Green Audit Report

Shivaji College

University of Delhi

Raja Garden, Ring Road, New Delhi- 110027

July 2021

Prepared By:

STEP Private Limited

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SUSTAINABLE TECHNOSOLUTIONS FOR ENVIRONMENTAL PROTECTION PVT. LTD.

Green Audit Report of Shivaji College, New Delhi has been prepared by STEP based on review of findings of internal green & environmental audits conducted by College, desktop review of documents/ records, virtual tour of the College campus and telephonic interviews of faculty, non-teaching staff & students.

The audit was conducted in **June 2021.**

The Green Audit Report also presents green initiatives followed and taken up by the College and provides suggestions and recommendations to improve environmental sustainability.

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1. Introduction

Shivaji College (College), New Delhi was established in 1961 in Matiala by Hon'ble Dr. Panjabrao Deshmukh and shifted to present campus in 1976. College has more than 3700 students enrolled in various Academic, Professional and Research Programs. It is affiliated to University of Delhi. It has 195 faculty members and 110 non-teaching & other staff.

The College comprises 16 departments offering 20 undergraduate programmes. College offers various courses listed below:

Undergraduate Courses
B.Com (Hons.)
B.Com (Programme)
B.A. (Hons.) Business Economics
B.A. (Hons.) English
B.A. (Hons.) History
B.A. (Hons.) Hindi
B.A. (Hons.) Political Science
B.A. (Hons.) Sanskrit
B.A. (Hons.) Economics
B.A. (Hons.) Geography
B.A. (Programme)
BSc. (Hons.) Mathematics
BSc. (Hons.) Botany
BSc. (Hons.) Biochemistry
BSc. (Hons.) Physics
BSc. (Hons.) Chemistry
BSc. (Hons.) Zoology
BSc. Physical Science (with Chemistry)
BSc. Physical Science (with Computer Science)
B.Sc. Life Science

Postgraduate Courses
M.A. Hindi
M.A. Political Science
M.A. Sanskrit

Self- financing Courses
B.A. (Hons.) Business Economics

Remedial Classes
Computer Skills and Information Technology
English/Communication Skills
Mathematical Ability (Basics)

ADD-ON Courses
Certificate course of University of Delhi in German Language
Certificate course of University of Delhi in French Language
Certificate Course in Awareness on Legal Prospects

1.1 Environmental Setting

The college is spread over 10.35 acres which includes about 5 acre sports ground and 1.83 acre green area. College is easily accessible by road and metro; nearest metro station is ESI- Basaidarapur which is 900 m away. Indira Gandhi International Airport is 21.4 km away from the College.

Although campus is located in residential area, presence of green belt including gardens, lawns and an herbal garden has considerably reduced noise pollution in the campus. College building area has an academic building, an under-construction block and green operations/ infrastructures including roof-top solar PV system, Rainwater Harvesting System (RWH) and vermicomposting unit. For the treatment of sanitary wastewater generated in the campus, College is constructing Sewage Treatment Plant (STP) in the College building area.

Shivaji College Campus Location

1.2 Basis of Green Audit and Stakeholders Consultation

Green Audit enables to:

- Enhance awareness levels on environment management and sustainability.
- Prepare an environment management plan and promote sustainability through efficient resource management resulting in cost reduction.
- Benchmarking process in terms of resource utilisation.
- Develop outreach programs in environment management and Sustainability

STEP Private Limited (STEP) team conducted Green Audit of Shivaji College in June 2021 through desktop review of findings of internal green & environmental audits conducted by College, review of documents/ records and virtual tour of the College and telephonic interviews of faculty, non-teaching staff and students. Prior to audit, questionnaire and checklists were prepared. Virtual tour of the campus included College building and infrastructure facilities such as solar PV system, Rainwater Harvesting System (RWH), Reverse Osmosis (RO) system, gardens etc. List of stakeholders interviewed is presented in **Annexure 1**.

Green Audit Report addresses green initiatives taken/ under implementation by management, the outreach of the College, suggestions & recommendations to improve overall environmental sustainability of the campus.

1.3 Campus Information

College campus consists of two buildings, one is operational and another is under construction. As the under- construction building is non-operational, it is not considered in the Green Audit Scope.

College building has classrooms, well-equipped laboratories, a library and an auditorium. College Sports ground has indoor and outdoor games facilities. There are 4 gardens in the campus including an herbal garden. The area details of the College building is presented in **Table 1**.

Table 1: Facilities Details

Floor	Facilities
Ground floor	2 Chemistry laboratories, computer laboratories, 5 classrooms, 2 small classrooms, canteen, girls common room, Principal's office, staff room, administrative office, bank, 2 washrooms
First floor	2 Physics laboratories, 2 computer laboratories, staff room, 10 classrooms, auditorium, 2 washrooms
Second floor	Library, 10 classrooms, zoology laboratory, 2 botany laboratories, lecture theatre, 2 washrooms
Third floor	Library, pantry, staff room, biochemistry laboratory, 5 classrooms, lecture theatre, 2 washrooms
Terrace	Solar Panels

2. Green Audit Findings

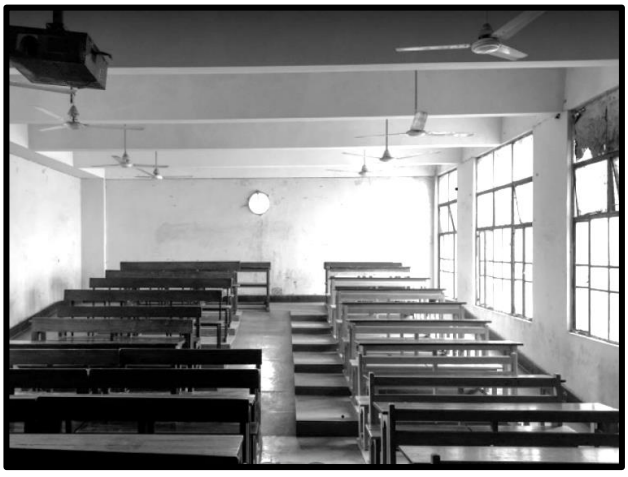
For Green Audit following major areas (including their sub-sections) were covered and compliance/ initiatives under these areas were verified/ validated,

a) Good Daylight Design and Ventilation
b) Water Efficiency
c) Wastewater Management
d) Indoor Air Quality
e) Energy Management
f) On-site Energy Generation
g) Solid Waste Management
h) Universal Access and Efficient Operation and Maintenance of Building
i) Transportation
j) Green Belt
k) Green Programs (Green initiatives)

2.1 Good Daylight Design and Ventilation

a) Classrooms, laboratories, offices, library etc. have high ceiling, wide doors and large windows.
b) Building is designed in such a way that corridors and classrooms receive ample sunlight. Curtains are provided for laboratory windows to avoid glare. Natural light in the classrooms was about 70-85 lux.
c) Ventilation in classrooms is facilitated by windows and fans. Cross ventilation is facilitated due to large windows on both sides of some classrooms. Air conditioners are used in offices, computer laboratories and computer server rooms.
d) Exhaust fans are provided in washrooms, kitchen and chemistry & biochemistry laboratories.

Blinds and exhaust fan in laboratory



Natural light in classroom

2.2 Water Efficiency

a) Major water source for College is tap water, supplied by Delhi Jal Board. College also has one borewell in the campus which is currently not used for water withdrawal. As informed by College's

water management team, daily water consumption for the entire campus when in full operation is 51 KL, which includes 25 KL consumption in academic area and 26 KL for gardening. Water collected in rainwater harvesting pits is used for gardening. As per IS 1172 standards (http://dasta.in/wp-content/uploads/2015/04/CB_Code_2002.pdf) for non-residential institutions, water consumption should be maximum 45 L/person/day. Water consumption of the College works out to be 6.3 L/person/day, which is well under limit.

b) As per the water bill dated 15.06.2021 available for review, water consumption from November 2020 to June 2021 varies between 78 KL/ month to 244 KL/ month because college is non-functioning/ partially functioning as per COVID- 19 regulations imposed by Delhi Government.
c) Water is stored in the underground storage tank of capacity 40 KL, and then transferred to 12 overhead tanks of total capacity 21 KL using 5 HP pump and then distributed to washrooms, basins, kitchens, laboratories and water purifiers/ coolers installed in the College building.
d) Additionally, 2 tanks of 5 KL capacity each are installed in the campus to provide inlet water to 1 KL/ day RO system. Water from RO is sent to drinking water unit provided near main gate. RO system is operated by College water management team and maintenance is done by third party contractor appointed by College. Maintenance is done twice in a year. The water distribution diagram is presented in **Annexure 2**.
e) RWH system, comprised of rooftop and surface runoff, is provided in the campus. Through RWH, rain water collected is used for recharging ground water through 2 recharge bores. Rain water collected is also stored in recharge pits which is used for gardening. Installation of rooftop RWH system is also planned for under-construction building which will comprise of an underground tank with a desilting chamber of 60 KL storage capacity.
f) 4 water coolers fitted with RO purifiers are provided in College building as a source of safe drinking water. Third party contractor is appointed by the College for their maintenance.
g) Restrooms and canteen are water intensive areas. Water conservation faucets (non-concussive taps, aerator taps) are fitted in some washrooms. Dual flushing systems are not provided in the washrooms.
h) Dry and wet mopping is practised for floor cleaning. Floors are mopped once a day. College has appointed third-party contractor, Shanti Enterprises for cleaning activities.
i) As informed by College's water management team, tap water leakage is immediately attended to by the maintenance department.
j) Signage on water conservation were not seen in washrooms or near water purifiers.
k) Sprinkler system is provided in all gardens which leads to water conservation.
l) As per the 'Code of basic requirements for water supply, drainage and sanitation' clause 5.3 (http://dasta.in/wp-content/uploads/2015/04/CB_Code_2002.pdf), following are the requirements for educational institutions.

Table 2: Requirements for Educational Institutions

Filaments	Educational Institutions (Non- residential)	
	For boys	**For girls**
Water closets	1 per 40 students	1 per 25 students
Ablution taps	1 in each water-closet	1 in each water-closet
	1 water tap with draining arrangement/ 50 students	
Urinals	1 per 20 students	
Wash basins	1 per 60 students, minimum 2	1 per 40 students, minimum 2
Baths	-	-
Drinking water fountains or taps	1 per 50 students	1 per 50 students
Cleaner's sinks	1 per floor, minimum	

RO system

Water purifier

2.3 Wastewater Management

a) Wastewater is mainly generated from washing, toilet flushing, canteen kitchen and laboratories. Total 8 washrooms are provided in the College building (2 washrooms on each floor).
b) Currently, sanitary wastewater generated is sent to municipal sewer line. Sewage treatment plant of 130 KLD capacity is under construction for the treatment of sanitary wastewater generated in the campus. STP will comprise of primary and secondary treatment (biological treatment) followed by filtration.

2.4 Indoor Air Quality

Indoor Air Quality (IAQ) refers to the air quality within & around buildings and structures, it relates to the health and comfort of building occupants. Common indoor pollutants are listed as below:

- Carbon monoxide – Sources of carbon monoxide are incomplete combustion of fossil fuels
- Volatile organic compounds (VOCs) – VOCs are emitted by paints and lacquers, paint strippers, pesticides, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions etc.

- Carbon dioxide – Due to human respiration
- Particulate matter – Due to construction and maintenance activities, vehicular pollution
- Nitrogen Oxides- Due to vehicular pollution

a) Science laboratories and kitchen in the canteen use liquefied petroleum gas (LPG), a clean fuel.
b) 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 and computer laboratories. ACs are serviced regularly to ensure indoor air quality.
c) Science laboratories are provided with exhaust fans so that the fumes are safely discharged outside the building.
d) Green belts have been set up in the campus area.

2.5 Energy Efficiency

Electricity:

a) Common electricity meter is provided for the entire campus. Electricity is provided by Bombay Suburban Electric Supply (BSES) Rajdhani Power Limited. Electricity bills of July 2016, November-December 2016 and January 2017 were available for review (average consumption 15498 units/ month). Latest bills were not available for review. In the absence of latest electricity bill, it is difficult to comment on electricity consumption. The areas of major consumption of electricity are:

Tube Lights & LEDs	388+ (30% LEDs)
Fans (ceiling fans & wall fans)	425
Air Conditioners	49
Computers (desktops & laptops)	1254
Projectors	45
Water purifiers	4
RO system of 1 KLD	1

b) Conventional tube lights, LEDs & fans are installed in classrooms, laboratories and library. For efficient energy consumption and saving on electric bill, College has initiated the process of replacing incandescent bulbs and tube lights with LEDs.
c) College has 49 air conditioners with two/ three/five -star ratings (6 five Star, 11 three star and 32 two star) [Standards set by Bureau of Energy Efficiency (BEE)].
d) An Uninterruptible Power Supply (UPS) system is provided in computer laboratories for computers and servers. The UPS system is typically used to protect hardware viz. computers, data centres, telecommunication equipment or other electrical equipment when an unexpected power disruption could cause serious work disruption or data loss.
e) Reflectors are not provided for lights in the library and auditorium. Reflectors can reduce the number of lights required and hence electricity consumption.
f) All computers have LED screens; computers are shut down by turning off the main switch when not in use.
g) Common switches are provided for some tube-lights & fans. To avoid wastage of energy due to common area illumination, it is recommended to have separate switches.
h) Tube-lights and fans are switched off by students and staff when not in use. Instructions regarding switching off the electrical appliance were seen in laboratory notice boards. However, signage are

not provided near electrical switch boards. Signage can encourage & help users to switch off lights and fans to save electricity.

2.6 On-Site Energy Generation (Usage of LPG/ Natural Gas)

a) LPG cylinders are used mainly in canteen kitchen for cooking and in chemistry, botany, zoology and biochemistry laboratories. Inventory of cylinders usage was not available for review. 1 cylinder of 19 kg generates 881.6 MJ (Mega Joules) of energy.
b) Storage facility for LPG cylinder is located on ground floor. All the commercial LPG gas cylinders were in vertical position with access control; however it is necessary to provide extra support system like chain in order to prevent cylinders from falling, movement or physical damage.(http://peso.gov.in/Work_Mannual/Gas_cylinder_Rule_WM.pdf)
c) Campus has a diesel generator (DG) of capacity 100 KVA. DG set is used only in case of emergency when there is power cut-off. DG emissions are not monitored.
d) On grid Rooftop Solar PV System of 75 KWH capacity has been installed in December 2016 by Tata Power Solar Systems Limited. Solar panels cleaning is done by College's maintenance team and the system is maintained by Tata Power Solar Systems Limited. Solar panels are installed on the terrace of College building. As mentioned by College, the solar facility exports more than 1000 units per month to the Northern Grid of the country.

Rooftop Solar PV System

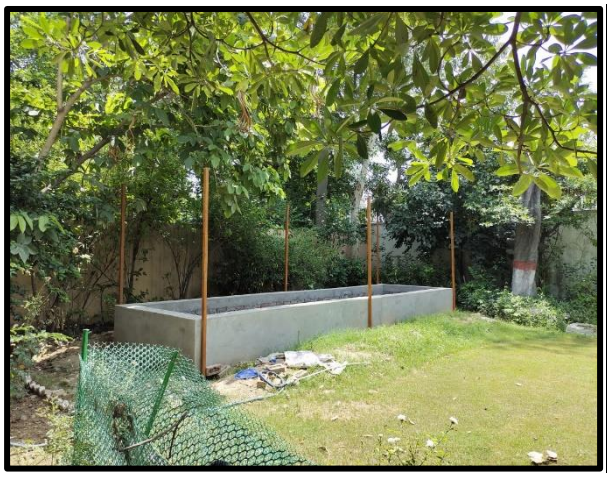
2.7 Solid Waste Management

Solid waste generated from campus includes mainly paper waste, wet (food/ organic) waste and E-waste.

a) Blue and Green covered/ pedal-pushed dustbins are placed in the premises. Waste bins are provided on each floor, in staff rooms, laboratories, washrooms, kitchen and in campus area.
b) Daily around 25-50 kg organic/ bio-degradable waste is generated in the campus which includes horticultural waste. Quantity of horticulture waste varies significantly due to seasonal variation, e.g. around 50-70 kg of horticulture waste is generated daily in February- March due to leaf fall.
c) College had vermicomposting unit for the treatment of horticulture waste which was dismantled during construction of new building. Recently, College has installed new vermicomposting unit

(10x1x1 m) for the treatment of horticulture waste generated in the campus. The unit will be operational in 2-3 months.

d) Being a College with non- residential facility, the quantity of wet (food/ organic) waste generated in the premises is minimum. Biodegradable wet waste is mostly generated from the canteen. College has initiated the process of installing a composting unit of 25-30 kg/ day capacity for the treatment of canteen waste and some horticulture waste. Composting unit will be operational once the College starts working.
e) In other areas like classrooms, mostly paper waste and plastic wrappers are generated.
f) Segregation of wet and dry waste is practised within the campus. However, there is no signage for promoting segregation of wet and dry waste.



Vermicomposting pit

Dustbin in campus area

A) Paper Waste Management

Being an academic institution, waste paper is one of the main solid wastes generated in the premises. College has taken steps to minimise and avoid paper usage.

a) Prints and photocopies are taken on both sides of the paper to avoid excess paper usage. Rather than photocopy, digitalisation (scanning) is practised.
b) College has two floor library with 80,533+ books; journals, magazines, newspapers are also available in the library. Library has an e-book facility having 6000+ e-journals, and 7,64,300+ e-books available online through different portals such as INFLIBNET, National Digital Library. Two computer rooms are provided in the library to access online services.
c) Internal notices and communications are through e-mail/ SMS. College has a Learning Management System (LMS) where notices are sent, exam results are displayed and attendance is recorded digitally.
d) Display Screen is provided on ground floor where notices are displayed digitally.
e) College has installed Paper Recycling Unit with 5 kg capacity, which is operated and maintained by College. Paper recycled is used for laboratory work. Remaining paper waste is sent to local vendor for recycling. The dissertation reports, journals and answer papers are stored as per the University rules.

f) The college encourages students to use eco-friendly material and recycle old papers/ scrap for decoration purposes during College festivals.

Computer room in the library

Paper recycling unit

B) E- Waste Management

E- waste is broadly comprised of discarded computer monitors, motherboards, mobile phones and chargers, compact discs, headphones, Printed Circuit Boards (PCB), televisions etc.

a) College is digitized to a large extent. This includes classrooms, library, LMS for academic work etc.
b) College has 1254 computers, 45 projectors, 49 air conditioners in working condition.
c) E- waste is collected & stored in college campus and sent to authorised vendor for recycling/ disposal under buy-back policy. E- waste documents dated 05.11.2018 & 18.02.2019 from 'Nishta Innovative Solution' for old UPS/SMF batteries recycling was available for review. The documents mentioned quantity of batteries sent to Nishta Innovative Solution for disposal.

C) Plastic Waste

a) College strictly follows the guidelines regarding plastic usage and has prohibited the use of single use plastic e.g. carry-bags, glasses, spoons etc., in the campus.
b) As per the College guidelines, Canteen Contractor is prohibited to use plastic cutlery, instead paper plates and wooden spoons are used.

2.8 Universal Access and Efficient Operation and Maintenance of Building

a) Campus is easily accessible by metro and bus services.
b) Staircases and classrooms have wide windows, which can allow safe evacuation during emergency. Handrails are provided on all staircases.
c) Total 35 fire extinguishers are installed in the corridors of all floors, laboratories and kitchen area. They are maintained and serviced regularly by 'Santra Fire Services'. Fire extinguishers present in the building were found within expiry limit when checked randomly.
d) Sand buckets are also provided on each floor for firefighting purpose. Total 25 sand buckets are installed in the building.
e) There were no signage for emergency fire exit. This is crucial during emergency.

f) First aid boxes are maintained in various science laboratories.
g) University has prepared detailed emergency response plan for disaster management for natural calamities like earthquake, thunderstorm and other hazards such as fire, structural collapse, food poisoning, chemical spill. E.g. Mock drill on earthquake preparedness September 30, 2019 (Jointly organised by District Disaster Management Authority (WEST), New Delhi) and Road safety week 2020 on January 15 2020. The actions and roles & responsibilities are clearly identified in the emergency response plan.

Fire extinguisher- refilling and expiry dates

Handrail on staircase

Mock drill

2.9 Transportation

a) The location of College is quite enviable with metro station and bus service in close vicinity. Most of the staff pool cars and few staff members travel by private vehicles.
b) College has vehicle-free campus. Dedicated area for parking has been allotted on the sports ground; vehicle movement and parking in the main campus is prohibited.
c) College management encourages students and staff to use the metro or public transport system to reduce carbon emissions.

2.10 Green Belt/ Landscaping

a) College campus has 4 gardens (including rock garden and rose garden) and an herbal garden. College has 1.83 acre green belt area, having 300 variety of plants (including 57 tree species), 427 trees, shrubs and 1400-1500 potted plants. List of few plants present in the campus is given in **Annexure 3**. Plantation improves aesthetics and helps as a buffer in reducing noise level, maintaining temperature of the area. Herbal garden has different sections in which specific types of plants planted with respect to their medicinal importance.
b) As per the findings of internal green audit conducted by College, large trees include Peepal (*Ficus religiosa*), Goolar (*Ficus racemose*), Pilkhan (*Ficus virens*), Ashok (*Saraca asoca*), Jamun (*Syzygium cumini*), Mango (*Mangifera indica*), Kadamb (*Neolamarckia cadamba*), Bael (*Aegle marmelos*), Gulmohar (*Delonix regia*), Champa (*Magnolia* champaca), Kanak Champa

(*Pterospermum acerifolium*), Semal (*Bombax ceiba*) and Neem (*Azadirachta indica*) etc. Few trees were identified and confirmed during virtual tour.

c) Fruit bearing trees attract variety of insects like wasps, bees, ants and beetles thus increasing the biodiversity. Various field-based projects were assigned to students studying Environmental Science Course to assess the birds and butterflies in College Campus. Student survey showed that the campus has total of 19 different bird species and 6 butterfly species. The different tree species provide habitat to variety of bird species. List of bird and butterfly species is presented in **Annexure 4**.

d) College has indoor plants in the building. Indoor plants have aesthetic appearance as well as health benefits. List of few indoor plants which can be potted and their benefits are presented in **Annexure 5**.

e) Gardens are managed by 7 staff members. Organic fertilisers and pesticides are used for plants if necessary.

Green belt in campus

Indoor plants

Green belt in campus

2.11 Green Initiatives

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

College has demonstrated consistent commitment towards nature and environment for the last 6 years. College has 'Eco Club' and the Garden Committee which offers wide spectrum of environmental and nature activities and platforms to enhance awareness and exhibit the relationship with nature. The National Service Scheme (NSS) and National Cadet Corps (NCC) of the college undertakes projects for environment, rural development, education awareness, healthcare, etc. Various activities like cleanliness drive, tree-plantation, seminars and workshops are organised by 'Eco Club'/ Garden Committee/ NCC/ NSS increase the awareness and sensitivity among students and faculty.

Eco Club at College has instituted a Green Trophy in the name of Dr. Panjabrao Deshmukh to promote excellence in research and innovative activities on ecological concerns and issues. Students also participate in innovative workshops and campaigns like solar lamp making, refill the pen campaign, campaigns for discouraging the use of polythene, etc. Visit to biodiversity parks, wetlands and other places of ecological importance are also being arranged by Eco Club. In the current scenario when academic activities are taking place virtually, College arranges webinars, online conferences pertaining to environment. Records of all activities are being maintained by the College which were available for review.

Webinar arranged on Biodiversity & Environmental Health

Green Initiatives & Awareness Activities by Shivaji College (2015- 2020)

Date	Organised by/ for	Activity Details
2015		
October 10	B. Com (Prog) -Sem-I	Field visit to Najafgarh Drain. Attended by 100 students
October 15	B. A (Prog) -Sem-I	Field visit to National Zoological Park, Delhi. Attended by 199 students
October 20	BSc Physical Science (CS) & BSc (PS)	Field visit to Kamla Nehru Park, Delhi. Attended by 85
October 20 & 30	(Chem) Sem-I and B. Com (H) Sem-I	Field visit to Kamla Nehru Park, Delhi. Attended by 100 students
November 4	BSc (H) Mathematics – Sem-I	Field visit to Sultanpur National Park, Haryana. Attended by 135 students
2016		
February 2	B. Sc (H) Botany -Sem-II	Field visit to Yamuna Biodiversity Park. Attended by 25 students
March 22	Eco Club	Guest lecture on 'Water and Air Quality in Urban Ecosystem'
March 29	Department of Commerce	National Conference on 'Globalisation, Economic Development and Sustainability'
June 23	Department of Botany	Conference on 'Environmental Pollution and Health in Urban Ecosystems (EPHUE-2016)'
September 5	Eco Club	Tree plantation drive organised for encouraging the faculty and students to plant trees in their backyard
October 3	Department of Botany	One day educational programme on 'Organic Farming'
2017		
February 14	Eco Club	One day programme to create 'Environmental Awareness on Fuel Conservation'
August 29 & 30	NCC & NSS	NCC cadets and NSS members participated in Swachhata Pakhwada with the aim to clean the College and nearby places
October 21	NSS	NSS along with 'Leaders for Tomorrow' organised a cleanliness drive and awareness rally from Shivaji College to Raghubir Nagar
November 2	NSS	NSS team launched an Online Campaign against Pollution
November 4	Eco Club	Lecture on 'Climate Change and India' by Dr. Subodh Sharma, former advisor of Ministry of Environment Forest and Climate Change (MoEFCC)
2018		
February 2	BA (H) English and BA (H) Economics	Visit to Centre for Environmental Science and Climate Resilient Agriculture, ICAR-Indian Agricultural Research Institute, New Delhi. Attended by 99 students
February 13	B. Sc (H) Chemistry Sem-II	Field visit to Okhla Bird Sanctuary. Attended by 45 students
March 24	B. A (H) Geography Sem-II	Field Visit to Najafgarh Drain. Attended by 63 students
April 3	BA (P)	Visit to Najafgarh drain. Attended by 137 students

August 8	NSS	Organised 'Campaign for Better Sanitation Practices', a cleanliness drive by formation of human chain and poster rallies
September 15	Eco Club	Celebration of 'World Ozone Day'. The event was highlighted by a talk on "Stratospheric and Ground-level Ozone" by speaker from the Central Pollution Control Board (CPCB) followed by a screening of a documentary on 'Ozone layer and its story' and various students' competitive events.
September 17	B. Com (H) Sec-A Sem-I	Field visit of to Najafgarh Drain. Attended by 35 students
September 18	BSc (H) Mathematics I Semester (Sec A & B)	Visit to Sahibi River channel and its flood plane. Attended by 110 students
September 22	BA (P) I Semester	Visit to National Zoological Park, Delhi
September 24	NSS	Organized an awareness campaign against use of plastic. 200 students participated in the rally.
September 24	NSS	NSS participated in the campaign 'Rally for Rivers' in association with Isha Foundation
September 30	NSS	Organised 'C.Y.O.W.B.- Carry Your Own Water Bottle' a rally in the College & nearby area for the awareness about the harmful effect that plastic has on our environment. The volunteers carried their own steel bottles to portray their service and role towards the environment.
October 9	NSS	Organised a play on water crisis
October 16	Leaders for Tomorrow (LFT) unit	LFT unit organized a plantation drive– ADAPT (Adopt a plant) in College campus. The volunteers planted more than 50 saplings.
November 5	NSS	Vigilance week was celebrated in the first week of November and the 'Refill the Pen' campaign .
October 30 to November 11 & November 4, - November 14	LFT	A Collection Drive was held to collect clothes, books etc. Later, donated material was distributed to underprivileged children staying at Rajouri Garden, Ren Basera under 'Visit for Compassion' event
2019		
January 16	Eco Club	Organised 10th Jijabai Awards Ceremony. The awards were conferred to Ms. Lakshmi N. Menon, founder of PURE LIVING, Mr. Shyam Sunder Paliwal who started the "111 Trees for Each Girl Child movement", Dr. Manisha Gupte and Dr. Ramesh Awasthi, founders of the Mahila Sarvangeen Utkarsh Mandal, Sister Annie Jesus Mary of Jeevan Jharna Vikas Sanstha, Ms. Vidya Nambirajan of Paramount Auto Bay Services and Nambirajan Foundation Automobile Academy.
February 14-15	Eco Cub	In collaboration with Institute of Bioresources and Sustainable Development (IBSD), Imphal, EDC organised an International E-Summit on 'Entrepreneurship Development through Ecotourism in Northeast India'.
March 20	Students studying Environmental Science Sem-II	Sparrow Counting Exercise on occasion of the World Sparrow Day. Attended by 54 students
March 30	BA (H) Hindi Sem-II	Visit to Okhla Bird Sanctuary. Attended by 12 students
September 15 & 16	NCC	NCC cadets participated in cleanliness campaign in the college and nearby places under 'Swachh Bharat Pakhwada'

September 25 & 27	BSc (H) Mathematics I Semester (Sec A & B)	Visit to Sahibi River channel and its flood plane. Attended by 43 & 53 students
September 28	B. A (Prog) Sem-I	Field Visit To Okhla Bird Sanctuary, Noida, Attended by 24 students
November 1	Eco-Club	Organised an environmental awareness programme, 'Observe Eco-Friendly Diwali- Say No To Crackers'. It included poster making, essay writing and slogan writing competitions, along with signature campaign.
2020		
February 20	B. A (H) Hindi and Sanskrit Sem-II	Field visit to Okhla Bird Sanctuary. Attended by 45 students
March 5	SPADE	Organised the annual intercollegiate festival on 'Climate Change' and launched the 3rd edition of the annual research book 'Arthmanthan'.
March 7	BA (H) English Sem-II	Visit to Kamla Nehru Ridge, Delhi. Attended by 25 students
May 19	Eco Club	Organised a Webinar on 'Biodiversity and Environmental Health' in collaboration with the Society for Ecological Research and Natural Resources Management (SERNRM). The lecture was delivered by Prof. C.R. Babu.
September 5	Garden Committee	Celebrated 'Van Mahotsav' (Plantation Day) on the occasion of Teacher's Day. Saplings were planted in the campus. Faculty members, non-teaching staff members and students participated in the tree plantation drive.
September 13 - 16	Eco Club	World Ozone Day was celebrated by- • Organising an International Seminar on 'Science, Environment and Spirituality' • Conducting various intercollege students' competitions including poster making, essay writing, and slogan writing and signature campaign • Organising a visit to Tughlaqabad Biodiversity Park in collaboration with SERNRM (Society for Ecological Research and Natural Resources Management). 50+ participants • Participating in plantation drive organised by DDA-Times of India
September 29	Eco Club	Instituted Dr. Panjabrao Deshmukh Memorial Running Trophy for Innovative Green Model a Solution for Environmental Issues. The trophy was awarded for "Water Recirculation Model" in 2020.

Tree plantation drive

Field visit to Okhla Bird Sanctuary

Field visit to Najafgarh drain

Field visit to Sultanpur National Park, Haryana

Expert lecture on Improvement of Environment through Organic Farming

Flyer of poster making competition

3. Green Steps taken by Shivaji College

College campus was audited with respect to Green Audit Checklist developed by STEP (refer **Annexure 6**). Based on the data available for review, it is understood that since 6 years college is actively taking initiatives in environment related activities. College has taken green initiatives by installing a renewable energy system, rainwater harvesting system, vermicomposting, establishing Eco Club, a paper recycling unit, promoting eco-friendly activities etc.

a) Buildings are specifically designed with wide windows and wide passages to utilise sunlight, and for ventilation.

b) College has 1800+ trees, shrubs and potted plants present in the campus.

c) College has installed a rooftop solar PV system of 75 KWH capacity in December 2016.

d) College has e-book facility in the library.

e) For e-waste management, college has tied-up with E-waste recycler/ disposer.

f) Understanding the importance of efficient energy use, college has initiated the process of replacing all incandescent lights with LEDs.

g) College established an ‘Eco Club’ and ‘Garden Committee’ in which students and staff arrange different environmental activities such as guest lectures, conferences, cleanliness drives etc.

h) Sewage treatment plant is under construction. Water treated in STP will be used for non-potable activities such as flushing, gardening, etc. in the campus.

4. Recommendations

1) College has implemented several green initiatives such as rainwater harvesting, vermicomposting, solar PV system and under process for installation sewage treatment which help in promoting sustainability. College should develop monitoring mechanism and generate & maintain the performance records of the green infrastructure.

2) Water consumption can be reduced further through various conservation methods. Replacement of all old water faucets with water saving faucets such as pressmatic taps, aerator taps, jet sprays etc. can save water and help in minimising the water footprint.

3) Treated sanitary wastewater can be recycled for toilet flushing by providing dual pumping system.

4) College should test water quality at regular intervals, develop water demand/ balance diagram and a plan delineating water conservation practice.

5) Records of pipe/ water taps leakage complaints should be maintained as a part of Standard Operating Procedures (SOPs).

6) Solid waste generated in campus includes paper waste, E-waste, plastic waste, food waste from canteens and dry recyclable waste from gardening. Paper waste and E-waste are given to approved agencies for recycle/ disposal. Inventories & management processes of all waste (including food and dry recyclable waste) should be well documented.

7) College can upgrade the waste segregation practices and segregated dry waste can be handed over to the aggregators appointed by the Municipal Corporation. A mechanism to be developed to segregate plastic in 7 categories viz. High density Polyethylene (HDPE), Low Density Polyethylene (LDPE), PET, Polyvinyl Chloride (PVC), Polypropylene (PP), Polystyrene (PS) and Multi-layered plastic; and handing over to plastic waste segregator or the recyclers to enable circular economy in plastic waste management.

8) Signage regarding water conservation, reduction & segregation of plastic waste, reduction in food waste, waste segregation can be put up in kitchen, dining areas and near drinking water facilities to create awareness among staff and students.

9) Mirror optic reflectors can be retrofitted on existing tube lights as the reflectors can spread light to relatively large areas. Control sensors can help to reduce consumption by automatically dimming lights when people are not around.

10) Every classroom and laboratory with central switch board can have a diagram linking location of a tube light, fan etc. with corresponding switch. This will ensure that correct fitting is switched on/ off and can save time & unnecessary operation. The awareness regarding energy management could be improved by encouraging students to help in monitoring energy consumption and by integrating energy education into classroom learning.

11) College is procuring LED lights and electrical equipment with star ratings. SOPs should be prepared and followed for purchasing green equipment, equipment star rating and eco-friendly materials.

12) The installed solar energy system capacity could be expanded to the remaining roof top area to generate more renewable energy.

13) It is recommended that indoor air quality, noise levels and water quality to be monitored once in 6 month and records to be maintained as per IS: 10500.
https://scclmines.com/env/DOCS/NAAQS-2009.pdf
http://cgwb.gov.in/Documents/WQ-standards.pdf

14) Information on sources, impacts and mitigation of indoor air pollution to be displayed within campus for increasing awareness about indoor air pollution. E.g. Signage can be put in chemistry laboratory for handling fuming chemicals.

15) It is recommended to measure emissions from diesel generator and ambient air quality at least once a year.

16) Air quality, water quality, noise level monitoring within College campus can be included as short-term projects under course curricula. This will help the students to get first-hand experience in environmental monitoring and also help College to maintain records of the quality of important environmental attributes. Additional credits can be considered for students who are part of the project team.

17) There should be a schedule for safety training, fire-fighting drills and mock drills. Records of these activities should be maintained.

18) Fire hydrants and fire alarm systems can be installed in the College. Fire hydrant and alarm system can be commissioned after receiving the NOC.

19) Fire safety drills should be conducted at regular intervals and their records should be maintained.

20) Safety, Health and Environment (SHE) groups can be formed which will include staff members and students. They can have regular meetings, and suggestions to be recorded and implemented if found suitable.

21) Emergency escape route plans should be provided on each floor. Floor plan should be clearly visible with an emergency exit and assembly point.

22) Records of green and environmental initiatives conducted by College should be maintained properly which will include aim & objective of the initiative, details in brief and the outcome.

Annexure 1: List of Stakeholders Interviewed

Stakeholders interviewed during the audit

Virtual tour of Shivaji College was conducted on 17.06.2021. During the visit, College campus, College building (classrooms, laboratories, etc.), solar panels, rain water harvesting system, paper recycling unit, green belt, RO plant, LPG storage area were visited virtually. Following stakeholders were interviewed.

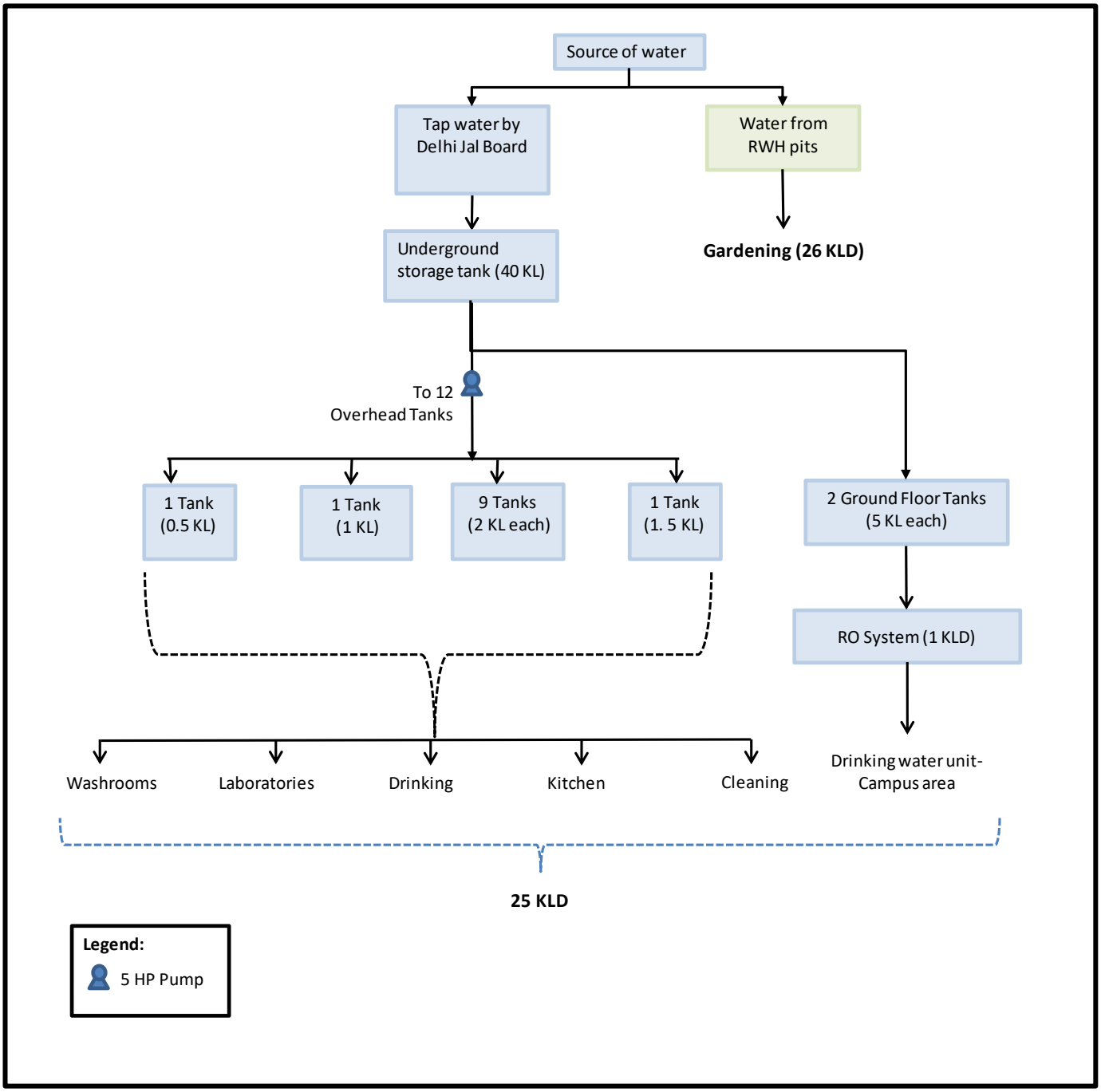
Sr. No.	Stakeholder Name	Designation
1	Dr. Virat Jolli	Assistant Professor, Department of Environmental Studies (Virtual tour coordinator)
2	Mr. Ravi	PA, Library
3	Mr. Ved	RO Operator, Cleaning & Maintenance
4	Mr. Rahul Rajak	Gardener
5	Mr, Jitendra Kumar Jena	Caretaker, Water Management
6	Ms. Meenakshi	Cleaning in charge
7	Mr. Ratandeep	Computer Laboratory In charge

Faculty, Non- teaching Staff & Students Interviewed Individually over Telephone

Sr. No.	Stakeholder Name	Designation, Department	Date
1	Dr. Ashwani Sharma	Assistant Professor, Department of Environmental Studies	Overall audit coordinator
2	Dr. Bishu Sathpaty	Assistant Professor, Department of Political Science	17.06.2021
3	Dr. Mridula Budhraja	Assistant Professor, Department of Mathematics	17.06.2021, audit coordinator
4	Dr. Prabuddh Mishra	Assistant Professor, Department of Geography	17.06.2021
5	Dr. Gyanendra Pandey	Assistant Professor, Department of Physics	17.06.2021
6	Dr. Richa Arora	Assistant Professor, Department of Chemistry	18.06.2021
7	Priya Shaw (Contractor)	Incharge for Horticulture, cleaning & waste management	17.06.2021
8	Neha	Student, SY Physics	17.06.2021
9	Yashika	Student, TY Zoology	17.06.2021
10	Naman Gupta	Student, FY Biochemistry	17.06.2021

Annexure 2: Water Distribution Diagram

Major water source for College is tap water provided by Delhi Jal Board. College also has one borewell in the campus which is currently not used for water withdrawal. Daily water consumption for the entire campus when in operation is 51 KL, which includes 25 KL consumption in academic area (used for drinking, cleaning, washrooms, laboratories and kitchen) and 26 KL for gardening. Water collected in rainwater harvesting pits is used for gardening purpose.



Annexure 3: List of Plant present in the Campus

College campus has 5 gardens and has 300 variety of plants (including 57 tree species), 427 trees, shrubs and 1400-1500 potted plants present in the campus area.

List of some plant species present in the campus is given below,

1. Silver Oak *(Grevillea robusta)*
2. Dhak *(Butea monosperma)*
3. Kanak Champa *(Pterospermum acerifolium)*
4. Red Gum *(Eucalyptus australensis)*
5. Neem *(Azadirachta indica)*
6. Lemon *(Citrus limon)*
7. Bottle Palm *(Roystonea regia)*
8. Jamun *(Syzigium cumini)*
9. Saptaparni *(Alstonia scholaris)*
10. Peepal *(Ficus religiosa)*
11. Gulmohur *(Delonix regia)*
12. Mango *(Mangifera indica)*
13. Bottle Palm *(Roystonea regia)*
14. Toot *(Morus alba)*
15. Ashok *(Polyalthia longifolia)*
16. Goolar *(Ficus racemose)*
17. Champa *(Plumeria rubra)*
18. Shisham *(Dalbergia sissoo)*
19. Jarul *(Lagerstroemia speciosa)*
20. Semal *(Bombax ceiba)*
21. Harshingar *(Nyctanthes arbor-tristis)*
22. Pilkhan *(Ficus virens)*
23. Bottle Brush *(Callistemon spp)*
24. Maulsari *(Mimusops elengi)*
25. Putranjiva *(Drypetes roxburghii)*
26. Kassod *(Cassia siamea)*
27. Kadamb *(Neolamarckia cadamba)*
28. Guava *(Psidium guajava)*
29. Ficus Panda *(Ficus panda)*
30. Ficus *(Ficus retusa)*
31. Amla *(Phyllanthus emblica)*
32. Chinese Lemon *(Citrus spp.)*
33. Jungle Jalebi *(Pithecellobium dulce)*
34. Bargad *(Ficus benghalensis)*
35. Amaltas *(Cassia fistula)*
36. Mahua *(Madhuca longifolia)*
37. Bael *(Aegle marmelos)*
38. Siris *(Albizia lebbeck)*
39. Imli *(Tamarindus indica)*
40. Kachnar *(Bauhinia variegate)*
41. Chamrod *(Ehretia laevis)*
42. Kinow *(Citrus spp.)*
43. Pomegranate *(Punica granatum)*
44. Karanj *(Pongamia pinnata)*
45. Pilkhan *(Ficus virens)*
46. Bougainville *(Bougainville glabra)*
47. Copperpod *(Peltophorum pterocarpum)*
48. Babool *(Acacia nilotica)*
49. Shareefa *(Annona squamosal)*
50. Chikoo *(Manilkara zapota)*
51. Yellow Oleander *(Thevetia peruviana)*
52. Arjun *(Terminalia arjuna)*
53. Drumstick *(Moringa oleifera)*
54. Laurel Fig *(Ficus microcarpa)*

Annexure 4: List of Bird and Butterfly Species found in the Campus

List of bird species:

1. Black Kite *(Milvus migrans)*
2. Shikra *(Accipiter badius)*
3. Black rumped Flameback *(Dinopium benghalense)*
4. Indian Grey Hornbill *(Ocyceros birostris)*
5. Brown headed Barbet *(Megalaima zeylanica)*
6. Copper smith Barbet *(Megalaima haemacephala)*
7. Asian Koel *(Eudynamys scolopaceus)*
8. House Crow *(Corvus splendens)*
9. Blue Rock Pigeon *(Columba livia)*
10. Eurasian collared Dove *(Streptopelia decaocto)*
11. Rose ringed Parakeet *(Psittacula krameri)*
12. Jungle Babbler *(Turdoides striata)*
13. Common Myna *(Turdoides striata)*
14. Red vented Bulbul *(Pycnonotus cafer)*
15. Oriental Magpie Robin *(Copsychus saularis)*
16. Common Tailor Bird *(Orthotomus sutorius)*
17. Oriental white Eye *(Zosterops palpebrosus)*
18. Purple Sunbird *(Cinnyris asiaticus)*
19. House Sparrow *(Passer domesticus)*

List of butterfly species:

1. Indian cabbage White *(Pieris canidia)*
2. Lime Butterfly *(Papilio demoleus)*
3. Common Jay *(Graphium doson)*
4. Common Emigrant *(Catopsilia)*
5. Common Mormon *(Papilio polytes)*
6. Plain Tiger *(Danaus chrysippus)*

Annexure 5: Indoor Gardening Details

Indoor plants are commonly used for their aesthetic benefits but they also play a vital role in reducing airborne pollution. The right choice of plants can be an excellent way in improving indoor air quality and general health. Local landscape contractor can be contacted for supply and rotation of these plants.

Plants	VOC it removes	Indoor source of VOC's	Plant care
 **Aloe Vera**	Formaldehyde, Trichloroethylene and Benzene	Chemical based cleaners and paints	Easy to grow with enough sunlight
 **Bamboo Plant**	Formaldehyde, Trichloroethylene and Benzene	Paints, Plastics, Wood products etc.	Thrives under low light conditions as well as easy to maintain
 **Chinese Evergreen**	Benzene	Paints	Low maintenance plant that prefers low light conditions.
 **English Ivy**	Formaldehyde, Benzene, Air borne fecal matter particles	Wood, Paper products, Air borne faecal – matter particles from pests	Easy to maintain
 **Janet Craig**	Formaldehyde, Benzene and Trichloroethylene	Paints, Plastics, Wood products etc.	Medium to low light tolerant plant. Requires little water for growth.

 **Golden Pothos or Devils Ivy**	Formaldehyde, Cleanses air	Exhaust fumes, carpeting materials, panelling and furniture products made with particle board	Extremely easy to maintain under low to bright light conditions. Fast growing and grows well under Fluorescent light.
 **Mass Cane**	Formaldehyde, benzene and trichloroethylene	Paints, Plastics, Wood products etc.	Medium to low light tolerant plant. Requires little water for growth.
 **Snake plant**	Formaldehyde and trichloroethylene	cooking fuels, wood products, facial tissues, personal care products and waxed papers	Drought resistant and Tolerates a variety Of light conditions. Hard to damage or kill.
 **Peace Lily**	Formaldehyde, benzene and trichloroethylene	Paints, Plastics, Wood products etc.	Relatively easy to maintain. Survives in low light conditions.
 **Red-edged Dracaena**	Formaldehyde and trichloroethylene	cooking fuels, wood products, facial tissues, personal care products and waxed papers	Drought resistant and Tolerates a variety of light conditions. Hard to damage or kill.
 **Spider Plant**	Formaldehyde, benzene, carbon monoxide and xylene	cooking fuels, wood products, Printing	Easy to maintain under medium to bright light condition.
 **Parlor Palm**	Purifies indoor air	-	Easy to maintain

Annexure 6: Green Audit Checklist

College campus is audited with respect to Green Audit Checklist developed by STEP. College building is specifically designed with broad windows and wide passages to utilise sunlight and for ventilation. College has ample number of trees in the campus. Facilities such as rainwater harvesting system, rooftop solar PV systems are provided in the campus. STP is under construction.

Students and staff demonstrate consistent efforts in arranging environmental activities and actively participate in them.

Good Daylight Design

Sr. No.	Design Feature		Remarks (If any)
1	Wide corridors open to daylight	✓	
2	Broad doors and windows allowing daylight	✓	
3	Building architecture which allows sunlight within buildings	✓	Specifically designed with broad windows and wide passages
4	Presence of Skylight/ Rooflight	X	Large number of trees and herbal garden are present in the premises.
5	Enough natural illumination in classrooms/ seminar halls/ laboratories	✓	Wide windows provided for natural sunlight.
6	Ultraviolet (UV) filtering windows/ Use of exterior louvers or light coloured fabric or blinds for windows to control glare	✓	Light coloured curtains or blinds used for laboratory windows
7	Operable/ openable windows	✓	
8	Use of glass as facilitator of natural light	✓	
9	Use of insulated and tinted glass to filter heat gain	✓	

Ventilation

Sr. No.	Design Feature		Remarks (If any)
1	Good ceiling height which allows internal air circulation	✓	Height- about 4 m
2	Self-movement ventilators in the roof	X	
3	Wide windows and doors for classrooms, laboratories, seminar halls	✓	
4	Wide corridors	✓	Width- 2- 2.5 m
5	Operable louvers	X	
6	Exhaust fans in kitchen/ toilets	✓	Exhaust fans are provided in laboratories, washrooms and kitchens.

Temperature and Acoustic Control

Sr. No.	Design Feature		Remarks(If any)
1	Roof design & type (Double/ False ceiling with plaster of paris etc.)	✓	All roofs are false ceiling made from plaster of paris.
2	Sand stone cladding/ tiling outside the walls	-	
3	Specially designed walls for temperature control, Sound noise barriers for windows/ walls	X	
4	Building construction allows diffused sunlight but not the heat. Specially designed glass walls/ windows with better U value/ factor depending upon climate conditions	✓	
5	Use of insulation material (e.g. autoclaved aerated blocks, hollow blocks, Thermocrete etc.)	X	
6	Use of water bodies/fountain to maintain temperature within building	X	
7	Climbing creepers on the walls	X	
8	Retrofitting the existing roofs with cool roof technology	-	
9	Use of landscaping as sound barrier	✓	Trees and shrubs are planted in the Campus. Indoor plants are also placed in the building.

Water Efficiency & Wastewater Management

Sr. No.	Measures		Remarks (If any)
1	RO based water purifiers for drinking water	✓	
2	Aerators to water taps	✓	Limited. Present only in some washrooms.
3	Automatic toilet faucets	X	
4	Drip irrigation/ Sprinklers (for plant watering system)	✓	Sprinklers are provided in gardens.
5	Dual flush toilet with cistern	X	Dual flush is important for reducing water footprint.
6	Dry mopping/ cleaning methods adopted	✓	
7	Sewage treatment plant for sewage recycle	P	STP of 130 KLD capacity is under construction.
8	Rainwater harvesting	✓	RWH is provided in the campus.
9	Regular maintenance for leakage free plumbing system	✓	Maintenance is done by maintenance department.
10	Use of low flow/flow control water equipment or gadget	X	

11	Water free urinals (No flush urinals/ Zero flush urinals/ water less urinals/ air-based flushing system)	X	
12	Water balance diagram and water consumption monitoring at each consumption level	X	Water consumption monitoring at each level is essential to identify major water consumption areas.
13	Routine monitoring of water quality	X	
14	Awareness signs displayed for promoting water conservation	X	Water conservation signage to be displayed to create awareness among staff and students.

Energy Efficiency and On-site Energy Generation Mechanism

Sr. No.	Measures		Remarks (If any)
1	Maintaining correct lux levels (70-300 lux) to avoid excessive light	✓	The illumination (Lux) levels were adequate in most areas (70-115 lux sunlight). Lights are kept switched off when not required.
2	Computerized monitoring of electrical system	X	
3	On-site energy generation (Diesel generators, LPG)	✓	Diesel generator of capacity 100 KVA is provided. LPG is used in kitchen and laboratories.
4	Use of renewable energy (Solar, biogas)	✓	Rooftop solar PV system of 75 KWH capacity is installed.
5	Photocell occupancy sensor for automatic light control	X	
7	Regular maintenance of electrical system	✓	On-site maintenance department is present for regular maintenance.
8	Use of energy efficient equipment like VFDs, maximum star rated equipment.	✓	All ACs are with star rating. 30% lights are LEDs.
9	Use of energy saving bulbs (Compact florescent light/LED lights)	✓	30% lights are LEDs.
10	Awareness signage on electricity conservation	✓	Electricity conservation signage are provided on laboratory notice boards. Signage should be provided near all switch boards.

Solid Waste Management

Sr. No.	Measures		Remarks (If any)
1	Waste segregation practices and supporting hardware for waste segregation (Dry recyclable, organic, plastic, hazardous and E waste)	✓	Dry recyclable waste, e-waste and paper waste segregation is practised.

2	Setting up recycling / composting/ biogas generation facility	✓	Campus has vermicomposting facility and is planning to install composting unit.
3	Minimise use of paper through digitalization	✓	'Learning Management System' has helped in reducing paper use.
4	Printing on both sides of paper/ Reuse of printed paper/ envelops	✓	
5	Mechanism for collection & disposal of E-waste as applicable regulation	✓	E-waste is stored and handed over to 'Nishta Innovative Solutions'.
6	Single use plastic free campus	✓	College has prohibited the use of single use plastic.
7	Inventories of waste generation and records of waste disposal	X	
8	Recycle/ archiving of paper waste	✓	Paper recycling unit is installed in the campus.
9	Segregation of dry and wet waste	✓	Blue and green coloured bins are installed for segregation.
10	Purchase of electronic products from companies which have service for disposal of product with buyback policy	✓	
11	Recreating into new sustainable products	✓	Waste materials are being used by students for projects and during festivals.

Environmental Audit

Sr. No.	Type of audit		Remarks (If any)
1	Energy audit (includes energy consumption, thermal comfort, visual comfort)	X	Energy Audit helps to assess existing energy balance, implement energy efficient operational strategies and adopt Energy Conservation Measures (ECM) effectively.
2	Sound/ Noise and lux level monitoring (including indoor noise level, outdoor noise level)	✓	College has conducted environmental audit in June 2021.
3	Water and waste audit (including water consumption, quality, solid waste generation, solid waste disposal process)	X	
4	Safety Audit	X	It is recommended to conduct safety audit to identify the improvement opportunities and increase safety awareness.

Universal Access and Efficient Operation and Maintenance of Building

Sr. No.	Design feature		Remarks (If any)
1	Easy access to the main entrance of the building and minimum two exists	✓	
2	Energy efficient elevator	-	
3	Carpooling by staff and students/ use of Public transport/ Use of bicycles and battery-operated vehicles within campus	✓	Most students use public transport. Carpooling is practiced by College staff.
4	Preferred car park spaces for differently abled	X	
5	Ramp/ stairs with handrails on at least one side	✓	Handrails are installed on all staircases. Ramp to be installed at crucial places such as the main entrance.
6	Restrooms (toilets) in common areas/ Restroom for differently abled	X	Separate restroom for differently-abled is not provided.
7	Braille assistance for differently abled	✓	Braille kits, audio books are present in the library.
8	Availability of wheel chair	X	
9	Emergency response plan for natural and manmade emergencies	✓	
10	Fire exits, assembly points, first aids, firefighting systems	✓	First aid kits are provided in specific laboratories. Fire extinguishers and sand buckets are provided. Fire exit signage should be installed.
11	Regular maintenance of building	✓	In-house maintenance department is present.

Green Program

Sr. No.	Green program		Remarks (If any)
1	Upcycling of waste. Recycling beyond books i.e. paper, aluminium, plastic, e-waste	✓	Dry waste is used by students for projects and during festivals for decoration purpose.
2	Creation of “Green Team” in the institution/library	✓	College has Eco Club and Garden Committee.
3	Awareness programs on environment, energy management & safety (external sessions and academic courses)	✓	Each course has at least one environment related subject. Awareness sessions are arranged for student and also by faculty & students in nearby area.
4	Outreach, activities, green programs (Tree plantation, waste segregation, plastic waste collection, cleaning etc.) records/ photos of programs	✓	

5	Presence of system/ methodology available for implementation of green initiatives and green projects (long term system-based continuity and not an isolated/ standalone activity)	X	
6	Mindset for reduction, recycle of waste (Green mindsets)	✓	Students are motivated to recycle waste materials. Awareness programs are being conducted with the campus as well as in nearby area.
5	Digitization	✓	
6	E-archiving	✓	
7	E-resources: E books, Online Journals, membership of consortium	✓	
8	Maintaining green campus / Greening of campus	✓	Campus has 1800+ large trees, shrubs and potted plants.

✓: Provided P: Planned/ under construction - : Not Applicable X : Not Provided