Environment Audit

Study Period (Two Years) 2022 – 2023 and 2023 – 2024

Sustainability study

AUDIT REPORT

Studied for

Maris Stella College

(Autonomous)

No.16 N.H.Service Road, Near Benz Circle,

Beside Lepl, Vijayawada 520008, India

Studied in the capacity of

Accredited and Certified GBP

Studied by

Website: https://thegreenviosolutions.co.in/

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Background reference image Nic Y C Gua on unsplash

Disclaimer

The Audit Team has prepared this report for the **Maris Stella College (Autonomous)** located at *No.16 N.H.Service Road, Near Benz Circle, Beside Lepl, Vijayawada 520008, India* based on input data submitted by the Institute analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the internal team. The warranty or undertaking, expressed or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

The audit is a thorough study based on the inspection and investigation of data collected over a period of time and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied or regenerated in any form.

The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh who is as an Accredited and Certified Green Building Professional-Architect. Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

The Study is conducted in capacity of Accredited & Certified Green Building Professional with extensive experience.

Ar. Nahida Abdulla

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for Conducting Audits

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Acknowledgement

The Audit Assessment Team extends its appreciation to the **Maris Stella College (Autonomous), Andhra Pradesh** for assigning this important work of Environment Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are extended are due to everyone from the Management.

Our heartfelt thanks extended to Chairpersons of entire process **Dr.Sr.Kulrekha Mudartha,** (Principal) and **Dr.Sr.Leena Quadras,** (Correspondent) for the valuable inputs.

We are also thankful to Institute's Task force who have played a major role in data collection.

- Teaching members – ***Dr.G.Little Flower,*** *Professor;* ***Dr.C.Krishnaveni,*** *Professor;* ***Dr.Sr.P.Japamalai,*** *Professor;* ***Dr.Sr.K.Ramana,*** *Asso.Professor;* ***Sr.Sahaya Arokia Mary,*** *Asst.Professor*
- Non-teaching staff members – ***Mr.Yunus,*** ***Mr.Moses,*** *Electrician and* ***Mrs.Aruna,*** *Sweeper*
- Admin staff members – ***Mrs.K.V.L.Prasuna,*** *Admin*

We appreciate the cooperation of the **entire Teaching, Non-teaching, and Admin staff** for their support while collecting the data.

Sustainable Academe
Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

Evidence documents for Site visit of external audit team

Audit team headed by external expert - Ar. Nahida Abdulla
Accredited & Certified Green Building Professional, ISO IA (IMS)
Audit objective: Green Building up gradation of the premises

Audits covered: ☑ Green audit ☐ Energy audit ☐ Environment audit

Institute: Maris Stella College (A), Vijayawada **Date:** 21.02.2024

Document objective: Inferences of the Site visit

Observations (Positive aspects)	**Suggestions** (Improvement aspects)
Green Audit	
- Waste management by outreach program through compost by agriculture department - Water harvesting, bio-remedition by excellent water management	- Continue with current practice Increase documentation by reflectance practice
Energy Audit	
- Approx. Rs. 6,000/- awarded every year (2021) for consumption - Approx. 75% lighting are energy efficient fans	- Continue with the current practice by undertake smart by sensor based facilities
Environment Audit	
- Good green cover by pocket landscapes all over camps - Excellent maintenance by well managed premises	- Continue the green cover expansion all over premises

Signature & round seal
Name: Dr. K. Prakash
Designation: Principal
For the said Institute

Signature & round seal
Name: Mrs. F. A. Shaikh
Designation: Project Coordinator
For The Greenvio Solutions

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Institute: Maris Stella College (A), Vijayawada **Date:** 21.02.2024

Document objective: Proof of the Site visit

Meeting with the core team

Induction Meeting

Seminar on Trash to Treasure

Exit Meeting

Investigation of the systems

Signature & round seal
Name: Dr. Kavitha
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Signature & round seal
Name: Mrs. F.A. Shaikh
Designation: Project Coordinator
For The Greenvio Solutions

1. Introduction

1.1 About the statements of the Institute

1.1.1 Vision

The Institute proposes *"Empower, Enrich, Excel, Transform: To contribute to a just and equitable society through quality education for leadership and social responsibility in an environment of academic excellence and sound values."*

1.1.2 Mission

The Institute adheres and focuses *"To empower young women through a transformative education to form intellectually competent, morally upright, socially committed and spiritually inspired women imbued with the values of humanism in the service of society."*

1.2 Assessment of the Institute

1.2.1 Affiliations

The Institute is affiliated to **Krishna University,** a state university at Andhra Pradesh, India.

1.2.2 Certification

The College has received the following Certifications

- **AISHE** – The All India Survey of Higher Education code is C-25318
- **ISO** – Received the ISO 9001,14001 and 50001 Certifications

1.2.3 Recognitions

The College has been recognized under section *2(f) and 12(B) of the UGC Act, 1956* by University Grants Commission, New Delhi.

2. Overview

2.1 Summarised Populace analysis for 2023-2024

2.1.1 Students data

The data (shared by the Institute) shows there were **1,703 students.**

2.1.2 Staff data

S. No.	Type	Male	Female	Total
1	Admin staff	05	14	**19**
2	Teaching staff	12	59	**71**
3	Non-Teaching staff	17	18	**35**
Total Staff Members		**34**	**91**	**125**

Table 1: Staff data of the Institution for 2023-2024

The staff data shows the Institute premises **125 Staff Members.**

2.2 Summarised Populace analysis for 2022-2023

2.2.1 Students data

The data (shared by the Institute) shows there were **1,857 students**

2.2.2 Staff data

S. No.	Type	Male	Female	Total
1	Admin staff	05	15	**20**
2	Teaching staff	12	58	**70**
3	Non-Teaching staff	13	17	**30**
Total Staff Members		**30**	**90**	**120**

Table 2: Staff data of the Institution for 2022-2023

The staff data shows the Institute premises had **120 Staff Members.**

2.3 Total site and building spread area

The **total site area is 20** and the **total Built-up area of the Institute is 3,10,065 sq. ft.**

2.4 Establishment

The Institute was established in **1962**.

2.5 Operation and Maintenance of the premises

The interview session was held with the staff regarding the operation and working hours. The Institution is open for 290 working days with the timings being 09:00 hours to 17:00 hours.

3. Research

3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution sustainable and healthy premises for its inhabitants.

3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification as follows:

- Investigation
- Technical discussion with team
- Observations
- Inferences

3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

3.4 Activities undertaken for the Green Building Study Audit

- Discussion with the Institute
- Allotment and Initiation by the Institute
- Site visit at the Institute
- Submission of the files

Evidence documents for Site visit of external audit team

Audit team headed by external expert - Ar. Nahida Abdulla
Accredited & Certified Green Building Professional, ISO IA (IMS)
Audit objective: Green Building up gradation of the premises

Audits covered: ☑ Green audit ☑ Energy audit ☑ Environment audit

Institute: MARIS STELLA COLLEGE (AUTONOMOUS) **Date:** 21/02/2024

Document objective: Induction Meeting attendance sheet

S. No.	Name	Committee	Designation	Signature
1.	Mrs. F. A. Shaikh	External	Project Coordinator	
2.	Ar. Nahida Abdulla	External	Project Head	
3	Dr. Sr. Leone Quadros		Correspondent.	
4	Dr. Sr. Kulvelde Mudavath		Principal	
5	Dr. C. Vaishnavi		IQAC coordinator	
6	Ms. G. Usha Kumari		Vice - Principal	
7	Dr. G. Little Flower		Dean, Student Affairs	
8	Dr. V. N. Maya devi		" "	
9	Dr. S. Vanitha		Dean, Academic Affairs	
10	Dr. Sr. P. Jayanada		" "	
11	Sr. A. Saheya Mary		Supervisor, Head, Dept of SW	
12	Dr. G. Bendu P. Swamy		Head, Dept of Visual	
13	Dr. Lakshmana Swamy		Head, Dept of ARD	
14	Ms KVL Archana		Admin Incharge	
15	Sr. Veronica D'Souza		Bursar	

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For the said Institute

Signature & round seal
Name: Mrs. F. A. Shaikh
Designation: Project Coordinator
For The Greenvio Solutions

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Institute: MARIS STELLA COLLEGE (AUTONOMOUS) **Date:** 21/02/2024

Document objective: Exit Meeting attendance sheet

S. No.	Name	Committee	Designation	Signature
1.	Mrs. F. A. Shaikh	External	Project Coordinator	
2.	Ar. Nahida Abdulla	External	Project Head	
3.	Dr. Sr. Leena Quadras		Correspondent	
4	Dr. Sr. Kulrekha Kudaltha		Principal	
5	Dr. C. Krishnaveni		IQAC Coordinator	
6	Ms. G. Usha Kumari		via Principal	
7	Dr. S. Lilly Flower		Dean, Student Affairs	
8	Dr. V. N. Hemadevi		" "	
9	Dr. S. Vanitha		Dean, Academic Affairs	
10	Dr. Sr. P. Jayanthi		" "	
11	Sr. A. Saroja Mary		Superior, Head, Dept. of SW	
12	Dr. G. Benita P. Inparaj		Head, Dept. of History	
13.	Dr. Lakshmana Swamy		Head, Dept. of ARD	
14	Ms KVL Prasuna		Admn Incharge	
15	Sr. Vanaja D'Souza		Bursar	

Signature & round seal
Name: Dr. Kulrekha
Designation: Principal
For the said Institute

Signature & round seal
Name: Mrs. F. A. Shaikh
Designation: Project Coordinator
For The Greenvio Solutions

4. Evidence

Plate 1: Discussion with the team

Plate 2: Investigation of the system

Plate 3: Seminar on subject related to Sustainability for the stakeholders

Note: the text mentioned in ***maroon colored italics bold font*** represents a suggestion.

5. Documentation

5.1 Open Spaces

The first hand observations about the space documented below:

- The campus has multiple breakout zones with pocket landscapes all over the site
- There are huge open spaces used as 'Recreational zones' as well and equal cover of small green pockets all over, there have an equal balance of green cover
- The outdoor areas as used equipped with seating and shaded throughout
- The unique part is given the extent of site the maintenance and development is done consistently and well
- ***The study suggests to continue the current maintenance and divide the site into multiple zones such as:***
  - *Breakout zones*
  - *Biodiversity zone*
  - *Recreational zone*
  - *No mobile zone*

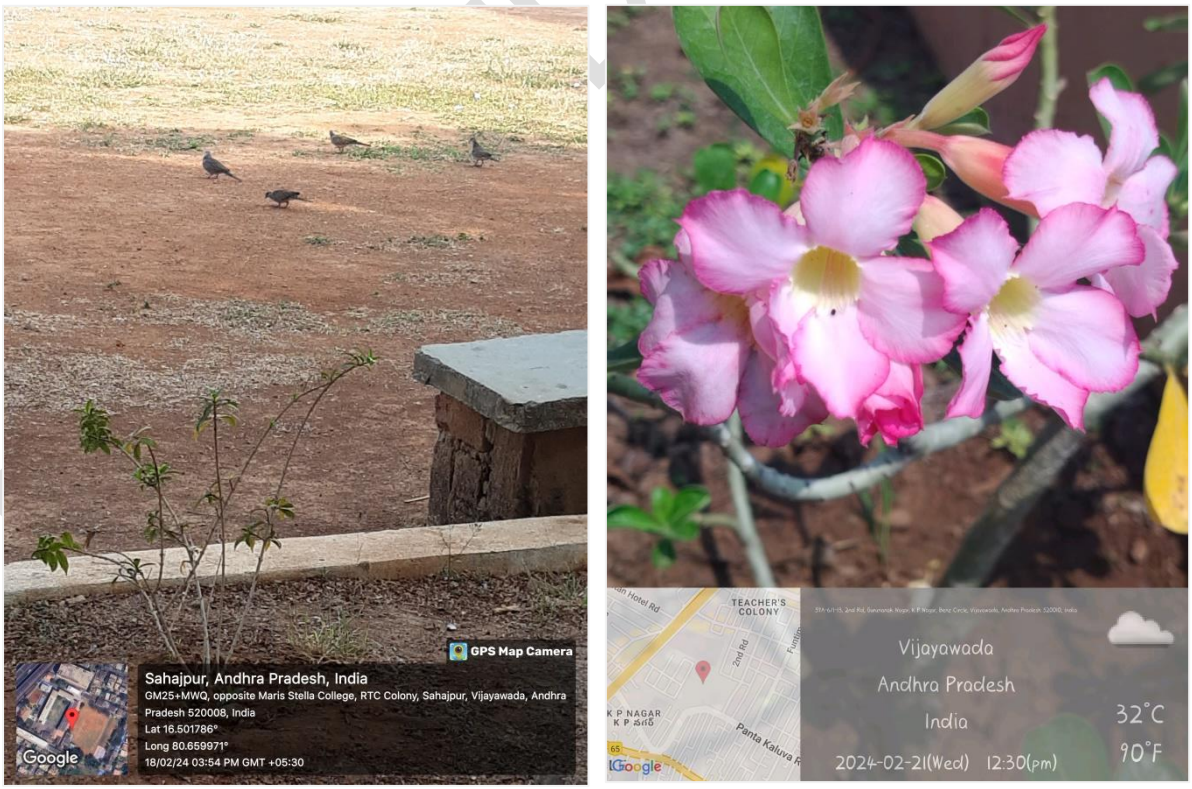

Plate 4: Varieties of flora and fauna in the campus

Plate 5: Shaded green cover and breakout zone (with seating area) in the campus

The study suggests the current practices are good and do not require up gradation.

Plate 6: Organic farm garden in the campus

The study suggests the current practice is good, however a board displaying organic farm details would be appreciating.

Plate 7: Naming (Scientific and local) and coding (with paint) the plants have been undertaken

The internal team informed that the QR coding of the plantations is under process; the study states the work undertaken is good and can be continued.

Plate 8: Shaded seating area and restriction on vehicles beyond a certain point in the campus

The study suggests the current practices are good and do not require up gradation.

Plate 9: Open ground with well-maintained green cover in the campus

The study suggests the current practices are good and do not require up gradation.

5.2 Flora audit

A flora survey to identify the total numbers of plants and trees by internal team as documented below displays the verities of the plantations.

S. No.	Plant name	Type	Nos.	Planted by
1	*Polyalthia longifolia*	Tree	50	Staff and students
2	*Azadiracta indica*	Tree	10	Staff and students
3	*Cassia fistula*	Tree	2	Staff and students
4	*Peltophorum plecatum*	Tree	20	Staff and students
5	*Senna auriculata*	Tree	12	Staff and students
6	*Albezzia lebek*	Tree	2	Staff and students
7	*Eukalyptus*	Tree	2	Staff and students
8	*Palms*	Tree	10	Staff and students
9	*Syzygium cumini*	Tree	20	Staff and students
10	*Musa paradisica*	Tree	100	Staff and students
11	*Moringa oleraceae*	Tree	20	Staff and students
12	*Murraya koenigii*	Tree	20	Staff and students
13	*Ficus religiosa*	Tree	10	Staff and students
14	*Annona reticulate (ramaphalam)*	Tree	2	Staff and students
15	*Psidium guajava*	Tree	10	Staff and students
16	*Punica granatum*	Tree	10	Staff and students
17	*Terminalia arjuna*	Tree	2	Staff and students
18	*Emblica phyllanthus*	Tree	8	Staff and students
19	*Mangifera indica*	Tree	30	Staff and students
20	*Nerium oleander*	Tree	20	Staff and students
21	*Courouptia guinensis*	Tree	1	Staff and students
22	*Butea monosperma*	Tree	2	Staff and students
23	*Manilkara zapota*	Tree	20	Staff and students
24	*Annona squmosa*	Tree	4	Staff and students
25	*Annona reticulata*	Tree	1	Staff and students
26	*Avocado/ Persea americana*	Tree	10	Staff and students
27	*Sapota/ Manilkara Zapota*	Tree	10	Staff and students

28	*Lychee/ Litchi chinensis*	Tree	10	Staff and students
29	*Mango/ Mangifera indica*	Tree	10	Staff and students
30	*Mosambi/ Citrus limefera*	Tree	10	Staff and students
31	*Lemon/Citrus limon*	Tree	25	Staff and students
32	*Dragon fruit/ Selenicereus undataus*	Tree	10	Staff and students
33	*Tamarind/ Tamarindus indica*	Tree	10	Staff and students
34	*Pomegranate/ punica granatum*	Tree	10	Staff and students
35	*Guava/ Psidium guajava*	Tree	10	Staff and students
36	*Betel nut/ Areca nut*	Shrub	70	Staff
37	*Ixora/ Ixora coccinea*	Shrub	500	Students
38	*Chlorophytum cosmosam*	Shrub	1000	Students
39	*Copper leaf plants*	Shrub	300	Students
40	*Allamanda cathartica*	Shrub	600	Students
41	*Mandara/ Hibiscus*	Shrub	100	Students
42	*Indigofera tinctoria*	Shrub	50	Students
43	*Tabebuia rosea*	Tree	8	Staff
44	*Karivepaku/ Murraya koenigii*	Shrub	10	Staff and students
45	*Silver ciprus*	Shrub	4	Staff and students
46	*Kagitham pulu/ Bougainvillea glabra*	Shrub	30	Staff and students
47	*Nerium/ Nerium odorum*	Shrub	50	Staff and students
48	*Rose/ Rosa indica*	Shrub	10	Staff and students
49	*Jade plants*	Shrub	10	Staff and students
50	*Pogada/ Mimusops elengi*	Tree	20	Staff and students
51	*Hedge plants/ Loropetalum*	Herb	200	Staff and students
52	*Drum stick/ Moringa oleracea*	Tree	30	Students
53	*Banana/ Muca paradisica*	Tree	200	Students
54	*Papaya/ Carica papaya*	Tree	50	Students
55	*Kondapindi aaku/ Areva lanata*	Herb	100	Grown naturally
56	*Btingaraj/ Eclipta alba*	Herb	500	Grown naturally
57	*Uttareni*	Herb	100	Grown naturally
58	*Tridox procumbence*	Herb	300	Grown naturally
59	*Water lilies*	Herb	150	Grown naturally

60	*Datura*	Herb	20	Grown naturally
61	*Tulasi*	Herb	50	Grown naturally
62	*Poraka*	Herb	20	Grown naturally
63	*Garika*	Herb	1000	Grown naturally
64	*Tomato*	Herb	10	Grown naturally
65	*Ponnaganti aaku*	Herb	50	Grown naturally
66	*Kuppintaku/ Achalypha indica*	Herb	500	Grown naturally
67	*Insulin plant / Costus igneus*	Herb	50	Staff
68	*Kalabanda/ Aloe vera*	Herb	50	Staff
69	*Betel leaf*	Herb	5	Staff
70	*Bonsai/ Adenium*	Shrub	50	Staff and students
71	*Touch me not/ Mimosa pudica*	Herb	20	Grown naturally
72	*Tippa teega/ Tinospora Cordifolia*	Herb	100	Grown naturally
73	*Grass/ cynodont*	Herb	500	Grown naturally
74	*White clover*	Herb	200	Grown naturally
75	*Quick weed*	Herb	100	Grown naturally
76	*Wild violet*	Herb	100	Grown naturally
77	*Quack grass*	Herb	100	Grown naturally
78	*Lemon grass*	Herb	10	Grown naturally
79	*Spurge*	Herb	50	Grown naturally

Table 3: Details of the Flora in the premises

At present there are **more than 7,500 numbers of plantations** in the premises confined to the campus, given the size of the site the plantations are available in plenty nos. to suffice the oxygen needs and green cover of the educational institute.

The study suggests there is scope to document the plantations further through coding, numbering and book.

5.3 Fauna audit

Iit was observed during site visit that many parrots were known to have their nest, internal team also shared that there are owls and many varieties of fauna all over the premises.

The study suggests that there is scope to document the fauna in a publication format for stakeholder sensitization and awareness.

5.5 Carbon Footprint Audit

5.5.1 Eco-friendly Commuting Practices

- There are day scholars and hostilities as students stakeholders
- The hostilities reside within premises, and thus do not use any vehicle to commute
- The day scholars and staff members however reside within the city and commute back and forth to the premises on a daily basis

The study suggests the current practices are fine and should be continued, a study could be undertaken on the exact nos. of stakeholders that commute walking/ vehicle and eco-friendly/ carbon emitting vehicles for research, documentation.

5.5.2 Heat Island Reduction

The following features add to low heat island effects of the campus:

- Huge green cover spread over more than 2/3rd of the site area
- Multiple pocket landscapes
- Light colored facades of the buildings
- Shaded areas (Due to the built space and green cover)

Plate 10: Green areas of the campus

The study suggests the current practices are good, the terrace areas be covered with 'COOLTOP' paint two coats and maintained every two years.

5.5.3 Outdoor Light Pollution Study

The Institute compound lights are not upward looking thus, these do not cause light pollution.

5.6 Fire Safety

Fire and life safety are an important consideration of the National Building Code 2016.

This aspect is touched upon as part of this study in the capacity of an Architect registered with the Council of Architecture. As part of the research, fire safety audit was considered from the 'Building systems' perspective. All available provisions documented below:

- **Fire hose reel**
- **Fire extinguisher**
- **Sand buckets**
- **Fire hydrant cabinet**

Plate 11: Fire extinguisher inside the campus and the server room

The study suggests the current practices up gradation in applicable spaces

- ***Every space that has a gas cylinder/ air conditioner/ combustible appliance/ more than ten electrical or electronic appliance and Server rooms there should be EITHER sand bucket/ fire ball/ fire extinguisher***
- ***Fire and life safety 'SIGNAGES' all over the premises***
- ***The study suggests that the floor should have a 'FIRE ESCAPE ROUTE LAYOUT' that highlights the position of stakeholders and nearest passage as well as staircase.***
- ***The study suggests that there should be an increase in nos. of 'FIRE BALLS'***

in the premises for life safety purposes.

- ***PASS Board near fire extinguishers and RACE Board near entrance***
- ***There should be additional provisions in the LABORATORIES including:***
  - ***Eye washers***
  - ***First aid box***
  - ***Concealing of exposed wiring***
  - ***Display chart about the 'dos and don'ts, a workshop for stakeholders about fire and life safety***
  - ***Rubber flooring as an electrical safety measure***

6. Investigation

The following results are based on the investigation carried out during the site visit.

Figure 1: Energy and environmental parameters investigation study

The comfort levels as per temperature is 26^0C which was good as per site conditions observed as per investigation were good and being surrounded by residential areas the sound levels are under control.

7. Suggestion

7.1 Section-wise suggestions

The following points are related to 'entire Institute' and should be considered as ***second priority*** once the general suggestions are executed. These should be implemented ***within 3.5 to 5.5 years from date of the Report submission.***

7.1.1 Site beautification

Bird house/ Feeders - At appropriate locations there can be provisions for drinking water and some grains for birds as they visit the site much frequently.

7.1.2 Heat island reduction

Cool rooftops - The Terrace rooftops should be painted with Cooltop – reflective materials to reflect the harsh sun rays and reduce the heat absorption in the top most floor and surrounding areas of the building.

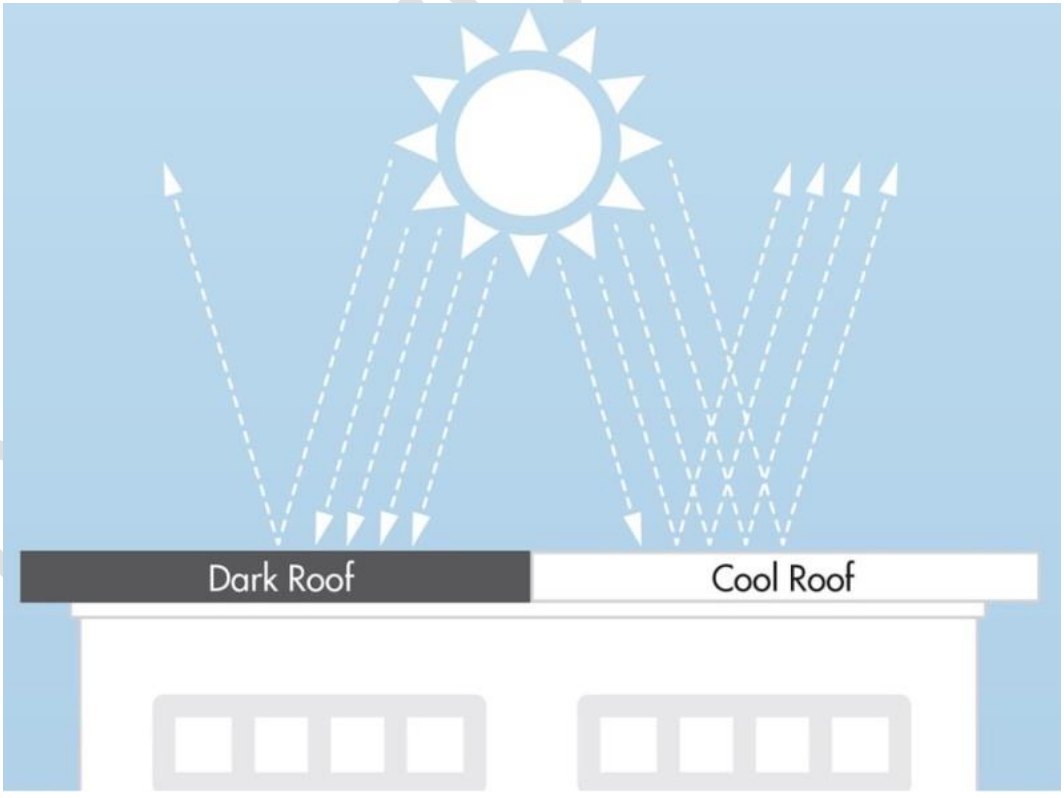

Plate 12: Cool roof comparative analysis (For reference purpose only)

Source: Image by https://www.gaf.com/en-us/blog/six-truths-about-cool-roofs-281474980105387

7.1.3 Life safety

- **Fire station** – A dedicated fire station could be established within the premises as part of the Fire and Life safety practices.

- **Combustible equipment** - Every space which has a gas cylinder or combustible equipment should have a provision for the barricade around the gas cylinders, appropriate safety board's mentioning 'danger sign' and 'Do not touch' with an additional small fire extinguisher close by.

- **Awareness** - Fire layouts in immediate spaces outside the lift, on the staircase landing, signages mentioning 'Do not use lift in case of fire' additionally fire exit signages, boards should be put up at all possible locations.

- *The **fire and life safety signages (Including exit signages)** should be increased and displayed.*

- *There should be a **PASS Board** alongside every fire extinguisher and a **RACE Board** at the location of extreme populace/ footfalls.*

Reference suggestions 1: PASS Board display

7.1.4 Pollution Control

- **Specific area designated for E-vehicles –** There should be designated area dedicated to E-vehicles parking and charging and this zone should be demarcated as 'Eco-Zone'

- **Internal circulation –** (applicable only to large campuses) – There could be an e-vehicle for public transportation that can be used by the stakeholders for internal circulation.

- **Battery charging points for Eco-friendly vehicles -** There can be provision for battery charge points, this would inspire students to change their mode of transportation and adopt sustainable practices.

- **Avoid burning waste -** The waste produced on the premises should not be burned as it is dangerous to the health of students and staff

- **Bicycles as a gift -** As an appreciation gesture maybe the student's toppers/ staff best performers can be awarded a bicycle occasionally.

- **Paperless technologies for offices -** The Institute can go technology-friendly and go paperless in the functioning of premises to a certain extent maybe not fully.

8. Compilation

The study is based on the data collected, analyzed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below. However, no direct references have been used anywhere. These are used as a base to analyze and study the data collected.

National references

- Uniform Plumbing Code – India, 2008
- IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
- IGBC Green Landscape Rating system, March 2013

International references

- BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
- Used only for understanding Universal design - Universal Accessibility Guidelines for Pedestrian, Non-motorized vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National center for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation and www.umassd.edu
- The city of Cheyenne, Streetscape/ Urban Design elements - Wyoming Planning Association, Gillette, Wyoming, United States
- Streetscape elements – Chapter 6 on San Francisco
- American lung association https://www.lung.org/
- Study related to air pollution https://www.airgle.com/
- Exploring the light pollution https://education.nationalgeographic.org/
- Accessibility study https://www.washington.edu/
- Urban heat island effect https://www.epa.gov/heatislands/what-you-can-do-reduce-heat-islands