ARYA COLLEGE OF ENGINEERING

GREEN AUDIT REPORT

2023-2024

PREPARED BY

EHS ALLIANCE SERVICES

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CERTIFICATE

EHS alliance

CERTIFICATE

PRESENTED TO

ARYA COLLEGE OF ENGINEERING

SP-40, RIICO Industrial Area, Kukas, Delhi Road, Jaipur-302028, Rajasthan

Has been assessed by EHS Alliance Services for the comprehensive study of environmental impacts on institutional working framework to fulfill the requirement of

GREEN AUDIT

ACADEMIC YEAR 2023 - 2024

The green initiatives carried out by the institution have been verified on the report submitted and was found to be satisfactory.

The efforts taken by the management and the faculty towards environment and sustainability are appreciated and noteworthy.

EHS ALLIANCE SERVICES GURGAON

SIGNATURE

02.03.2024
DATE OF AUDIT

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ACKNOWLEDGEMENT

EHS Alliance Services would like to thank the management of Arya College of Engineering for assigning this important work of Green Audit. We appreciate the co-operation to the teams for completion of assessment.

First of all, we would like to thank ***Dr. Arvind Agarwal - President*** for giving us an opportunity to evaluate the environmental performance of the campus.

We are also thankful to ***Dr. Pramod Sharma - Audit Coordinator***, for his continuous support and guidance, without which the completion of the project would not have been possible. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

We are also thankful to

Dr. Puja Agarwal, *Vice- President*
Dr. Himanshu Arora, *Principal*
Mr. Kshitiz Agarwal, *Registrar*

DISCLAIMER

EHS Alliance Services Audit Team has prepared this report for Arya College of Engineering based on input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

While all sensible care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the conclusions are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

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Signature

LEAD AUDITOR

CONCEPT AND CONTEXT

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory from the academic year 2019–20 onwards that all Higher Educational Institutions should submit an annual Green, Environment and Energy Audit Report. Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

In view of the NAAC circular regarding green auditing, the College management decided to conduct an external environment assessment study by a competent external professional auditor. The green audit aims to examine environmental practices within and outside the college campus, which impact directly or indirectly on the atmosphere. Green audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of college environment. It was initiated with the intention of reviewing the efforts within the institutions whose exercises can cause risk to the health of inhabitants and the environment.

Through the green audit, a direction as how to improve the structure of environment and inclusion of several factors that can protect the environment can be commenced. This audit focuses on the Green Campus, Waste Management, Water Management, Air Pollution, Energy Management & Carbon Footprint etc. being implemented by the institution. The concepts, structure, objectives, methodology, tools of analysis, and objectives of the audit as below:

INTRODUCTION

Now a days, the educational institutions are becoming more thoughtful towards the environmental aspects and as a result new and innovative concepts are being introduced to make them sustainable and eco-friendly. To preserve the environment within the institution, a number of viewpoints are applied by the several educational colleges to solve their environmental problems such as promotion of the saving the energy, waste recycle, water consumption reduction, water harvesting and many more...

The activities carried out by the institution can also create adverse environmental impacts. Green audit is defined as an official inspection of the effects a college has on the environment. Green Audit is conducted to evaluate the actual scenario at the institution campus. Green audit can be a useful tool for a university /college to determine how and where they are using the most of the energy or water or resources; the institution can then decide how to implement changes and make savings. It can also be used to determine the nature and volume of waste, which can be used for a recycling project or to improve waste minimization plan.

Green auditing and the application of mitigation measures is a win-win situation for all the institutions, the learners and the mother earth. It can also result in health awareness and can promote the environmental awareness, values and beliefs. It provides a better understanding to staff and students about the Green impact on institution. Green auditing also upholds financial savings through reduction of resource usage. It gives an opportunity to the students and teachers for the development of ownership of the personal and social responsibility. The audit process involves primary data collection, site walk through with the team of university /college including the assessment of policies, activities, documents and records.

OVERVIEW OF THE COLLEGE

Arya College of Engineering (ACE) is amongst the foremost of Top Colleges in Rajasthan for Engineering in Higher Technical Education & Research. Established in the year 2005, in the State of Rajasthan, Arya College of Engineering has evolved into the most prominent College in the state as well as the Best Engineering Colleges in Jaipur. Spread over 5 acres of land, its highly skilled faculties are imparting education and guidance to thousands of students in a multi-faceted environment comprising of various Teaching Departments on its Campus. Since its establishment, the College has played a vital role in providing the best technical manpower and know-how to the country.

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MISSION, VISION & VALUES

MISSION

- ✓ To create a Progressive Academic Environment by nurturing the Creativity, Ideas, Innovation and Skills in Students in order to achieve Qualitative Techno-Managerial Skills.
- ✓ To provide Excellent Ambience to enhance the Teaching-Learning processes amongst Students and Faculty members by building a determined team who are committed to the ideas of Integrity, Positive Thinking and Social Development to meet industry expectations and requirements.
- ✓ To make Students Globally Competitive by providing suitable Training, Value Added Certification Courses and Beyond Syllabus Academics in order to generate capacity to face competitions and placements and become imaginative mastermind and inventive issue solver while providing them safe and challenging environment.

VISION

To emerge as the best educational college and Work for Excellence in imparting quality education to the students to nurture their inherent talent as Innovative Professional in technical and managerial field there by making them competitive to meet all the future challenge of global economy.

VALUES

Create an environment that instils professionalism, integrity, and the highest professional commitment to the students.

Facilities in the campus

Amenities at Arya College of Engineering (ACE) provide far more than academic and administrative facilities on campus. It is dedicated to provide students with an exceptional infrastructure for learning as well as facilities for simplifying the procurement of fundamental skills. To accomplish the goal, ACE offers the following:

GREEN CAMPUS: The College has an impressive and pollution-free campus with panoramic green surroundings, elegant landscaping and beautiful flowerbeds.

TRANSPORT: The college runs its own fleet of buses and Cabs for the convenience of the students and the staff members to help them commute from Jaipur and surrounding areas. The students intending to avail the transport facility need to inform the transport officer at the time of admission.

SPORTS ACTIVITIES: Spending quality time is never a problem in the College. Sports facilities are provided for Lawn tennis, Table tennis, Carom, Billiards Table, Cricket, Football, Badminton, Basketball, and Volleyball. Evenings find students enjoying the pleasure of these sports as players and audience.

MESS: The college has its huge mess, which serves healthy and nutritious cuisines to its students.

CANTEEN: The college has its own canteen, which serves healthy and nutritious food to its students at subsidized rates. The menu varies from spicy samosas, wafers to full-meals. The students also have a wide range of chocolates and soft drinks to choose from.

WATER & ELECTRICITY: The college has complete arrangements to deliver uninterrupted water and electricity supply for the students, round the clock. Sufficient water coolers with filtered water are available throughout the campus to provide clean drinking water to the students. In case of power failures, high power generators are also available. Constant monitoring is carried out to ensure that cleanliness is given utmost importance.

HEALTH: Health is wealth. Keeping this in mind regular health checkup Camps are organized in the campus to examine the health of students and staff members. Acquisition of health related knowledge, attitudes, skills and practices empower students to pursue a healthy life. The energetic students take full advantage of every opportunity to learn and thus achieve higher - academic excellence & tend to maximize social relationships and interactions, thus improving their chances of balanced progress.

MEDICAL: Each hostel is provided with necessary first aid facilities. The College provides free first aid to the students in college campus during working hours. Qualified physicians are available in

the close proximity of the college & hostels for consultancy.

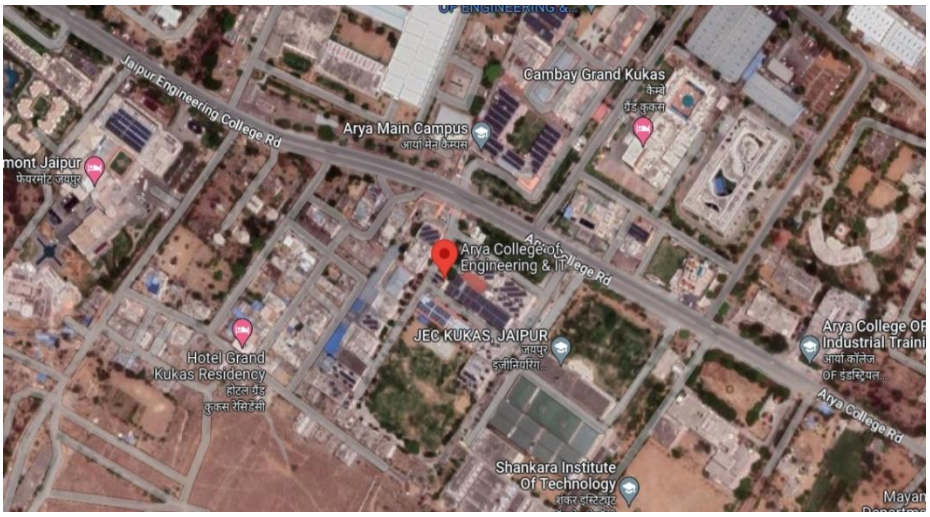
CAFETERIA

AUDITORIUM

GYMNASIUM

HOSTEL

Geo Location
Geo Coordinates from Google maps:
27.0299119, 75.8913942



AUDIT PARTICIPANTS

On behalf of Arya College of Engineering

Name	Designation
Dr. Arvind Agarwal	President
Dr. Puja Agarwal	Vice- President
Dr. Himanshu Arora	Principal
Mr. Kshitiz Agarwal	Registrar
Dr. Pramod Sharma	Audit Coordinator

On behalf of EHS Alliance Services

Name	Position	Qualifications
Dr. Uday Pratap	Lead Auditor	*Ph.D., PDIS, QCI – WASH, Lead Auditor ISO 14001:2015*
Ms. Pooja Kaushik	Co-Auditor	*M.Sc., Field Expert, QCI – WASH, PGCCC*

EXECUTIVE SUMMARY

Green auditing is an essential step to identify and determine whether the institutional practices are sustainable and ecological. Traditionally, we were upright and efficient users of natural resources. But over the period, excessive usage of resources like water, electricity, petrol, etc. has become habitual for everyone especially, in urban and semi-urban areas. It is the right time to check if we (our process) are consuming more than the required resources? Whether we are using resources sensibly?

Green audit standardizes all such practices and provides an efficient way to use natural resources. In a time of climate change and resource exhaustion, it is necessary to re-check the processes and convert them in to green and sustainable. Green audit provides an approach for the same. It also increases overall awareness among the folks working in the institution towards the eco-friendly environment.

This is the third attempt to conduct a green audit of this campus for fulfilment of NAAC criteria. This audit was mainly focused on greening indicators like consumption of energy in terms of electricity and fossil fuel, quality of soil, water usage, vegetation, waste management practices and carbon footprint of the campus. Initially, a questionnaire was shared to know about the existing resources of the campus and the resource consumption patterns of the students and staff in the campus.

GREEN AUDIT - ANALYSIS

1.1 GENERAL INFORMATION

1. Does any Green Audit conducted earlier?

Yes, this is the third external audit organized by the College

2. What is the total strength (people count) of the College?

Students
Male: 1662 Female: 347 Total: 2009

Teachers (including guest faculty)
Male: 99 Female: 77 Total: 176

Non-Teaching Staff
Male: 65 Female: 8 Total: 73

Total Strength
Male: 1826 Female: 432 Total: 2258

3. What is the total number of working days of your campus in a year?

There are two hundred and seventy-five days in a year.

4. Where is the campus located?

The campus is located at SP-40, Kukas, RIICO Industrial Area, Delhi Road, Jaipur -302028, Rajasthan

5. Which of the following are available in your college?

Garden area	*Available*
Playground	*Available*
Kitchen	*Available*
Toilets	*Available*
Garbage Or Waste Store Yard	*Available*
Laboratory	*Available*
Canteen	*Available*
Hostel Facility	*Available*
Guest House	*Available*

6. Which of the following are found near your college?

Municipal dump yard	*Not in the vicinity of the college*
Garbage heap	*No Garbage heaps*
Public convenience	*Public convenience is available*
Sewer line	*Approximately 1.0 KM sewer line within campus*

Stagnant water	*No stagnant water*
Open drainage	*No*
Industry – (Mention the type)	*No*
Bus / Railway Station	*Sindhi Camp Bus Stop, Jaipur Junction Station*
Market / Shopping complex	*Available*

1.2 WASTE MINIMIZATION AND RECYCLING

1. Does your college generate any waste? If so, what are they?

Yes, following types of wastes are generated by the campus

- *Biodegradable waste,*
- *Non-biodegradable waste*
- *Biomedical waste*
- *Hazardous waste*
- *E-waste*

2. What is the approximate amount of waste generated per day? (in Kg approx.)

Biodegradable waste - 20 Kg
Non-biodegradable waste -3 Kg
Hazardous Waste - 1 Kg
Others < 1 Kg

3. How is the waste managed in the college? By Composting, Recycling, Reusing, Others (specify)

- *Food waste and horticulture waste is collected into pits for composting*
- *On campus, single-use plastic is prohibited.*
- *After collecting the BMW separately, the Municipal Corporation takes care of the solid garbage.*
- *Paper with printing on one side is reused for internal correspondence.*
- *Grey water from college waste is recycled using the STP (… KLD).*
- *Rainwater harvesting pits are there in campus for groundwater recharge*
- *E-waste collection and management through recycled – authorized vendor*

4. Do you use recycled paper in the college?

Yes, college uses single sided used paper for rough work, assessment work and prints

5. How would you spread the message of recycling to others in the community?

Following are the ways through which the college is spreading awareness about recycling

- *Waste plastic collection drives*
- *Installation of Dustbins for waste plastic collection, e-waste collection and recycling*
- *Tie-ups with authorized e-waste collection agency*
- *Awareness among the Students by Webinars, seminars, Sign Boards, Posters, etc.*

6. Can you achieve zero garbage in your college? If yes, how?

Not yet achieved. Possible through waste management policy and planning.
1. Minimization of waste production
2. Awareness workshops & training for students and faculty on Waste management

1.3 GREENING THE CAMPUS

1. Is there a garden in your college?

Yes, about 37673.68 Sq ft areas are developed as Gardens.

2. Do students spend time in the garden?

Yes, students spend around 2-4 Hours during winter.

3. Total number of Plants in Campus?

Plant type with approx. count	
Full-grown Trees	*92*
Small Trees	*330*
Hedge Plants	*3420*
Grass Cover sqm	*37673.68 Sq ft*

4. Is the College campus having a Horticulture Department? (If yes, give details)

Yes, Total 4 staff (maali) were deployed in the horticulture department

5. How many Tree Plantation Drives are organized by campus per annum?

3 Plantation Drives are Organized by the campus in the last year. A total of 200 plants were planted during the plantation drives. The survival rate is more than 60%.

6. Is there any Plant Distribution Program for Students and Community?

Yes, Plantation distribution drives are conducted in nearby Villages under Unnat Bharat. Moreover, the college has a practice where all guests are given a planter as a gift rather than a bouquet of flowers.

8. Is there any Plant Ownership Program?

Arya College is continuously encouraging the students to adopt a tree in their neighborhood

1.4 WATER AND WASTEWATER MANAGEMENT

1. List uses of water in your college

Basic use of water in campus:

***Drinking** – 72.45 KL/month*

***Gardening** – 4.41 Kl/month*

***Kitchen and Toilets** – 418.86 KL/month*

Others *– 164.42 KL/month*

Hostel *– 1782 KL/Month*

Total = 2442.13 KL/Month

2. How does your college store water? Are there any water-saving techniques followed in your college?

Available total water storage of the college is 10,000 x 4 = 40,000 litres

Saving Techniques

- *Avoid overflow of water-controlled valves are provided in water supply system.*
- *Close supervision for water supply system.*
- *Push taps are installed for water conservation*
- *Water Conservation awareness for new students*
- *Sprinklers usage for gardening and grass cover*

3. Locate the point of entry of water and point of exit of wastewater in your college.

Entry *- Water comes from Municipal corporation supply and borewells*
Exit*- From Canteen, Toilets, Hostel, bathrooms and Labs through covered drainage which is connected to sewage treatment plant of capacity 100 KLD*

4. Write down ways that could reduce the amount of water used in your college

Basic ways:

- *Close the taps after usage*
- *Water Conservation awareness for new students*
- *Maintenance and monitoring of valves in supply system to avoid overflow, leakage and spillage*
- *Push taps are installed to save water*
- *Use of sprinklers for gardening purpose*
- *Water recycling through STP (100 KLD)*

1.5 ANIMAL WELFARE

1. List the animals (wild and domestic) found on the campus (dogs, cats, squirrels, birds, insects, etc.)

5 dogs, 10 Cats, 30+ butterfly species, 100+ Squirrels and 30+ Bird species and dragonflies are found in campus. Arya college has arranged bird nests and bird feeders at different places on campus, so college is doing their bit for bio diversity conservation.

2. Does your college have a Biodiversity Program or a KARUNA CLUB?

Yes, Arya College of Engineering's eco club actively organizes awareness through various campaigns and activities including seminars, poster competition, etc.

1.6 CARBON FOOTPRINT - EMISSION & ABSORPTION

1. Electricity used per year - CO2 emission from electricity

(electricity used per year in kWh/1000) x 0.84
= 311006 /1000x0.84
= 261.25 tons

2. LPG/PNG used per year - CO2 emission from LPG/PNG

(LPG/PNG used per year in KG) x 2.99
=25964 x 2.99
=77.63 tons

3. Diesel used per year CO2 emission from HDS (Diesel)

(Diesel used per year in litres) x 2.68
= 144969.24 x 2.68
=144.97 tons

4. Transportation per year (car) CO2 emission from transportation (Bus and Car)

There are 7 Cars, 7 buses, 1 van, 1 Tractor, 1 Tanker and 1 tempo
*=(7*1*2*180/100)*0.01 + (8*2*2*180/100)*0.02*
=1.40 tons

Total CO2 emission per year is 491.96 tons

After considering the carbon absorption capacity of the campus and solar energy export, the net carbon emission is 245.53 tons

CARBON ABSORPTION BY FLORA IN THE INSTITUTION

There are 92 full-grown trees and 330 semi-grown trees of different species, on the campus spread over 37673.68 sq ft.

Carbon absorption capacity of one full-grown tree 22 kg CO_2 Therefore Carbon absorption capacity of 80 full-grown trees 92 x 22 kg CO_2 = 2.02 tons of CO_2.

The carbon absorption capacity of 330 semi-grown trees is 30% of that of full-grown trees. Hence the carbon absorption 330 x 6.8 kg of CO_2 = 2.24 tons of CO_2

There are approximately Hedge Plants 3420 of various species being raised in the gardens and grown in the areas where no buildings are built Carbon absorption of bush plants varies widely with their species. Certain bushes absorb very high level of CO_2 whereas some others absorb very low levels of CO_2In the absence of a detailed scientific study, 200g of CO_2, absorption is taken per bush (in consultation with Environmental Science specialists). Based on this, the total carbon absorption of bushes is 3420 x 200 g = 0.68 tons of CO_2

The lawns on the campus have buffalo grass, Mexican grass, and indigenous grass species and cover a total area of 37673.68 sq. ft. Carbon absorption capacity of a 10 sq. ft. area of lawn is 1 g per day Therefore, carbon absorption by lawn area 37673.68 x 365 x 0.1 g CO_2 = 1.38 tons CO_2 per year.

The total of carbon absorption capacity of the campus is 6.33 tons.

GREEN INITIATIVES BY CAMPUS

- **Solid Waste Management**
  - Collect paper waste produced on campus and recycle through authorized vendor
  - College does compost for horticulture waste
  - College has fully functional bio gas plant
  - Reduce the use of paper by supporting the digitization of attendance and internal assessment records.
  - Reduce the requirement of printed books by updating the e-books and e-journals collection of the college library.
  - Take initiatives to spread awareness amongst students about food wastage and ways of minimizing it
  - The habit of reusing and recycling non-biodegradable products
  - Organizing workshops for students on solid waste management.
  - There is a ban on single-use plastic and plastic crockery in the campus.
  - The college has installed a sanitary waste disposal facility by installing an incinerator as per CPCB guidelines for the management of sanitary waste -As per Solid Waste Management Rules, 2016
- **Liquid Waste Management**
  - Maintain leakproof water fixtures.
  - Minimize the use of water by constructing more Indian-style toilets instead of Western-style toilets.
  - Urinals are installed in boys washroom to reduce water wastage
  - STP is installed for waste water treatment
  - Continued employment of a caretaker to take immediate steps to stop any water leakage through taps, pipes, tanks, toilet flush etc.
  - Reuse of wastewater generated by the Reverse Osmosis (RO) system in washrooms.
- **E-waste Management**
  - The college has a separate storeroom for the safe storage of electronic waste. After a certain interval of time college disposes of the E-waste to concerned agencies through the auction process.
- **Rainwater harvesting**
  - College has 3 rainwater harvesting pits for better groundwater recharge. The stored water in this tank can be used for gardening purposes
- **Renewable Energy**
  - The college has installed solar PV (450 kWh) on the rooftop of building.
  - The College is using solar lights for street lights.
- **Air Pollution Reduction**
  - Personal Vehicles (Students) are not allowed in the campus
- **Green Committee Initiatives**
  - Please provide the details of activities

RECOMMENDATIONS

- Environmental parameters shall be included in the purchase policy to achieve a cradle-to-grave approach for sustainability.
- Arrange training programs on environmental management systems and nature conservation for schools and local people.
- More Messages should be displayed at various locations to Aware People of Energy Savings
- Water Meters should be installed at every building of the college for monitoring of water consumption per capita.
- Borewell permission should be taken from an authorized government department
- College should start drip irrigation to save water in campus
- The flow rate of taps should be checked, it should not be more than 2.5 liters/minute.
- Green building guidelines for future expansion projects of the campus.

CONCLUSION

This audit involves considerable team discussions and meetings with key staff members on a variety of environmental-related topics. The eco club of Arya College of Engineering promotes the conservation of resources.

Overall 50% of Arya College of Engineering is for landscaping. The college makes a significant effort to act in an environmentally responsible manner and takes into account the environmental effects of the majority of its activities. The recommendations in this report suggest some more ways in which the college can work to improve its practices and develop into a more sustainable institution.

It's important to begin a few things, such as increasing plantation drives and increasing energy & water conservation awareness message display. Additionally, we strongly advise signing an MOU with third-party authorized vendors for waste management such as plastic, paper, metal, e-waste, etc.

REFERENCE

- The Environment [Protection] Act – 1986 (Amended 1991) & Rules-1986 (Amended 2010)
- The Petroleum Act: 1934 – The Petroleum Rules: 2002
- The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle
- Rules:1989 (Amended in 2005)
- Energy Conservation Act 2010.
- The Water [Prevention & Control Of Pollution] Act – 1974 (Amended 1988) & the Water (Prevention & Control of Pollution) Rules – 1975
- The Air [Prevention & Control Of Pollution] Act – 1981 (Amended 1987) The Air (Prevention & Control of Pollution) Rules – 1982
- The Gas Cylinders Rules – 2016 (Replaces the Gas Cylinder Rules – 1981
- E-waste management rules 2016
- Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules, 2008 (Amended 2016)
- The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)
- The Batteries (Management and Handling) rules, 2001 (Amended 2010)
- Relevant Indian Standard Code practices

ANNEXURE – PHOTOGRAPHS OF ENVIRONMENT CONSCIOUSNESS

Well maintained campus

Well ventilated building

Lush green campus

Sports Ground

Paving stone installed in campus

Color coded waste segregation

Ornamental plants in campus

Indoor plants in campus

Gym Facility

Spacious and well equiped labs

Well equiped labs

Spacious Auditorium

Water RO for water purification

Dish washer

Sprinklers usage

Reused plastic containers

REUSED PLASTIC CONTAINERS

STP plant

Biogas plant

Solar Lights installed on campus streets

Solar panel installed on building roofs

Cleanliness drive campaign in Govt. School Aamer

Cleanliness drive

Plantation drive

Solar panel installed on building roofs

********** END OF THE REPORT **********