Profile of Audit Team Members and Independent Reviewers

Mr. Swapnil Thanekar

Certified Energy Auditor, M. Tech (Heat & Power Engineering), Expert Global Reporting Initiative, GHG Expert

Ms. Bhakti Thanekar

Certified Energy Auditor, B. Tech (Chemical Engineering), Principal Consultant – Energy and Safety

Mr. Ashish Soni

Diploma Graduate with 16 years' experience in electrical systems

Mr. Sushant Deshkar

Electrical Engineer, Assessment Team Member

Mr. Rushikesh Kohre

Mechanical Engineer, Assessment Team Member

DISCLAIMER

Green Audit Team has prepared this report for *S.S.S.S. Taywade College, Koradi, Nagpur* based on input data submitted by the representatives of college and after having complemented with the best judgment capacity of the expert team.

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

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

Prepared by:
(Swapnil Thanekar)
Bureau of Energy
Efficiency Registration
Number – EA-4416

Onsite Assessment Team
Leader,
Ashish V. Soni

Technical Review by:
(Bhakti Thanekar)
Bureau of Energy Efficiency
Registration
Number – EA-14451

SUSTAINABILITY SOLUTIONS

Certificate

On Successful Completion of Green Audit, Environment Audit & Energy Audit

awarded to

S.S.S.S. Taywade College, Koradi, Nagpur

for Period April 2020 - March 2021

Assessment topics are stated below

1. Organization Level Efforts
2. Creation of Awareness
3. Lighting
4. Cooling and Ventilation
5. Operation of Electronic Equipment's
6. Water Management
7. Water Quality
8. Renewable Energy
9. Transportation
10. Purchasing Practices
11. Energy and Carbon Footprint
12. Waste Management
13. Plantation Details

Sustainability Solutions, Nagpur

Mr. Swapnil Thanekar
M.Tech (Heat & Power Engineering)
Certified Energy Auditor
Expert Global Reporting Initiative

Date
2022-01-18

INTEGRATED GREEN, ENVIONMENT AND ENERGY AUDIT

FOR THE ASSESSMENT YEAR PERIOD APRIL 2020 – MARCH 2021

IN LINE WITH NAAC REQUIREMENTS

S.S.S.S. Taywade College, Koradi, Nagpur

18/01/2022
Version 01

By:
Energy and Green Audit Team,
Sustainability Solutions

MESSAGE FROM CHAIRMAN

The term "Sustainable development" is widely used these days by the policymakers, industries, environmentalists, social organizations, and governments as well as various reasonable stakeholders. Sustainability is not only discussed for the sake of discussion, however, but it is also integrated into practice at various levels at industries, organizations, Institutions, etc. to optimize their resource utilization and establish a balance between the functions and associated impacts (positive and negative) on the triple bottom line of sustainability i.e. Economic, Environment, and Social.

Educational institutions are blessed as they are living examples of sustainability. We completely understand that sustainability is becoming an increasingly important issue for the nation, the role of higher education institutions about environmental sustainability is more prevalent as we are nurturing and shaping young minds. We are setting the living examples for our students, society, peers, and other reasonable stakeholders by adopting environmentally friendly steps. We endeavor to press our present generation "into action mode" and subsequently "hand over the future generation cleaner and safer environment which is socially stable and economically prosperous".

To achieve this objective there are many trails; the main challenge is "one should be able to identify the best path". I am pretty gland my Institutions have engaged with the experts in the field of Sustainability i.e., Sustainability Solutions lead by Mr. Thanekar and Ms. Bhakti and "together" we identified material topics which are addressed "Step by Step", year on year and objective oriented.

During our journey, we learned that education is one of the key solutions to this situation. We have included various educational drives and programs to sensitize the topic. We are promoting energy savings, reduction in water consumption, augmenting water harvesting, inducting renewable solar energy, introduction of sensor-based lighting controls for night lights, energy-efficient lighting (CFL), maximum use of daylight, educating the society, mass plantation of trees outside the college campus, blood donation programs, waste reduction, responsible waste disposal, and many more applicable programs material to our type of institutions.

I am thankful to the entire Green Audit Team (Mr. Swapnil Thanekar, Ms. Bhakti Thanekar, Mr. Ashish Soni, and Mr. Sushant Deshkar) for taking sincere efforts and hard work for this green audit. I hope the report will be helpful to society, staff, students, and all concerned in the Taywade College Campus and will motivate for sustainable and green practices throughout.

Dr. Babanraoji Taywade

Chairman

Scan to view Video Message

https://www.youtube.com/watch?v=l2acJrX70fU

MESSAGE FROM PRINCIPAL

The major objective of performing green audits is controlling the pollution. It also helps in improving the production safety and to making sure the prevention and reduction of the chemical waste. It also provides performance reviews of Institution working facilities and its possible impact on the surroundings.

This institute is constantly working in this direction with support from our management. Awareness about the present rapid change in the nature of globalized development and environment compels us to focus on maintaining green zone in area. Our institute is deeply concerned and unconditionally believes that there is an urgent need to address the fundamental environmental problem.

Green campus audit help to promote financial saving through reduction in use of resources. It provides staff and students to better understand of green impact on campus. The college has established green campus committee to initiate the measures in campus to maintain necessary environment sustainability.

We uphold the principle of inclusiveness. Our Green Campus Committee is constituted by encircling each stakeholder. We understand our responsibility as a responsible institutional and understand that we are role model for our students and society. To remain in sync with the internally traceable norms, we refer to the United Nation's defined Sustainable Development Goals. These are popularly coined as SDGs also.

We adhere to the SDG 7 and 13 as we have installed the renewable solar electricity system which is affordable as well as eco-friendly.

We also understand that we must adhere to the norms of consumption. We have therefore optimized the resource consumption and taken steps. We have therefore introduced

- Biometric system to save the paper,
- We are giving saplings to our guests in place of bouquet
- We have banned use of single use of plastic in our campus
- We serve the RO water in place of single use plastic bottle
- We have planted lot of trees inside and our side the campus
- Our NSS team has taken lot of steps on social aspects to contribute the community.

Green audit has helped us all not only in understanding our environment in a scientific way but also in spreading the awareness to the remote villages through our students. So, taking the green audit as a capacity building exercise for our institution, I express my deep thanks to the experts of the audit team Mr. Swapnil Thanekar, Ms. Bhakti Thanekar, Mr. Ashish Soni, Mr. Rushikesh Kohre and Mr. Sushant Deshkar and hope that the directions provided by them will go a long way in the development of green practices in our campus.

Green audit is helping us all not only in understanding our environment in a scientific way but also in spreading the awareness to the remote villages through our students.

The Sustainable impact of our institution are mapped considering the United Nations SDG's as follows:

	✓ Our Institutions is actively engaged in ✓ Awareness Camps ✓ Blood Donation Programs ✓ Health Check-up Camps
	✓ Refer our SSR Report
	We are in advanced stage of planning the implementation of solar energy in our campus.
	✓ MoU with Industries & Government Organizations.
	✓ We are giving saplings to our guests in place of bouquet ✓ We have banned use of single use of plastic in our campus ✓ We serve the RO water in place of single use plastic bottle ✓ We have planted lot of trees inside and our side the campus ✓ Organic composting ✓ Energy efficiency projects (Sensor Based Lighting) (Refer Annexure V)
	We are promoting energy savings, reduction in water consumption, augmenting water harvesting, planning to induct renewable solar energy, introduction of sensor-based lighting controls for night lights, energy-efficient lighting (CFL), and maximum use of daylight, and educating the society, plantation of trees outside the college campus, waste reduction, responsible waste disposal, and many more applicable programs.
	We have implemented the projects of ✓ Plantation of trees ✓ Rain water harvesting

Taking the green audit as a capacity building exercise for our institution, I express my deep thanks to the experts of the audit team from Sustainability Solutions (Mr. Swapnil Thanekar, Mrs. Bhakti Thanekar and Mr. Ashish Soni) and hope that the directions provided by them will go a long way in the development of green practices in our campus.

Scan to view Video Message

Dr. Sharyou B. Taywade
Principal

https://www.youtube.com/watch?v=XtVXgHsW5sQ

Acknowledgement

Green Audit Assessment Team thanks the management of S.S.S.S. Taywade College, Koradi, Nagpur for assigning this important work of Green Audit. We appreciate the cooperation of our Team for completion of study. Our special thanks to:

Chairman	Dr. Babanraoji Taywade
Principal	Dr. Sharyou B. Taywade
IQAC Coordinator	Dr. Girish S. Katkar
Head Dept. Of Botany	Dr. Suvarna P. Patil,
Head Dept. Of Microbiology	Dr. Vijay Charde
Faculty, Dept. Of Chemistry	Dr. Prerna Thorat
Faculty, Dept. Of Zoology	Dr. Chanchal Deshmukh
Faculty, Dept. Of Physics	Dr. Kamlesh Dabre
Faculty, Dept. Of Comp. Sc.	Dr. Ajay Ramteke
Supervisor (Administrative)	Shri Ramesh Gaikwad
Head Clerk, Canteen Manager	Shri Ajay Wagde

All the members of College Development Committee, S.S.S.S. Taywade College, Koradi, Nagpur.

For giving us necessary inputs to carry out this very vital exercise of Green Audit. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

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Prepared by:

(Swapnil Thanekar)

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Onsite Assessment Team

Leader,

Ashish V. Soni

Technical Review by:

(Bhakti Thanekar)

Bureau of Energy Efficiency

Registration

Number – EA-14451

Scope of Work

Topics to be covered as part of the assessment are

✓ **Solar Passive Architecture**

- How the buildings are constructed to utilize the solar energy efficiently. This includes use of day light as lighting source and avoidance of GHG intensive technology example AC as source of cooling due to solar heat gains.

✓ **Implementation of measures to reduce wastage of energy**

- This includes effective and objective evidences to create awareness towards wastage of electric energy. Hoardings, placards, messages, posters etc. planted at key locations in college, hostels and cafeterias. PCRA (Petroleum Conservation Research Association, Govt. of India) and BEE (Bureau of Energy Efficiency) posters are exhibited.
- It can also be extended to include papers presented by the students on avoidance of electricity at college or day to day life.
- Appointment of joint committees of teachers and students to save electricity
- Controlling of Power Factor by installation of APFC and getting rebate (up to 5% or MSEDCL norms) from MSEDCL for maintaining unity Power factor

✓ **Energy Efficient Procurement**

- This includes evaluation of energy efficient procurement practices. This does not exactly mean that you need to buy the most efficient, but you need to buy the most efficient which is financially viable. Example AC with efficiency star ratings, Transformer etc.
- Replacement of lighting sources to CFL or LED
- Replacement of Copper Ballast with Electronic Ballast
- Centralized controls of lighting, auditorium etc. to avoid any misuse of electricity
- Procurement of LED monitors to phase-out CRT Monitors
- Shift to paperless regime wherever not required, example attendance muster replaced by biometrics, DG logbook replaced by computerized logbook, daily reports converted from paper to paperless, HoD meetings converted to paperless formats, and all such examples.
- Installation of Solar panels, Power Purchase Agreements with Solar Power Plant owners to buy environmentally friendly energy Source etc.
- Documentary evidences as feasible to calculate the above impacts and finally into the value of avoidance of tCO_2 emitted to atmosphere.

✓ **Rain Water Harvesting**

- This includes Calculation of Catchment Area (Terrace and ground) and evaluating rough amount of water that is recharged into the water recharge pits if applicable.

✓ **Hazardous Waste Management and e-Waste Management**

- There are various wastes that are generated within the organization. The report will give the list of the procedures for waste handling.

✓ **Duration of the Green Audit**

The Green audit field observations data collection was carried from 16th January 2022 to 18th January 2022 for the period of April 2020 to March 2021. The submitted data was monitored by the college throughout the year and assessed by Assessment Team during the visit.

Scorecard

NAAC Criteria Key Indicator - 7.1 Institutional Values and Social Responsibilities	
Environmental Consciousness and Sustainability	**Audit Team Assessment**
7.1.2 The Institution has facilities for alternate sources of energy and energy conservation measures: 1. Solar energy ✓ 2. Biogas plant 3. Wheeling to the Grid ✓ 4. Sensor-based energy conservation ✓ 5. Use of LED bulbs/ power efficient equipment ✓ Options: A. 4 or All of the above ✓ B. Any 3 of the above C. Any 2 of the above D. Any 1 of the above E. None of the above	Annexure –V: Lighting Survey 2020 - 21 Annexure –XI: Solar Passive Structure
7.1.3 Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 500 words): 1. Solid waste management ✓ 2. Liquid waste management ✓ 3. Biomedical waste management 4. E-waste management ✓ 5. Waste recycling system 6. Hazardous chemicals and radioactive waste management	Refer chapter 12 and Annexure –XIII: Waste Management
7.1.4 Water conservation facilities available in the Institution: 1. Rain water harvesting ✓ 2. Bore well / Open well recharge ✓ 3. Construction of tanks and bunds ✓	Refer chapter 06 and Annexure –XII: Water Management

4. Waste water recycling	NA	
5. Maintenance of water bodies and distribution system in the campus	✓	Refer Annexure –XIII: Waste Management
Green Campus Initiatives include: **7.1.5.1. The institutional initiatives for greening the campus are as follows:**		
1. Restricted entry of automobiles	✓	
2. Use of Bicycles/ Battery powered vehicles		Annexure –XIII: Waste Management SoP: Green Initiatives by College
3. Pedestrian Friendly pathways	✓	
4. Ban on use of Plastic	✓	Refer Annexure –XIII: Waste Management
5. Landscaping with trees and plants	✓	
Options: A. Any 4 or All of the above ✓ B. Any 3 of the above C. Any 2 of the above D. Any 1 of the above E. None of the above		
7.1.6 Quality audits on environment and energy are regularly undertaken by the institution: **7.1.6.1. The institutional environment and energy initiatives are confirmed through the following:**		Covered as part of this report. Please refer the contents of this report
1. Green audit	✓	Covered as part of this report under Chapter -11 and Annexure –XVII
2. Energy audit	✓	
3. Environment audit	✓	Covered as part of this report under Annexure –XVI
4. Clean and green campus recognitions/awards		
5. Beyond the campus environmental promotional activities	✓	Refer Chapter 01 and Annexure No. XIV - Awareness / Posters
Options: A. Any 4 or all of the above ✓ B. Any 3 of the above C. Any 2 of the above D. Any 1 of the above E. None of the above		

Clean Campus[1]

Sr. No.	Aspect	Reference
1.	Cleanliness in and around the campus and waste minimization	➢ Chapter No. 1 & Annexure No. IV ➢ Chapter No. 1 & Annexure No. XIV
2.	Water conservation and management including ➢ Waste water management and reuse ➢ Rain water harvesting, etc.	➢ Chapter No. 12 & Annexure No. XIII ➢ Chapter No. 6 & Annexure No. XII
3.	Environment-friendly activities adopted and practiced by the campus	➢ Chapter No. 1 & Annexure No. IV ➢ Chapter No. 1 & Annexure No. XIV
4.	Greenery within the campus to provide pollution free air and carbon-sink	➢ Chapter No. 13 & Annexure No. XIV

Smart Campus[2]

Sr. No.	Aspect	Reference
1.	Impact of deployment of digital technology in order for the students, faculty and management in the campus to reduce consumption of natural resources (such as paper, gas, energy etc).	➢ Digital attendance for teachers ➢ Digital Meetings (online meetings) ➢ Online conferences and classes ➢ Double side printers ➢ Efficient electronic equipment's like LED screens, LED projectors. For details, please refer Annexure 08 ➢ Procurement of energy efficient equipment ➢ Techno commercial stages of the Solar PV
2.	Alignment of the latest digital trends like IoT, Big Data and Cloud Networking to achieve various aspects of sustainability in the campus, specifically to contribute to United Nations SDGs	Our college uses IoT for the automated processing of Online (Theory/ Practical) examination at college level for all the students of college through Google forms. This helps us to share data/links to all students within fraction of second and result will be prepared in less time duration which saves our time, man power and paper work. We are also using G Suite for sharing data / files using Google drive. In this Pandemic situation, we are conducting online classes through G Suite, sharing Notes on Google class and also through Google drive. Through Google drive we can give access to limited students of particular class only. These technologies help us to shares the data in short duration of time to all students and also help in saving papers. ➢ Installation of smart photo sensor to regulate the night lighting
3.	Create an ecosystem to 'smartly' connect and share the information with each other at campus, institute	To share the data among all the Teachers and students, we are using Google Cloud system for sharing information at Campus, Institutes and also at National level. Google Drive is a file storage and synchronization service

[1] http://www.aicte-india.org/csc2019
[2] http://www.aicte-india.org/csc2019

	and national level. Any international level connect will provide a distinct advantage. The smart connects, though the cloud networking, so established should address concerns of environmental challenges including contribution to United Nations Sustainable Development Goals.	developed by Google for sharing of information to all users or to specific users. Google drive helps to share Notes/ Notices/ University important notices by single click to specific group of students/ to all students/ to the teachers. Also, we are conducting our regular online classes through Google meet for all classes of our college; we are sharing notes to the students in the form of PDF or in DOC format which ever possible in their Google class. College had organized 01 FDP (Online workshop on Use of Google tools), 02 online National conference/Seminar (by the Department of Chemistry and Departments of life Sciences) and 02 National webinars by the faculty of arts) during COVID lock down. We had connected peoples (Guest, Speakers and participants) from all over the India in one platform. We had taken online feedback from participants and we also share E-Certificates to all the participants. This platform is helpful not only to connect the peoples but also it is useful in sharing the also saves paper and with less use of man power. We had collected all data in only soft format. Our faculty members had online attended more than 20 National/International webinars during lock down.

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Abbreviations

AHU	**Air Handling Unit**
CFL	Compact Fluorescent Lamp
COP	Coefficient Of Performance
DG	Diesel Generator
ECRM	Energy Consumption Reduction Method
HVAC	Heating, Ventilation, And Air Conditioning
ISO	International Standardization Organization
ITHD	Current Voltage Total Harmonic Distortion
km	Kilometer
kV	Kilo Volt
kW	Kilo Watts
Lab	Laboratory
LED	Light-Emitting Diode
MNRE	Ministry of New and Renewable Energy
MSEDCL	Maharashtra State Electricity Distribution Co. Ltd.
MEDA	Maharashtra Energy Development Agency (MEDA)
TR	Tons of Refrigeration
VTHD	Voltage Total Harmonic Distortion

Reference list of Websites

Sr. No.	Websites
1	IEEE 519 - http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=2227
2	http://mnre.gov.in/solar-energy/ch2.pdf
3	BEE - http://www.beeindia.in/
4	ECBC - http://beeindia.in/content.php?page=schemes/schemes.php?id=3
5	http://www.energymanagertraining.com/new_index.php
6	http://www.usailighting.com/stuff/contentmgr/files/1/92ffeb328de0f4878257999e7d46d6e4/misc/lighting_comparison_chart.pdf
7	https://www.bijlibachao.com/lights/use-energy-efficient-lights.html
8	http://www.imd.gov.in/section/climate/climateimp.pdf
9	http://www.bijlibachao.com/air-conditioners/air-conditioner-selection-understand-tonnage-eer-cop-and-star-rating.html
10	http://www.thehindubusinessline.com/opinion/time-to-focus-on-more-crop-per-drop/article9778971.ece
11	http://cgwb.gov.in/District_Profile/Maharashtra/Washim.pdf
12	http://www.indiawaterportal.org/sites/indiawaterportal.org/files/Roof%20Top%20Rainwater%20Harvesting_Presentation_2006.pdf
13	http://www.imd.gov.in/section/climate/climateimp.pdf
15	http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf
16	http://cdm.unfccc.int/
17	http://database.v-c-s.org/
18	https://taywadecollege.edu.in/
19	https://www.mahadiscom.in/
20	https://www.mahaurja.com/meda/

Introduction of the College

Perpetual exertions to accomplish academic excellence are indispensable for any Institute. Taywade College, Mahadula, Koradi, Dist. Nagpur is one of the idealistic Institutes of Shri Sachhidanand Shikshan Sanstha which continuously strives to provide quality education to rural segment of India and produce capable work force who will contribute in Nation development.

Shri Sachhidanand Shikshan Sanstha is founded by visionary academician Dr. Babanraoji Taywade in 1991 and Taywade College is first sapling sowed in 1993. This small sapling has now grown in to big hierarchy providing education to more than 2300 students in many disciplines. The college is spread over an area of 11 acres with spacious building and ample playground.

Starting with basic programs in Arts, Commerce and Science viz. B.A., B.Com. and B.Sc., college has introduced new professional programs like B.Com. (C.A.), B.B.A., M.C.M. PGDCCA and some Post Graduate level programs like M.A. in Marathi, English, Economics and Sociology, M. Com, M.Sc. in Microbiology, Chemistry and Mathematics. We have privileged to be recognized as the place for Higher learning and research leading to Ph.D. degree. College runs several career-oriented programs (Add-on courses). We also run the Centre for Yashwantrao Chavan Maharashtra Open University for the working students.

The college has highly qualified 37 faculty members and they are actively engaged in research and fetching the grants for research from various funding agencies like UGC. Out of these teaching faculty 33 are Ph.D.'s, whereas 8 have qualified NET/SET. It is our proud that our 9 faculty members are member of Board of Studies for various subjects and the members of various academic bodies of Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur. Three Faculty members received grant for Major Research Projects and 25 have received grants for Minor Research Projects. We would like to specially mention here that Chairman of our society, Dr. Babanraoji Taywade has been honored by Government of Maharashtra by conferring "Best Teacher Award".

In order to set the goal to achieve academic excellence, Management and College have Mission depicting "To provide excellent teaching and learning environment with good infrastructure and to promote extracurricular and sports talent amongst students for their overall development". Management and College staff are committed to provide student centric environment and contribute beyond their basic responsibilities. We are fortunate that students also reciprocate to their efforts.

The foremost challenge before us is to uplift the students with average academics to better performer as they belong to rural areas with apathy towards education. We have started several PG courses to motivate them for higher learning.

Many of our students are from lower economic background and are dependent on some financial aid for their education. College provides student friendly administrative support to facilitate the various Government schemes for SC/ST/OBC/VJNT etc.

Being situated in rural area, many students are academically poor and are slow learners. Slow learners

are identified and our faculty members take additional efforts to raise their moral to perform better. College has some add on courses to provide additional skill and knowledge to make them more competitive.

Our faculty members use modern methods of teaching such as internet, LCD projectors to develop interest of students in learning and motivate them to make more interactive. College library is well enriched with all necessary books of each subject. Library has user's friendly system to make it easily accessible to students and staff.

We are very fortunate to have motivated faculty members towards research. Many faculty members have published their research work in reputed journals and many papers have appeared in journal with good impact factor.

Extracurricular and co-curricular activities are very important for any institute for overall development of students to make them better citizen. College has extension committee and NSS unit which organize various activities and program involving students and society. College plays lead role in organizing NSS camp in collaboration with neighboring institutes.

The NSS unit along with Extension Activity committee and Green Army (Green Campus committee) organizes various activities for environment like Tree Plantation, Cleanliness Drive, Maintenance of Tree Garden etc.

The College has a tradition of excellence in sports with a good number of students participating at National, State and University Level.

The college has separate Cell for career Guidance and Counselling. The admission committee provides academic counseling interpersonal at the time of entry into the college regarding the choice of stream and subject. Women Cell, Anti-ragging cell and Grievance cell take care of their interpersonal and psycho-social problems. The college invites resource persons from various fields for professional as well as psychological counselling. From 2013-2014, college has constituted separate Placement cell. The Cell is sensitized to function all through the year towards placement and training opportunity. It displays Advertisements of vacancies on the notice board. The cell organizes Campus Interview drive with different companies. It also guides the students for various offline campus interviews held at various institutions.

The institution has an Alumni Association constituted in the year 2008. The College holds annual meeting of alumni and takes feedback from them for academic developments and share their experience. They also play an important role in institutional social responsibilities.

The college is conscious about eco-management. Making the campus eco-friendly is the major concern of the college Administration. College has well developed botanical garden with different trees right from ornamental to big trees. We have also undertaken plantation all around and along the walk track to make the area lustrous green. College has open dug well to take care of water requirement. We have huge open area which absorbs water in rainy season and maintain ground water level in our campus.

To maintain the green campus the institution regularly initiates the Green Audit of the Campus.

Innovations in learning and teaching process and effective execution of extra curriculum and activities introduced during the last four years which have created a positive impact on the functioning of the college.

- Use of ICT in teaching learning process.
- Cash prizes, medals, memento are giving by the staff members as incentives to students in sports, cultural and academic activities.
- Publication of ELIXIR: ISSN-2277-3428 National Journal of Multidiscipline
- Participation in NCC (discipline)
- Participation in NSS (Co- operation, mutual understanding)
- Recognition as a place for Higher Learning and Research leading to Ph.D. degree in various Subjects.
- Well-equipped central Research Laboratory for Life Sciences.

We feel proud to place on record that our Institution is one of the best Institutions in the rural part of Nagpur region.

Objective of Green Audit

The Green Audit Team focused on Material3 Issues pertaining to college which have the highest influence on the Green Attributes of the College. To evaluate steps taken by college management towards green campus below material issues are discussed chapter wise:

1. Organization Level Efforts
2. Creation of Awareness
3. Lighting
4. Cooling and Ventilation
5. Operation of Electronic Equipment's
6. Water Management
7. Water Quality
8. Renewable Energy
9. Transportation
10. Purchasing Practices
11. Carbon Footprint
12. Waste Management
13. Plantation Details

Checklist approach is adopted for transparent evaluation of the topics and increase readability for independent reader.

3Definition: as per Global Reporting Initiative : GRI 101: FOUNDATION2016

An organization is faced with a wide range of topics on which it can report. Relevant topics, which potentially merit inclusion in the report, are those that can reasonably be considered important for reflecting the organization's economic, environmental, and social impacts, or influencing the decisions of stakeholders. In this context, 'impact' refers to the effect an organization has on the economy, the environment, and/or society (positive or negative). A topic can be relevant – and so potentially material – based on only one of these dimensions.

1. Organizational Level Efforts

Is the college having campus green team?	Yes, the Green Campus Committee in the name of "Green Army" is already in place. This committee is highly active and meets twice in a year.
If yes, who are the stakeholders?	Yes, it included stakeholders. The stakeholders include ➢ Management ➢ Teaching Faculty ➢ Students ➢ Lab Technician ➢ Canteen manager ➢ Computer Operator The Green Campus Committee is shared with the Audit Team. Refer Annexure III.
Does it meet regularly?	The Team meets once in a semester. This was confirmed during site visit interviews and the review of the minutes of meeting.
Can the Green Campus Team suggest new environmental initiatives to College Management?	Suggestions on improvement of environmental performance are always welcomed by College Management. Installation of solar PV, rain water harvestings, tree plantation at various locations around the college etc. was also discussed as part of brain storming sessions within the meetings. These discussions were converted into live projects by the college management. The annexure to this report captures the live projects of the college.
Has the college established an environmental mission/vision for its campus?	The Management of College is persistent and resolved to make the campus eco-friendlier in due course of time. Various efforts are already initiated towards implementation sustainable initiatives, application of efficient technologies to save energy, plantation etc. There is no separate environmental mission/vision.
Is the college encouraging sustainable behaviour via: o education campaigns? o Posters, placards, messages o incentives? o contests? o awards?	College conducts various activities to create awareness amongst the students and society on environment safety and protection. College has established 'Green Campus Committee' which has conducted various Environmentally Friendly Activities / Trainings: ➢ Birds Nest Installation Drive was carried out on the occasion of Bird Week on 9th November 2020. ➢ Webinar on "Keep Soil Alive and Protect Soil Biodiversity" was organized on 5th December 2020. ➢ Intercollegiate Poster Competition was organized on account of National Science Day on 28th February 2021 in which 90 students participated.

	Activities conducted for Community / Society: ➢ Tree Plantation Drive was organized at Adasa on 07th July 2020. **Note: The college conducts various activities for community / society, but due the COVID-19 pandemic and lockdown college was unable to conduct such activities.** Please refer Annexure IV and XIV for details.
Is the college staff modelling sustainable behaviour for students, peers, and community?	During interviews it was confirmed that **Teaching & Non-Teaching Staff:** There are 55 staff members in the college, out of which: ➢ 90% staff of the college travel on sharing basis (car pulling, two-wheeler pulling). ➢ 10% staff of the college travel by their own vehicles.
Do students model sustainable behaviour for staff, peers, and community?	**Students:** Total 3079 students are enrolled for 2020-21 session. Due to the pandemic only, online classes are conducted. Based on the interviews last year, approximately: ➢ 50% public transport (State Transport) ➢ 30 % by walk, bicycle and ➢ 20% of the students travel by personal vehicles / sharing, Students participate in activities conducted by college on environment and sustainable development. In addition, please refer above assessments.
Is the college sharing learning internally via o Posters, placards, messages? o assemblies? o classroom presentations? o training/professional development? o posters/bulletin boards? o newsletter? o website?	Data is shared via posters, placards and messages. The assessment team is appraised that the awareness poster includes topics related to minimization of energy usage by avoiding wastage, improvements on energy efficiency, minimization of water wastages, proper disposal of wastes. Please refer Annexure XIV for details.
Does the college offer energy conservation lessons?	Yes, it is an integral part of the syllabus for 2nd year B.A., B.Com. & B.Sc. as they have to submit assignments and projects on Energy and Environment Conservation, college also organizes lectures and motivates students for Energy and Environment Conservation.
Is the college sharing its learning externally via o Paper presentations? o newsletter? o website?	The students are encouraged to present projects on topic related to environmental aspects. College is extensively engaged in the research work. The college also makes the Green Audit Report public so that learning's of college are shared.

Further Scope of Improvement:

- **At organization level, the college needs to establish long term improvement objectives to further reduce energy consumption, water consumption and reflect the same in form of dedicated Environment Policy.**

Conclusion:

- **Active involvement of Organization is observed.**
- **Adequate awareness amongst the students and other stakeholders (faculty, other staffs, service providers, etc.) is observed and reflected from their behavior.**

2. Creation of Awareness

Are the objectives of green audit clearly understood by the institute	Yes To spread awareness amongst the students and the surrounding community about the environmental impact due to operations associated with their teaching institution. ➢ To sensitize them how to address the situation at the local and personal level by conducting programs, camps and other means as feasible ➢ To reduce the negative environmental footprint on the environment ➢ To explore possibilities to use renewable energy sources to avoid GHG emissions and also reduce power cost ➢ To introduce renewable energy and to continuously improve its share in total energy mix ➢ To increase share of the efficient LED based lighting ➢ To introduce the automatic controls on the lighting systems ➢ To mitigate the carbon emission ➢ To increase the green cover ➢ To vigorously and responsibly position the institute for active contribution in Clean India Mission undertaken by the Governments. ➢ To identify ways and means to sustainably contribute and reduce gaps and become environment friendly ➢ To support community to combat various environmental and social issues as feasible
Are there posters/guidance displayed to remind students and staff of good practices?	Yes
Are the students aware of energy sources?	The major source of energy is electricity (Solar PV and grid electricity) followed by usage of diesel in the DG as back in case of failure of grid electricity. Students are aware of these sources of energy which are utilized by the college.

Is college tracking its electrical energy usage?	There is a single meter, which measures the electricity imported by the college. The readings of electricity consumption are included as part of this report under chapter 11.
Is college offering energy conservation lessons and programs?	➢ College has created awareness among the faculty and students to reduce energy wastage. ➢ The college has appropriately disabled the screen savers and programmed the computers for sleep mode operations. ➢ The usage policy of photocopiers, fax machines and other equipment users is "POWER ON" when in use and "POWER OFF" when not in use. There is no idle power consumption. Please refer Annexure VI for details.
Do students and staff know where their water comes from?	The only source of water is well water. Well water is utilized for drinking (after purification), in the wash rooms and cleaning.
Is college encouraging responsible water use via: o posters, placards? o incentives? o contests? o awards?	Yes, by posters, placards, contests and winner of contest are awarded.
How is trash managed outside the campus?	The waste is given to the Grampanchayat for disposal.
Further Scope of Improvement ➢ **College may calculate the water footprint to compare its performance with national and international consumption standards and communicate with its stakeholders.**	
Conclusion ➢ **Visible communication on environmental issues.** ➢ **Effective use of notice boards and signs.** ➢ **Water footprint may be calculated in future**	

3. Lighting

How college is utilizing daylight?	The college building is situated in such a manner that it is getting the full advantage of good airflow enabling good ventilation and sun light. It is a building having large windows and open space in all directions. During the day time, it is possible to carry out activities without air conditioners and air fans during operational days.
Is college utilizing any incandescent lights? Can they be replaced with compact fluorescents (energy saving bulbs)?	The college timings are from 8 AM to 3 PM. Thus, requirement of daytime lighting (powered by electricity) is limited. Energy efficient lighting system is followed. the

contemporary best practices will recommendations on lighting by Bureau of Energy Efficiency, Book-3, Chapter 8, table 8.1

Table 8.1 Luminous Performance Characteristics of Commonly Used Lu

Type of Lamp	Lumens / Watt		Colour Rendering Index	Typical Application
	Range	Avg.		
Incandescent	8-18	14	Excellent (100)	Homes, restaurants, general lighting, emergency lighting
Fluorescent lamps	46-60	50	Good w.r.t. coating (67-77)	Offices, shops, hospitals, homes
Compact fluorescent lamps (CFL)	40-70	60	Very good (85)	Hotels, shops, homes, offices
High pressure mercury (HPMV)	44-57	50	Fair (45)	General lighting in factories, garages, car parking, flood lighting
LED lamps	30-50	40	Good (70)	Reading lights, desk lamps, night lights, spotlights, security lights, signage lighting, etc.

Thus, LED's are considered for installation as night lights, security street lights by the college. The term reading light4 normally refers to lamps or lights which focus light dedicated for readings, thus LEDs were not considered for class room lightings initially. Fluorescent lamps were utilized for class rooms (as the same are stated to be suitable for office illumination level requirements). LED lights started replacing the conventional tube light as a replacement measure after failure. LED lighting survey was also undertaken by the Audit Team. Please refer below assessments in details.

During the onsite visit the Audit Team visited each department and physically counted the installed lights by their types (Fluorescent tube lamp, CFL and LED). It is confirmed that there is no incandescent light installed for lighting purpose.

As per the published article: http://www.usailighting.com/stuff/contentmgr/files/1/92ffeb328de0f4878257999e7d46d6e4/misc/lighting_comparison_chart.pdf

LED light has lumen/ watt in the range of 80-100 whereas CFL has lumen/ watt in the range of 70-90

Recommendation:

As per the replacement policy the college should continue to install LED lights in the class rooms in place of conventional tube lights. The existing CFL lamps5 should be replaced by the LED lamps.

4https://www.collinsdictionary.com/dictionary/english/reading-light

5The CFL lamps have problem as they contain mercury. Mercury is very toxic to human health and the environment.

Has the college evaluated existing lighting for opportunities to reduce lighting in over-lit areas?	The lighting arrangements are well balanced with arrangements to switch ON and OFF lights independently. There are therefore practically no over lit areas.
Are the light switched duly labelled to make more obvious which switches relate to which appliances?	Switch arrangements are lucid. The fan switches are adjacent to fan speed regulators. Light switches are arranged in order of lighting. The buttons are marked.
Are the lights switched off to make use of daylight? (e.g. lights parallel to windows or in corridors)	There is minimum or practically negligible use of lights during day time as the building structure has possibility of daylight usage. The lux level in the classrooms was measured and found above 250. On the outcast days some places register lower lux level. The locations were pinned and college management confirmed to take subsequent corrective actions.
Is the college utilizing natural lighting when possible?	Yes, natural lighting is first preference.
For the spaces like store rooms, toilets, kitchen areas, copying rooms, corridors etc is there scope for automatic lighting controls?	The college avails the sensor-based lighting arrangements to control the night illumination. The lighting sensors automatically switch on and switch off lights depending on the lux levels. **Recommendation:** **The students and staff washrooms can be equipped with the proximity sensors to control the lighting arrangements.**
Can main lighting ever be switched off and dedicated lighting be used?	As such there are no dedicated lamps which can replace overhead lighting. However, redundant lighting can be switched off when it is not required.
Are the light fittings clean?	The staff responsible for day to day cleaning was interviewed during onsite visit. Cleanliness is well maintained. In-house light fittings are cleaned regularly some light fittings need cleaning. However, the installed fittings were not cleaned as Covid-19 Pandemic caused shortage of staff.
Do windows and skylights need cleaning to allow in more natural light?	The window and skylight were not clean as Covid-19 Pandemic caused shortage of staff.
Has the college installed lighting occupancy sensors?	No, lights are negligibly operated during day time. The lights are operated manually. The night lights are however operated based on the sensors which operate lights based on the illumination levels.
Is there mechanism in place to immediately report inoperable occupancy light sensors?	Yes, in case of failure of the existing sensor, the night lights will not operate.
What is the % contribution of the LED lighting?	We have evaluated the % LED installation at Passage and ground and all other floor. The value is determined and presented under Annexure V.

Further Scope of Improvement

- **The students and staff washrooms can be equipped with the proximity sensors to control the lighting arrangements.**

Conclusion

- **The students and employees were interviewed and no complains was identified within respect to the sufficiency of lighting measures.**
- **Sufficient lux levels above 250 are common in class rooms and work-stations based on the survey of audit team.**
- **Negligible lighting load is observed during day time as college makes good use of daylight.**

- **Replacement policy to further improve lighting efficiency (as stated above) is already implemented.**

4. Cooling and Ventilation

How are the Air Conditioning Controls? For the local controls, how it is ensured that AC is working only ON when necessary. What is temperature setting of the AC?	The AC usage is very high as the temperature in Nagpur district is (Max temperature is above 42°C[6]) hottest day in Nagpur was registered with temperature of 47.9[7]°C). The AC temperature is set at 28°C. Awareness is created and measures are implemented in line with the recommendations of Ministry of Power (https://www.cseindia.org/a-step-in-the-right-direction-says-cse-of-power-ministry-s-move-to-fix-starting-temperature-of-room-air-conditioners-at-24oc-and-not-lower-to-save-energy-8814)
What is the mechanism of reducing heat in-grace? Are the closing blinds or fitting reflective film to windows installed to reduce solar gain?	The building is designed to make best use of day light and avoid the heat in-grace. Blinds are available in office to control unnecessary heat in-grace.
Are all external doors and windows closed when air conditioning is on?	There are 10 number of ACs in college. Based on interviews, it is confirmed that the practice of closing doors and windows is maintainedwhen air conditioning is in operation.
Is there a scenario where air conditioning is wasted in unused spaces, such as cupboards, corridors?	There are no such instances observed. Arrangements are duly implemented to avoid losses.
Are Efficient and energy labelled AC's utilized for cooling purposes?	There are 10 number of ACs in the college all are 2 star. These AC's run for 5-6 hours during summer and rainy season, **Recommendation:** **The 2 start AC are not the most economical AC for the sustained working hours of 5-6 hours for approximately 100 days a year. It is recommended to replace the AC with more energy efficient AC (at least 3 Star ratings or above).** **Below guidelines can be considered by college in future while selecting between the AC and evaporative cooling.** The Assessment team has undertaken document review and analysis of the data for the assessment of the air conditioning system. Based on the same it was found that there exists scope for the use of evaporative based cooling which is energy effective compared to the reversed Bryon cycle i.e., Vapour Compression Cycle. The basic reason for the same installed

6http://www.imd.gov.in/section/climate/climateimp.pdf

7https://timesofindia.indiatimes.com/city/nagpur/Nagpur-records-all-time-high-temperature-at-47-9-C/articleshow/20216419.cms

	system has COP of 1.5 kW/TR of refrigeration compared to evaporative cycle which draws 0.3-0.5 kW based on the size of installation.
Further Scope of Improvement ➢ **The 2 start AC are not the most economical AC for the sustained working hours of 5-6 hours for approximately 100 days a year. It is recommended to replace the AC with more energy efficient AC (at least 3 Star ratings or above).** ➢ **Evaporative cooling can be availed.**	
Conclusion ➢ **The 2-star AC need to be replaced by at least 3 Star AC or better at the end of their technical lifetime.** ➢ **Evaporative cooling can be availed.**	

5. Operation of Electronic Equipment

Are computers, printers, photocopiers and other equipment switched off at the end of the day?	Yes
Is there any mechanism by which the screens and other equipment be controlled during the day?	The has availed the services of the Green Audit from session 2017-18 onwards. The college has appropriately disabled the screen savers and programmed the computers for sleep mode operations. Please refer to Annexure VI.
Are the screen savers disabled?	Yes, please refer above assessment.
Are computers programmed to 'power down' mode?	Computers are programmed for the sleep operation.
Is the user entrusted with the rights to modify standby settings? (e.g. TVs, LCD projectors, printers etc.)	No, the college has the administrative rights. Such changes cannot be initiated by users.
What is status of the photocopiers, fax machines and other equipment? Are they programmed on 'Energy Saver' mode during the day?	The equipment like photocopiers, fax machines are shutdown when not in use, computers are turned to sleep mode whenever not in use.
Are the power management settings enabled on all the computers/ monitors/ all-in-one machines?	All machines are governed by the college. All are equipped by power management settings as already described above.
Conclusion: ➢ **The Electrical Equipment's are well operated. Redundant operations are avoided.**	

6. Water Management

Are any water leaks identified?	The urinals are flushed periodically and manually. The urinals need to be equipped with push button taps. Please refer below recommendation.

Are taps left running? Are there any dripping taps? Do taps need maintenance?	No such instance was observed.
Are push button taps utilized?	The toilet washrooms are not equipped with the push buttons. Please refer below recommendation.
Is water escaping from overflows either inside or outside buildings?	No such instance was identified during onsite audit.
Has the college installed low-flow faucets, automatic faucets, and/or faucet aerators?	**Recommendation:** **The college Management needs to consider dedicated flush at urinals (in place of periodic manual flushing), low-flow faucets, automatic faucets, and/or faucet aerators as the replacement for the existing conventional taps.**
Has the college installed low-flow shower heads at Hostel?	No, **Recommendation:** **Low flow shower heads should be installed in hostel.**
Has the college harvested rainwater?	Yes, the rain water is harvested over the indoor stadium. **Recommendation** **Rain water harvesting system should be installed on the college building and hostel.**
Is the college collecting the condensation from A/C units for onsite watering needs?	Yes. The condensed water is charged into the ground table.
Has the college optimized its irrigation system for gardening to o operate at night or early morning hours to minimize evaporation? o water the minimum time and frequency necessary for the applicable vegetation?	No. As per the latest publication from "The Hindu" drip irrigation is one of the most important measures to achieve "more crop per drop". Share of Agriculture consumption is approximately 83 per cent of India's water resources, thus approximately 17 per cent water resources are available for domestic and industrial use (http://www.thehindubusinessline.com/opinion/time-to-focus-on-more-crop-per-drop/article9778971.ece). **Recommendation** **College Management can prioritize the installation of efficient irrigation methods (drip irrigation / sprinklers).**
What is amount of rain water harvested?	Total area of roof top of indoor stadium is 654.40 m^2. The rainfall for Nagpur Region (Gramin) approximately 1064 mm. Total rain water harvesting is 626 m^3 at the run off coefficient of 0.9. Total area of roof top of college building is 1289.27 m^2. The rainfall for is approximately 1064 mm. Total rain water harvesting potential is estimated as 1234 m^3 at the run off coefficient of 0.9.
Are there any community based projects implemented by the college?	Yes, but due to the pandemic the college was unable to do so.

Further Scope of Improvement:

Long Term Measure:

- **The college Management needs to consider dedicated flush at urinals (in place of periodic manual flushing), low-flow faucets, automatic faucets, and/or faucet aerators as the replacement for the existing conventional taps.**
- **College needs to install the metering arrangement to measure the water drawn from well.**
- **College can undertake determination of water footprint and calibrate its specific water consumption with the established National and International Norms.**
- **Low flow shower heads should be installed in hostel.**
- **Rain water harvesting system should be installed by the college over hostel.**

Conclusion:

- **The college is having 03 nos. of well which is the only source of water.**
- **The toilet washrooms are not equipped with the push buttons.**
- **Practically efficient measures need to be implemented for gardening.**

7. Water Quality

Is the college campus maintained clean to minimize litter polluting water table?	The college premise is kept clean. Thus, the chances of litter polluting water table are negligible. The Assessment Team has also observed that the effluent from the chemical lab is directly flown into the sewer line without treatment. Recommendation: College needs to perform study of all the effluent chemicals (volume, weight, impact) used and accordingly develop mitigation measures under its sustainable strategy.
Is the college monitoring drinking water quality regularly? If yes, what is the frequency?	Yes. Water Testing is done by the college in their own Chemistry lab as well as Third-Party Water Testing is also conducted by the college. Water Quality Test Reports are included as part of Annexure VII to this Report.

Further Scope of Improvement:

- **College needs to perform study of all the effluent chemicals (volume, weight, impact) used and accordingly develop mitigation measures under its sustainable strategy.**

Conclusion:

- **The students, staff members and guests have access to clean, safe and potable water with the RO system.**

8. Renewable Energy

Is the college having solar, wind, or other forms of renewable energy?	Yes. The college installed solar PV system on date 03/08/2019 vide letter issued by M/s. Bijlee LED Lighting Pvt. Ltd., Nagpur. College Management has installed 50 kW solar PV generation. The share of renewable energy is estimated as the measurement formalities with MSEDCL are under progress. The share of renewable energy is expected to be 618 %.
Is the college purchasing renewable power from third party or renewable energy certificates for its electricity use?	No, college has availed its own solar PV system.
Is the college offering renewable energy lessons / programs?	This already assessed under chapter 01 of this report.
Further Scope of Improvement ➢ **College can also buy carbon credits (registered under CDM, VCS) to offset its GHG emissions.**	
Conclusion ➢ **College Management has installed renewable electricity generation (solar PV) system in college.**	

9. Transportation

Is college encouraging transportation measures like bicycle, Bulk transport, walking?	**Students:** Total 3079 students are enrolled for 2020-21 session. Due to the pandemic only, online classes are conducted. Based on the interviews last year, approximately: ➢ 50% public transport (State Transport) ➢ 30 % by walk, bicycle and ➢ 20% of the students travel by personal vehicles / sharing, **Faculties:** There are 55 staff members in the college, out of which:

8% renewable = electricity generated by Solar PV / Total electrical energy consumed

= 87600 kWh/(87600+56129) kWh = 61 %

	➢ 90% staff of the college travel on sharing basis (car pulling, two-wheeler pulling). ➢ 10% staff of the college travel by their own vehicles. Students participate in activities conducted by college on environment and sustainable development. In addition, please refer above assessments.
Is the college providing eco-friendly or less GHG intensive transportation matching services? (Example carpools, college buses etc)	Refer above response.
What are the good practices pertaining to Transport?	**Recommendation:** **College Management should encourage use of bi-cycle and mass transport systems amongst students and faculties.**
Further Scope of Improvement: ➢ **College Management should encourage use of bi-cycle and mass transport systems amongst students and faculties.**	
Conclusion: ➢ **The college management, its employees and the students observe satisfactory practices of transportation/ commutation.**	

10. Purchasing Practices

Describe the purchasing that confirms the better environmental performance?	Printers with duplex printing facility is installed at the computer lab and Library. There is culture of the two-sided printing. Paper is not wasted.
How does the college limit the purchase of single-serve bottles and containers?	The college has RO system; guests are served with water from RO system. Single serve bottles are not utilized unless requested by the guest.
Is the college having water fountains/stations to promote easy filling of reusable water bottles?	Yes, the water dispensers are connected to output of RO system. Clean and potable water is available to staff, student and guests.
Further Scope of Improvement: **The college should further emphasize on the purchase of:** ➢ **no- to low-odor (VOC) markers** ➢ **No- to low-VOC paints? (via Facilities)** ➢ **paper/paper products with maximum recycled content** ➢ **refillable pens/pencils** ➢ **compostable bags for compost collection**	
Conclusion:	

- Focus on the replacement of lighting as per above stated recommendation needs to be considered
- Focus of the recommendation pertaining to the environmental preference of evaporative cooling over AC needs to be considered.
- One sided paper is utilized by college to avoid use of fresh papers
- Policy for the disposal of Archived paper Records needs to be formed by college

11. Energy and Carbon Footprint

Has the college undertaken energy audit?	Yes, the energy audit was undertaken and electrical measurements were undertaken at the college. Please refer the Annexure – XV of this report. Energy audit is an effective tool in identifying and perusing a comprehensive energy management program. Energy Audit highlights the areas of energy savings, thereby reducing the energy costs. The following are the major consumers of electricity in the facility. Please refer the Annexure – XVII ➢ Computers ➢ Lighting ➢ Air-Conditioning ➢ Fans ➢ Pumps ➢ Other Lab Equipment
What are the steps undertaken during the energy audit?	The Assessment Team undertook the analysis of the college premise: ➢ To study electricity bills ➢ Study of lighting system and its measurement. ➢ Air conditioner ➢ Study of loads in particular at the IT labs ➢ Usage of Renewable energy systems ➢ Identification of energy saving opportunity and energy conservation.
What methodology was adopted?	The energy assessment involved desk review and onsite measurements. Review of energy bill received from MSEDCL was undertaken. Review of lighting, HVAC, fuel usage, pumping systems etc. was undertaken. Energy conservation and saving opportunities are identified and included below.
What are the suggested energy conservation measures?	**Below energy conservation measures are suggested** ➢ The one switch for college concept should be implemented in the college. This will avoid unwanted operation and wastage of electricity. ➢ There are 40 W tube lights with copper chokes. As per replacement policy the LED tube-light should be installed. The T8 LED tube has wattage of 20 W, thus the energy saved is 40-20 = 20 watt/fitting. As per study there are 146 tubes of 40 W in college, library and hostel. After the replacement based on failure the energy savings will be approximately 3504 kWh. With average electricity cost of INR 13 /kWh, the annual savings will be approximately INR 45552 per year. ➢ Air conditioner shall be operated between temperature range of 24-28^{0}C to maintain lower cooling load on compressor to save energy.

<table>
<tr><td></td><td>

The existing non-star labeled AC's and reached end of their service life. The ACs should be replaced by the 5-star AC's (as daily usage is above 4 hours).

<table>
<tr><td></td><td>0.75 ton</td><td>1 ton</td><td>1.5 ton</td><td>2 ton</td></tr>
<tr><td>1 Star AC (mostly non Inverter)</td><td>627</td><td>843</td><td>1246</td><td>1648</td></tr>
<tr><td>2 Star AC (mostly non Inverter)</td><td>596</td><td>800</td><td>1184</td><td>1626</td></tr>
<tr><td>3 Star AC (mix of Inverter and non Inverter)</td><td>542</td><td>747</td><td>1104</td><td>1448</td></tr>
<tr><td>4 Star (mostly Inverter)</td><td>464</td><td>645</td><td>945</td><td>1293</td></tr>
<tr><td>5 Star (mostly Inverter)</td><td>450</td><td>554</td><td>840</td><td>1113</td></tr>
<tr><td></td><td colspan="4">Annual Electricity Consumption (Units or kWh for 1600 hrs) based on data from BEE</td></tr>
</table>

All Class Rooms and labs must sensitize students regarding optimum use of electrical appliances in the room like, lights, fans, computers
The comfort air conditioning temperature to be set between 24˚C to 26˚C.
Lights in toilet area may be kept OFF during day time. Additional sensors can be installed in washrooms to automatically regulate the light and exhaust fans.

</td></tr>
<tr><td>Has the college calculated its carbon footprint?</td><td>College is calculating the carbon footprint every year. The data applicable to Scope-2 emission (electricity purchase from grid) is available. The emissions pertaining to Scope-01 are limited to HSD use in DG and LPG usage in various Labs.</td></tr>
<tr><td>How is college promoting zero emission transportation options?</td><td>Not applicable. There is no internal transportation within the college.</td></tr>
<tr><td>Are all the applicable emission sources calculated?</td><td>The emission source pertaining to grid-based electricity source is calculated. Scope-01 emission source data pertaining HSD consumption in DG, LPG consumption in labs are calculated, Scope 2 emission on account of electricity imported from grid is considered.

Scope-01 Emissions:
<table>
<tr><th>Year</th><th>HSD Consumption in DG</th><th>LPG consumption in Labs</th></tr>
<tr><td>Session</td><td>lit</td><td>kg</td></tr>
<tr><td>2020-21</td><td>25.38</td><td>-</td></tr>
</table>
</td></tr>
</table>

Equivalent Scope-01 Emissions are as below[9]:

Year	HSD Consumption in DG	LPG consumption in Labs	Total GHG Emission (Scope-1)
Session	tCO_2	tCO_2	tCO_2
2020-21	0.09	-	0.09

Scope-02 Emissions are tabulated as follows[10]:

Year	Annual Electricity Consumption	Total GHG Emission (Scope-2)
Session	kWh	tCO_2
2020-21	31595	31.60

Total CO_2 emissions for financial year 2019 - 020
= Scope-01 + Scope-02

Year	Total GHG Emission (Scope-1)	Total GHG Emission (Scope-2)	Total GHG Emission (Scope-1+2)
Session	tCO_2	tCO_2	tCO_2
2020-21	0.09	31.60	32.00 (Rounded Value)

12. Waste Management

How the college reduces its paper waste via: o encouraging digital reading, note-taking, and activities? o setting printers and computers to default to duplex (double-sided) printing? o reducing margins and white space on documents that must be printed? o printing multiple pages per sheet? o minimizing paper correspondence with families? o opting out of unwanted mail?	➢ The class room and labs are well ventilated and spacious. This minimizes suffocation to students by improving air changes and hence the air quality. ➢ The college has adopted the duplex printers, which enables the complete usage of the paper areas ➢ College has taken initiates towards plastic free campus. The students are

[9]With 10 % uncertainty

[10]With 10 % uncertainty

Is the college undertaking recycling collection for additional recyclable materials—like plastic bags, CFL (spiral) light bulbs, batteries, drink pouches, candy wrappers, and electronics?	encouraged to use waste bins which are placed in the college. ➢ The internal correspondences and various functionalities are taken care by the electronic means like emails, sms etc. ➢ The recycling/ disposal system adopted by the college is as below. **Different types are generated within campus which include**. ➢ **E-Waste:** The E-waste generally includes the tube-lights, CFL, LED, etc. are stored into the scrap bin an handed over to an agency for proper disposal, MoU for E-waste handling is executed. ➢ **Plant Waste:** The plant waste is composted in-house. Vermi culture compost is obtained from waste leaves. ➢ **Sewage Waste:** The liquid waste from lavatories and other sources are disposed in the sewer line. ➢ **Chemical Waste:** The chemical waste is flown into the sewer line. Please refer Annexure XIII for details **Recommendation:** ➢ **College needs to improve the waste disposal method for the chemical waste handling for chemical labs.** ➢ **Vending machine & Incinerator machine needs to be installed in the college.** ➢ **Proper process of disposal of cellulose waste needs to be initiated.**

Further Scope of Improvement:

- **College needs to improve the waste disposal method for the chemical waste handling for chemical labs.**
- **Vending machine & Incinerator machine need to be installed in the college.**
- **Considering the huge volume of paper usage college needs to work out feasible solution for recycling of waste papers.**

13. Plantation by College

The College campus has several trees i.e., a college garden and a Botanical Garden with various rare and medicinal important species.

Every year, plantation programme is carried out in the campus as well as outside the campus. Students are also involved in plantation programme in surrounding locality. In the current session, the Institution planted several trees in the vicinity.

The tree survey is under progress and soon the same will be completed, there are approximately 246 fully grown trees in the campus.

TAYWADE COLLEGE,

Mahadula-Koradi, Tah. Kamptee, Dist. Nagpur

Sr. No.	Botanical Name	Family	Vernacular Name/ Common Name	Quantity
1.	Abelmoschus manihot (L.) Medik	Malvaceae	रानभेंडी	1
2.	Abrus precatorious (L.)	Fabaceae	गुंज	1
3.	Acacia catechu (L.f.) P.J.H. Hurter & Mabb	Fabaceae	कथ्था	1
4.	Acorus calmus (L.)	Acoraceae	वेखंड	4
5.	Aegle marmelos (L.) correa	Rutacae	बेल	1
6.	Aloe vera L. Burm f.	Liliaceae	ज्ञवतचींक	1
7.	Ailianthus excelsa (Mill)	Simaroubaceae	महारूख	7
8.	Alstonia scholaris (L.)	Apocynaceae	सप्तपर्णी	1
9.	Andrographis paniculata (Burm. f)	Acanthaceae	काळमेघ	1
10.	Anthocephalus cadamba (Roxb) (P. Beauv)	Rubiaceae	कदंब	3
11.	Jasminum sp.	Oleaceae	मोगरा	1
12.	Argyreia nervosa (Burm.f.)	Convolvulaceae	समुद्रशोश	1
13.	Artocarpus heterophyllus (Lam)	Moraccae	फणस	1
14.	Asparagus racemosus (wild)	Asparagaceae	षतावरी	1
15.	Hygrophila auriculata (K. Schum.)	Acanthaceae	कोळषिंदरा	1
16.	Azadirachta indica A. Juss	Meliaceae	कडूनिंब	11
17.	Bacopa monnieri (L.)	Apiaceae	ब्रम्ही	1
18.	Bauhunia racemosa (Lam.) Benth	Fabaceae	कांचन	1
19.	Boerhavia diffusa (L.)	Nyctaginaceae	पुनर्नवा / कावळी / खापरखुटी	1
20.	Kalanchoe pinnata (Lamk.)	Crassulaceae	पानफुटी	1
21.	Caesalpinia bonduc (L.)	Minosaceae	सागरगोटी	1
22.	Canna Indica (L.)	Cannaceae	कर्दळ	1
23.	Cassia siamea Lamk	Fabaceae	कॅसिआ ट्री	4
24.	Catharanthus roseus (L.)	Apocynaceae	सदाफूली	1
25.	Clitoria ternatea (L.)	Fabaceae	गोकर्ण	1
26.	Cordia gharaf (Forsk.)	Boraginaceae	भोकर	2
27.	Costus speceosus (J. Konia)	Costaceae	क्रेप जिंजर	1
28.	Cycas circinalis (L.)	Cycadaceae	सायकस	2
29.	Cymbogogon citrinus (D.C.) Stapf	Poaceae	गावठी चहा	1
30.	Datura metel (L.)	Solanaceae	काळाधोतरा	1
31.	Delonix regia (Boj.)	Caesalpiniaceae	गुलमोहर	5

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Sr. No.	Botanical Name	Family	Vernacular Name/ Common Name	Quantity
32.	Dalbergia sissoo Roxb.	Fabaceae	शिशम	1
33.	Dypsis lutescens	Arecaceae	अरिका पाम	10
34.	Eclipta alba (L.)	Asteraceae	माका	1
35.	Emblica officinale (L.)	Euphorpiaceae	आवळा	2
36.	Euphorbia antiquorum (L.)	Euphorbiaceae	दुधी	1
37.	Erythrina variegata L.	Fabaceae	पंगारा	2
38.	Ficus racemosa (L.)	Moaceae	उंबर	2
39.	Ficus religiosa (L.)	Moraceae	पिंपळ	2
40.	Gardenia resinifera Roth	Rubiaceae	डिकेमाली	1
41.	Haldina cordifolia (Roxb)	Rubiaceae	हलदू	1
42.	Hydrocotyl asiatica (L.)	Apiaceae	ब्राम्ही	1
43.	Leucaena leucocephala (Lamk.)	Mimosaceae	सूबाभूळ	2
44.	Lantana camara L.	Verbenaceae	घानेरी	1
45.	Madhuca longifolia (J. Konia)	Sapotaceae	मोह	1
46.	Mangifera indica (L.)	Ancardiaceae	आंबा	2
47.	Melia azadirach (L.)	Meliaceae	कडूलिंब	4
48.	Mimosa pudica (L.)	Fabaceae S. Family – Mimosaceae	लाजाळू	1
49.	Mimusops elangi (L.)	Sapotaceae	बकुळ	3
50.	Mirabilis jalapa (L.)	Nyctaginaceae	गुलबक्षी	1
51.	Moringa olifera (L.)	Monigaceae	मुंगणा / शेवगा	2
52.	Murraya paniculata (L.)	Rutaceae	गोडलिंब	8
53.	Michelia champaca	Magnoliaceae	सोनचाफा	2
54.	Mutingia calabura L.	Mutingiaceae	चेरी प्लॅन्ट	10
55.	Musa paradisiacal L.	Musaceae	केली	1
56.	Pongamia pinnata (L.)	Fabaceae	करज	1
57.	Peltophorum pterocarpum (D.C.) K. Heyne	Caesalpiniaceae	पेल्टोफोरम	9
58.	Psidium guajava L	Myrtaceae	जांभ	1
59.	Plumeria rubra L.	Apocynaceae	चाफा	30
60.	Roystonia regia (Kunth.)	Arecaceae	बॉटल पाम	6
61.	Spathodea campanulata D. Beauv	Bignoniaceae	फाउंटन ट्री	3
62.	Spilanthus indicus (L.)	Asteraceae	अक्कलकाढा	1
63.	Samanea saman (Jacq.)	Mimosaceae	रेन ट्री	8
64.	Syzygium cumini (L.) Skeels	Myrtaceae	जांभूळ	1
65.	Tamarindus indicus (L.)	Fabaceae	चिंच	1
66.	Tecoma stans (L.) Kunth	Bignoniaceae	येलो बेल	4
67.	Tectona grandis (L.)	Lamiacae	साग	1

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Sr. No.	Botanical Name	Family	Vernacular Name/ Common Name	Quantity
68.	Terminalia bellerica (Gaertn) Roxb	Combretaceae	बेहडा	1
69.	Tinospora cordifolia (Thumb.)	Menispermaceae	गुळवेल	1
70.	Tridax procumbens (L.)	Asteraceae	कंबमोडी	1
71.	Thuja sp.	Cupressaceae		6
72.	Thevetia peruviana (Pers.) Schum	Apocynaceae	पिवळा कनेर	13
73.	Terminalia catappa L.	Combretaceae	बदाम	1
74.	Vitex nigundo (L.)	Verbenaceae	निर्गुडी	1
75.	Withania somnifera (L.) Dunal	Solanaceae	अश्वगंधा	1
76.	Wodyetia bifurcata A.K.Irvine	Arecaceae	फोक्सटेल पाम	32

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List of trees in the campus

Annexure

Annexure – I: List of Interviewed College Staff / Students

Shri Sachhidanand Shikshan Sanstha's
TAYWADE COLLEGE
(Arts, Commerce, Science) (U.G. & P.G.)
Mahadula - Koradi, Tah. Kamptee Dist. - Nagpur

NAAC ACCREDITED 'B' GRADE
Recognised Centre for
Higher Learning and Research

Principal
Dr. Sharyou B. Taywade
9822716608

Chairman
Dr. Babanrao Taywade
9422145290

Ref. No. :

Date : 18/01/22

List Of Interviewed College Staff / Students (2020-21)

S. No.	Interviewee	Designation
1.	Mrs. Dr. Sharayou B. Taywade.	Principal
2.	Dr. Girish S. Katkar	IQAC Co-ordinator
3.	Dr. Suvarna P. Patil	Head Dept. Of Botany
4.	Dr. Vijay Charde	Head Dept. Of Microbiology
5.	Dr. Prerana Thorat	Faculty. Dept. Of Chemistry
6.	Dr. Chanchal Deshmukh	Faculty. Dept. Of Zoology
7.	Dr. Kamlesh Dabre	Faculty. Dept. Of Physics
8.	Dr. Ajay Ramteke	Faculty. Dept. Of Comp. Sc.
9.	Shri Ramesh Gaikwad	Supervisor (Administrative)
10.	Shri Ajay Wagde	Head Clerk, Canteen Manager
11.	Shri. RakeshKumar Sing B. Sc. II	Member, Green Campus Committee
12.	Ku. Rashmita Behara B.Sc. I II	Member, Green Campus Committee
13.	Ku. Pratik Soni B.Sc. III	Member, Green Campus Committee
14.	Ms. Bhavana Mondhe B.Sc. II	Member, Green Campus Committee
15.	Shri. Darshan Talhande M.Sc. II	Volunteer, Green Campus Committee
16.	Ku. Karishma Lohakare M.Sc. II	Volunteer, Green Campus Committee

Principal
Taywade College
MAHADULA KORADI DIST NAGPUR

• Phone : 07109 - 262204 • Fax : 07109-262525 • Website : acsckoradi.com • Email : acscollegekoradi@gmail.com
Formerly Known as Arts, Commerce & Science College, Koradi

Annexure – II: Reference Documents / Surveys

Sr. No	Reference Documents / Surveys pertaining to
1.	Functionality of RO water plant
2.	Roof top area by college
3.	Setup for Rain Water Harvesting
4.	Information regarding Garden Waste Management
5.	Information regarding Liquid Waste Management
6.	Measures for maintaining Cleanliness in Campus.
7.	Measures for Garbage Collection and disposal
8.	Plantation Measures
9.	Electricity Bills for duration of April 2020 to March 2021
10.	Nature Conservation Club composition
11.	Declaration on Operational Controls of System Department with Respect to IT Management & Other Electronic Equipment's.
12.	Roll Of Staff, Students & Management to Save Electricity in Campus.
13.	Lighting Survey undertaken by the Green Audit Team
14.	AC Survey undertaken by the Green Audit Team
15.	Water Harvesting Survey undertaken by the Green Audit Team
16.	Waste Water Management Survey undertaken by the Green Audit Team

Annexure –III: Green Campus Committee

Shri Sachhidanand Shikshan Sanstha's

TAYWADE COLLEGE

(Arts, Commerce, Science) (U.G. & P.G.)

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Principal
Dr. Sharyou B. Taywade
9822716608

Chairman
Dr. Babanrao Taywade
9422145290

Ref. No. :

Date : 25/03/21

Green Army

(Green Campus Committee)

2020-21

S. No.	Name	Position
1	Mrs. Dr. Sharayou B. Taywade, Principal	Chairperson
2	Mrs. Suvarna P. Patil Head Dept. Of Botany	Co-ordinator
3	Shri. RakeshKumar Sing B. Sc. II	Member
4	Ku. Rashmita Behara B.Sc. I II	Member
5	Ku. Pratik Soni B.Sc. III	Member
6	Ms. Bhavana Mondhe B.Sc. II	Member
7	Shri Ajay Wagde Head Clerk	Canteen Manager
8	Shri Darshan Talhande M.Sc. II	Volunteer
9	Ku. Karishma Lohakare M.Sc. II	Volunteer

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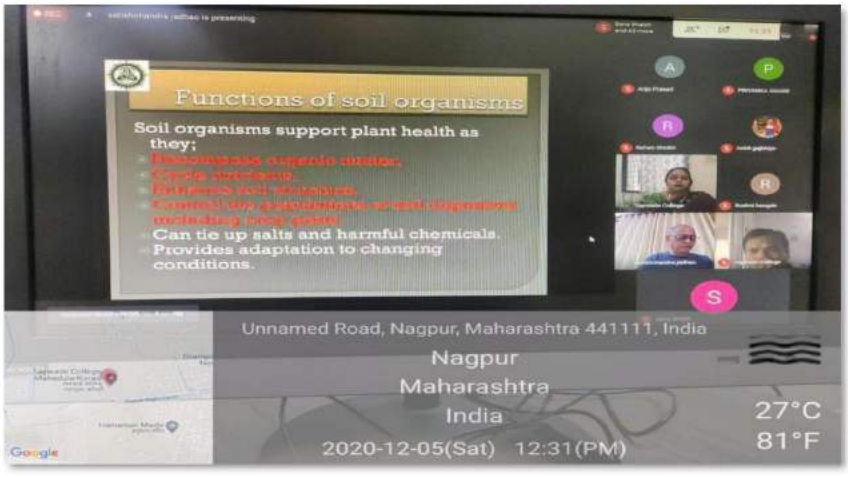
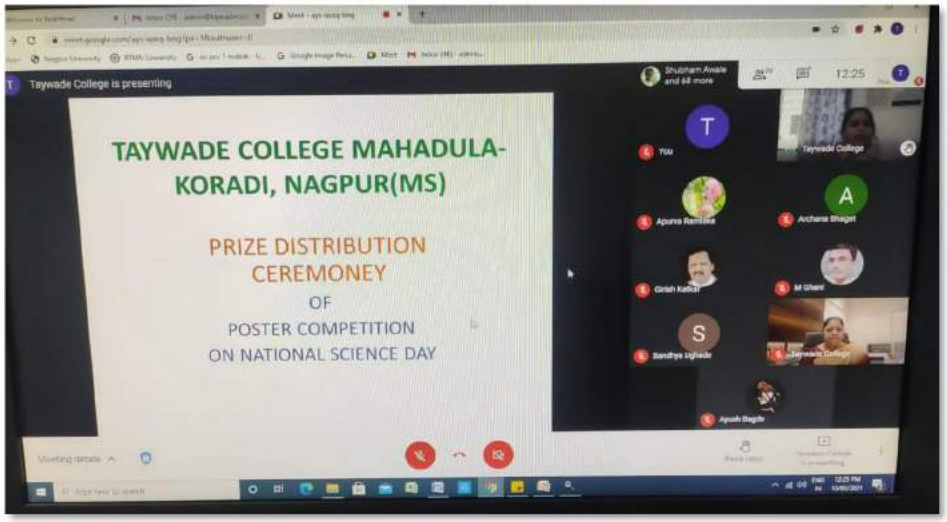
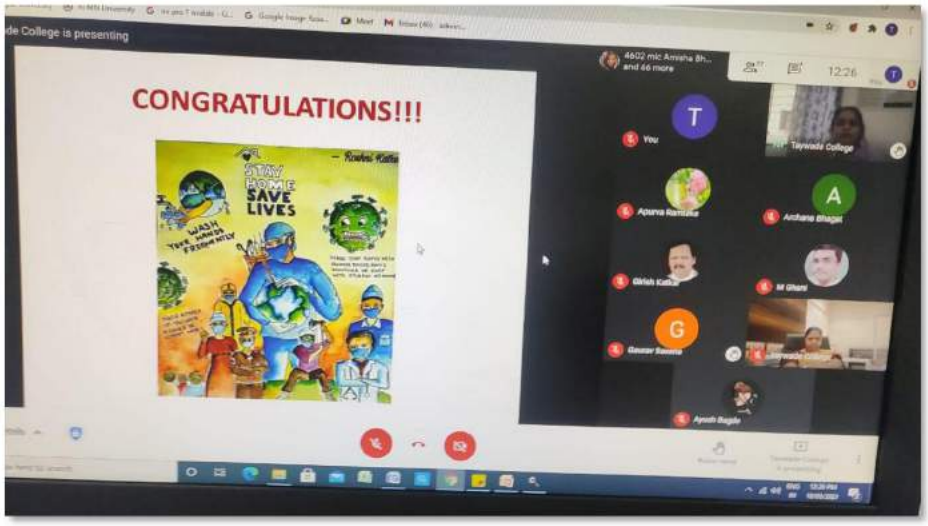
Annexure – IV: List of Awareness Program Undertaken By College

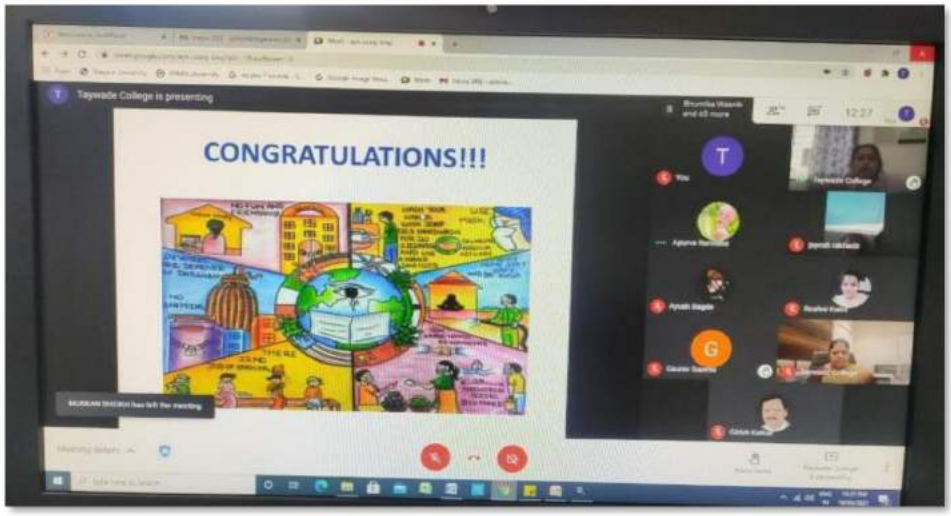
Birds Nest Installation program at Taywade College Campus on 9th November 2020



Webinar on "Keep Soil Alive, Protect Soil Biodiversity" on 05th December 2020







Intercollegiate Poster Competition on 28th February 2021

Annexure –V: Lighting Survey (2020 – 21)

List of Assumptions:

- During the survey specific hours for each class room, wash room, office space was assessed and accordingly average daily hours were considered
- The kW ratings of the installed lights is taken from the College data
- The calculations cover the two approaches
    - Approach: Calculation of LED contribution based on the total lighting load energy consumption.

      Note: The Lumen/Watt for 28 W tube light is up to 110; which is almost same as LED is: 110-12011

    - The Green Audit Team acknowledges the criteria for introduction of LED lights as LED lights do not have disposal problems. Tube lights face problem of mercury contamination.

    - Conversely the college also faces the problem of disposal of existing tube lights. The sudden disposal of tube lights on large scale and within their service life will lead to huge amount of e-waste which has critical impact on environment. The college management is thus looking for the replacement policy and lighting (tube light, CFL) will be upgraded to eco-friendly LED after failure of existing lighting system.

Lux Levels observed at working place - 250

Calculated Contribution of various lighting arrangements: Calculated for 200 working days

Light Sources	Daily Wh Consumption
Tube light	28760
LED	18690
CFL	420

Light Sources	% Contribution
Tube light	60%
LED	39%
CFL	1%

Light Sources	Number
Tube light	146
LED	168
CFL	7

Light Sources	% Contribution
Tube light	45%
LED	52%
CFL	3%

11https://www.google.co.in/amp/s/www.bijlibachao.com/lights/comparing-led-lights-with-fluorescent-lights.html%3fisamp=1

Lighting Survey 2020 – 21

Room Name / No.	Tube light	Watts	Daily average hrs	W.hr	LED	Watts	Daily average hrs	W.hr	CFL	Watts	Daily average hrs	W.hr	Fan	Watts	Daily average hrs	W.hr
Principal Office	1	40	8	320	14	20	8	2240	7	10	6	420	3	80	8	1920
Office	1	40	8	320	7	20	8	1120	-	-	-	-	7	80	8	4480
Home Eco. Lab	4	40	6	960	1	20	6	120	-	-	-	-	3	80	6	1440
	1	40	6	240	1	20	6	120	-	-	-	-	1	80	6	480
Microbiology Lab	3	40	6	720	1	20	6	120	-	-	-	-	4	80	6	1920
Seminar Hall	-	-	-	-	3	20	2	120	-	-	-	-	8	80	6	3840
Chemistry Lab	4	40	6	960	1	20	6	120	-	-	-	-	8	80	2	1280
New Lab	1	40	6	240	13	20	6	1560	-	-	-	-	3	80	6	1440
	-	-	-	-	1	15	6	90	-	-	-	-	-	-	-	-
Geography Lab	3	40	6	720	-	-	-	-	-	-	-	-	2	80	6	960
Room No. 2	1	40	5	200	4	20	5	400	-	-	-	-	4	80	5	1600
Meeting Room	2	40	6	480	-	-	-	-	-	-	-	-	2	80	6	960
Passage	2	40	2	160	4	20	2	160	-	-	-	-	1	80	2	160
Staff Room	1	40	6	240	2	20	6	240	-	-	-	-	3	80	6	1440
	-	-	-	-	1	10	6	60	-	-	-	-	-	-	-	-
N.S.S. Room	2	40	6	480	-	-	-	-	-	-	-	-	3	80	6	1440
Room No.3	4	40	5	800	-	-	-	-	-	-	-	-	3	80	5	1200
Physics Lab	3	40	6	720	-	-	-	-	-	-	-	-	3	80	6	1440
Dark Room	1	40	2	80	-	-	-	-	-	-	-	-	1	80	2	160
Zoology Lab	1	40	6	240	5	20	6	600	-	-	-	-	12	80	6	5760
Zoology Staff Room	2	40	6	480	1	20	6	120	-	-	-	-	3	80	6	1440
Computer Lab	-	-	-	-	41	20	6	4920	-	-	-	-	17	80	6	8160
Botany Lab	1	40	6	240	2	20	6	240	-	-	-	-	5	80	6	2400
Room No. 4	-	-	-	-	1	20	6	120	-	-	-	-	4	80	6	1920
Stock Room	-	-	-	-	1	20	6	120	-	-	-	-	-	-	-	-
Passage	2	40	6	480	3	20	6	360	-	-	-	-	-	-	-	-

Library Corridor	9	40	6	2160	-	-	-	-	-	-	-	-	3	80	6	1440
Library	19	40	6	4560	3	20	6	360	-	-	-	-	20	80	6	9600
Library Seminar Hall	14	40	2	1120	1	20	2	40	-	-	-	-	9	80	2	1440
Library Stairway	2	40	6	480	-	-	-	-	-	-	-	-	-	-	-	-
Junior College Room	2	40	6	480	2	20	6	240	-	-	-	-	4	80	6	1920
Commerce Staff Room	2	40	6	480	2	20	6	240	-	-	-	-	3	80	6	1440
Room No. 6	-	-	-	-	2	20	5	200	-	-	-	-	2	80	5	800
Room No. 7	-	-	-	-	2	20	5	200	-	-	-	-	2	80	5	800
Room No. 8	1	40	5	200	1	20	5	100	-	-	-	-	3	80	5	1200
Room No. 9	2	40	6	480	3	20	5	300	-	-	-	-	5	80	5	2000
Room No. 10	-	-	-	-	4	20	5	400	-	-	-	-	4	80	5	1600
Room No. 13	4	40	5	800	-	-	-	-	-	-	-	-	4	80	5	1600
Room No. 14	-	-	-	-	4	20	5	400	-	-	-	-	3	80	5	1200
YCMOU 1	2	40	6	480	1	20	6	120	-	-	-	-	3	80	6	1440
Exam Room	3	40	6	720	-	-	-	-	-	-	-	-	2	80	5	800
Room No. 15	2	40	5	400	-	-	-	-	-	-	-	-	2	80	5	800
Room No. 16	2	40	5	400	-	-	-	-	-	-	-	-	3	80	5	1200
Room No. 17	2	40	5	400	-	-	-	-	-	-	-	-	3	80	5	1200
Room No. 18	6	40	5	1200	2	20	5	200	-	-	-	-	5	80	5	2000
Room No. 19	6	40	5	1200	-	-	-	-	-	-	-	-	5	80	5	2000
Room No. 20	4	40	5	800	-	-	-	-	-	-	-	-	3	80	5	1200
Room No. 21	3	40	5	600	1	20	5	100	-	-	-	-	3	80	5	1200
Room No. 22	2	40	5	400	-	-	-	-	-	-	-	-	3	80	5	1200
Passage	14	40	2	1120	6	20	2	240	-	-	-	-	-	-	-	-
Washroom Gents	-	-	-	-	1	20	2	40	-	-	-	-	-	-	-	-
Washroom Girls	-	-	-	-	1	20	2	40	-	-	-	-	-	-	-	-
Placement Cell	-	-	-	-	2	20	6	240	-	-	-	-	1	80	6	480
Department Of Language	1	40	6	240	1	20	6	120	-	-	-	-	2	80	6	960
Toilet	-	-	-	-	1	20	2	40	-	-	-	-	-	-	-	-

Life Sciences Research Lab	4	40	6	960	8	20	6	960	-	-	-	-	5	80	6	2400
Store Room	-	-	-	-	1	20	2	40	-	-	-	-	-	-	-	-
Staff Room	-	-	-	-	2	20	6	240	-	-	-	-	2	80	6	960
Boys Common Room	-	-	-	-	2	20	2	80	-	-	-	-	4	80	2	640
PG Class Room 1	-	-	-	-	2	20	5	200	-	-	-	-	2	80	5	800
PG Class Room 2	-	-	-	-	2	20	5	200	-	-	-	-	2	80	5	800
PG Class Room 3	-	-	-	-	2	20	5	200	-	-	-	-	2	80	5	800
PG Class Room 4	-	-	-	-	2	20	5	200	-	-	-	-	2	80	5	800
Total	**146**			**28760**	**168**			**18690**	**7**			**420**	**216**			**92560**

On & off culture practiced in college

Use of LED lights in college

Sensor based lighting installed in college

Annexure –VI: Undertaking by the System Department regarding control of Electronic Equipment's

Shri Sachhidanand Shikshan Sanstha's
TAYWADE COLLEGE
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Principal
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9822716608

Chairman
Dr. Babanrao Taywade
9422145290

Ref. No. :

Date : 25-03-2021

CERTIFICATE

The Administrative Rights of Computer Setting are with the administrative department of the college.

As part of the sustainable and eco-friendly setting, system department has initiated below setting in the copters of all the users.

1. We have disabled all the computer screen savers.
2. When the computer are idle for five minutes, they are turn to sleep mode.
3. The computer setting cannot change as the administrative rights are with the department.
4. With regards to the uses policy of photocopier and other equipment user "POWER ON" when in used and "POWER OFF" when not in use
5. The statement is issued in response to the query raised during the green audit.

PRINCIPAL
Taywade College,
Mahadula, Koradi,
Dist. Nagpur

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Formerly Known as Arts, Commerce & Science College, Koradi

Annexure –VII: Water Quality Reports

Shri Sachhidanand Shikshan Sanstha's
TAYWADE COLLEGE
(Arts, Commerce, Science) (U.G. & P.G.)
Mahadula - Koradi, Tah. Kamptee Dist. - Nagpur

NAAC ACCREDITED 'B' GRADE
Recognised Centre for
Higher Learning and Research

Principal
Dr. Sharyou B. Taywade
9822716608

Chairman
Dr. Babanrao Taywade
9422145290

Ref. No. :

Date : 10-03-21

Water Analysis Report
(Chemical and Microbiological analysis)
(Session 2020-21)

Date of Analysis: 03-03-21

Temperature: 32°C

S. No	Name of Test	Sample 1	Sample 2	Sample 3	Sample 4
1.	Colour	Clear	Clear	Clear	Clear
2.	pH	6.67	6.69	6. 66	6.67
3.	Conductivity	0.55	0. 54	0.58	0.57
4.	Hardness (ppm)	145	141	143	141
5.	Total Coliform/ 100ml	Absent	Absent	Absent	Absent
6.	E Coli/ 100ml	Absent	Absent	Absent	Absent

Sample description:

Sample 1: Water Cooler 1 Ground Floor
Sample 2: Water Cooler Boys room
Sample 3: Water Cooler exam room
Sample 4: Water Cooler 2 Ground Floor

Principal
Dr. Sharayou B. Taywade
Taywade College, Mahadula Koradi

Principal
Taywade College
MAHADULA KORADI DIST. NAGPUR

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महाराष्ट्र राज्य
सार्वजनिक आरोग्य सेवा
प्रादेशिक आरोग्य प्रयोगशाळा नागपूर दूरध्वनी/फॅक्स क्र. 0712-2546014

पाण्याच्या नमुन्याचा सुक्ष्मजीवीय अहवाल

पाठविणाऱ्यांचे नाव व पत्ता : Principal, Taywade College, Mahadula Koradi -
पाठविणाऱ्यांचे पत्र क्रमांक व दिनांक : 2777/26/11/2021
प्रयोगशाळा संदर्भ क्रमांक : 28751 — 53

नमुना घेतल्याचा दिनांक : 25/11/2021
नमुना पोहोचल्याचा दिनांक : —"—
परीक्षण सुरु केल्याचा दिनांक : —"—

अ.क्र.	नमुन्याचे प्रकार	परीक्षणाचे निष्कर्ष		इतर अभिप्राय
		प्रति १०० मि.ली. नमुन्यातील सूक्ष्मजंतूंची संख्या		
		कोलीफॉर्म्स	थरमोटॉलरंट जीवाणू	
1)	मुलांचे- महाविद्यालयातील	00	—	पिण्यास योग्य
2)	" वसतीगृहातील	00	—	
3)	" कॅन्टीनमधील	00	—	

अभिप्राय :
पिण्यास अयोग्य पाण्यावर योग्य प्रमाणात क्लोरीनची प्रक्रिया केल्यानंतर व सूक्ष्मजीवीय पुर्णतपासणीनंतर पिण्यास योग्य असल्याची खात्री झाल्यानंतर ते पाणी पिण्यासाठी वापरता येईल.

अहवाल क्रमांक : प्राआप्रशा/१/28751 — 53 4923 दिनांक : 01/12/21

प्रत सादर
१) जिल्हा आरोग्य अधिकारी, जिल्हा परिषद, जिल्हा नागपूर
२) शल्यचिकित्सक, जिल्हा रुग्णालय, जिल्हा नागपूर.

प्रभारी अधिकारी
प्रादेशिक आरोग्य प्रयोगशाळा
नागपूर

Water Testing Report for Year 2020 - 21

Annexure– VIII: List of Electronic Equipment's in College

ShriSachhidanandShikshanSanstha's
TAYWADE COLLEGE
Mahadula-Koradi, Tal. Kamptee, NAGPUR-441111

Details of Electronic Equipments,Computer, printer,scanner etc.

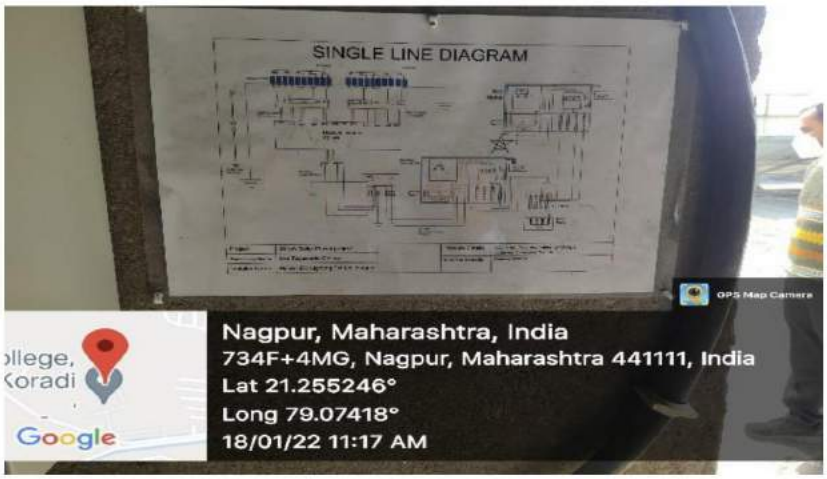
Acadmic Year - 2020-2021

Sr. No.	Item	Office & Principal Cabin	Computer lab & Other Labs	Staff cabin, Seminar Hall,Classrooms & Passage	Library Building	Total
1	Number of computer	14	29	04	13	60
2	Multifunction/Laser Printer	04+06	02+01	04+00	01+00	11+07
3	Xerox Machine	03	00	00	00	03
4	AC***	01	05	04	00	10
5	Laptops	01	01	01	00	03
6	Deep freezer ***	00	02	00	00	02
7	Refrigerators ***	00	07	00	00	07
8	Incubator	00	02	00	00	02
9	Audio System	00	00	01	00	01
10	LCD Projectors	00	04	01	00	05
11	CFL	08	01	09	02	20
12	LED Lights	07	31	56	05	99
13	Fans	11	45	100	26	182
14	Spot LED Lights	00	00	02	00	02
15	Tube Lights	08	29	81	37	155
16	UPS	02	02	00	01	05
17	Water Cooler RO	00	00	04	00	04
18	LED TV	02	00	01	00	03

Principal
Taywade College,
Mahadula, Koradi (Dist. Nagpur)

Annexure –IX: Solar Panel Installations

Solar Panels Installation on the College Roof



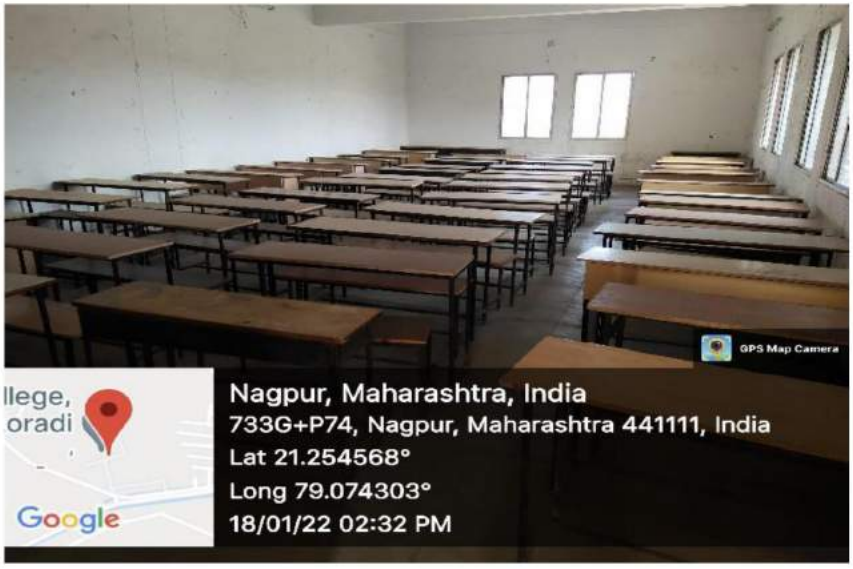
Junction Box and Net Meter

Annexure –X: Water Distribution Data

Note: The water is drawn from 3 nos. of wells, the water drawn is not measured.

Annexure –XI: Solar Passive Structure / Drip Irrigation

Note: No Drip Irrigation System Installed in College



Adequate light in classrooms without using electrical lighting

Adequate light in labs without using electrical lighting

Use of False Ceiling

Use of blinds for windows to reduce heat

Condenser of AC in shade

Annexure –XII: Water Management

Rain Water Harvesting System & Cement blocks in college for water harvesting

Tank constructed in college

Flush to be replaced by push buttons

Taps to be replaced by faucets

Well in college

Annexure –XIII: Waste Management

AC condensed water for ground recharge

Ban of single use plastic

Compost pit

E-Waste Collection Bin

महाराष्ट्र MAHARASHTRA

KW 606921
16 OCT 2014
Stamp Head Clerk / Sr. Cl

Agreement for disposal of E-Waste

This indenture of agreement is made on 01 Nov. 2014 between Principal, Taywade College, Koradi, Nagpur(Hereafter Party No. 1) and Prism Electronics, Nagpur, sole proprietor through Mr. Sanjay Bhokre (Hereafter Party No. 2)

Whereas the Party – 1, is running Arts, Commerce & Science College at Mahadula, Koradi, Dist. Nagpur. The College is recognized by Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur and Government of Maharashtra.

And

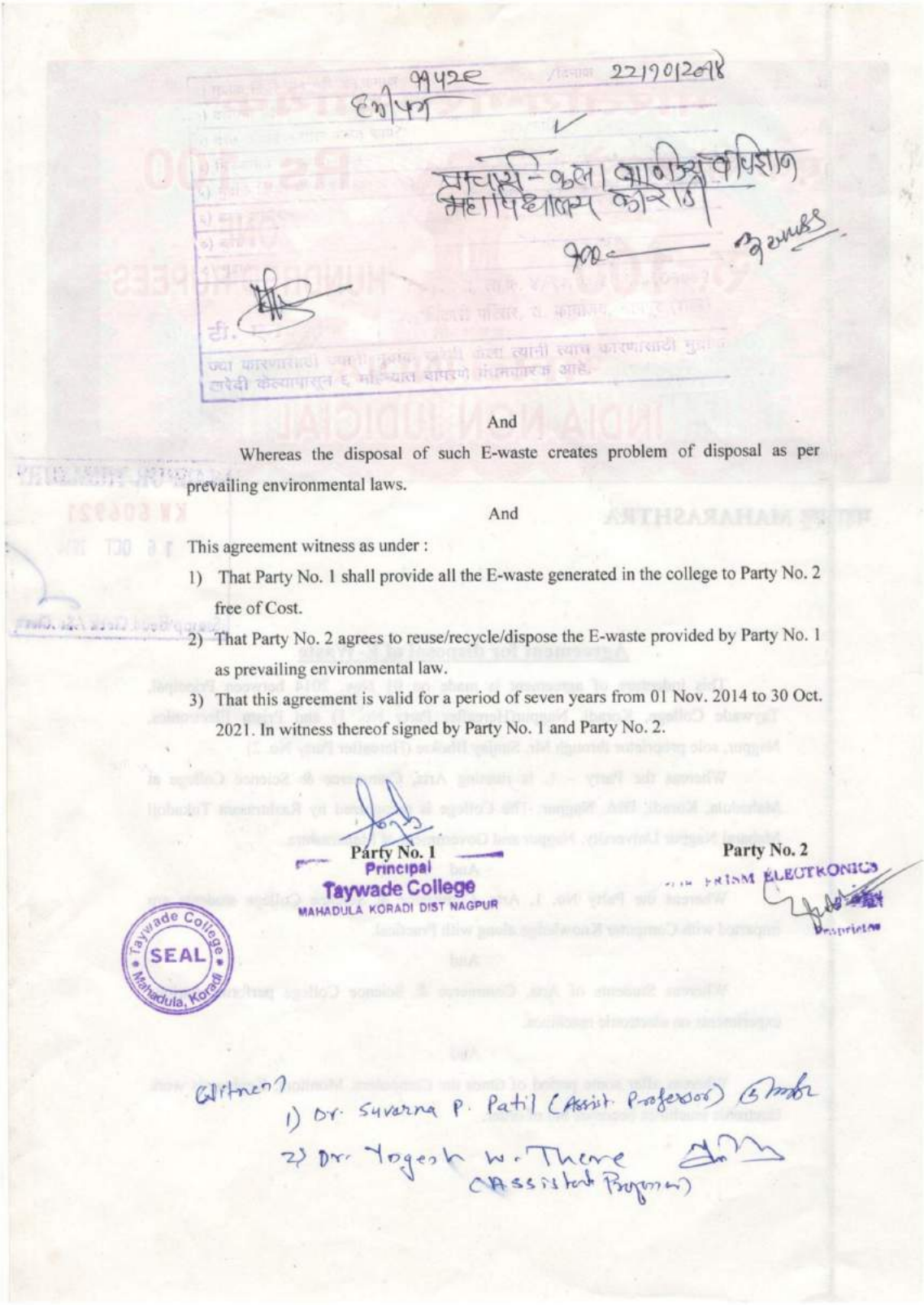
Whereas the Party No. 1, Arts, Commerce & Science College students are imparted with Computer Knowledge along with Practical.

And

Whereas Students of Arts, Commerce & Science College performs various experiments on electronic machines.

And

Whereas after some period of times the Computers, Monitors, Keyboards work electronic machines becomes out of order.



And

Whereas the disposal of such E-waste creates problem of disposal as per prevailing environmental laws.

And

This agreement witness as under :

1) That Party No. 1 shall provide all the E-waste generated in the college to Party No. 2 free of Cost.
2) That Party No. 2 agrees to reuse/recycle/dispose the E-waste provided by Party No. 1 as prevailing environmental law.
3) That this agreement is valid for a period of seven years from 01 Nov. 2014 to 30 Oct. 2021. In witness thereof signed by Party No. 1 and Party No. 2.

Party No. 1
Principal
Taywade College
MAHADULA KORADI DIST NAGPUR

Party No. 2
PRISM ELECTRONICS

SEAL

Witness
1) Dr. Suvarna P. Patil (Assist. Professor)
2) Dr. Yogesh W. There (Assistant Professor)

MOU of E-waste handling for 6 years

PRISM ELECTRONICS

❒ Data Guard/U & Kay/ APC/Microtec/UPS (On line & Off Line) ❒ Smart AVR (Stabliser) ❒ Exide /Okaya Battries
❒ Servo Stabliser, CVT ❒ Consumables ❒ Invertors ❒ HP/Sony/Levono/Compac Desktop & Laptop

C/o. Raghatate Printing Press, Mehadia Square, Chhoti Dhantoli, Nagpur - 440012. Ph. 0712-2774791, 9881488941

CERTIFICATE OF E-WASTE DISPOSAL

This the certify that the E-Waste received from Taywade College, Mahadula-Koradi, Dist. Nagpur during the Period from 01/07/2020 to 30/04/2021 has been disposed off in environment friendly manner.

Vide Certificate No. : PE/21/EW-39

Date : 02/05/2021

FOR PRISM ELECTRONICS
Proprietor

Authorized Signature

E-waste handling certificate for 2020-21

नगर पंचायत कार्यालय महादुला

ता. कामठी, जि. नागपूर-441111

ई-:मेल-mahadulanagarpanchyat@gmail.com टोल फ्री-:18001233265

जावक कमांक: 1688 /स्वच्छ.वि/नपंम/२०२१ दिनांक 01/12/२०२१

प्रमाणपत्र

प्रमाणीत करण्यात येते की,तायवाडे महाविद्यालय नगर पंचायत महादुला क्षेत्रात येत असुन नगर पंचायत द्वारे महाविद्यालय मधुन निघणारा ओला व सुखा कच–याची घंटागाडी मध्ये उचल नगर पंचायत द्वारे करण्यात येत असुन नगर पंचायत घनकचरा व्यवस्थापन प्रकल्पात कच–याची विल्हेवाट लावण्यात येते

करिता प्रमाणपत्र देण्यात येत आहे,

मुख्याधिकारी
नगरपंचायत महादुला

Letter from Nagar Panchayat for garbage collection

Shri Sachhidanand Shikshan Sanstha's

TAYWADE COLLEGE

(Arts, Commerce, Science) (U.G. & P.G.)

Mahadula - Koradi, Tah. Kamptee Dist. - Nagpur

NAAC ACCREDITED 'B' GRADE
Recognised Centre for
Higher Learning and Research

Principal
Dr. Sharyou B. Taywade
9822716608

Chairman
Dr. Babanrao Taywade
9422145290

Ref. No. :

CERTIFICATE

Date :

This is to certify that to our campus is declared as Plastic Ban Campus. No Plastic allowed in the campus area. Banners are displayed at various places to indicate Plastic Ban Campus.

PRINCIPAL
TAYWADE COLLEGE
Mahadula, Koradi

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Ban On Single Use Plastic Notice

Shri Sachhidanand Shikshan Sanstha's
TAYWADE COLLEGE
(Arts, Commerce, Science) (U.G. & P.G.)
Mahadula - Koradi, Tah. Kamptee Dist. - Nagpur

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9822716608

Chairman
Dr. Babanrao Taywade
9422145290

Ref. No. :

Date :

CERTIFICATE

This is to certify that to reduce air pollution it is decided to ban the vehicles in campus on every first Saturday of the month.

PPRINCIPAL
TAYWADE COLLEGE
Mahadula, Koradi

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No Vehicle Day Notice

Shri Sachhidanand Shikshan Sanstha's
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9822716608

Chairman
Dr. Babanrao Taywade
9422145290

Ref. No. :

Date :

CERTIFICATE

This is to certify that the overhead water tanks of our college are regularly cleaned after every 3 months by third party water tank cleaner M/s L. Khadgi, Panchpaoli Golibar Chaouk, Nagpur 440018.

PRINCIPAL
Taywade College,
Mahadula, Koradi Dist. Nagpur

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Formerly Known as Arts, Commerce & Science College, Koradi

tankclean

Clean tanks cleaner water

L. KHADGI

(We Clean All Types of Water Tanks)
Panchpaoli Golibar Chowk, Nagpur. 440018
Mob. 9373723989, 8208906497.

No. 157 Date:- 23 03 2021

M/s. Taywade College, Koradi

SR.No.	PARTICULARS	QTY.	AMOUNT RS.	AMOUNT PS.
01	Overhead water tank Cleaning	01	3800/-	
	TOTAL AMOUNT		3800/-	

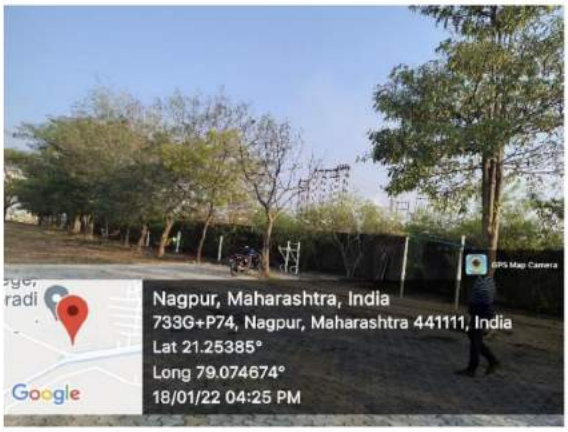
For L. KHADGI

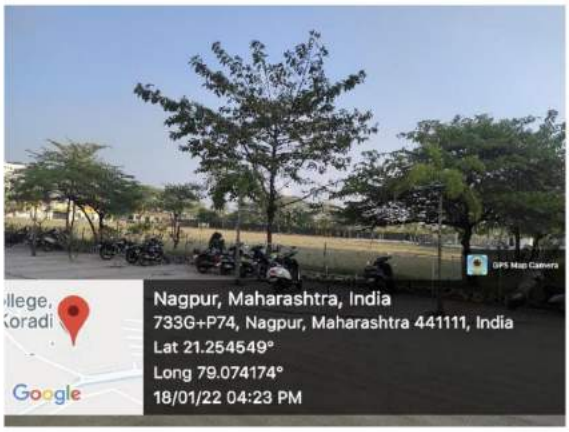
Annexure –XIV: Awareness / Posters

आदासा देवस्थान परिसरात वृक्षारोपण

कोराडी : स्थानिक तायवाडे महाविद्यालयातील राष्ट्रीय सेवा योजना व वनस्पती शास्त्र विभागाच्यावतीने श्रीक्षेत्र आदासा देवस्थान परिसर व मातोश्री वृद्धाश्रम परिसरात वृक्षारोपण करण्यात आले. कार्यक्रमाच्या अध्यक्षस्थानी प्राचार्या डॉ. शरयू तायवाडे होत्या तर प्रमुख अथिती म्हणून आदासा-सोनपूरचे सरपंच चेतन निंबाळकर, माजी सरपंच राजेंद्र जिचकार, मातोश्री वृद्धाश्रमाचे व्यवस्थापक प्रदीप चंदनबटवे उपस्थित होते. यावेळी विविध जातींच्या रोपट्यांची लागवड करण्यात आली. शिवाय, त्यांच्या संगोपनाची जबाबदारीही स्वीकारण्यात आली. संचालन प्रा. डॉ. किशोर घोरमाडे यांनी केले तर प्रा. डॉ. सुवर्णा पाटील यांनी आभार मानले. याप्रसंगी प्रा. डॉ. वकील शेख, शुभम चव्हाण, ज्ञानेश्वर डहाके, सौरभ मांडवगडे यांच्यासह रासेयोचे विद्यार्थी उपस्थित होते.

Tree Plantation Drive at Adasa on 07th July 2020





Landscaping with trees and plants

Green Gym in the college

Diesel Generator in college

No Vehicle Day Banner

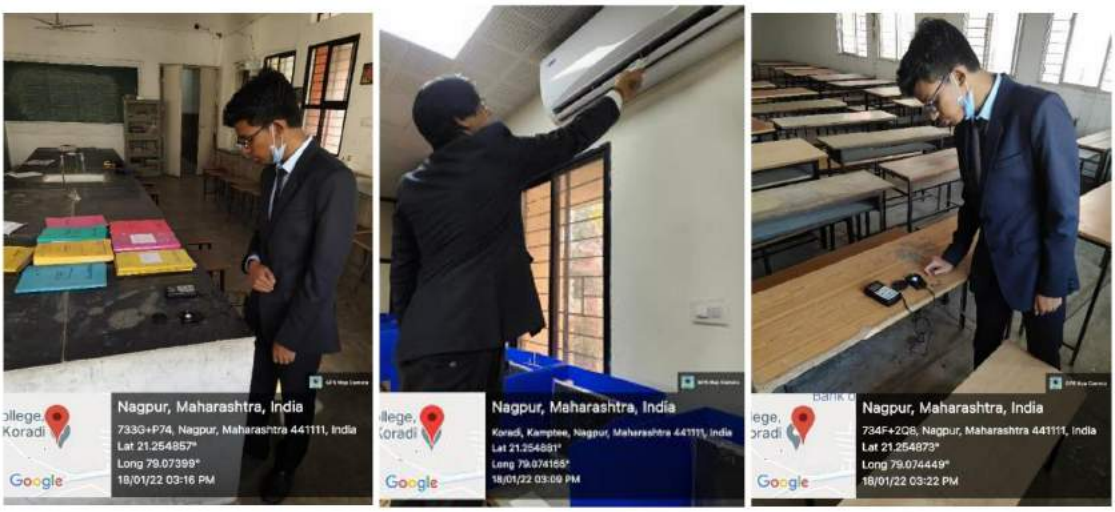
Pedestrian friendly pathways

Biometric attendance for staff members

Green Audit Team in discussion with the principal

Green Audit Team interviewing the staff

Annexure –XV: Onsite Measurements (Sample Pictures)



Onsite measurements taken by Green Audit Team

Lux meter readings taken by Green Audit Team

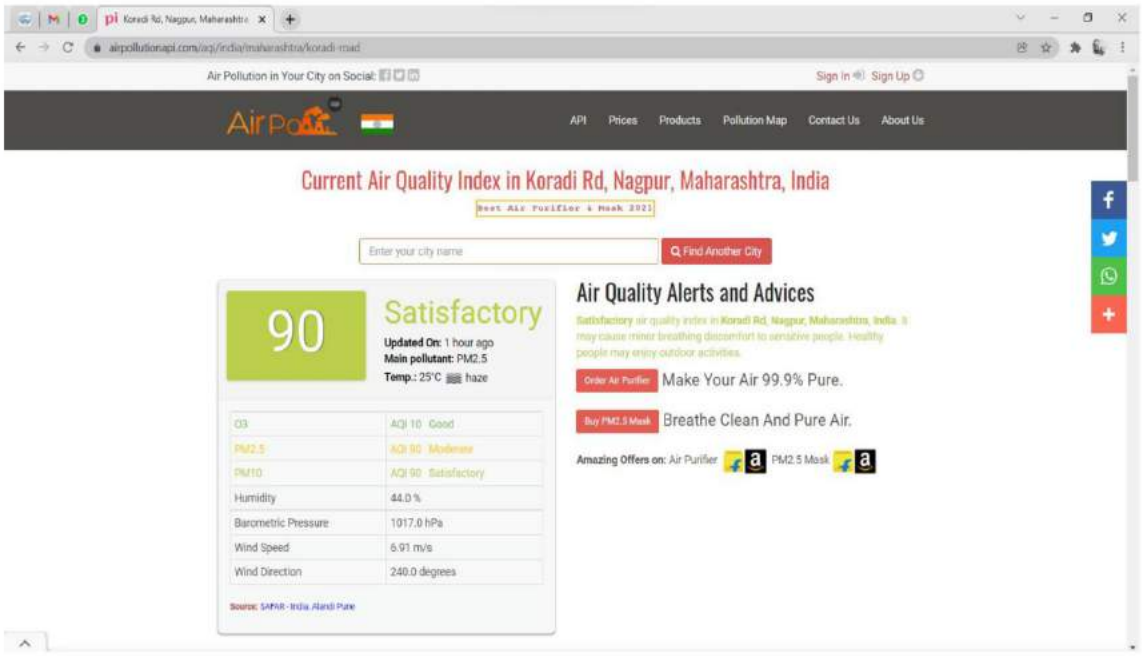
Fire extinguishers installed in the college

Annexure –XVI: Sound and Air Quality Readings

WHO/ CPCB Guidelines for Noise[12]

Specific Environment	Time Base (hours)	Standard limits as per WHO guidelines	
		LAeq [dB]	LAmax, Fast [dB]
School class rooms and pre-schools, indoors	During class	35	-
School, playground outdoor	During play	55	-
Ceremonies, festivals and entertainment events	4	100	110
Public addresses, indoors and outdoors	1	85	110

The noise levels were registered at various locations. Sample evidence in form of readings is captured in next page.



Air Quality Index

The Air Quality is independently monitored and sourced from publically available, reliable and reproducible source. Air Quality was found satisfactory however it is variable and changes with season and anthropogenic activities.

[12] https://cpcb.nic.in/who-guidelines-for-noise-quality/,http://cpcbenvis.nic.in/noisepollution/noise_rules_2000.pdf , https://www.mpcb.gov.in/sites/default/files/noise-pollution/archives/noise-monitoring/Metro_city_Noise_Monitoring_Report_Final.pdf

Computer Lab

Classroom

Campus

Office

Readings of sound at various locations in college

Annexure –XVII: Energy Audit Report

Description of Energy Audit

An energy audit is an inspection, survey and analysis of energy flows, for energy conservation in a building, process & system to reduce the amount of energy input into the system without affecting the output(s). An energy audit is the first step in identifying opportunities to reduce energy expense and carbon footprints.

The term energy audit is commonly used to describe a broad spectrum of energy studies ranging from a quick walk-through of a facility to identify major problem areas to a comprehensive analysis of the implications of alternative energy efficiency measures sufficient to satisfy the financial criteria of sophisticated investors.

Major process of Energy Audit: -

- The analysis of building and utility data, including study of the installed equipment and analysis of energy bills;
- The survey of the real operating conditions;
- The understanding of the building behavior and of the interactions with weather, occupancy and operating schedules;
- The selection and the evaluation of energy conservation measures;
- The estimation of energy saving potential;
- The identification of customer concerns and needs.

Generally, four levels of analysis can be outlined: -

Level 0 – Benchmarking: Breakout of electric and fuel consumptions into end-use components (space heating, fan energy, lighting consumption, etc.). Comparison of the building's consumptions to other buildings of typical size, use and geographic location.

Level I – Walk-through audit: Preliminary analysis made to assess building energy efficiency to identify not only simple and low-cost improvements but also a list of energy conservation measures to orient the future detailed audit. This inspection is based on visual verifications, study of installed equipment and operating data and detailed analysis of recorded energy consumption collected during the benchmarking phase;

Level II – Detailed/General energy audit: Based on the results of the pre-audit, this type of energy audit consists in energy use survey in order to provide a comprehensive analysis of the studied installation

Level III – Investment-Grade audit: Detailed Analysis of Capital-Intensive Modifications focusing on potential costly ECOs requiring rigorous engineering study.

Chapter 1 – Description of Process and Measurements

Instrument Used for the Study: -

1. 3 Phase power Data Logger – Fluke 1735 model

The 3-phase power analyzer and data logger were used to measure and log the electrical parameters data for the various load centers in the facility. Most of the loads have variation in power requirement and therefore logging helps to observe the variations as well as the average electrical consumption of the load centers.

Using the logger, all major electrical parameters of voltage, current, power, power factor, apparent power, harmonics etc. are recorded at fixed intervals of time.

The variation of parameters like power are plotted and shown with time on X axis and parameter on Y axis. Observations are made based on these measurements.

Some Basic terms:

1. Power – kilowatt (kW) – It is the power consumed by the equipment. This value is varying as per load requirements.
2. Energy – kilowatt hour (kWh) – It is the energy (electrical units) consumed by the equipment. If average power for an electrical load is 2 kW, it means that it consumes 2 kWh units per hour.
3. Apparent power kilo Volt Ampere (kVA) – It is a measure of demand Power / power factor.

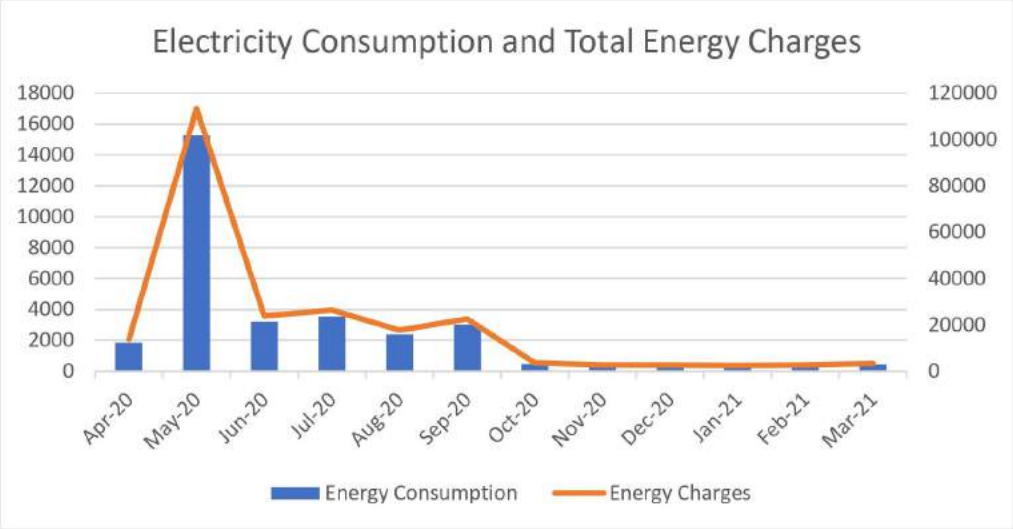
Chapter 2 – Electrical Bill Analysis

Electricity bill pattern under consideration is from April 2020 to March 2021

Consumer No	410120125480
Tariff	88 LT-VII B I
Category	Public Services Other
Connected Load	50.00 kW
Contract Demand	63.00 KVA
50% of Contract Demand	31.05 KVA

Sr. No.	Month	Energy Consumption	Rate/kWh	Energy Charges
1	Apr-20	1852	7.44	13778
2	May-20	15261	7.43	113346
3	Jun-20	3206	7.44	23852
4	Jul-20	3543	7.44	26359
5	Aug-20	2384	7.44	17736
6	Sep-20	3024	7.44	22498
7	Oct-20	481	7.44	3578
8	Nov-20	354	7.44	2633
9	Dec-20	361	7.44	2685
10	Jan-21	328	7.44	2440
11	Feb-21	357	7.44	2656
12	Mar-21	444	7.44	3303
Average		**2632.92**	**7.44**	**19572.00**
Yearly		**31595**	-	**234864**

Table: Monthly Electricity Consumption Details (Year April 2020 to March 2021)



Graphical Representation of Electricity Consumption and Total Energy Charges

Observations from Bill Analysis for Year April 2020 to March 2021:

1. Average monthly MSEDCL energy consumption are 2632 Units (kWh) and avg. monthly bill is Rs.19572
2. Average of 12 months' unit cost is Rs. 7.44 / kWh. (Excluding Tax).

Chapter 3: Electrical Logging for Main Feeder

Start (India Standard Time)	Vrms_AN_avg	Vrms_BN_avg	Vrms_CN_avg	Vrms_AB_avg	Vrms_BC_avg	Vrms_CA_avg	Irms_A_avg	Irms_B_avg	Irms_C_avg	VIdistorsion_VA_avg	VIdistorsion_VB_avg	VIdistorsion_VC_avg	VIdistorsion_IA_avg	VIdistorsion_IB_avg	VIdistorsion_IC_avg
11:40:40	247	247	254	428	434	432	26.3	40.9	30.4	1.9	1.8	2.1	10.5	8.8	13.2
11:40:50	247	247	254	429	434	432	26.2	41.1	30.3	1.9	1.8	2.1	10.4	8.7	13.2
11:41:00	247	247	254	429	434	432	26.6	41.2	30.2	1.9	1.8	2	10.4	8.6	13.3
11:41:10	247	247	254	429	434	432	28.1	41.1	30.1	1.8	1.8	2	9.9	8.6	13.6
11:41:20	247	246	254	428	434	432	28.1	41.1	30.1	1.9	1.8	2	10.2	8.5	13.8
11:41:30	247	246	254	428	434	432	27.7	41	30.1	1.8	1.8	2	10.5	8.6	13.7
11:41:40	247	246	254	428	434	433	27.6	41	30.1	1.8	1.8	2.1	10.3	8.6	13.7
11:41:50	247	246	254	428	434	433	26.6	41	30.2	1.8	1.8	2	10.6	8.7	13.6
11:42:00	247	246	254	428	434	432	26	39.4	30.2	1.9	1.8	2.1	10.5	9	13.6
11:42:10	247	247	254	429	434	433	26.3	34.8	30.1	1.9	1.9	2.1	10.9	10.1	13.6
11:42:20	247	247	254	429	434	433	25.8	34.7	30	1.9	1.9	2.1	10.5	10.1	13.7
11:42:30	247	247	254	429	435	433	25.4	34.6	29.6	2	1.9	2.1	11.1	10.1	14
11:42:40	247	247	255	429	435	433	25.7	34.7	29.6	2	1.9	2	11.4	10.2	13.9
11:42:50	247	247	254	429	434	433	25.1	34.6	29.6	2	1.9	2	11.3	10.2	13.5
11:43:00	247	247	254	429	435	433	24.4	34.6	29.6	2	1.9	2	11.5	10.2	13.5
11:43:10	247	247	254	429	435	433	24.9	34.7	29.2	2	2	2	11.6	10.4	14.2
11:43:20	247	247	254	429	434	433	24.7	34.6	29.1	2	1.9	1.9	11.6	10.3	15
11:43:30	247	247	254	429	434	433	24.7	34.6	29.1	2	1.9	2	12.1	10.3	14.7
11:43:40	247	246	254	429	434	433	24.1	35.6	29	2	1.9	2	11.8	9.8	14.4

11:43:50	247	246	254	429	434	433	25.8	36	29	1.9	1.8	2	12	9.7	14.4
11:44:00	247	246	254	428	434	433	26.7	36.1	29	1.9	1.8	1.9	12.1	9.5	14.4
11:44:10	247	246	254	428	434	432	24.6	36	29	1.9	1.8	1.9	11.6	9.4	14.4
11:44:20	247	246	254	429	434	432	24.8	36	29	1.9	1.9	2	11.8	9.5	14.5
11:44:30	247	246	254	429	434	432	24.9	36.7	29.8	1.9	1.9	2	11.7	9.7	14.8
11:44:40	247	246	254	429	434	432	24.6	36.4	29.7	1.9	1.9	2	11.7	9.6	14.8
11:44:50	247	246	254	429	434	432	24.8	36.1	29.1	1.9	1.9	2	11.6	9.6	15.6
11:45:00	247	247	254	428	434	432	24.9	36.2	28.5	1.9	1.9	1.9	11.5	9.6	16.5
11:45:10	247	247	254	429	435	433	24.5	36.1	27.1	1.9	1.9	1.9	11.5	9.5	17
11:45:20	247	247	254	429	434	433	23.8	36	26.6	1.9	1.9	2	11.9	9.6	16.2
11:45:30	247	247	255	429	435	433	26	36.3	26.9	1.9	1.9	2	11.1	9.7	15.8
11:45:40	247	247	254	429	435	433	28.8	37	29.4	1.9	1.8	2	11.3	10.9	16
11:45:50	247	247	254	429	435	432	30.6	38.3	32.1	1.8	1.8	1.9	12.4	12.1	16.6
11:46:00	247	247	255	429	435	433	28	36.2	28.5	1.9	1.9	2.1	10.1	9.8	14.6
11:46:10	247	247	254	429	434	433	28.1	41.6	28.7	1.9	1.9	2	10.1	8.7	14.5
11:46:20	247	247	255	429	435	433	28.1	42.7	29.3	1.9	1.9	2	10	8.4	14.2
11:46:30	247	247	255	428	435	433	28.2	41.8	28.8	1.9	1.8	2	10	8.6	14.4
11:46:40	247	247	255	428	435	433	28.2	40.8	28.9	1.9	1.8	2	10	8.8	14.4
11:46:50	247	247	255	429	435	433	28.2	41.3	29.3	1.9	1.8	2	9.9	8.7	14.2
11:47:00	247	247	255	429	435	433	28.1	41.7	28.8	1.9	1.8	2	10	8.6	14.4
11:47:10	247	247	255	430	435	433	28.2	42	29.1	1.9	1.8	2	10	8.6	14.1
11:47:20	247	247	255	429	435	433	28.2	42.1	29.3	2	1.9	2	10	8.6	14.2
11:47:30	247	247	255	429	435	433	31.4	41.2	28.6	1.9	1.8	2	10.4	8.8	14.2
11:47:40	247	247	255	429	435	433	30.4	42.2	29.3	1.9	1.8	2.1	10.5	8.6	13.6

11:47:50	247	247	255	429	435	433	28.2	42.6	29.1	1.9	1.8	2.1	10	8.5	13.7
11:48:00	247	247	255	429	434	433	28.1	42.7	28.8	1.9	1.8	2.1	9.9	8.5	13.8
11:48:10	247	247	255	429	434	433	28.2	42.6	29.6	1.9	1.8	2	10	8.5	13.4
11:48:20	247	247	255	430	435	433	28.2	41.8	29.5	1.9	1.9	2.1	10.1	8.7	13.6
11:48:30	247	247	255	430	435	433	28.5	43.5	29.6	1.9	1.9	2.1	10.2	8.7	14
11:48:40	248	247	255	430	435	434	28.2	43.4	30.1	2	1.9	2.1	10.2	8.6	13.4
11:48:50	247	247	255	429	435	434	32.4	42.9	29.7	1.9	1.8	2.1	9	8.6	13.2
11:49:00	248	247	255	430	436	434	28.5	41.8	29.6	1.9	1.8	2.1	10	8.7	12.8
11:49:10	248	247	255	430	436	434	28.4	42.3	30	1.9	1.9	2.1	9.9	8.6	12.6
11:49:20	247	248	255	430	436	434	28.2	38.2	29.8	1.9	1.9	2.1	10	9.3	12.6
11:49:30	247	248	255	429	436	434	28.1	36.9	30	1.9	1.9	2.1	10	9.7	12.4
11:49:40	247	247	255	429	436	434	28.3	36.1	30.1	1.9	1.9	2.1	9.9	10	12.3
11:49:50	247	247	255	429	436	434	28.1	36	29.8	1.9	1.9	2.1	10.2	10	12.5
11:50:00	247	247	255	429	436	433	28.7	36.8	30.1	1.9	1.9	2.1	9.9	9.8	12.4
11:50:10	247	247	255	428	435	433	31	36.8	30.2	1.9	1.9	2.1	9.3	9.8	12.3
11:50:20	248	247	255	430	436	434	28.6	36.2	29.4	2	1.9	2.1	10	10	12.6
11:50:30	247	247	255	429	436	433	29.4	36	30.1	2	1.9	2.2	9.9	10.1	12.3
11:50:40	247	247	255	429	435	433	29.7	36.9	30.4	2	1.9	2.1	9.7	9.7	12.1
11:50:50	247	247	255	429	435	433	29.4	36.8	29.7	1.9	1.9	2.1	9.8	9.7	12.3
11:51:00	247	247	255	429	435	433	28.5	36.2	30.5	2	1.9	2.1	10	10	12
11:51:10	247	248	255	430	436	433	29.1	36.1	30.2	2	1.9	2.1	10.3	10.2	12
11:51:20	247	248	255	430	436	433	27.8	36.9	29.9	2	2	2.1	10.5	10	12.2
11:51:30	248	248	255	430	436	434	27.8	36.9	30.5	2	2	2.1	10.6	10.1	11.9
11:51:40	247	248	255	430	436	433	28	36.2	30.4	2	2	2.2	10.3	10.3	11.9

11:51:50	248	248	255	430	436	433	27.8	36	30.1	2	2	2.1	10.6	10.3	12
11:52:00	247	247	254	429	435	432	32.2	41.4	36.4	1.8	1.7	2	13.7	12.3	14
11:52:10	248	247	255	429	435	433	28	37.3	31	2	1.9	2.1	10.9	10.5	12.6
11:52:20	248	247	255	429	436	434	27.3	35.8	30.3	2	1.9	2.1	10.7	10.3	12
11:52:30	248	247	255	430	436	434	27.7	35.9	30.3	2	1.9	2.1	10.4	10.2	12
11:52:40	248	247	255	430	436	434	27.7	36.7	30.2	2	1.9	2.1	10.5	10.1	12
11:52:50	248	247	255	430	435	433	27.5	36.6	30.5	2	1.9	2.1	10.7	10	11.8
11:53:00	248	247	255	430	435	433	27.6	36.3	31	2	1.9	2.1	10.8	10.3	12
11:53:10	248	247	255	430	435	434	27.6	36.3	30.3	2	1.9	2.1	10.7	10.4	12.2
11:53:20	248	247	255	429	435	433	28.8	39.9	32.4	2	1.9	2.1	11.8	10.4	12.9
11:53:30	248	246	255	429	434	433	30.3	46.1	34.2	1.9	1.8	2	12.8	10.2	14.1
11:53:40	248	247	255	430	435	434	27.7	41.6	30	2	1.9	2.1	10.5	9.1	12
11:53:50	248	247	255	430	435	433	27.6	41.5	30.5	2	1.9	2.1	10.6	9.1	11.9
11:54:00	247	247	255	429	435	433	27.7	42.2	31.8	2	1.9	2.1	10.4	8.9	11.4
11:54:10	247	247	255	429	435	433	27.6	42	32.4	2	1.9	2.1	10.5	9	11.1
11:54:20	247	247	255	429	435	433	27.7	41.3	32.2	1.9	1.9	2.1	10.5	9.1	11.3
11:54:30	247	247	255	429	435	433	27.7	41.5	32.1	2	1.9	2.1	10.5	9	11.3
11:54:40	247	247	255	429	435	433	27.4	42.1	31.2	2	1.9	2.2	10.7	8.9	11.6
11:54:50	247	247	255	429	435	433	27.5	42.2	32.2	2	1.9	2.1	10.4	8.8	11.2
11:55:00	247	247	255	429	435	433	27.7	41.4	31.8	1.9	1.9	2.1	10.5	9	11.4
11:55:10	247	247	255	429	435	433	27.8	41.9	31.3	1.9	1.8	2.1	10.5	8.9	11.5
11:55:20	247	247	255	429	435	433	27.5	42.6	30	1.9	1.8	2.1	10.5	8.7	12
11:55:30	247	247	255	429	434	433	27.8	42.8	29.7	1.9	1.8	2	10.3	8.6	12.2
11:55:40	247	247	255	429	434	433	27.5	41.8	29.7	1.9	1.8	2	10.4	8.8	12.2

11:55:50	247	247	255	429	434	433	27.7	42.5	30.8	1.9	1.8	2.1	10.2	8.6	11.8
11:56:00	247	246	255	429	434	433	27.7	43.1	29.8	1.9	1.8	2.1	10.3	8.4	12.2
11:56:10	247	246	255	429	434	433	28.2	43.2	29.6	2	1.8	2.1	10.6	8.4	12.3
11:56:20	247	246	255	429	434	433	29.9	42.2	29.5	2	1.8	2.2	11.1	8.7	12.3
11:56:30	247	246	255	429	434	433	29.3	42.6	29.2	1.9	1.8	2.1	10.8	8.6	12.4
11:56:40	247	246	255	429	434	433	27.9	43.3	29.2	2	1.8	2.1	10.4	8.4	12.4
11:56:50	247	247	255	429	434	433	27.6	37.1	29.2	1.9	1.8	2.1	10.4	9.5	12.4
11:57:00	247	247	255	429	434	433	27.8	35.5	29.3	1.9	1.8	2.1	10.7	10	12.4
11:57:10	247	247	255	429	434	433	27.4	36	29.6	1.9	1.8	2.1	10.6	9.8	12.4
11:57:20	247	247	255	429	434	433	27.8	36.7	29.4	1.9	1.8	2.1	10.7	9.6	12.4
11:57:30	247	247	255	429	434	433	27.5	36.4	29.4	2	1.8	2.2	10.6	9.8	12.4
11:57:40	247	247	255	429	434	433	27.8	35.6	29.4	2	1.9	2.2	10.8	10	12.4
11:57:50	247	246	254	428	434	433	27.5	36.3	29.4	1.9	1.8	2.1	10.4	9.6	12.2
11:58:00	247	246	254	428	434	433	28.1	36.6	29.3	1.9	1.8	2.1	10.5	9.5	12.2
11:58:10	247	246	254	429	434	433	27.4	36.3	29.3	2	1.8	2.1	10.4	9.7	12.3
11:58:20	247	246	254	429	434	433	27.5	35.5	29.3	2	1.8	2.2	10.6	10	12.4
11:58:30	247	246	254	429	434	432	27.4	36.4	29.3	2	1.8	2.2	10.4	9.7	12.3
11:58:40	247	246	254	429	434	432	27.4	36.6	29.3	2	1.9	2.2	10.3	9.8	12.3
11:58:50	247	247	254	429	434	432	27.6	36	29.2	2	1.9	2.2	10.5	9.9	12.3
11:59:00	247	247	255	429	436	433	27.2	35.7	29.1	2	1.9	2.2	10.3	10.1	12.3
11:59:10	247	247	255	430	436	433	27.5	36.7	29.1	2	1.9	2.2	10.5	9.8	12.4
11:59:20	247	247	255	430	435	433	27.2	36.6	29.1	2	1.9	2.2	10.3	9.7	12.4
11:59:30	248	247	255	430	435	433	27.4	35.8	29.1	1.9	1.9	2.2	10.5	10	12.5
11:59:40	248	247	255	430	435	433	27.2	35.8	29.2	1.9	1.9	2.2	10.4	9.9	12.4

11:59:50	247	247	255	429	435	433	28.9	36.6	29.3	2	1.9	2.1	10.1	9.7	12.2
12:00:00	247	247	255	429	435	433	31.2	36.6	29.3	2	1.9	2.1	9.5	9.8	12.2
12:00:10	248	247	255	430	435	433	28	35.7	29.3	2	1.9	2.2	10.6	10.2	12.3
12:00:20	248	247	255	430	435	434	27.2	36.3	29.3	2	1.9	2.1	10.5	9.9	12.3
12:00:30	248	248	255	430	436	434	27.7	36.7	29.4	2	1.9	2.1	10.7	9.8	12.4
12:00:40	248	247	255	430	435	434	30	38.2	29.3	2	1.9	2.2	9.9	9.4	12.4
12:00:50	248	247	255	430	435	434	28	42.3	29.3	2	1.8	2.2	10.5	8.7	12.5
12:01:00	248	247	255	430	435	434	28.9	42.2	29.2	2	1.8	2.2	10.4	8.7	12.4
12:01:10	248	247	255	430	435	434	27.5	42	29.2	1.9	1.8	2.1	10.4	8.7	12.3

The following table gives the results of voltage & Current data logging for main Feeder.

	Voltage Variation (V) – L1	Voltage Variation (V) – L2	Voltage Variation (V) – L3	Current Variation (A) – L1	Current Variation (A) – L2	Current Variation (A) – L3
Minimum	247.00	246.00	254.00	23.80	34.60	26.60
Maximum	248.00	248.00	255.00	32.40	46.10	36.40
Average	247.21	246.86	254.69	27.65	38.65	29.82

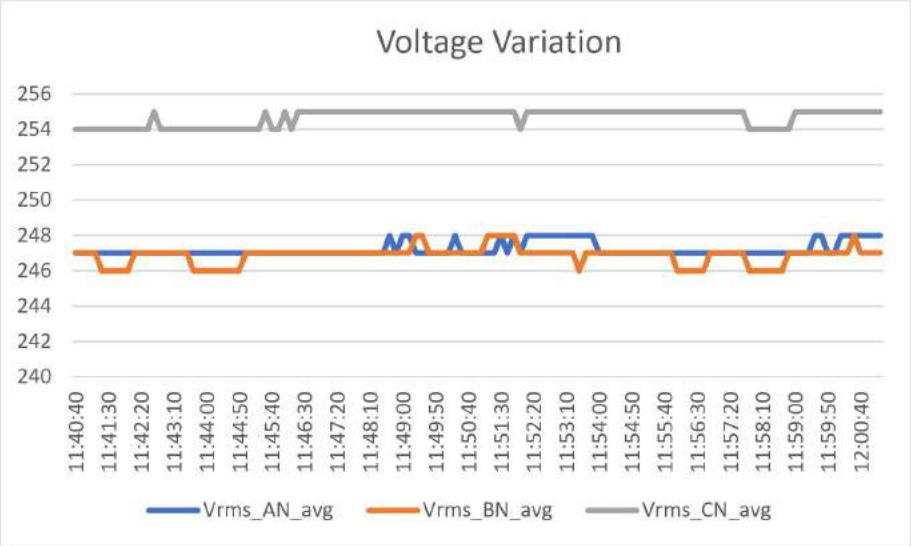
The following table gives the results of power data logging for main Feeder.

	Total Harmonics Distortion – Voltage (THD L1)	Total Harmonics Distortion – Voltage (THD L2)	Total Harmonics Distortion – Voltage (THD L3)	Total Harmonics Distortion – Current (THD L1)	Total Harmonics Distortion – Current (THD L2)	Total Harmonics Distortion – Current (THD L3)
Minimum	1.80	1.70	1.90	9.20	9.00	8.40
Maximum	2.00	2.00	2.20	13.70	12.30	17.00
Average	1.94	1.86	2.08	10.60	9.47	13.06

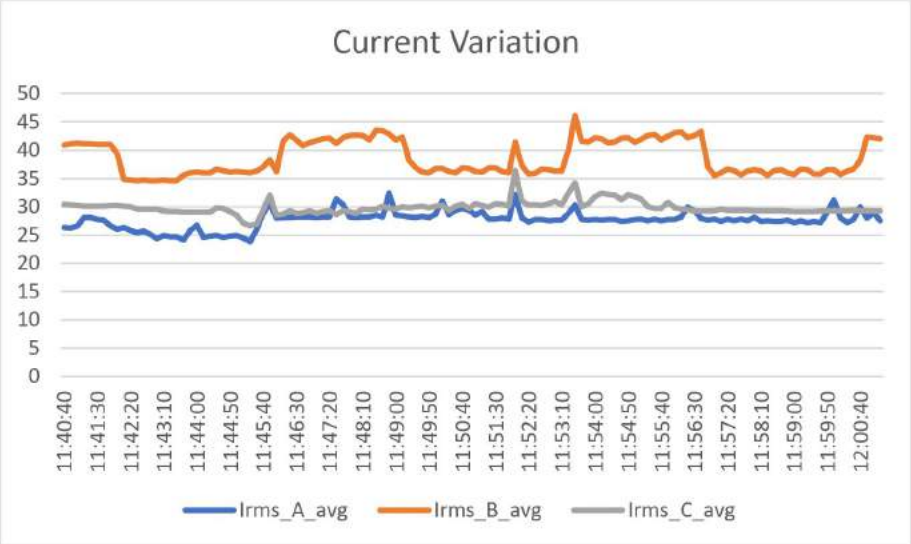
Observations for Main Feeder Logging

- The voltage variation from was recorded in range of 246 V to 255 V. Increase in voltage levels can damage the electrical equipment's such as Lightings. Use of voltage stabilizer at the source end will deliver a constant value of voltage. It is recommended to use 15 KVA Voltage Stabilizer at the source end.
- There is unbalance in current. The unbalance in 3 phases is around 10 – 15 % which is high. The unbalance in network was recorded due to some load connected in the Line 2. It is recommended that the single-phase loads on each phase are distributed properly so that the current in each phase will be balanced.
- Voltage harmonics are found to be within acceptable limits. The maximum allowable voltage harmonics is about 5 %. Voltage harmonics are a function of the supply from service provider and indicate pollution of the electrical grid system by non-linear loads. Observed voltage harmonics are up to 2%.

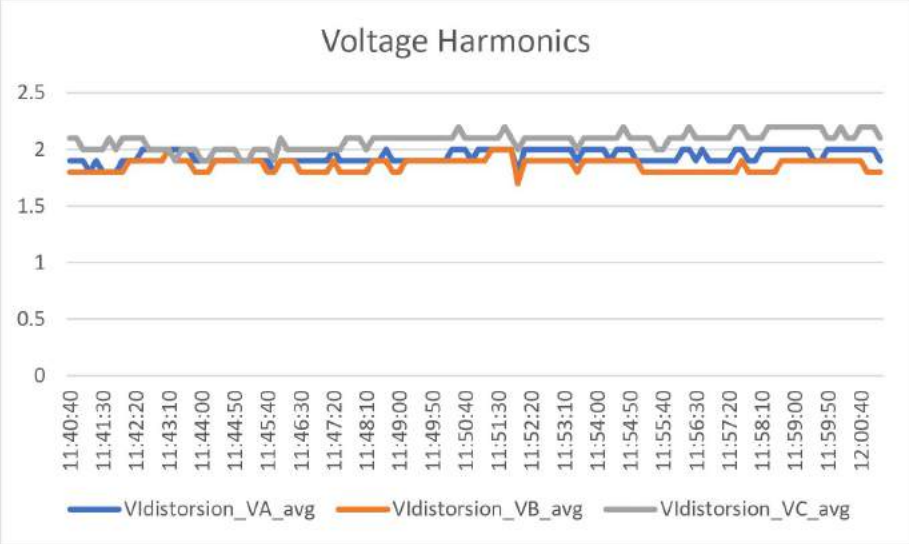
Graphical Representations of Measured Electrical Data



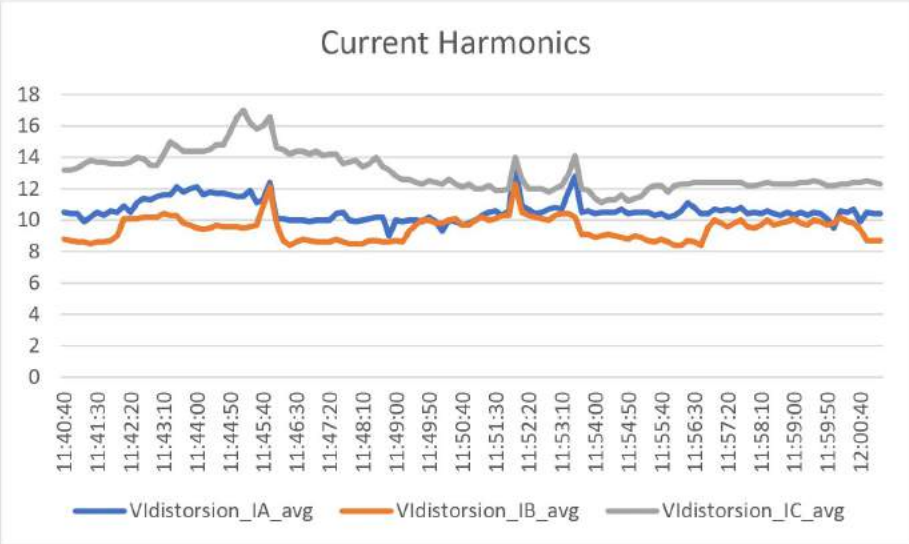
Graphical Representation of 3 Phase Voltage Variation



Graphical Representation of 3 Phase Current Variation



Graphical Representation of 3 Phase Voltage Harmonics Variation



Graphical Representation of 3 Phase Current Harmonics Variation

Annexure –XVIII: Snapshot of annual rainfall data, Grid Emission Factor

Table: Rainfall data of Nagpur District (2002-2011) in mm

Taluka	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
Nagpur city	1176.1	1431.5	702.3	973.4	975.7	741	952.9	954.4	1395	879.4	**1018.2**
Nagpur Gramin	966.7	1229	689	1274.7	1205.5	966.3	953.2	947.4	1495	913.8	**1064**
Kamthi	1035.8	1208.7	707.1	1475.8	1178.2	1205	791.6	1032.6	1099	861.3	**1059.5**
Hingna	489.2	770	583.3	920.4	814.9	806	683.1	724.7	942.2	814.8	**753.9**
Ramtek	1101.3	822.5	733.9	1435.5	1133	1370.8	865.3	905.2	1184	885.1	**1043.7**
Parshiwani	850.1	1056.9	858.4	1239.5	1106.2	878.8	1068.6	983.6	1087	1043.8	**1017.3**
Maudha	904	1171.6	631.3	1679.1	1114.3	1030.9	814.1	1280.4	1521	1366.2	**1151.2**
Katol	649.6	920.1	555.1	1092.3	937.4	1271.8	773.2	888.4	1028	801.8	**891.8**
Narkhed	822.8	778	606.7	914.9	768.6	1281.3	671	954.1	1137	764.9	**869.9**
Savner	823.6	1063.6	812.6	1497.2	974.1	1209	873.6	941.6	1078	945.8	**1022**
Kalmeshwar	740	1092.2	808.6	1320.9	916.4	1203.4	675.9	780.5	1181	855.2	**957.4**
Umrer	846.2	1296.8	747.1	1856.3	1014.2	1464	1060.4	926.2	1551	887.1	**1164.9**
Bhiwapur	923.3	1146.3	740.4	1431.2	1045.6	1341.8	853.2	993.7	1690	1088.4	**1125.4**
Kuhi	859.2	1057.2	596.4	1543.8	828.6	1286	817.9	950.3	1292	1024.7	**1025.6**
Average	**869.9**	**1074.7**	**698**	**1332.5**	**1000.9**	**1146**	**846.7**	**947.4**	**1263**	**938**	**1011.8**

Web link: http://www.agri.mah.nic.in

CEA Database Version-13

Emission Factors (tCO2/MWh) (incl. Imports)	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Weighted Average Emission Rate (2)	0.78	0.83	0.82	0.82	0.82	0.82
Simple Operating Margin (1) (2)	0.97	0.99	1.00	0.99	0.97	0.96
Build Margin (not adjusted for imports)	0.92	0.97	0.95	0.93	0.91	0.87
Combined Margin (1) (2)	0.95	0.98	0.98	0.96	0.94	0.92

Action Taken Report

Shri Sachhidanand Shikshan Sanstha's
TAYWADE COLLEGE
(Arts, Commerce, Science) (U.G. & P.G.)
Mahadula - Koradi, Tah. Kamptee Dist. - Nagpur
NAAC ACCREDITED 'B' GRADE
Recognised Centre for
Higher Learning and Research

Principal
Dr. Sharyou B. Taywade
9822716608

Chairman
Dr. Babanrao Taywade
9422145290

Ref. No. :

Date : 16/01/22

Action Taken Report

Sr. No.	Last Audits Recommendation	Action Taken
1	At organization level, the college needs to establish long term improvement objectives to further reduce energy consumption, water consumption and reflect the same in form of dedicated Environment Policy.	The college has published the notices for switching off the electrical equipment and computers when they are not in use. Time to time repairing of water taps has been done.
2	College may calculate the water footprint to compare its performance with national and international consumption standards and communicate with its stakeholders.	The college is trying to reduce the use of water maintain the water footprint to compare its performance with national and international consumption standards and communicate with its stakeholders.
3	As per the replacement policy the college should continue to install LED lights in the class rooms in place of conventional tube lights. The existing CFL lamps[4]should be replaced by the LED lamps.	IN most of the laboratories and in office the LED lights has been installed
4	The students and staff washrooms can be equipped with the proximity sensors to control the lighting arrangements	The college has submit the requisite to the management to purchase proximity sensors to control the lighting arrangements
5	The 2 start AC are not the most economical AC for the sustained working hours of 5-6 hours for approximately 100 days a year. It is recommended to replace the AC with more energy efficient AC (at least 3 Star ratings or above).	The AC of computer lab has been replaced with more efficient AC with 3 star rating.
6	Rain water harvesting system should be installed on the college building and hostel.	Rain Water Harvesting system is installed in hostel and indoor stadium building.

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Mahadula, Koradi (Dist. Nagpur)

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7	Third party water testing needs to be executed by thecollege.	Water testing has been done by Maharashtra state regional Heath Laboratory, Nagpur
8	College can also buy carbon credits (registered under CDM, VCS) to offset its GHG emissions.	The college management is looking forward to it
9	College Management should encourage use of bi- cycle and mass transport systems amongst studentsand faculties.	Most of the employees of the college use sharing basis transportation. Accordingly college also publish a notice
10	The college should further emphasize on the purchase of: ➢ paper/paper products with maximum recycled content ➢ refillable pens/pencils compostable bags for compost collection	The college has made the efforts to make the campus plastic free and emphasize on use of maximum paper bags. Compostable bags are used to collect compost.
11	Dedicated soak pit should be constructed for safe disposal of the chemicalwaste.	Dedicated Soak pit is under construction
12	Considering the huge volume of paper usage college needs to work out feasible solution for recycling of waste papers.	The college management looking forward to workout feasible solution

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