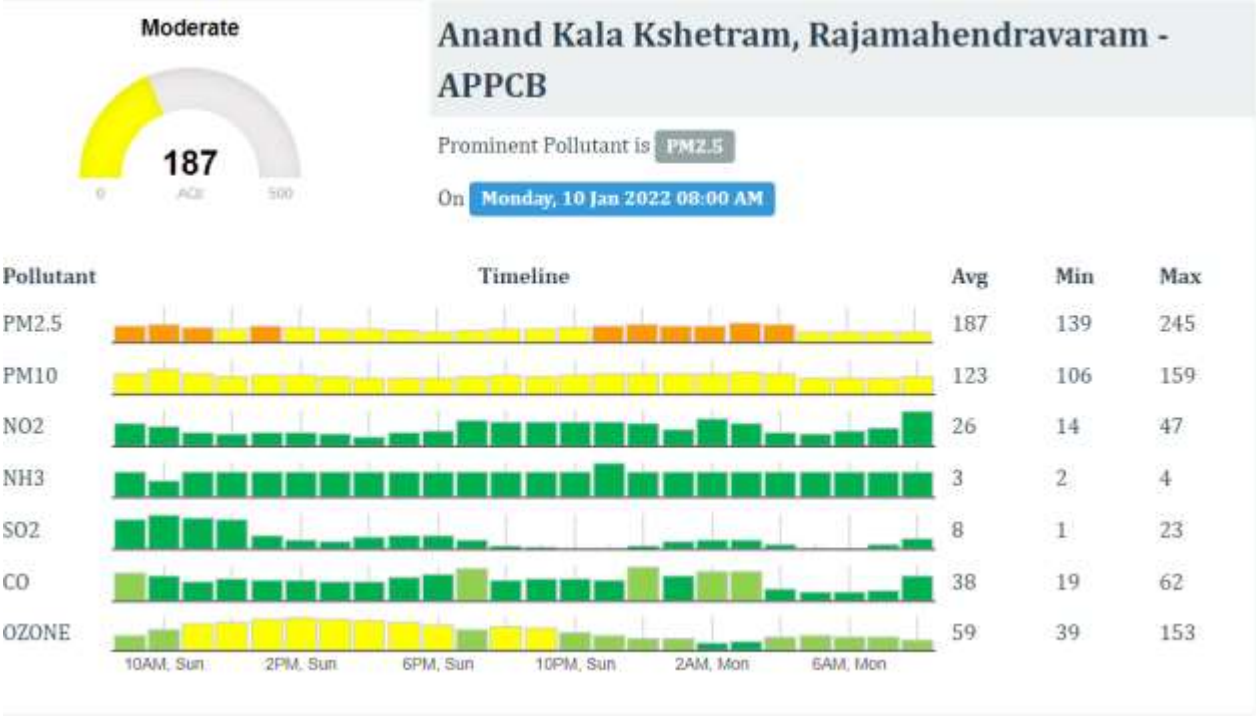
Mnth	Max Temp (C^0)	Min Temp (C^0)	Precipitation (mm)
January	34.6	20.3	12.6
February	37.8	21.7	10.3
March	40.0	24	7.5
April	42.8	26.2	16.4
May	46.9	27.8	42.3
June	47.4	27.3	122.8
July	41.7	26.2	175.4
August	38.4	25.9	176.9
September	37.9	25.9	199.4
October	37	24.8	243.
November	35.9	22.5	98.8
December	34	20.3	10.7

From the above table, it is evident the temperature is high in the month of June and low in the month of December. The rain fall is high during the month of September and low in the month of February.

AIR QUALITY IN KAKINADA: AEC COLLEGE

The climate of AEC college campus located at Surampalem near Kakinada city outskirts. It was noticed the college is away from the bustling city Kakinada and the campus is fully green with many trees and plantations.

Air Quality determination
Moderate: Air quality index (OVERALL 187) in **Rajamahendravaram weather station (34 km from Surampalem), India**



The air quality index is found 187 as per the publicly available data for the month January 2022. This indicates moderate air quality at the nearby air quality monitoring station. However, as the AEC campus is surrounded by greenery and plantation the air quality is of much better quality.

Indoor Air Quality:

The interviews with the college staff have revealed the below:

- During day- time Air Quality Index (AQI) of 45-60 because of campus greenery
- In kitchens present in Cafeteria, LPG is used for cooking which is a clean fuel.
- In classrooms the mode of ventilation is natural draft (through windows) and is enhanced by fans. Large windows and cross-ventilation are observed in corridors. Air conditioners are used in some offices, computer laboratories and computer server room.
- Exhaust fans are provided in chemistry laboratory and all kitchens.

WATER ANALYSIS AT AEC

The overhead tanks installed at the top of all the building blocks provided water for domestic use within the blocks of Aditya Engineering College. The bore well is used to feed the overhead tanks with groundwater. The water used in restrooms, wash basins, and other areas comes only from overhead tanks, which have been cleaned every three months. When it came to drinking water, cooling water tanks on the top level. The waste water collected from the drinking water basins is utilized for watering of plants on the garden.

AEC consumes the ground water which is stored in the sump and overhead tanks. The sump capacity is 130 KL.

It was informed that there is 2000 Liters per hour of Reverse Osmosis plant. It was observed the RO plant is working efficiently.

Green audit team noticed that the drinking water quality was found good and potable.

Green audit team has noticed that there is a water harvesting pit where the RO reject is

used to recharge the ground water. Approximately 40% of the water entering the RO water gets rejected which is used to recharge the ground water.

Wastewater: Wastewater is mainly generated from toilet flushing and kitchens. Wastewater generated from academic blocks as well as hostels is collected in septic tanks and passed to surrounding trees and plants through canals.

Rainwater harvesting:

Rainwater collected from building roofs is gathered in the building blocks' interior gardens. Some rainwater is directly absorbed into the ground, while some is used for vegetation development. The majority of the precipitated water was channeled to the inner garden area's outlet, where it entered the combined drainage system. The drained water was sent to the campus's open ponds, while precipitation that fell near the ponds was also transported through drains and gathered in the ponds.

The rainwater is fed into the surface pond nearby the college. The picture of the pond is provided below.

The pond water is used for gardening needs of the college.

Liquid Waste Management:

The liquid wastes generated in the campus include Sewage, Laboratory, Laundry, hostel and canteen effluent waste. The above waste is treated through Pond setup in the institute with a capacity of 95000 KLD (Kilo Liters per Day). The entire treated water is used for watering the gardens and lawns maintained in the campus. Therefore, the entire waste water generated in the campus is treated and reused. The laboratory waste water does not contain hazardous chemicals and periodical monitoring is done by the maintenance team.

NOISE LEVEL IN THE SURROUNDING OF AEC COLLEGE

Our site visit observations, revealed that the noise levels were found satisfactory and within the permissible limits.

WASTE MANAGEMENT AT AEC COLLEGE

Management of solid waste is an important driver in Green Audit. Solid waste not properly managed leads to the degradation of the environment which, in turn, affects the flora and fauna. Keeping this in mind, the College has been strictly implementing scientific solid waste management to maintain the green status of the campus.

The present Prime Minister of India Sri Narendra Modi launched 'Swachh Bharat Abhiyan' (Clean India Mission) on 2nd October, 2014. In this mission, the proper use of dust/waste bins is one of the major priorities. For the implementation of this mission, collective mass effort is necessary. For proper segregation and management. proper use of waste bins is the only solution for waste management purpose in the college campuses.

Waste Management includes the management and handling of all types of wastes. This waste types include the following:

Wet Waste: Wet waste includes the organic waste such a food waste, kitchen waste after peeling the vegetables and garden waste etc.

Dry Waste: Dry waste can be categorized into different wastes such as plastic waste, E-Waste, bio-medical waste, Construction & demolition waste and hazardous waste.

Paper Waste:

In order to reduce the paper waste, the management started digitization. It has implemented good practices such as prints and photocopies are taken on both sides of the pages. Further, the campus has E-book facility since 2018 all the book are available on the college website for the students at any time. Further, records of books and e-books are well kept and were available for review.

Internal notices and communications are through E-mail/SMS. AEC has Learning Management System (LMS) where notices are sent, exam results are displayed and attendance is recorded digitally.

Other good practices followed by AEC are provided below:

- Biometric attendance is provided for AEC staff.
- Paper notices are displayed on the notice boards. The dissertation reports, journals, and answer papers are stored as per the University rules.
- Around 10 kg paper waste is being generated by AEC each year. Old papers and books are given to the recycler Aditya Notebooks
- AEC encourage students to use eco-friendly material and recycle old papers/ scrap for decoration purpose during college festivals.

Solid Waste:

Being an institute with residential facility, considerable quantity of wet (food/ organic) waste is generated in the premises.

Below information is obtained from the college:

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. It is a great concern relating to environment and society Aditya Engineering College took major steps to manage the waste to protect and create a clean and pleasant environment. The departments as well as administrative offices generates some waste and put in two bins for wet waste and dry waste kept in departments and corridors. Each building has several dust bins from where the housekeeping staff collects the trash. In the same manner waste from canteens, residential quarters, Hostel and guest houses is collected. The collected waste is dumped in big containers (wet and dry) by the housekeeping staffs regularly. The whole waste is then segregated and then the waste that can be used for composting is dumped for vermicomposting. Vermicomposting unit converts the biodegradable waste to fertilizer. This fertilizer is used to promote the lemon orchard located in the AEC campus. AEC discourages use of plastic; particularly single use plastics in campus. Paper wastes from departments, Library, Administrative offices, Hostels, are disposed through vendors. The wastes are properly stacked in designated place and later disposed through vendors for proper waste management. Aditya promotes digital platform to reduce the usage of paper for communication and sharing documents.

E-Waste:

Being one of the progressive colleges in India, AEC has also moved to on-line learning system through it's e-courses. This includes classrooms, library, internal mails etc. All the classrooms are digitized. It also has an E-library, student & staff portal for academic work, biometric attendance system for staff, etc.

Electronic goods are put to optimum use; the minor repairs are set right by the Laboratory assistants and teaching staff; and the major repairs are handled by the Technical Assistant and are reused. AEC has entered MoU with ELECTROPRO SYSTEMS which buys our damaged computers and other non-reparable e-waste and issues a recycling certificate. ELECTROPRO procures the equipment which cannot be refurbished for re-use is dismantled and remanufactured into raw materials (i.e. metals, plastics, glass) to be marketed as recyclable. The waste compact discs and other disposable non-hazardous items are used by students for decoration during college fests as a creative means of showcasing the waste management practice that has been induced in the minds of the students.

Transportation

AEC is located in surampalem, which is 35 km from Kakinada and 35 km from Rajahmundry. AEC provides buses and cars for transportation for students/ staff. Most of the staff pool buses and cars and a few staff members travel by private vehicles. AEC management encourage students and staff to use the college buses (40) or public transport system to reduce carbon emissions.

Sustainability Initiatives

Due to minimum consideration for environment & sustainability, the world is facing problems of ozone depletion, climate change, water scarcity and sustainable resource management. AEC organizes guest lectures on Environmental conservation, biodiversity, etc. every year.

AEC has a demonstrated consistent commitment towards nature and environment. AEC started Haritha eco green club, which offers wide spectrum of environmental and nature activities and platforms to enhance awareness and exhibit the relationship with nature. Various activities organized by 'Haritha 'involved guest lectures, nature visits, workshops and competitions.

NSS groups of AEC organized the green activities and awareness campaigns such as plantation camps in college, rally in nearby villages.

Recommendations/ Suggestions

For Indoor Air Quality

- Indoor plants can be chosen in such a way that they give aesthetic appearance as well as health benefits.
- Information on sources, impacts and mitigation of indoor air pollution to be displayed within AEC for increasing awareness about indoor air pollution. E.g. Signage can be put in chemistry laboratory for handling fuming chemicals.

Water Conservation

- Provide information on water usage and savings to students/ staff through notices, screen savers in computer laboratories, and encourage reduction/ wastage of water.
- Replace all old water faucets with water saving faucets, aerator taps, jet sprays etc. Installation of such faucets can save water and help in minimizing the water footprint.
- Dual flushing system can be installed for toilet flushing, with appropriate instructions, which will save considerable amount of water.
- Grey water/ sewage recycling system can be installed for flushing toilets. This will reduce the fresh water footprint.
- Signage/ posters should be posted in high water consumption areas in Academic Blocks to increase awareness regarding water conservation.
- As the source of water is borewell, AEC can install water meter on borewell line to monitor daily borewell withdrawal.
- Implementation of the STP could reduce the dependency on the ground water.