Green Audit Report

St. Teresa's Institute of Education

S. V. Road, Santacruz West, Mumbai-400054

September 2021

Prepared By:

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SUSTAINABLE TECHNOSOLUTIONS FOR ENVIRONMENTAL PROTECTION PVT. LTD.

Green Audit Report of St. Teresa's Institute of Education, Santacruz has been prepared by STEP based on visit to the institute campus, desktop review of documents/ records and interactions with/ telephonic interviews of faculty, non-teaching staff and students. The audit was conducted on **September 9, 2021.**

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

STEP PRIVATE LIMITED MUMBAI 400 093.

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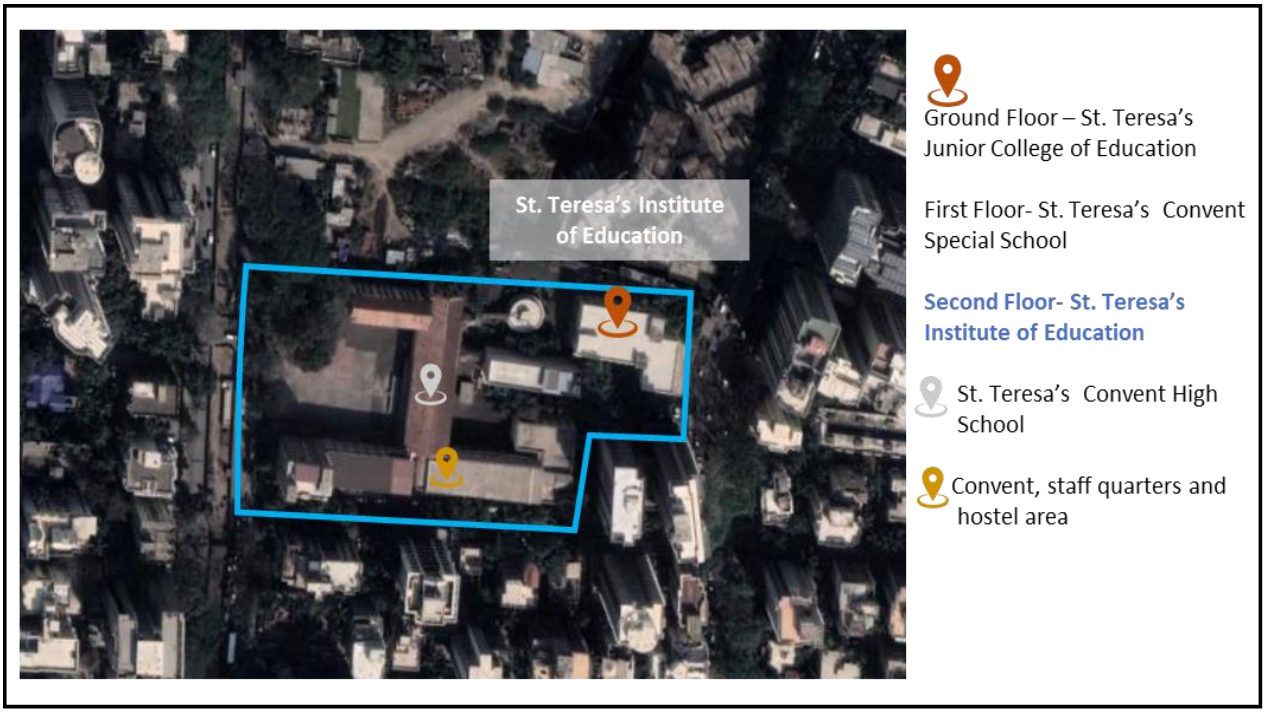
1. Introduction

St. Teresa's Institute of Education (S.T.I.E.), Santacruz, established in 1973 by the sisters of the Congregation of Carmelite Religious, is a Christian Minority Educational Institution and one of the pioneering institutes of teacher-education in Mumbai. S.T.I.E. is the first women's college of Education to be affiliated to University of Mumbai. S.T.I.E. is affiliated to University of Mumbai since 1986 and received University Grants Commission (UGC) recognition in 1987. S.T.I.E. also has National Council for Teachers Education (NCTE) recognition.

S.T.I.E. offers B.Ed. Undergraduate Degree Course and is a contact centre for M.A. (Education) Postgraduate Course offered by Institute of Distance & Open Learning (IDOL), University of Mumbai. It has 100 students enrolled and 15 teaching & non-teaching staff on its payroll.

1.1 Environmental Setting

S.T.I.E. shares its campus with St. Teresa's Convent High School, St. Teresa's Junior College of Education and St. Teresa's Convent Special School. Convent, staff quarters and hostel are also present in the campus area. Entire campus is spread over 15175.71 m^2 area and located in Santacruz, Mumbai. It is adjacent to Swami Vivekanand Road and about 1 km from Santacruz and Khar railway stations.



St. Teresa's Institute of Education Campus

1.2 Basics of Green Audit and Stakeholders' Consultation

Green Audit enables the institute to:

- Enhance awareness levels on environment management and sustainability
- Prepare 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 visited the S.T.I.E. premises on September 9, 2021 to conduct Green Audit. The audit was performed according to the Green Quotient. Prior to the audit questionnaire and checklists were prepared, based on which the audit is conducted. During the audit STEP team visited entire S.T.I.E. campus i.e., classrooms, library, washrooms, staff room, computer laboratory and infrastructure facilities such as Rainwater Harvesting System (RWH), green belt etc. Audit procedure also involved face to face and telephonic interactions with stakeholders viz. faculty, staff members, with students, contract employees etc. List of stakeholders interviewed is presented in **Annexure 1.**

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

1.3 Campus Information

S.T.I.E. is located in a building shared with St. Teresa's Junior College of Education and St. Teresa's Convent Special School. S.T.I.E. library is on ground floor and classrooms, laboratories, staff room, office etc. are on second floor. The area details are as below:

Facility Details

Floor	Facilities
Ground floor	Library
Second floor	Lecture hall, 4 classrooms, students' common room, computer laboratory, prayer room, conference room, staff room, office, washrooms

2. Green Audit Findings

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

a) Good Daylight Design, Ventilation and Acoustics
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 & Maintenance of Building
i) Transportation
j) Green Belt
k) Green Programs (Green initiatives)

2.1 Good Daylight Design, Ventilation and Acoustics

a) Classrooms, computer laboratory and library have high ceiling with wide doors and large windows. Corridors are 2.3 m wide and ceiling height is about 3.5 m.
b) Building is designed in such a way that corridors and classrooms receive ample sunlight. Windows are kept open for adequate daylight. S.T.I.E. informed that, when in operation, curtains are fitted on classroom windows to avoid glare.
c) Ventilation in classrooms is facilitated by windows and fans. Cross ventilation is facilitated by windows on both sides. Air conditioners are installed in conference room, prayer room and computer laboratory.
d) Although located in city area, vehicular noise pollution is minimum in the premises probably due to dense tree cover in the campus. Noise levels are between 58-64 dB(A) in the premises.
e) Light intensity and noise levels were monitored at 6 different locations and the results are presented in **Table 1**.
f) As per the Occupational Safety and Health Administration (OSHA) standards, permissible noise exposure for 8 hours/day is 90 dB(A). (https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.95). Colleges, schools, hospitals and courts come under silent zone. (http://cpcbenvis.nic.in/noisepollution/noise_rules_2000.pdf). Permissible noise limits near the educational institute is 50 dB(A) during day time and 40 dB(A) during night time.
g) Noise level monitored during the audit is above the permissible limits near entry gate.
h) The illumination (Lux) levels were adequate in all areas.

Table 1: Light intensity and noise levels monitoring results

Sr. No.	Location	Light Intensity (Lux)	Average Noise (dB(A))
1	Lecture hall	152 (Artificial + partial sunlight)	58
2	Classroom 1	82 (partial sunlight)	61
3	Classroom 3	115 (Artificial + partial sunlight)	62
4	Staff room	112 (Artificial + partial sunlight)	63
5	Library	125 (Artificial + partial sunlight)	60
6	Near entry gate	-	64

Wide corridor

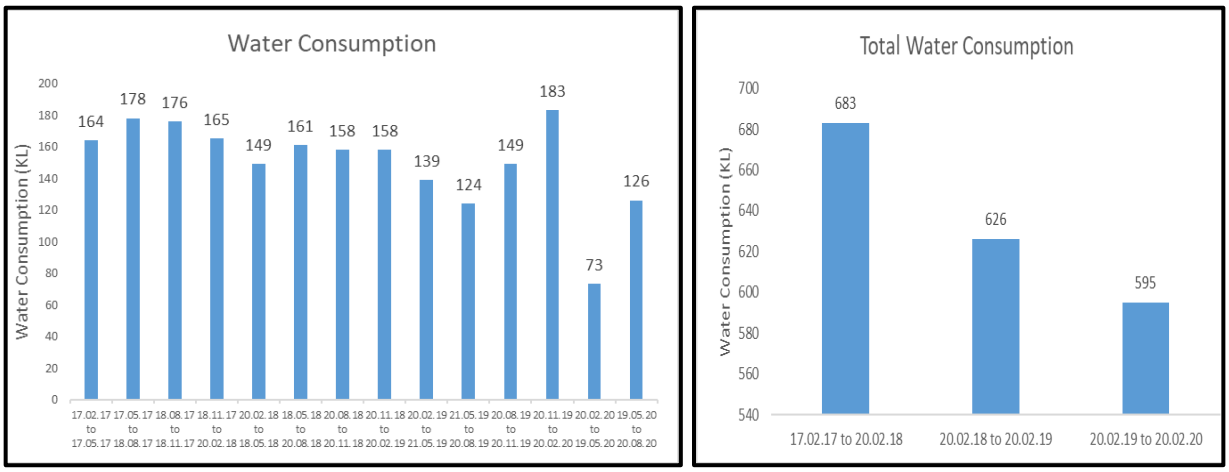
Adequate sunlight in library

2.2 Water Efficiency

a) Water source for S.T.I.E. is tap water supplied by Brihanmumbai Mahanagar Palika. Common water meter is installed for water consumption of entire building which is shared with St. Teresa's Junior College of Education and St. Teresa's Convent Special School. Details of water consumption as per water bills are presented in **Figure 1(a)**, it includes consumption by S.T.I.E., St. Teresa's Junior College of Education and St. Teresa's Convent Special School. As presented in **Figure 1(b)**, reduction in yearly water consumption was observed from February 2017 to February 2020.

b) 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. Daily average water consumption at S.T.I.E. from February 2019- February 2020 when S.T.I.E. was in operation (before COVID-19 lockdown) works out to be around 6-7 L/person/day, which is well under limit.

c) Water consumption from 20.02.2020 to 20.08.2020 is less as S.T.I.E. was non-operational due to COVID-19 lockdown imposed by the Government.



(a) **(b)**

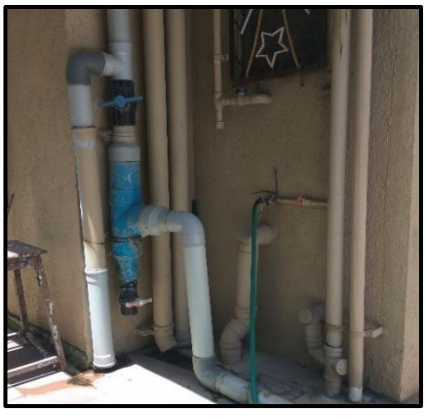
Figure 1. Water Consumption

d) Water is stored in underground storage tank of capacity 10KL and then transferred to overhead storage tanks of capacity 5KL each by transfer pump. Water is then distributed to washrooms, water purifiers. Water from underground storage tank is also used for gardening. The water distribution diagram is presented in **Annexure 2.**
e) Water purifiers are based on Reverse Osmosis technology (RO) and are fitted with coolers. Water purifiers are maintained by 'ACE Technologies'.
f) Dry and wet mopping are practised for floor cleaning which results in water conservation. Floors are mopped twice in a day. There is 4-member team which looks after cleaning/housekeeping of S.T.I.E.
a) Water conservation faucets (taps with aerators) are installed.
b) Dual flushing system is not provided in the washrooms.
c) If there is water leakage from any tap, it is immediately attended by third-party organisation. Records of such leakage complaints should be maintained to quantify water saved.
d) Water Conservation signage are displayed continuously on the display TV installed in the corridor to create awareness among staff and students.
e) 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), the requirements for educational institutions are presented in **Table 2**. Number of water closets, ablution taps and wash basins at S.T.I.E. are as per the requirement.
f) Rainwater harvesting system is installed in January 2019 on new hostel building and staff quarters present in the campus. RWH is comprised of rooftop water collection system and captured rainwater is partly stored in underground rainwater storage tank & remaining is used for recharging ground water.

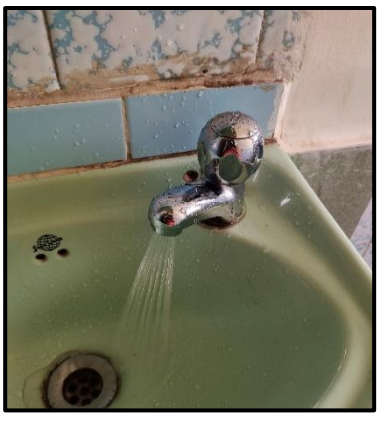
Table 2: Requirements for Educational Institutions

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
Drinking water fountains or taps	1 per 50 students	1 per 50 students
Cleaner's sinks	1 per floor, minimum	

Water purifier



Rainwater harvesting pipeline



Water tap with aerator

2.3 Wastewater Management

a) Wastewater is mainly generated from washing & toilet flushing. S.T.I.E. has 3 washrooms for students and 1 exclusively for the staff.
b) Sanitary wastewater generated is sent to municipal sewer line.

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:

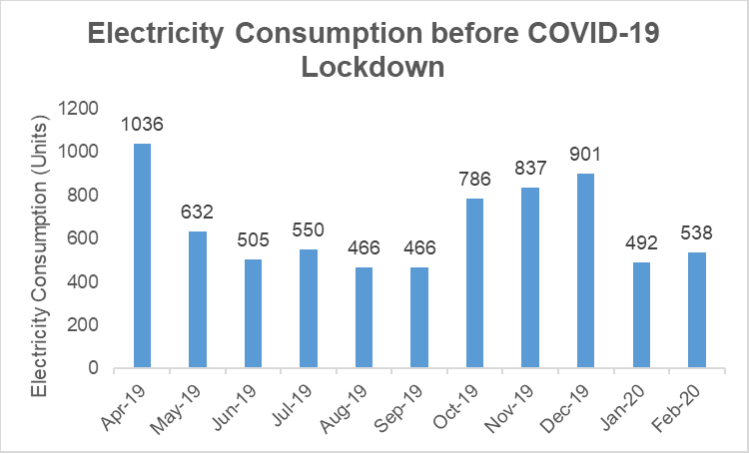
- Carbon monoxide – Sources of carbon monoxide are incomplete combustion of fossil fuels
- Volatile organic compounds (VOCs) – VOCs are emitted by paints and lacquers, paint strippers, pesticides, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and 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) In classrooms, the mode of ventilation is natural draft (through window) and is enhanced by fans. Cross ventilation is facilitated by windows on both sides. Air conditioners are installed in conference room, prayer room and computer laboratory.
b) Green belt has been set up in campus area.

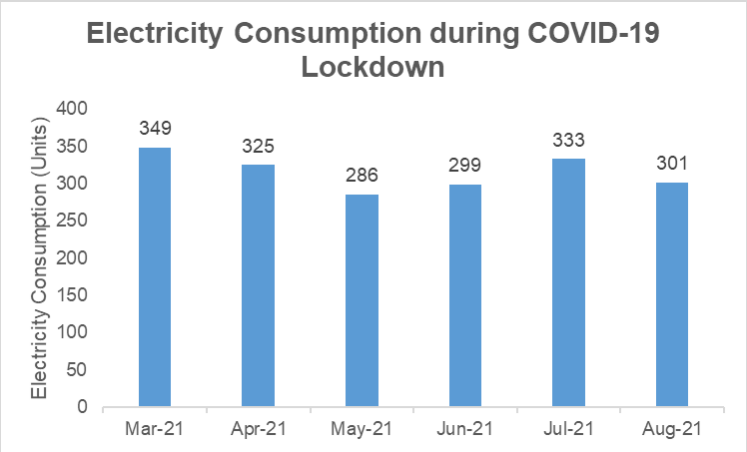
2.5 Energy Management

Electricity:

a) Electricity is provided by Adani Electricity Supply Company Limited. Three electricity meters are installed for S.T.I.E. (Meter no. 7772380, 7924157 & 7924153). Electricity bills from April 2019 to February 2020 and March 2021 to August 2021 were available for review. The monthly electricity consumption by S.T.I.E. before and during lockdown is presented in **Figure 2 (a)** & **(b)**.



(a)



(b)

Figure 2. Electricity Consumption

b) Before COVID-19 lockdown, energy consumption was maximum in April 2019 followed by December and November 2019. The minimum energy consumption was in June 2019. Electricity consumption is lower from March 2021 and August 2021 as S.T.I.E. was closed/ partially operating as per the COVID-19 restrictions imposed by the Government. The areas of major consumption of electricity are,

Electrical Units/ Equipment	**: Quantity**
Tube Lights & LEDs	: 65 (about 10% LEDs)
Fans	: 68
Air Conditioners	: 4
Computers	: 67
Printers	: 1
Projectors	: 5
Refrigerators	: 1
Reprographic Machine	: 2
Microwave Oven	: 1
CCTV	: 16
Display TV	: 1

c) S.T.I.E. has air conditioners without any ratings [Standards set by Bureau of Energy Efficiency (BEE)].
d) Understanding the importance of efficient energy use, procurement of LEDs and star-rated equipment is done by S.T.I.E.
e) Uninterruptible Power Supply (UPS) system is provided in library for computers and server. 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 business disruption or data loss.
f) Reflectors are provided for lights in lecture hall and library. Reflectors reduce number of lights required and hence electricity consumption.
g) Computers are shut down by turning off the main switch when not in use.

h) Separate switches are provided for tube-lights and fans. So, it is possible to switch on a specific light or a fan and to avoid wastage of energy due to common area illumination. Library switchboard is marked indicating tube-lights & fans to avoid unnecessary switching on and thereby avoiding the energy wastage.
i) Tube-lights and fans are switched off by students and staff when not in use.
j) Energy Conservation signage are displayed continuously on the display TV installed in the corridor to create awareness among staff and students.

2.6 On Site Energy Generation

a) Liquid petroleum gas (LPG) is not used by S.T.I.E.
b) S.T.I.E. along with other institutes/ schools present in the campus is planning to install on-grid solar rooftop PV system in the campus.

2.7 Solid Waste Management

a) Solid waste generated from campus includes mainly paper waste, wet (organic) waste and E-waste.
b) When S.T.I.E. is in operation, daily around 3-4 kg dry waste is generated by S.T.I.E. In areas like classrooms, mostly paper waste and plastic wrappers are generated. Biodegradable wet waste is mostly organic consisting of dry leaves, branches etc.
c) Waste bins are provided in staff rooms, classrooms, computer laboratory, washrooms, library and in campus area.
d) Segregation of wet and dry waste is practised within the campus. Currently two-colour coded bins- blue (dry waste) and green (wet waste) are used. Wet waste bins should be covered with net to avoid flies' infestation. S.T.I.E. is planning to install four-colour coded bins in October 2021 for segregation of dry waste. Plastic, paper, metal and glass waste will be collected separately.
e) S.T.I.E. is in process to install two composting units for wet waste generated in hostel kitchen. Composting units are scheduled to be installed in October 2021 by RUR GreenLife Pvt. Ltd.
f) Signage regarding waste segregation are displayed continuously on the display TV installed in the corridor to create awareness among staff and students.

Switchboard with markings

Colour coded bins

A. Paper Waste Management

Being academic institution, waste paper is one of the main solid waste generated in the premises. S.T.I.E. has taken steps to minimise and avoid paper usage.

a) Prints and photocopies are taken on both sides of the pages to avoid excess paper usage. Rather than photocopy, digitalisation (scanning) is practised.
b) S.T.I.E. has a library with total 12000+ books; journals, magazines are also available in the library. Records of books and journals are well maintained and were available for review.
c) S.T.I.E. has created a repository/blog which is a web space storing important instructional resources needed to be accessed frequently by the faculty and students. This includes Action Research Projects, CAI (computer assisted instruction) lessons, Examination Question Papers and other material which would normally be stored as hard copies, printed versions or CDs. This has helped considerably to conserve the unnecessary wastage of paper.
d) S.T.I.E. library has E-book facility where about 35000+ E-books and 6000+ E-journals are available online. 4 computers are provided in the library to access online services. Library services are automated with iSLIM Library Management System.
e) S.T.I.E. has subscribed to N-LIST (National Library and Information Services) through which users have access E-books and E-journals. All the staff members and students are provided with individual user IDs and passwords ensuring 24x7 accesses to N-LIST resources. S.T.I.E. library is also associated with 'National Digital Library of India' and S.T.I.E. ranked 6th in India in July 2019 as for its active use.
f) Internal notices and communications are through E-mail/SMS.
g) Biometric attendance is provided for S.T.I.E. staff & students.
h) Display TV is provided in the corridor where notices, awareness signage are displayed digitally.
i) S.T.I.E. encourages students & faculty for online submission of projects and other necessary documents to reduce paper use.
j) The dissertation reports, journals and exam papers are stored as per the University rules.
k) Around 20-25 kg paper waste is generated by S.T.I.E. each year. Old papers, books etc. are given to the local vendor for recycling.
l) S.T.I.E. encourages students to use eco-friendly material and recycle old papers/ scrap for decoration purpose during the festivals.

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) S.T.I.E. is digitized to a large extent. This includes classrooms, library, internal mails etc.
b) S.T.I.E. has E-library, student & staff portal for academic work and biometric attendance system for staff & students.
c) S.T.I.E. has 67 computers, 4 air conditioners & a printer in working condition.
d) E-waste is collected & stored in S.T.I.E. campus and sent to 'Eco Friend Industries' vendor for recycling/safe disposal. Certificate for E-waste management was not available for review.

C. Plastic Waste Management

a) S.T.I.E. 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) The 'Go-Green with Tetra Pak Initiative' was undertaken by S.T.I.E. from 2018-2020 in collaboration with RUR GreenLife Pvt. Ltd and in association with Sahakari Bhandar and Reliance Fresh. Under this initiative 26,026 used Tetra Pak cartons were collected and given to RUR GreenLife Pvt. Ltd for recycling. In return, S.T.I.E. received 3 garden benches and a dustbin made up of recycled Tetra Pak.

Awareness poster to encouraging 'No Plastic Use'

Bench & Dustbin made up of recycled Tetra Pak

2.8 Universal Access and Efficient Operation & Maintenance of Building

a) S.T.I.E. is easily accessible by train and bus services.
b) Ramp is provided for specially abled persons. Handrails were seen on one side on all staircases.

c) Classrooms have wide windows and S.T.I.E. has 2 exits which can allow safe evacuation during emergency.
d) As per the certificate dated 11.12.2020 available for review, fire audit was conducted by 'Ronak Fire Industries' and 8 fire extinguishers & 2 sand buckets installed in S.T.I.E.
e) Sand buckets are located near meter room. Fire extinguishers are installed near meter room, staircase & entrance and in library, computer room, passage area, lecture hall and office. They are maintained and serviced regularly by 'Ronak Fire Industries'. Fire extinguishers were checked for expiry date and found within expiry limit.
f) Signage for emergency fire exit were not provided. This is crucial during emergency.
g) Fire safety mock drill was performed in May 2019 for staff as well as students. Records of mock drill were not available for review.
h) First aid box is maintained at S.T.I.E. and regularly checked to ensure all the medicines and ointments are within expiry limit.

Fire extinguisher and sand buckets

Ramp

2.9 Transportation

a) The location of S.T.I.E. is accessible with Santacruz and Khar railway stations and bus service in close vicinity. Most of the staff and students travel by public transport.
b) S.T.I.E. encourages students and staff to use the public transport system to reduce carbon emissions.

2.10 Green Belt/ Landscaping

a) 'Terracon Ecotech Pvt. Ltd.' conducted green belt mapping of the campus in September 2021 and 'GPS based Tree Inventory Report' was available for review. As mentioned in the report, the campus has a green belt with 94 trees of 17 native species, 15 exotic species and 1 unidentified species. There are 26 species of shrubs, 33 species of herbs & 10 species of climbers and twiners present in the campus. List of plants present in the campus is given in **Annexure 3**.
b) Plantation improves aesthetics and helps as a buffer in reducing noise level, maintaining temperature of the area.

c) As per the findings of on 'GPS based Tree Inventory Report' large trees include Banyan Tree *(Ficus benghalensis*), Jackfruit (*Artocarpus heterophyllus*), Coconut (*Cocos nucifera*), Jamun (*Syzygium cumini*), Mango (*Mangifera indica*), Tamarind (*Tamarindus indicus*), Chickoo (*Manilkara sapota*) etc. Few trees were identified and confirmed during the audit.

d) As informed by S.T.I.E., when in operation, indoor plants are kept 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 4.**

e) Green belt is maintained by 2 gardeners. Organic fertilisers and pesticides are used for plants only if necessary

Green belt in the 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. To promote the awareness among students and to develop a roadmap for sustainable future, Environmental Education subject is included in the curriculum. S.T.I.E. organises All-Mumbai inter-school/inter-college environmental based 'Planit-E' festival every year to create awareness among students. Through the course and activities there are efforts to increase the awareness towards Environment Management and Sustainability.

a) 'Planit-E' is two-day environmental festival which includes competitions based on themes relating to the environment. Students showcase their creativity and critical thinking skills as they present ingenious solutions to environmental issues. Around 80-100 educational institutions from Mumbai participate in the festival.

b) Since 2015, S.T.I.E. is minimizing the use of plastic by encouraging the use of metal and glass containers for carrying food and snacks. Spiral binding is discontinued. Several posters are displayed in the campus to create awareness regarding plastic ban and eco-friendly materials.

c) S.T.I.E. celebrates Make a Difference (M.A.D.) week annually with the aim of propagating environmental awareness among students. On each day of this green week, students conduct assemblies and educate their fellow classmates and faculty about pressing issues relating to environmental conservation. Some of the topics selected by students are Carbon Footprints, E-waste Strems, Zero Waste, Ocean Acidification, Organic gardens etc.

d) The ‘Go Green with Tetra Pak Initiative’ was undertaken by S.T.I.E. from 2018-2020 in collaboration with RUR GreenLife Pvt. Ltd and in association with Sahakari Bhandar and Reliance Fresh. Under this initiative 26,026 used Tetra Pak cartons were collected and recycled.

e) S.T.I.E. conducts tree plantation drive every year in the campus. S.T.I.E. actively keeps expanding its green cover by planting different varieties of native, medicinal & decorative trees and plants.

f) Eco-friendly gifts such as saplings, cloth carry bags, cloth files etc are given to guests and visitors as memento.

g) S.T.I.E. conducts several assemblies throughout the year related to the theme of environment and propagates ideas for conservation wherein students share tips and hacks on related themes such as sustainability, maintaining terrace gardens, hydroponics etc.

Planit-E Festival

Green Assemblies

M.A.D. week celebration

Green Initiatives & Awareness Activities by S.T.I.E. (2014- 2021)

Date	Activity Details
Every Year	**Tree Plantation Drive:** S.T.I.E. organises tree plantation drive once a year, within the campus.
	Swachh Bharat Abhiyan: Cleanliness Drive is arranged on the occasion of Gandhi Jayanti, 2nd October every year.
	Beach Clean Up Drive: S.T.I.E. organises beach clean-up drive every year on the day after Anant Chaturdashi
January 16 & 17, 2014, November 28 & 29, 2015, December 1 & 2, 2017 and November 16 & 17 2019.	**Planit-E festival:** S.T.I.E. organises Inter-school/Inter-college Environmental based Festival every year since 2014.
Initiated in 2015	Initiatives to minimise plastic usage, initiatives to minimise paper usage, creation of library blog/ repository to reduce paper use
November 21, 2017 to November 28, 2017, November 4 & 11, 2019	**Joy of Giving Week (DAAN Utsav):** Charity drive to stress the importance of the reduce-reuse-recycle. In this drive, used utility articles in good condition were collected and donated to the Sparsha NGO.
September 6, 2018 to March 13, 2020 (temporarily discontinued during the COVID-19 pandemic)	**Go green with Tetra Pak Campaign:** The 'Go Green with Tetra Pak Initiative' undertaken by S.T.I.E. in 2018 is an eco-friendly enterprise carried out in collaboration with RUR GreenLife Pvt. Ltd in association with Sahakari Bhandar and Reliance Fresh. 26,026 used Tetra Pak cartons were collected and have been recycled into 3 garden benches and a dustbin which are installed at the campus. The teacher trainees of the B.Ed course served as Green Champions, sensitizing and orienting students of schools across Mumbai to the Tetra Pak cut-clean-flatten process.

January 27, 2019 to February 29, 2019	50 students of S.T.I.E. volunteered for Save Water- Safe Water Project organized by Society for Service to Voluntary Agencies (SOSVA).
March 5, 2019 to March 7, 2019	Organized sessions on Fire safety, rainwater harvesting and environment
March 22, 2019 to March 28, 2019 and March 9, 2021 to March 18, 2021	**MAD (Make a Difference week):** S.T.I.E. celebrates Make a Difference (M.A.D.) week annually with the aim of propagating environmental awareness among students. Students conduct assemblies and educate their fellow classmates and faculty about pressing issues relating to environmental conservation. Some of the topics selected by students are carbon footprints, E-waste, zero waste, ocean acidification, organic gardens etc.
March 21, 2019	Exhibition on Environmental Awareness
March 28, 2019	**Workshop on Waste Management:** Conducted by RUR Greenlife Pvt. Ltd. to create awareness on the different strategies of waste segregation, composting and information regarding Municipal guidelines for waste segregation.
January 11. 2020	Expert talk on Biodiversity by Ms. Trusha Doshi (Faculty member of Mithibai College)
January 14, 2020	'Multiply the Message' workshop on Climate change & Sustainability by Trailblazers Foundation Inc.
January 15, 2020	Session on saving water by Mr. Subodh Bedre from Society for Service to Voluntary Agencies (SOSVA)
January 27, 2020, February 29, 2020.	S.T.I.E. conducted 'Save Water Safe Water' campaign in 5 Mumbai based schools wherein 14,416 school students were introduced to concepts such as water crisis and its causes, water scarcity and techniques of water conservation such as rain water harvesting.
June 14, 2020	S.T.I.E. participated in online 'All India Counter Corona Poster Contest 2020' to create awareness among the student and teacher and sensitized them to the importance of safety norms regarding COVID-19 pandemic
April 8, 2021	**E-module competition on Plant Health and Food Safety:** Students engaged in preparing modules on different aspects of plant health and safety to promote awareness on different technologies available to improve agricultural yield and enhance its quality.

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"Go Green...Grow Green...Glow Green!"

says St. Teresa's Institute of Education in its 3G formula

The Green Highlight of the Sesquicentennial celebrations of the Congregation of the Carmelite Religious was the 'Go-Green with Tetrapak' campaign undertaken by St. Teresa's Institute of Education, Santa Cruz. This tetrapak initiative was supported by RUR (Are you Reducing, Re-using & Recycling). All the four institutions located on the campus namely, St. Teresa's Convent High School, St. Teresa's Junior College, St. Teresa's Special School & the B.Ed college worked unitedly & undauntedly towards the worthy cause of environmental protection. The venture witnessed the collection of a total of 10,500 used tetrapak cartons which were then recycled into a collection bin & a garden bench which were inaugurated & installed at the campus on 21st January 2019 - a golden figured day in the green calendar of St. Teresa's Society.

The inaugural function was attended by Ms. Monisha Narke - Founder and CEO of RUR along with her team member Ms.Neha Mundra, Sr.Wilma Mendes - Manager of St. Teresa's Society, Dr. Sr. Tanuja Waghmare - Principal of St. Teresa's Institute of Education and the faculty and students. The project was spear-headed by Dr. Giselle D'souza and Dr. Cindrella D'mello. Dr. Sr. Tanuja stated with pride, "It is truly a green moment for the entire Teresian family. A green dream turned to reality!" What deserves mention is the enthusiasm of the school students in walking the extra mile to reach the exorbitant target of empty tetrapaks in one month which was record breaking!

Sr. Maria Pereira - Principal of the High School deserves special acclaim for being the driving force and the wind beneath their wings. The teacher trainees of the B.Ed course served as Green Champions, sensitizing and orienting the school students to the tetrapak cut-clean-flatten process. They more importantly walked the talk and carried out the Herculean task to fruition themselves. Amidst thunderous applause and cheer, Class VI B was declared the winner for collecting the maximum number of tetrapaks.

RUR felicitated the winners and green champions with certificates and awards for their commendable contribution. This venture alerted not only the students and teachers to safeguarding the environment, but its impact also trickled down into their homes, neighbourhoods and society at large. To mark this mega achievement Dr. Giselle D'souza jubilantly expressed, "The journey was uphill but we all agree now that every cloud indeed has a green lining! What started out as one tiny green step has culminated in a Green Revolution!"

Go Green initiative- news letter

Waste management workshop

CERTIFICATE OF APPRECIATION

This is presented to

St. Teresa's Institute of Education

for recycling 14,251 Tetra Pak cartons from January to March 2020.

Vinay Adhye, Business Head, Sahakar Bhandar
Jaideep Gokhale, Vice President, Sustainability, Tetra Pak
Mani..., CEO

Santacruz institutes turn 10K cartons into bench, bin

PACK A PUNCH

ALTERNATE WAY OF DISPOSAL

Certificate of appreciation for Tetra Pak collection and related news published

Beach clean-up drive

Eco-friendly gifts

3. Green Steps taken by S.T.I.E.

S.T.I.E. campus was audited with respect to Green Audit Checklist developed by STEP (refer **Annexure 5**). Based on the data available for review, it is understood that, since 2014 S.T.I.E. is actively taking initiatives in environment related activities. S.T.I.E. has taken green steps by installing rainwater harvesting system, reducing paper use in academic activities, E-waste management, promoting eco-friendly activities etc.

a) Buildings are specifically designed with wide windows and wide passages to utilise sunlight, and for ventilation.
b) S.T.I.E. has 90+ trees and abundant shrubs, climbers & potted plants in the campus.
c) S.T.I.E. has E-book & E-journal facilities in the library.
d) For E-waste management, S.T.I.E. has a tie-up with E-waste recycler/disposer.
e) Understanding the importance of efficient energy use, procurement of LEDs and star-rated equipment is done by S.T.I.E.
f) S.T.I.E. arranges/ participates in numerous environmental initiatives such as Make A Difference (M.A.D.) week, Planit-E festival, tree plantation drive etc. to create awareness about the environmental issues and eco-friendly practices.

4. Recommendations/ Suggestions

a) S.T.I.E. should develop monitoring mechanism and generate & maintain the performance records of the green infrastructure.
b) Sewage Treatment Plant can be installed for entire campus for the treatment of sanitary wastewater and same can be recycled for toilet flushing by providing dual pumping system.
c) Records of pipe/ water taps leakage complaints should be maintained as a part of Standard Operating Procedures (SOPs).
d) Solid waste generated in campus includes paper waste, E-waste, plastic waste and dry waste from gardening. E-waste is given to approved agency for recycle/ disposal. Inventories & management processes of all waste should be well documented.
e) A mechanism can 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.
f) Mirror optic reflectors can be retrofitted on existing tube lights as the reflectors can spread light to relatively large areas.
g) Lecture hall and computer 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.
h) Understanding the importance of efficient energy use, procurement of LEDs and star-rated equipment is done by S.T.I.E. SOPs should be prepared and followed for purchasing green equipment, equipment star rating and eco-friendly materials.
i) It is recommended that indoor air quality, noise levels and water quality should 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
j) Information on sources, impacts and mitigation of indoor air pollution to be displayed within campus for increasing awareness about indoor air pollution.

k) There should be a schedule for safety training, fire-fighting drills and mock drills. Records of these activities should be maintained.
l) Fire hydrants and fire alarm systems can be installed in S.T.I.E. Fire hydrant and alarm system can be commissioned after receiving the NOC.
m) Emergency response plan should be prepared.

Annexure 1: List of Stakeholders Interviewed

Stakeholders Interviewed during the Audit

Green audit of S.T.I.E. was conducted on September 9, 2021. During the visit, S.T.I.E. campus, building (classrooms, library, etc.) and rainwater harvesting system were visited. Following stakeholders were interviewed during the visit,

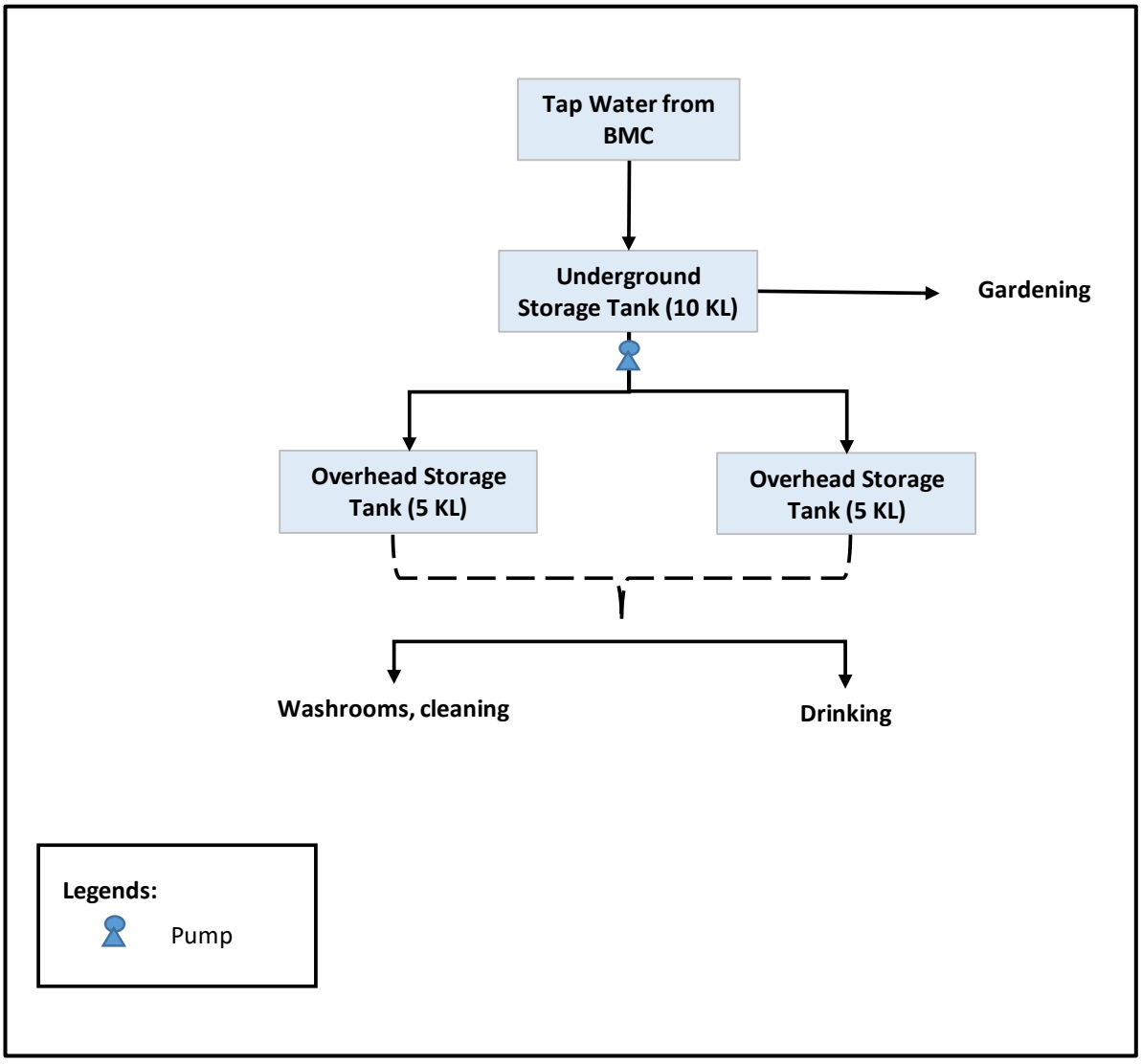
Sr. No.	Faculty/ Stakeholder Name	Designation, Department
1.	Assoc. Prof. Dr. Sr. Tanuja Waghmare	Principal
2.	Assoc. Prof. Dr. Giselle D'souza	Senior-most Faculty Member heading the Green Audit
3.	Assoc. Prof. Dr. Sheela Philip	Faculty Member
4.	Dr. Shakuntala Nighot	Librarian
5.	Colleen Fernandes	Administrative Staff
6.	Delicia Ferreira	Library Assistant
7.	Sanjay Gurav	Maintenance
8.	Laxman Garje	Maintenance
9.	Anthony D'souza	Maintenance

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

Sr. No.	Faculty/ Stakeholder Name	Designation, Department	Date
1.	Assoc. Prof. Dr. Cindrella D'mello	Faculty Member	15.09.2021
2.	Neha Gharat	Alumnus, June 2021 pass-out	14.09.2021
3.	Eshwari Satish	Alumnus, June 2021 pass-out	14.09.2021
4.	Upassana Sanghvi	1st Year B.ED. Student	14.09.2021
5.	Bruchelle Pereira	1st Year B.ED. Student	14.09.2021

Annexure 2: Water Distribution Diagram

Water source for S.T.I.E. is tap water provided by Brihanmumbai Mahanagarpalika (BMC). Water is stored in underground storage tank and from there it is pumped to overhead tanks.



Annexure 3: List of Plants present in the Campus

S.T.I.E. campus has 33 tree species, 26 shrub species, 33 herbs species & 10 climbers species. List of plant species present in the campus is given below,

List of Trees

1. Rain tree (Albizia saman)
2. Christmas tree (*Araucaria columnaris*)
3. Jackfruit (*Artocarpus heterophyllus*)
4. Cucumer tree (*Averrhoa bilimbi*)
5. Star fruit (*Averrhoa carambola*)
6. Margosa tree (*Azadirachta indica)*
7. Dwarf White orchid tree (*Bauhinia acuminate*)
8. Siamese cassia (*Cassia siamea*)
9. Lemon (*Citrus limon*)
10. Coconut (*Cocos nucifera*)
11. Mediterranean cypress (*Cupressus sempervirens*)
12. Royal Poinciana (*Delonix regia*)
13. Eucalyptus (*Eucalyptus globulus*)
14. Banyan tree (*Ficus benghalensis*)
15. Oriental thuja (*Platycladus orientalis*)
16. Sausage tree (*Kigellia pinnata*)
17. Mango (*Mangifera indica*)
18. Sapodilla (*Manilkara sapota*)
19. Drumstick tree (*Moringa oliefera*)
20. Star gooseberry (*Phyllanthus acidus*)
21. Mast tree (*Polyalthia longifolia var. longifolia*)
22. Indian beech tree (*Pongamia pinnata*)
23. Guava (*Psidium guajava*)
24. Fountain tree (*Spathodea campanulate*)
25. Java plum (*Syzygium cumini*)
26. Rose Apple (*Syzygium jambos*)
27. Tamarind (*Tamarindus indicus*)
28. Indian almond (*Terminalia catappa*)
29. Indian beech tree (*Pongamia pinnata*)

List of Herbs & Shrubs

1. Chinese evergreen (*Aglaonema commutatum "silver queen")*
2. Anthurium (*Anthurium sp.)*
3. Fox tail Asparagus (*Asparagus aethiopicus*)
4. Lacy Asparagus Fern (*Asparagus setaceus*)
5. Maranta (*Calathea Tricolor*)
6. Spider plant (*Chlorophytum comosum*)
7. Mexican mint (*Coleus amboinicus*)
8. Colocassia (*Colocassia sp*.)
9. Painted Spiral Ginger (*Costus pictus*)
10. Pink aboli (*Crossandra sp*.)
11. Turmeric (*Curcuma longa*)
12. Dendrobium (*Dendrobium sp.*)
13. Mother-in-law tongue (*Dracaena trifasciata*)
14. Dwarf Sansevieria green (Dracaena trifasciata "superba green")
15. Sontakka (*Hedychium coronarium*)
16. Lobster claw (*Heliconia rostrata*)
17. Dwarf Ixora (pink) (*Ixora taiwanensis (Pink))*
18. Banana (*Musa paradisiaca*)
19. Variegated Pandanus (*Pandanus tinctoreus (Variegated*))
20. Egyptian starcluster Pink (*Pentas lanceolata (Pink))*
21. Egyptian starcluster White (*Pentas lanceolata (White)*)
22. Ming Aralia (*Polyscias fruticose*)
23. Moss-rose purslane (*Portulaca grandiflora*)
32. Yucca (*Yucca sp.*)
33. Desert Rose (*Adenium obesum*)
34. Golden trumpet (*Allamanda cathartica*)
35. Areca nut (*Areca catechu*)
36. White Bougainvillea (*Bougainvillea sp. (White)*)
37. Night blooming jamine (*Cestrum nocturnum*)
38. Thin leaf Gold dust (*codiaeum variegatum var "gold dust*")
39. Broadleaf Gold dust (*codiaeum variegatum var "gold dust*")
40. Garden Croton (*Codieum variegatum*)
41. Cordyline (*Cordyline fruiticosa*)
42. Dieffenbachia (*Dieffenbachia bowmannii*)
43. Dieffenbachia (*Dieffenbachia seguine*)
44. Dracaena golden milky plant (*Dracaena green*)
45. Song of India (*Dracaena reflexa*)
46. Sky flower (*Duranta erecta*)
47. Butterfly Palm (*Dypsis lutescens*)
48. Poinsettia (*Euphorbia pulcherrima*)
49. Pink Hibiscus (*Hibiscus rosa-sinensis (Pink)*)
50. Red Hibiscus (*Hibiscus rosa-sinensis (Red)*)
51. Yellow Hibiscus (*Hibiscus rosa-sinensis (yellow))*
52. Regular Lantana (*Lantana camara (Red*))
53. Yellow Lantana (*Lantana camara (Yellow)*)
54. Fan palm (*Leucuala grandis*)

24. Brahma Kamal (*Saussurea obvallata*)
25. Variegated syngonium (*Syngonium podophyllum "variegated*")
26. Syngonium white (*Syngonium podophyllum "White Butterfly*")
27. Syngonium pink (Syngonium podophyllum 'Neon Robusta)
28. Wanlandii Syngonium (*Syngonium wanlandeii*)
29. Crepe Jasmine (*Tabernaemontana divaricate*)
30. Boatlily (*Tradescantia spathacea*)
31. Aglaonema lipstick (*Aglaonema commutatum "Lipstick")*
55. White Mussaenda (*Mussaenda philippica 'Aurorae'*)
56. Pink flag bush (*Mussaenda philippica 'Queen Sirkit'*)
57. Oleander (*Nerium oleander*)
58. Blue Plumbago (*Plumbago auriculata*)
59. Ceylon iron wood (*Mesua ferrea*)
60. Curry leaf (*Murraya koengii*)
61. Night-flowering jasmine (*Nyctanthes arbo-tristis*)
62. White Vinca (*Vinca rosea (White)*)

List of Climber/ Twiner

1. *Campsis sp.*
2. Bleeding-heart vine (*Clerodendrum thomsoniae*)
3. Cypress vine (*Ipomoea quamoclit*)
4. Juii (*Jasminium auriculatum*)
5. Jai (*Jasminium multiflorum*)
6. Red Passiflora (*Passiflora coccinea*)
7. Philidendron (*Philodendron sp*.)
8. Goldking Money plant (*scindapsus aureum var. "Gold king"*)
9. Green Money plant (*Scindapsus aureum var. "green*")
10. Golden money plant (*Scindapsus aureum var. "neon*")

Annexure 4: Indoor Gardening Details

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

Indoor plants reduce the amount of volatile organic compounds (VOCs). Indoor source of VOCs are chemical based cleaners, paints, personal care products, plastics, wood products, paper products, Air borne faecal -matter particles from pests, Exhaust fumes, carpeting materials, panelling, furniture products made with particle board, plywood and adhesives.

Plant	VOC it removes & plant care	Plant	VOC it removes & plant care
 **Aloe Vera**	Formaldehyde, Trichloroethylene and Benzene Easy to grow with enough sunlight	 **Bamboo Plant**	Formaldehyde, Trichloroethylene and Benzene Thrives under low light conditions as well as easy to maintain
 **English Ivy**	Formaldehyde, Benzene, Air borne fecal matter particles Easy to maintain	 **Janet Craig**	Formaldehyde, Benzene and Trichloroethylene Medium to low light tolerant plant. Requires little water for growth.
 **Golden Pothos or Devils Ivy**	Formaldehyde, Cleanses air Extremely easy to maintain under low to Bright light conditions. Fast growing and grows well under Fluorescent light.	 **Mass Cane**	Formaldehyde, Benzene and Trichloroethylene Medium to low light tolerant plant. Requires little water for growth.

 **Peace Lily**	Formaldehyde, Benzene and Trichloroethylene Relatively easy to maintain. Survives in low light conditions.	 **Red-edged Dracaena**	Formaldehyde and Trichloroethylene Drought resistant and tolerates a variety of light conditions. Hard to damage or kill
 **Parlor Palm**	Purifies indoor air Easy to maintain	 **Boston Fern**	Formaldehyde, Purifies indoor air Thrives under moisture & humidity
 **Ficus Prestige**	Purifies indoor air Semi Shade, Sun Growing	 **Philodendron Brasil Plant**	Formaldehyde Easy to maintain

Annexure 5: Green Audit Checklist

S.T.I.E. campus was audited with respect to Green Audit Checklist developed by STEP. The campus has ample number of trees in the premises. Buildings is specifically designed with broad windows and wide passages to utilise sunlight and for ventilation. Understanding the importance of efficient energy use, procurement of LEDs and star-rated equipment is done by S.T.I.E.
S.T.I.E. 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	✓	Corridors are 2.3 m wide
2	Broad doors and windows allowing daylight	✓	
3	Building architecture which allows sunlight within buildings	✓	Wide windows
4	Presence of Skylight/ Rooflight	X	
5	Enough illumination in classrooms, library	✓	Wide windows provided to get natural sunlight
6	Ultraviolet (UV) filtering windows/ Use of exterior louvers or light coloured fabric or blinds for windows to control glare	✓	When the S.T.I.E. is operational, light coloured curtains or blinds used for 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 3.5 m
2	Wide windows and doors	✓	
3	Wide corridors	✓	Corridors are 2.3 m wide
4	Operable louvers	X	
5	Exhaust fans in kitchen/ toilets	✓	Exhaust fan is provided in the washroom.

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 water bodies/fountain	-	
6	Retrofitting the existing roofs with cool roof technology	-	
7	Use of landscaping as sound barrier	✓	Trees and shrubs planted in the campus.

Water Efficiency & Wastewater Management

Sr. No.	Measures		Remarks (If any)
1	RO based water purifiers for drinking water	✓	
2	Water taps with aerators	✓	
3	Sprinklers (for plant watering system)	X	
4	Use of low flow/flow control water equipment or gadget, dual flush toilet with cistern	X	Dual flush is important for reducing water footprint.
5	Dry mopping/ cleaning methods adopted	✓	
6	Sewage treatment plant for sewage recycle	X	Sewage is sent to municipal sewer line.
7	Rainwater harvesting	✓	RWH is provided in the campus.
8	Regular maintenance for leakage free plumbing system	✓	Leakage repair records to be maintained.
9	Water free urinals (No flush urinals/Zero flush urinals/Water less urinals/air-based flushing system)	-	
10	Water balance diagram and water consumption monitoring at each consumption level	-	
11	Routine monitoring of water quality	X	

12	Awareness signs displayed for promoting water conservation	✓	Water conservation signage are displayed continuously on the display TV installed in the corridor 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 all areas (82-152 lux sunlight). Lights are switched off when not required.
2	On site energy generation; use of renewable energy (Solar, biogas)	P	S.T.I.E. is planning to install rooftop solar PV system.
3	Photocell occupancy sensor for automatic light control	X	
4	Regular maintenance of electrical system	✓	
5	Use of energy efficient equipment like VFDs, maximum star rated equipment.	✓	LEDs and star-rated equipment are procured by S.T.I.E. Existing ACs are not star rated.
6	Use of energy saving bulbs (Compact florescent light/LED lights)	✓	10% lights are LEDs.
7	Awareness signage on electricity conservation	✓	Energy conservation signage are displayed continuously on the display TV installed in the corridor to create awareness among staff and students.

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, wet waste, E-waste and paper waste segregation is practised.
2	Setting up recycling / composting/ biogas generation facility	P	S.T.I.E. is planning to install two composting units in the campus.
3	Minimise use of paper through digitalization	✓	
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 authorised vendor.

6	Single use plastic free campus	✓	S.T.I.E. 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 waste is handed over to local vendor.
9	Segregation of dry and wet waste	✓	Blue and green coloured bins are installed for segregation.
10	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)	✓	
3	Water and waste audit (include water quality, solid waste generation, solid waste disposal process)	-	

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	✓	Building has two exits.
2	Energy efficient elevator	-	
3	Preferred car park spaces for specially abled	✓	
4	Ramp/ stairs with handrails on at least one side	✓	Ramp is provided in the building. Handrails are installed on one side on all staircases.
5	Restrooms (toilets) in common areas/ restroom for specially abled	✓	
6	Braille assistance for specially abled	✓	Braille assistance facility is shared with St. Teresa's Convent Special School.
7	Availability of wheel chair	✓	
8	Personalized services by staff for specially abled	✓	

9	Fire exits, assembly points, first aids, firefighting systems	✓	First aid kit is provided. Fire extinguishers and sand buckets are provided. Fire exit signage should be installed.
10	Regular maintenance of building	✓	

Green Program

Sr. No.	Green program		Remarks (If any)
1	Upcycling of waste. Recycling beyond books i.e. paper, aluminium, plastic, E-waste	✓	Recycled materials are used for decoration during festivals.
2	Creation of "Green Team" in the institution/library	-	Although team/ committee is not present, environmental events are arranged regularly and all students participate in them.
3	Awareness programs on environment, energy management & safety (external sessions and academic courses)	✓	Course has one environment related subject. Awareness sessions are arranged for student and also by faculty & students in nearby schools/ colleges.
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)	✓	
6	Mindset for reduction, recycle of waste (Green mindsets)	✓	Students are motivated to recycle waste materials. Awareness programs are being conducted within the campus as well as in nearby schools/ colleges.
7	Digitization	✓	
8	E-archiving	✓	
9	E-resources: E books, Online Journals, membership of consortium	✓	
10	Maintaining green campus / Greening of campus	✓	Campus has ample number of large trees, shrubs and potted plants.

✓ : Provided P : Planned - : Not Applicable X : Not Provided