AMAR SEWA MANDAL'S

LATE GOVINDRAO WANJARI COLLEGE OF LAW

CD-2 NEW NANDANWAN, NEAR WATER TANK, NAGPUR
PHONE: 7276033392, 7264890089, FAX: 0712-2747853
E-mail: 2006.gwcl@gmail.com

Ref : NAAC 2022/ Metrics Level Deviations/Cr7-1.6 Date-27/07/2022

Criteria 7.1.6	**Quality audits on environment and energy are regularly undertaken by the Institution and any awards received for such green campus initiatives:** 1. **Green audit** 2. **Energy audit** 3. **Environment audit** 4. **Clean and green campus recognitions / awards** 5. **Beyond the campus environmental promotion activities**
Findings of DVV	Provide Certificate of Green audit Energy audit Environment audit Clean and green campus recognitions / awards Beyond the campus environmental promotion activities from the auditing agency. Provide Certificates of the awards received from the recognized agency. Provide Report on environmental promotional activities conducted beyond the campus with geo tagged photographs with caption and date for year 2020-21.
Response / Clarification	**1.** Green Audit, Energy Audit, Environment Audit Certified by an External Agency attached. **(Appendix I)** **2.** Clean Campus Recognition Award/Certificate and Beyond Campus Environmental Activities promotion documentations is attached. **(Appendix II)**

Co-ordinator, IQAC
Late. Govindrao Wanjari College of L
Nandanvan, Nagpur.

Late. Govindrao Wanjari College of LAW ★ Nagpur ★

OFFICIATING PRINCIPAL
ale. GOVINDRAO WANJARI COLLEGE OF L
NAGPUR

Appendix I

WANJARRI GROUP
redefines education

INTEGRATED ENERGY AND GREEN AUDIT FOR THE ASSESSMENT YEAR 2018-19, 2019-20[1] AND 2020-21

Govindrao Wanjari College of Law (GWCL), Nandanvan Nagpur

30/10/2021
Version 01

By:
Energy and Green Audit Team,
Sustainability Solutions

[1]Reference and data of old reports was taken for 2018-19 and 2019-20 vintages for consolidating assessments and reporting

From President's Desk

The world in 21st century is facing many challenges related to environment. On one hand world is developing at alarming rate while on the other hand the destruction of natural resources is going on. That means world's present development path is not sustainable. Efforts to meet the needs of a growing population in an interconnected but unequal and human-dominated world are ignoring the Earth's essential life-support systems. Today, the human society is facing severe environmental problems like climate change, greenhouse effect, energy crisis, depletion of natural resources, biodiversity loss, pollution of air, water, soil, etc. The ever-increasing population and changing life styles are increasing the severity of the environmental problems. The time has come to protect the natural environment through precise efforts. At the same time sustainable development through higher education provides a pivotal role in nations building. Sustainable development remains barely a significant social, economic or environmental challenge for any country. Though teaching and learning must begin to reflect environmental issues, there is an emerging consensus that institutions must also model sustainable practices. Such education contributes strongly to sustainable development by training and expanding young minds in researching solutions to the environmental challenges. After graduation the students become leaders of tomorrow and get dispersed from the world of higher education into their specific career. In doing so, they take with them the green practices and approaches they were involved with at their institution.

India with the second largest population in the world is now one of the fastest growing economies with a rapid growth in GDP. In the past few decades, the need for trained people is rapidly increasing in the industrial and other fields to support our countries technological growth. This has led to the establishment of more and more technological and educational institutions in India. India has a large number of universities, colleges, and other institutions and the number is growing rapidly in the past few decades. In Maharashtra itself there are more than 6000 educational institutions now operating to cater to the needs of students from various areas of study for more than 2 million students. It is well known that educational institutions consume resources like water, electricity; Forest products and generates wastes like many industries. Establishment and operating of educational institute are not covered by any of the environmental laws in India. As a result, the importance of making the educational institute operate with self-consciousness in the utility of resources inside the campus is least understood. Eco campus is a concept implemented in many educational institutes across the globe to make them sustainable because of their mass consumption of resources and creation of waste. Waste minimization plans inside the educational institute for solid and wastewater is now mandatory to maintain the cleanliness inside the campus. To find out the environmental performance of the educational institutions and to analyze the possible solutions for converting the educational campus as eco-campus the conduction of Green Auditing of institution is essential. Implementation of Green initiatives provides chance of capitalizing opportunities for better performance in the future. I know that sharing of this report will widely generate greater awareness with in campus community, hence I am very glad to share this report with the stakeholders.

Dr. Suhasini Wanjari

President, Amar Sewa Mandal, Nagpur

From Secretary's Desk

Over the last 25 years, Amar Sewa Mandal has made remarkable progress and is acknowledged as one of the best in the Vidarbha region. The major institutions run by the society now includes Kamla Nehru Mahavidyalaya, Nagpur, Govindrao Wanjari College of Engineering & Technology, Nagpur, Kamla Nehru College of Pharmacy, Butibori, Nagpur, Govindrao Wanjari College of Education, Butibori, Nagpur, Govindrao Wanjari College of Management Studies & Research, Butibori, Nagpur, Indira Gandhi College of Science & Computer Management, Nagpur, Govindrao Wanjari College of Law, Nagpur and Govindrao Wanjari College of Science & Computer Management, Butibori Nagpur.

Our experience taught us those educational institutions have the accountability to sustain the nation's growth. Our responsibility is not just limited to education; we inculcate principles and values. Human society is in the middle of Environmental, Social, and Economic challenges. The major ones are climate change, the greenhouse effect, polluted air, water, soil, etc. The key question is, "How do we do it?" We apply the principles of Inclusivity, Materiality, and Responsiveness.

Our principles are our constant source of inspiration. As Management, we completely understand that sustainable development through higher education will play a pivotal role in building our nation. After graduation or post-graduation, the students become leaders of tomorrow and get dispersed from the world of education into their specific career. They take with them the Sustainable practices and approaches as a kit to solve problems. We are developing our students so that they are prepared to face global challenges and convert them into opportunities. We strive to put forth living examples for our students, society, peers, and other reasonable stakeholders by adopting environmentally friendly steps. We endeavor to hand over the future generation with a cleaner and safer, socially stable, and economically prosperous world.

The audit's purpose was an independent review of the practices followed in our campus w.r.t the Sustainable Policies. We will take the learnings from this independent review as a "value addition" to promote better environmental performance and continually improve the College Campus and Community. We will adhere to PDCA's proven principles (Plan, Do Check, and Act) to identify, prioritize, allocate resources, initiate action, monitor results, and implement corrective actions to attain Sustainability, encompassing Environmental, Social topics.

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

Adv. Abhijit Wanjarri,

MLC, Secretary, Amar Sewa Mandal, Nagpur

From Treasurer's Desk

The rapid urbanization and economic development at local, regional, and global levels have led to several environmental and ecological crises. In this background, it becomes essential to adopt the Green Campus process for our college, which will lead to sustainable development. Govindrao Wanjari College of Law, Nandanvan Nagpur is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends. We work on several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Paperless Work, planning to induct renewable energy, and Green Audit. With this in mind, we are constantly evaluating the adequacy of the management control framework of environmental sustainability and the degree to which the Departments and other stakeholders adhere to policies and standards. It can make a good impact on student's health and teaching, learning environment in the college campus.

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

	✓ 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 ✓ Installation of Rain Water Harvesting system is under process.

I am thankful to the entire Green Audit Team Mrs. Bhakti Thanekar, Mr. Ashish Soni led Mr. Swapnil Thanekar for their sincere efforts and hard work for undertaking this green audit. We are very sure that the report will help the society, staff, students, and all concerned in the College Campus and will motivate for sustainable and green practices throughout.

Dr. Smeetaa Abhijit Wanjarri
Treasurer, Amar Sewa Mandal, Nagpur
Senate Member RTM Nagpur University, Nagpur

From Principal's Desk

We live on the Earth, which is the unique planet in the Solar System. The Stockholm Conference states that, 'Man has the fundamental right to freedom, equality, and adequate conditions of life, in an environment of a quality which permits a life of dignity and well-being and he bears a solemn responsibility to protect and improve the environment for present and future generations.' The Constitution of India also provides for right to life to the extent of right to healthy environment.

Educational Institutions have broad impact around them. The activities carried out by such institutions and college can create a variety of positive environmental impact. Thus, their role is to act as a leader in pursuing environmentally sustainable goals. Our college, Govindrao Wanjari College of Law has constantly strived to include in its domain various activities which would enable teachers as well as students to involve in various environment related activities such as Rain Water Harvesting, Planting of Trees, E-Waste Management, Energy Conservation etc. It is within this corner our college takes continues effort to promote environment protection.

Green Audit is a platform to discuss issues related to environment protection and to take measures for environment protection. Being a human being, we have a responsibility to meet the needs of the present generation without compromising environment protection. Sustainable development is the only way to solve the conflict between environmental issue and development concern.

I am thankful to entire Green Audit Team (Mr. Swapnil Thanekar, Mrs. Bhakti Thanekar, Mr. Ashish Soni), team of our college and the NSS Unit for taking sincere efforts and hard work for this green audit. We are ascertained that the report will help the society, staff, students and all concerned in the College Campus and will be motivated for sustainable and green practices throughout.

Dr. Snehal Fadnavis
Principal, Govindrao Wanjari College of Law, Nagpur

Acknowledgement

Green Audit Assessment Team thanks the Management of Govindrao Wanjari College of Law (GWCL), Nandanvan, Nagpur for assigning this important work of Green Audit. We appreciate the cooperation of our Team for completion of study. Our special thanks to:

President	Dr. Suhasini Wanjari
Secretary	Adv. Abhijit Wanjarri
Treasurer	Dr. Smeetaa Abhijit Wanjarri
Principal	Dr. Snehal Fadnavis
IQAC Coordinator	Dr. Archana Sukey
Assistant Professor	Dr. Leena Langde
Assistant Professor	Dr. Nandita Gaikwad
Assistant Professor	Mrs. Vaishali Shivankar
Librarian	Mrs. Shradha Thombre
Computer Operator	Mast. Pratik Ghorle

All the members of College Development Committee, Govindrao Wanjari College of Law (GWCL), Nandanvan, Nagpur & Team of students as stated under Annexure-I

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.

Profile of Audit Team Members and Independent Reviewers

Mr. Swapnil Thanekar

Certified Energy Auditor, MTech (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. Ajinkya Anjikar

MTech, Chemical Engineering, IIT Hyderabad (Observer, Reviewer)

Mr. Sushant Deshkar

Electrical Engineer, Assessment Team Member

DISCLAIMER

Green Audit Team has prepared this report for Govindrao Wanjari College of Law (GWCL), Nandanvan, 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.

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

Onsite Assessment Team Leader,
Ashish V. Soni

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

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 25th October 2021 to 30th October 2021 for the session 2018-2021. 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	Evaluating Financial viability for the installation of solar systems 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 ✓	

4. Waste water recycling	NA	
5. Maintenance of water bodies and distribution system in the campus	NA	
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	✓	Chapter 13 and 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:**		
1. Green audit	✓	Covered as part of this report. Please refer the contents of this report
2. Energy audit	✓	Covered as part of this report under Chapter -11 and Annexure –XVII
3. Environment audit	✓	
4. Clean and green campus recognitions/awards		Covered as part of this report under Annexure –XVI
5. Beyond the campus environmental promotional activities	✓	Covered as part of this report under Chapter -1 and Annexure –XIV
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		

Table: Summary Clean Campus[2]

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 ➢ Water, waste management and reuse ➢ Rain water harvesting, etc.	➢ Chapter No. 12 & Annexure No. XII & 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

Table: Summary Smart Campus[3]

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 library ➢ Digital Meetings ➢ Digital notes ➢ Digital papers ➢ Online conferences and classes ➢ Double side printers ➢ Efficient electronic equipment's like LED screens, LED projectors. For details, please refer annexure VIII ➢ Procurement of energy efficient equipment
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 Google forms, Google classroom, for online classes. This helps us to share data/ links to all students within fraction of second. In this Pandemic situation, we are conducting online classes through Google meet, Zoom app. We provide the notes of different theory subject and practicals to the students on Google Classroom / Whatsapp. These technologies help us to shares the data in short duration of time to all students and also help in saving papers.
3.	Create an ecosystem to 'smartly' connect and share the information with each other at campus, institute 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	To share the data among all the teachers and students, we are using Google. Google Drive is a file storage and synchronization service developed by Google for sharing of information to all users or to specific users. Whatsapp helps to share Notes/ Notices/ University important notices by single click to specific group of students/ to all

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

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

	including contribution to United Nations Sustainable Development Goals.	students/ to the teachers. Also, we are conducting our regular online classes through Google meet/Zoom App 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 an online Essay competition, Poster competition, and 10 National webinar during COVID lock down. We had connected peoples (Guest, Speakers and participants) from all over the India in one platform. We had taken online verbal feedback from 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. Our faculty members had online attended various International, National and Local Conferences during lock down.

Contents

List of Annexure

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
14	http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf
15	http://cdm.unfccc.int/
16	http://database.v-c-s.org/
17	http://www.gwcl.ac.in/
18	https://www.mahadiscom.in/
19	https://www.mahaurja.com/meda/

Introduction of the College

Amar Sewa Mandal Nagpur is an education society running various institutes in Nagpur region, Govindrao Wanjari College of Law is one of those. It has been established with an objective of legal education which is necessary to create professionals in legal field with a zeal for excellence. The college started on 16th August 2006 and since then it is running successfully. The college offers L.L.B. (3 years), B.A.L.L.B. (5 years), LLM and PGDCLIT courses. The college has a dedicated faculty with high qualifications and rich teaching experience. The college has well developed infrastructure with spacious classrooms and rich library. The students can also use the E-source center.

Vision of the Institute:

The vision of **Govindrao Wanjari College of Law** is to develop dynamic lawyers and legal professionals through innovation and excellence.

Mission of the Institute:

- To develop the Institute into a center of excellence in professional legal education and to serve the nation by nurturing and developing law professionals and lawyers who would contribute to nation building.
- To empower youth to be lawyers of tomorrow with absolute discipline, quest for knowledge & strong ethos to uphold the spirit of professionalism.
- To provide quality education at affordable cost for the upliftment of students from backward classes and rural areas.
- To build the image of GWCL as a unique place for legal education that focuses equally on mind and personality of the students.
- To nurture the students as responsible citizens with high ethical and social values.

Objectives of the Institute:

- To impart quality legal education for all.
- To create professionals in legal field with a zeal for excellence and faith in values.
- To create professionals who can compete not only at national level but also at global level.
- To strive for overall development of students by providing standard curricular, Co-curricular and extra-curricular facilities.
- To foster students as responsible techno-citizens with moral, ethical and social values.

Objective of Green Audit

The Green Audit Team focused on Material[4] 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. Energy and Carbon Footprint
12. Waste Management
13. Plantation Details

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

[4]**Definition: 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" is already in place. This committee is highly active and meets once in a year.
If yes, who are the stakeholders?	Yes, it included stakeholders. The stakeholders include ➢ Management ➢ Teaching Faculty ➢ Students ➢ Lab Technician ➢ 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 year. 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 was also discussed as part of brain storming sessions within the meetings. 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.
Is the college encouraging sustainable behaviour via: • education campaigns? • Posters, placards, messages • incentives? • contests? • awards?	College conducts various activities to create awareness amongst the students and society on environment safety and protection. College has established "Green Campus Committee" team has conducted various Environmentally Friendly Activities / Trainings **Initiatives for college staff and students:** ➢ Poster making competition on Save Environment was organized at GWCL on 8th March 2018. ➢ Rangoli Competition on Save Environment was organized at GWCL on 9th March 2018. ➢ National Seminar on Environment Protection and Sustainable Development Issues and Challenges was organized at GWCL on 10th March 2018. ➢ Tree Plantation Week (Van Mahotsav) was organized at GWCL from 2nd July to 7th July 2018.

	➢ Tree Plantation Program was organized by NSS Students and Mr. Aprup Adhawatkar at GWCL on 8th July 2019. ➢ Institutional Training Program by PERA on Energy Conservation was organized at GWCL on 14th July 2018. ➢ Celebration of NSS Foundation Day by conducting Yoga Activity for students and staff in the presence of Chief Guest Mr. Sanjay Khonde was organized at GWCL on 24th September 2019. ➢ Health Check – Up Camp by Specialist Doctors was organized at GWCL on 9th February 2020. ➢ Webinar on Right to Health and Responsibility of State during Covid -19 Pandemic by Guest Speaker Dr Rashmi Salpekar, Dean, VIPS, New-Delhi on 26th May 2020. ➢ Celebration of NSS Foundation Day BY conducting Online Yoga Activity for students and staff (Guest: - Dr. Keshav Walke, Director, NSS, and Mr. Sanjay Khonde, Yoga Expert) on 24th September 2020. ➢ National Webinar on International Environmental Law: New Perspective (Dr. Komidhi Challa, Associate Professor, Hidayatullah National Law University) on 6th February 2021. Please refer Annexure IV for details. **Community Based Initiative's by college:** ➢ Vruksh Dindi was organized at was organized at RTMNU Campus on 2nd July 2019. ➢ Awareness Drive on Solid Waste Management was organized at Pipla Fata, Hudkeshwar and Besa on 1st February 2020. ➢ Distribution of Grocery to the Needy People by Alumni of GWCL during Covid-19 Pandemic at Sakkardara Marketplace on 16th May 2020. ➢ Counselling of Migrant Workers and Distribution of Mask, Sanitizer by Dr. Snehal Fadnavis Principal, Jain Kalar Bhavan, Sakkardara, Nagpur on 22nd May 2020. ➢ Distribution of Grocery Items to the Needy Persons by Adv. Abhijeet Wanjari, Secretary, Amar Sewa Mandal at Sakkardara Marketplace on 25th May 2020.

	➢ Tree Plantation Week was celebrated by the students at their home from 2nd July to 7th July 2020. ➢ Distribution of Sanitizer, mask and food packets to the needy at Covid Care Center, Hingna on 19th July 2020 ➢ Monitoring of Body Temperature and Distribution of Mask among people of nearby locality at Hasanbagh Square, Nagpur on 21st September 2020. Please refer XIV for details.
Is the college staff modelling sustainable behaviour for students, peers, and community?	Total 20 staff members are there in the college, during interviews it was confirmed that, approximately: ➢ 70% staff of the college travel by their own 2-wheelers. ➢ 20% staff of the college travel by car / two-wheeler pulling on sharing basis. ➢ 10% staff of the college commute by car.
Do students model sustainable behaviour for staff, peers, and community?	Total 350 students are enrolled for 2020-21 session. Due to COVID -19 Lockdown only online classes are conducted so there is no transportation of students for current year, last year approximately: ➢ 50 % students of the college come to the college by 2-wheeler. ➢ 30% students of the college utilize public transport (Municipal Transport). ➢ 20% students of the college travel by 2-wheeler pulling on sharing basis. 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: • Posters, placards, messages? • assemblies? • classroom presentations? • training/professional development? • posters/bulletin boards? • newsletter? • 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, College organizes lectures and motivates students for Energy and Environment conservation. Environmental Law is a part of syllabus for VIth Semester of L.L.B. and

	Vth Semester of B.A.L.L.B..
Is the college sharing its learning externally via: • Paper presentations? • newsletter? • website?	The students are encouraged to present projects on topic related to environmental aspects. College is extensively engaged in the research work. The college is also going to make 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	Yes

students and staff of good practices?	
Are the students aware of energy sources?	The only source of energy is electricity (grid electricity). Students are aware of this source of energy which is 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 and XIV for details.
Do students and staff know where their water comes from?	Well, is the only source of water which is utilized for drinking (after purification) and in the wash rooms and cleaning.
Is college encouraging responsible water use via: • posters, placards? • incentives? • contests? • awards?	Yes, by posters, placards.
How is trash managed outside the campus?	The waste is given to the Nagpur Municipal Corporation 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.

<table>
<tr><td>Is college utilizing any incandescent lights? Can they be replaced with compact fluorescents (energy saving bulbs)?</td><td>The college timings are from 08:00 AM to 4:00 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 Li
<table><tr><th rowspan="2">Type of Lamp</th><th colspan="2">Lumens / Watt</th><th rowspan="2">Colour Rendering Index</th><th rowspan="2">Typical Application</th></tr><tr><th>Range</th><th>Avg.</th></tr><tr><td>Incandescent</td><td>8-18</td><td>14</td><td>Excellent (100)</td><td>Homes, restaurants, general lighting, emergency lighting</td></tr><tr><td>Fluorescent lamps</td><td>46-60</td><td>50</td><td>Good w.r.t. coating (67-77)</td><td>Offices, shops, hospitals, homes</td></tr><tr><td>Compact fluorescent lamps (CFL)</td><td>40-70</td><td>60</td><td>Very good (85)</td><td>Hotels, shops, homes, offices</td></tr><tr><td>High pressure mercury (HPMV)</td><td>44-57</td><td>50</td><td>Fair (45)</td><td>General lighting in factories, garages, car parking, flood lighting</td></tr><tr><td>LED lamps</td><td>30-50</td><td>40</td><td>Good (70)</td><td>Reading lights, desk lamps, night lights, spotlights, security lights, signage lighting, etc.</td></tr></table>
Thus, LEDs are considered for installation as night lights, security street lights by the college. The term reading light5 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</td></tr>
<tr><td>Has the college evaluated existing lighting for opportunities to reduce lighting in over-lit areas?</td><td>The lighting arrangements are well balanced with arrangements to switch ON and OFF lights independently. There are therefore practically no over lit areas.</td></tr>
<tr><td>Are the light switched duly labelled to make more obvious which switches relate to which appliances?</td><td>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.</td></tr>
<tr><td>Are the lights switched off to make use of daylight? (e.g., lights parallel to windows or in corridors)</td><td>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 260. On the outcast days some places register</td></tr>
</table>

5https://www.collinsdictionary.com/dictionary/english/reading-light

	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 their 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 complaints was identified with respect to the sufficiency of lighting measures.** ➢ **Sufficient lux levels above 260 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	No ACs are installed in the college.

necessary. What is temperature setting of the AC?	
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?	NA.
Is there a scenario where air conditioning is wasted in unused spaces, such as cupboards, corridors?	NA
Are Efficient and energy labelled AC's utilized for cooling purposes?	NA
Conclusion ➢ **Evaporative cooling is availed for office, classroom, library & computer lab.**	

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 college has availed the services of the Green Audit for the first time. 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?	Some toilet washrooms are 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?	NA
Has the college harvested rainwater?	Installation of Rain Water Harvesting system is under progress.
Is the college collecting the condensation from A/C units for onsite watering needs?	NA
Has the college optimized its irrigation system for gardening to: • operate at night or early morning hours to minimize evaporation? • water the minimum time and frequency necessary for the applicable vegetation?	No, the college has not installed drip irrigation system for gardening. 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
What is amount of rain water harvested?	Total roof top area of the college building is 584.15 m^2. The rainfall for Nagpur Region (Gramin) approximately 1018.2 mm. Total rain water harvesting is 535 m^3 at the run off coefficient of 0.9.

	The college has also laid the cement blocks. This enables the rain water falling on the cement blocks to get recharged in the ground. The area under the cement block is 386.39 m^2. The run off coefficient is considered as 0.3 based on the Manual on Artificial Recharge of Ground Water, issued by Government of India, Ministry of Water Resources, Central Ground Water Board, September 2007. The water rain water harvested from the cement blocks is 118 m^3. Total quantity of water harvested = 535 + 118 = 653 m^3
Are there any community-based projects implemented by the college?	Yes.

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.**
- **Drip irrigation system needs to be installed in the college.**
- **Some toilet washrooms need to be equipped with the push buttons.**

Conclusion:

- **The college is having 01 no. of well which is the only source of water.**
- **Some toilet washrooms are equipped with the push buttons.**

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 sent to soak pit for treatment.
Is the college monitoring drinking water quality regularly? If yes, what is the frequency?	Yes. Third party water testing is done by the college. Water Quality Test Reports are included as part of Annexure VII to this Report.

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?	No. **Recommendation:** **The college needs to install Solar PV System.**
Is the college purchasing renewable power from third party or renewable energy certificates for its electricity use?	No.
Is the college offering renewable energy lessons / programs?	This already assessed under chapter 01 of this report.
Further Scope of Improvement ➢ **The college needs to install Solar PV System.**	

9. Transportation

Is college encouraging transportation measures like bicycle, Bulk transport, walking?	**Students:** Total 350 students are enrolled for 2020-21 session. Due to COVID -19 Lockdown only online classes are conducted so there is no transportation of students for current year, last year approximately: ➢ 50 % students of the college come to the college by 2-wheeler. ➢ 30% students of the college utilize public transport (Municipal Transport). ➢ 20% students of the college travel by 2-wheeler pulling on sharing basis. **Faculties:** Total 20 staff members are there in the college, during interviews it was confirmed that, approximately: ➢ 70% staff of the college travel by their own 2-wheelers. ➢ 20% staff of the college travel by car / two-wheeler pulling on sharing basis. ➢ 10% staff of the college commute by car.
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: ➢ **One sided paper is utilized by college to avoid use of fresh papers**	

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 –XVII 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

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

Computers
Lighting
Fans
Pumps
Coolers

</td></tr>
<tr><td>What are the steps undertaken during the energy audit?</td><td>The Assessment Team undertook the analysis of the college premise:

To study electricity bills
Study of lighting system and its measurement.
Study of loads
Identification of energy saving opportunity and energy conservation.

</td></tr>
<tr><td>What methodology was adopted?</td><td>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.</td></tr>
<tr><td>What are the suggested energy conservation measures?</td><td>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.

<table>
<tr><th></th><th>0.75 ton</th><th>1 ton</th><th>1.5 ton</th><th>2 ton</th></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
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>For the first time college is calculating the carbon footprint. The data applicable to Scope-2 emission (electricity purchase from grid) is available.</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>
</table>

Are all the applicable emission sources calculated?	The emission source pertaining to grid-based electricity source is calculated. Scope 2 emission on account of electricity imported from grid is considered. **Scope -2 Emissions are tabulated as follows6:**

Year	Annual Electricity Consumption	Total GHG Emission (Scope-2)
Session	**kWh**	**tCO2**
2018-19	7050	**7.05**
2019-20	11619	**11.62**
2020-21	5633	**5.63**

12. Waste Management

How the college reduces its paper waste via: encouraging digital reading, note-taking, and activities? • setting printers and computers to default to duplex (double-sided) printing? • reducing margins and white space on documents that must be printed? • printing multiple pages per sheet? • minimizing paper correspondence with families? • 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 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.
Is the college undertaking recycling collection for additional recyclable materials—like plastic bags, CFL (spiral) light bulbs, batteries, drink pouches, candy wrappers, and electronics?	**Different types are generated within campus which include**: ➢ **E-Waste:** The E-waste generally includes the tube-lights, CFL, LED, computer waste, etc. are stored into the scrap bin and is given to the agency for proper

6With 10 % uncertainty

	disposal. MOU of 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 through sewer line. ➢ **Cellulose and Paper Waste:** Cellulose and paper waste is stored in a particular place and given to the agency for proper disposal. MOU of cellulose waste handling is executed. Please refer Annexure XIII for details

Further Scope of Improvement:

- **Considering the huge volume of paper usage college needs to work out feasible solution for recycling of waste papers.**
- **Vending machine for dispensing sanitary pads needs to be installed.**
- **Incinerator machine to dispose sanitary pads needs to be installed.**

13. Plantation by College

The College campus has several trees. 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. There are approximately **68** fully grown trees and about **350** shrubs in the campus.

AMAR SEWA MANDAL'S

Govindrao Wanjari College of Law

CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com

WANJARRI GROUP redefines education

Founder LATE GOVINDRAO WANJARI | President Dr. (Smt) SUHASINI WANJARI | Secretary Adv. ABHIJIT G. WANJARRI | Principal Dr. SNEHAL FADNAVIS

GWCL/

Date: 05/08/21

LIST OF PLANTS

Sr.no	Name of the Plant	Quantity
1	Black Ficus Panda	12
2	Singapore Ixora	13
3	Golden Duranta	250
4	Ecalipa	100
5	Peepl Tree	02
6	Green Tree	01
7	Royal Palm	01
8	Ashoka Tree	09
9	Karinji	02
10	Erica Palm	15
11	Chafa Tree	03
12	Umbar Tree	02
13	Kadulimb Tree	03
14	Sang Tree	02
15	Saptparni Tree	01
16	Mugna Tree	02

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

12

List of trees in the campus

Annexure

Annexure – I: List of Interviewed College Staff / Students

AMAR SEWA MANDAL'S
Govindrao Wanjari College of Law
CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com
WANJARRI GROUP
redefines education

Founder: LATE GOVINDRAO WANJARI
President: Dr. (Smt) SUHASINI WANJARI
Secretary: Adv. ABHIJIT G. WANJARRI
Principal: Dr. SNEHAL FADNAVIS

GWCL/ Date: 26/10/2021

List of Teaching and Non-teaching Staff were present for Green Audit

Sr. No.	Name	Designation	Signature
1	Dr. Snehal Fadnavis	Principal	
2	Dr. Leena Langde	Assistant Professor	
3	Dr. Archana Sukey	Assistant Professor	
4.	Dr. Nandita Deshpande(Gaikwad)	Assistant Professor	
5.	Mrs. Vaishali Khotle (Shivankar)	Assistant Professor	
6.	Mr. Pradeep Zalpure	Senior Clerk	
7.	Mr. Akash Chandanbawne	Computer Operator	
8.	Mrs. Vaishali Dongre	Librarian	

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

1

AMAR SEWA MANDAL'S

Govindrao Wanjari College of Law

CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com

WANJARRI GROUP
redefines education

Founder	President	Secretary	Principal
LATE GOVINDRAO WANJARI	Dr. (Smt) SUHASINI WANJARI	Adv. ABHIJIT G. WANJARRI	Dr. SNEHAL FADNAVIS

GWCL/ Date: 26/10/2021

List of Students were present for Green Audit

Sr No	Name	Class	Signature
1	Kasturi Panjankar	5th Year B.A.LL.B	Kasturi
2	Sonali Lanjewar	3rd Year LL.B	Lanjewar
3	Rashmi Pokle	4th Year B.A.LL.B	Pokle
4	Dev Mehta	3rd year B.A.LL.B	Dev M Mehta
5	Chaitnya Mamidwar	4th Year B.A.LL.B	
6	Prafulla Wankhede	3rd Year LL.B	

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

2

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 2018 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

AMAR SEWA MANDAL'S

Govindrao Wanjari College of Law

CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com

WANJARRI GROUP redefines education

Founder: LATE GOVINDRAO WANJARI
President: Dr. (Smt) SUHASINI WANJARI
Secretary: Adv. ABHIJIT G. WANJARRI
Principal: Dr. SNEHAL FADNAVIS

GWCL/

Date: 07/03/19

GREEN CAMPUS COMMITTEE 2018-2019

Sr. No	Name	Designation
1	Dr. Snehal Fadnavis	Chairman
2	Dr. Leena Langde	Assistant Professor
3	Dr. Archana Sukey	Assistant Professor
4.	Dr. Nandita Deshpande(Gaikwad)	Assistant Professor
5.	Mrs. Vaishali Khotele(Shivankar)	Assistant Professor
6.	Mr. Pradeep Zalpure	Senior Clerk
7.	Mr. Akash Chandanbawne	Computer Operator
8.	Mrs. Vaishali Dongre	Librarian
9.	Kasturi Panjankar	5th Year B.A.LL.B
10.	Sonali Lanjewar	3rd Year LL.B
11.	Rashmi Pokle	4th Year B.A.LL.B
12.	Chaitnya Mamidwar	4th Year B.A.LL.B
13.	Prafulla Wankhede	3rd Year LL.B

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

7

AMAR SEWA MANDAL'S

Govindrao Wanjari College of Law

CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com

WANJARRI GROUP
redefines education

Founder	President	Secretary	Principal
LATE GOVINDRAO WANJARI	Dr. (Smt) SUHASINI WANJARI	Adv. ABHIJIT G. WANJARRI	Dr. SNEHAL FADNAVIS

GWCL/

Date: 12/03/20

GREEN CAMPUS COMMITTEE 2019-2020

Sr. No	Name	Designation
1	Dr. Snehal Fadnavis	Chairman
2	Dr. Leena Langde	Assistant Professor
3	Dr. Archana Sukey	Assistant Professor
4.	Dr. Nandita Deshpande(Gaikwad)	Assistant Professor
5.	Mrs. Vaishali Khotele(Shivankar)	Assistant Professor
6.	Mr. Pradeep Zalpure	Senior Clerk
7.	Mr. Akash Chandanbawne	Computer Operator
8.	Mrs. Vaishali Dongre	Librarian
9.	Kasturi Panjankar	5th Year B.A.LL.B
10.	Sonali Lanjewar	3rd Year LL.B
11.	Rashmi Pokle	4th Year B.A.LL.B
12.	Chaitnya Mamidwar	4th Year B.A.LL.B
13.	Prafulla Wankhede	3rd Year LL.B

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

6

AMAR SEWA MANDAL'S

Govindrao Wanjari College of Law

CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com

WANJARRI GROUP
redefines education

Founder	President	Secretary	Principal
LATE GOVINDRAO WANJARI	Dr. (Smt) SUHASINI WANJARI	Adv. ABHIJIT G. WANJARRI	Dr. SNEHAL FADNAVIS

GWCL/

Date: 13/07/21

GREEN CAMPUS COMMITTEE 2020-2021

Sr. No	Name	Designation
1	Dr. Snehal Fadnavis	Chairman
2	Dr. Leena Langde	Assistant Professor
3	Dr. Archana Sukey	Assistant Professor
4.	Dr. Nandita Deshpande(Gaikwad)	Assistant Professor
5.	Mrs. Vaishali Khotele(Shivankar)	Assistant Professor
6.	Mr. Pradeep Zalpure	Senior Clerk
7.	Mr. Akash Chandanbawne	Computer Operator
8.	Mrs. Vaishali Dongre	Librarian
9.	Kasturi Panjankar	5th Year B.A.LL.B
10.	Sonali Lanjewar	3rd Year LL.B
11.	Rashmi Pokle	4th Year B.A.LL.B
12.	Chaitnya Mamidwar	4th Year B.A.LL.B
13.	Prafulla Wankhede	3rd Year LL.B

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR 5

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

AMAR SEWA MANDAL'S

Govindrao Wanjari College of Law

CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com

WANJARRI GROUP redefines education

Founder	President	Secretary	Principal
LATE GOVINDRAO WANJARI	Dr. (Smt) SUHASINI WANJARI	Adv. ABHIJIT G. WANJARRI	Dr. SNEHAL FADNAVIS

GWCL/

Date: 07/03/19

Vision mission of Green Campus Committee

Environment plays a crucial role in human life. Achievement of environmental sustainability is the need of today's world for the better protection of human life and health. With these objectives it is necessary to carry out green audit to upgrade the environment conditions around college campus. Green Audit helps to create environmental awareness to maintain Earth sustainability.

Vision

- To enhance and maintain environmental quality, improve health, hygiene and safety, reduce liabilities and save resources and money.
- To identify opportunity for sustainable development practices.

Mission

- To impart knowledge about environmental protection.
- To nurture moral values and to develop socially committed professionals and contributes for the sustainability of environment.
- To be more efficient in energy consumption by taking concrete steps and control measures for the use of electric energy.

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

8

Mission & Vision of Green Campus Committee

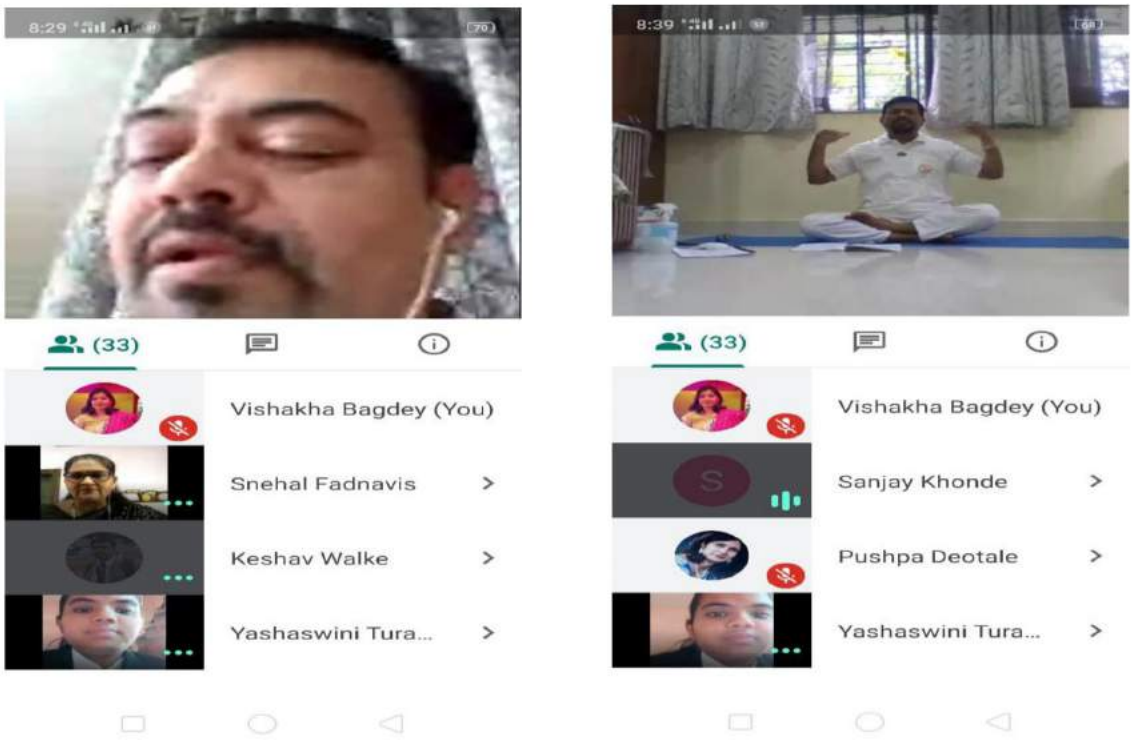
Annexure – IV: List of Awareness Program Undertaken by College

Tree Plantation Program by NSS Students and Mr. Aprup Adhawatkar at GWCL on 8th July 2019

Celebration of NSS Foundation Day by conducting Yoga Activity for students and staff at GWCL on 24th September 2019

Health Check – Up Camp at GWCL on 9th February 2020

Webinar on Right to Health and Responsibility of State during Covid -19 Pandemic by Guest Speaker Dr Rashmi Salpekar, Dean, VIPS, New-Delhi on 26th May 2020



Celebration of NSS Foundation Day BY conducting Online Yoga Activity for students and staff on 24th September 2020

National Webinar on International Environmental Law: New Perspective on 6th 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 are 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: 110-1207

  - 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 - 261

Calculated Contribution of various lighting arrangements: Calculated for 230 working days

Light Sources	Daily Wh Consumption
Tube light	288
LED	18400

Light Sources	% Contribution
Tube light	2
LED	98

Light Sources	Number
Tube light	1
LED	140

Light Sources	% Contribution
Tube light	1
LED	99

7https://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
Legal Aid Room	-	-	-	-	2	20	5	200	-	-	-	-	3	80	5	1200
Class Room	-	-	-	-	7	20	5	700	-	-	-	-	3	80	5	1200
Fishery Lab	-	-	-	-	6	20	5	600	-	-	-	-	3	80	5	1200
Class Room	-	-	-	-	2	20	5	200	-	-	-	-	2	80	5	800
Staff Room	-	-	-	-	4	20	5	400	-	-	-	-	4	80	5	1600
Office	-	-	-	-	8	20	5	800	-	-	-	-	4	80	5	1600
Principal Cabin	-	-	-	-	9	20	5	900	-	-	-	-	2	80	5	800
Corridor	-	-	-	-	5	20	2	200	-	-	-	-	-	-	-	-
Stair Case	-	-	-	-	1	20	1	20	-	-	-	-	-	-	-	-
Campus	-	-	-	-	1	20	8	160	-	-	-	-	-	-	-	-
Security Cabin	1	36	8	288	1	15	8	120	-	-	-	-	-	-	-	-
MSW II	-	-	-	-	4	20	5	400	-	-	-	-	2	80	5	800
MSW I	-	-	-	-	8	20	5	800	-	-	-	-	3	80	5	1200
Library	-	-	-	-	11	20	7	1540	-	-	-	-	8	80	7	4480
Resource Room	-	-	-	-	4	20	1	80	-	-	-	-	-	-	-	-
Corridor	-	-	-	-	2	20	2	80	-	-	-	-	-	-	-	-
Boys Wash Room	-	-	-	-	2	20	2	80	-	-	-	-	-	-	-	-
Girls Wash Room	-	-	-	-	3	20	2	120	-	-	-	-	-	-	-	-
Stair Case	-	-	-	-	2	20	1	40	-	-	-	-	-	-	-	-
Boys Wash Room	-	-	-	-	3	20	2	120	-	-	-	-	-	-	-	-
Store Room	-	-	-	-	4	20	2	160	-	-	-	-	2	80	2	320
Specialization Room	-	-	-	-	5	20	5	500	-	-	-	-	3	80	5	1200
Staff Room	-	-	-	-	5	20	5	500	-	-	-	-	3	80	5	1200
BSW II	-	-	-	-	8	202	5	8080	-	-	-	-	6	80	5	2400

BSW III	-	-	-	6	20	5	600	-	-	-	-	4	80	5	1600
Seminar Hall	-	-	-	23	20	2	920	-	-	-	-	12	80	2	1920
Corridor	-	-	-	4	20	1	80	-	-	-	-	-	-	-	-
	1			288	140		18400					64			23520

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

AMAR SEWA MANDAL'S

Govindrao Wanjari College of Law

CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com

WANJARRI GROUP redefines education

Founder	President	Secretary	Principal
LATE GOVINDRAO WANJARI	Dr. (Smt) SUHASINI WANJARI	Adv. ABHIJIT G. WANJARRI	Dr. SNEHAL FADNAVIS

GWCL/

Date: 19/07/21

OPERATION OF ELECTRONIC EQUIPMENT'S

The administrative Rights of Computer settings are with the administrative department of the college.

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

1. All the computer screen savers are disabled.
2. The computers are turned to sleep mode if they are ideal.
3. The computer setting cannot change as the administrative rights are with the department.
4. With regards to the use of policy of photocopies and other equipment user "POWER ON" when in use and "POWER OFF" when not in use.
5. The statement is issued in response to the query raised during the Green Audit.

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

14

Annexure –VII: Water Quality Reports

LATE GOVINDRAO WANJARI
Founder
DR. (Smt.) SUHASINI G. WANJARI
President
Adv. ABHIJIT G. WANJARRI
Secretary
DR. ASHOK KAMBLE
Officiating Principal

AMAR SEVA MANDAL'S
(Regd. No. M/220/78 NGP)
F-2299 (N)
KAMLA NEHRU MAHAVIDYALAYA
(ARTS, COMMERCE & SCIENCE)
SAKKARDARA CHOWK, NAGPUR - 440 024
Ph : (0712) 2747853, 2747854, 2742308, 2749784 Fax - (0712) 2747853
'A' Grade Reaccredited by NAAC
E-mail : kncnag@rediffmail.com Website : www.kamlanehrucollege.ac.in

KNM /_____ Date : 12/04/2019

The water sample was provided by GovindraoWanjari College of law, Nagpur for water quality monitoring. It was analysed in Department of Environmental Science, Kamla Nehru Mahavidyalaya, Nagpur.

The result of analysis are :

Water Analysis Report 18-19

Sr.No.	Parameters	Result
1	pH	7.2
2	Colour	Colourless
3	Alkalinity	68 mg/L
4	Hardness	100 mg/L
5	D.O	6.1 mg/L
6	Turbidity	3.8 NTU
7	Conductivity	0.614 microsiemens/cm
8	BOD	Nil
9	Sulphate	2 mg/L
10	Total Dissolve Solid	115 mg/L
11	Nitrogen	1.1 mg/L
12	Residual Chlorine	Nil
13	Chloride	92 mg/L

The provided water sample was tested and all parameters are found within the permissible limit prescribed by WHO.

Officiating Principal
Kamla Nehru Mahavidyalaya
Sakkardara Chowk, Nagpur

Water Testing Report for 2018-19

AMAR SEWA MANDAL'S (Regd. No. M/220/78 NGP) F-2299 (N)
KAMLA NEHRU MAHAVIDYALAYA
(ARTS, COMMERCE & SCIENCE)
SAKKARDARA CHOWK, NAGPUR-440 024 • Ph : (0712) 2747853, 2747854, 2742308, 2749784
fax : (0712) 2747853 • e-mail : knanag@rediffmail.com • website : www.kamlanehrucollege.ac.in
Grade A Reaccredited by NAAC
LATE GOVINDRAO WANJARI FOUNDER : AMAR SEWA MANDAL
DR. (Smt.) SUHASINI G. WANJARI President Adv. ABHIJIT G. WANJARRI Secretary DR. DILIP S. BADWAIK Principal

KNM/_____ Date : 16 / 03 / 2020

The water sample was provided by Govindrao Wanjari College of law, Nagpur for water quality monitoring. It was analysed in Department of Environmental Science, Kamla Nehru Mahavidyalaya, Nagpur.

The result of analysis are :

Water Analysis Report 19-20

Sr.No.	Parameters	Result
1	pH	7.8
2	Colour	Colourless
3	Alkalinity	69 mg/L
4	Hardness	110 mg/L
5	D.O	5.6 mg/L
6	Turbidity	4 NTU
7	Conductivity	0.640 microsiemens/cm
8	BOD	Nil
9	Sulphate	5 mg/L
10	Total Dissolve Solid	100 mg/L
11	Nitrogen	1.4 mg/L
12	Residual Chlorine	Nil
13	Chloride	98 mg/L

The provided water sample was tested and all parameters are found within the permissible limit prescribed by WHO.

PRINCIPAL
Kamla Nehru Mahavidyalaya
Sakkardara Chowk, Nagpur

Water Testing Report for 2019-20

AMAR SEWA MANDAL'S (Regd. No. M/220/78 NGP) F-2299 (N)
KAMLA NEHRU MAHAVIDYALAYA
(ARTS, COMMERCE & SCIENCE)
SAKKARDARA CHOWK, NAGPUR-440 024 • Ph : (0712) 2747853, 2747854, 2742308, 2749784
fax : (0712) 2747853 • e-mail : knanag@rediffmail.com • website : www.kamlanehrucollege.ac.in
Grade A Reaccredited by NAAC
LATE GOVINDRAO WANJARI FOUNDER : AMAR SEWA MANDAL
DR. (Smt.) SUHASINI G. WANJARI President Adv. ABHIJIT G. WANJARRI Secretary DR. DILIP S. BADWAIK Principal

KNM/_____ Date : 03/09/2021

The water sample was provided by Govindrao Wanjari College of law, Nagpur for water quality monitoring. It was analysed in Department of Environmental Science, Kamla Nehru Mahavidyalaya, Nagpur.

The result of analysis are :

Water Analysis Report

Sr.No.	Parameters	Result
1	pH	7.5
2	Colour	Colourless
3	Alkalinity	66 mg/L
4	Hardness	105 mg/L
5	D.O	6 mg/L
6	Turbidity	5 NTU
7	Conductivity	0.540 microsiemens/cm
8	BOD	2 mg/L
9	Sulphate	5.8 mg/L
10	Total Dissolve Solid	110 mg/L
11	Nitrogen	1.2 mg/L
12	Residual Chlorine	Nil
13	Chloride	99.969 mg/L

The provided water sample was tested and all parameters are found within the permissible limit prescribed by WHO.

Principal
Kamla Nehru Mahavidyalaya
Sakkardara Chowk, Nagpur

Water Testing Report for 2020-21

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

AMAR SEWA MANDAL'S

Govindrao Wanjari College of Law

CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com

WANJARRI GROUP redefines education

Founder LATE GOVINDRAO WANJARI | President Dr. (Smt) SUHASINI WANJARI | Secretary Adv. ABHIJIT G. WANJARRI | Principal Dr. SNEHAL FADNAVIS

GWCL/

Date: 19/4/19

Details of Computer, Printer, Scanner etc

Academic Year 2018-2019

Sr.No.	Item	Administration Office	Computer Lab	IQAC	Library	Principal Office	Total
1	Number of Computer	04	13	03	01	01	22
2	Number of Printer	04	-	02	-	01	07
3	Number of Scanner	03	-	-	-	01	04

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

11

AMAR SEWA MANDAL'S

Govindrao Wanjari College of Law

CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com

WANJARRI GROUP
redefines education

Founder	President	Secretary	Principal
LATE GOVINDRAO WANJARI	Dr. (Smt) SUHASINI WANJARI	Adv. ABHIJIT G. WANJARRI	Dr. SNEHAL FADNAVIS

GWCL/

Date: 10/3/20

Details of Computer, Printer, Scanner etc.

Academic Year 2019-2020

Sr.No.	Item	Administration Office	Computer Lab	IQAC	Library	Principal Office	Total
1	Number of Computer	04	13	03	01	01	22
2	Number of Printer	04	-	02	-	01	07
3	Number of Scanner	03	-	-	-	01	04

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur

AMAR SEWA MANDAL'S

Govindrao Wanjari College of Law

CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com

WANJARRI GROUP
redefines education

Founder	President	Secretary	Principal
LATE GOVINDRAO WANJARI	Dr. (Smt) SUHASINI WANJARI	Adv. ABHIJIT G. WANJARRI	Dr. SNEHAL FADNAVIS

GWCL/

Date: 12/8/21

Details of Computer, Printer, Scanner etc.

Academic Year 2020-2021

Details of Computer, Printer, Scanner etc

Sr.No.	Item	Administration Office	E-Resource center	IQAC	Library	Principal Office	Total
1	Number of Computer	04	10	04	05	01	24
2	Number of Printer	04	-	03	01	01	09
3	Number of Scanner	03	-	01	-	-	04

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur

Annexure –IX: Solar Panel Installations

No Solar PV System installed in college.

Annexure –X: Water Distribution Data

The water is drawn from1 no. of well. The water drawn is not measured. Recommendation to monitor the water drawn is raised under chapter 6 of this report.

Annexure –XI: Solar Passive Structure / Drip Irrigation

No Drip Irrigation System installed in college.

Adequate light in classrooms without using electrical lighting

Use of false ceiling

Passive Lighting System

Annexure –XII: Water Management

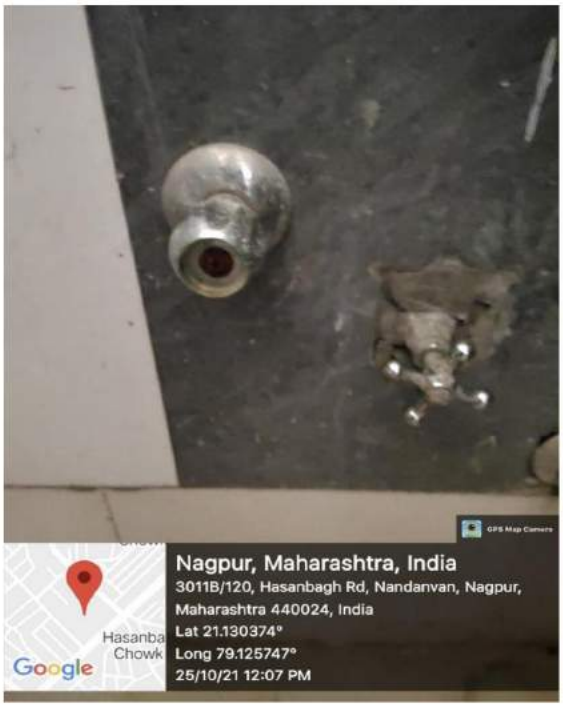
Rain Water Harvesting System under construction

RO water used for drinking purpose

Push buttons fitted in some washrooms

Flush to be replaced by push buttons

Taps to be replaced by faucets



Some cocks to be replaced by push buttons

Cement Blocks Area for Water Harvesting

Well only source of water

Tank constructed in college

Annexure – XIII: Waste Management

Ban of single use plastic in college campus

Save Water

Compost pit

Dustbins in classrooms

Dustbins used to segregate waste

Dustbins in corridor

Dustbins in library

E-waste Collection Bin

AMAR SEWA MANDAL'S
Govindrao Wanjari College of Law
CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com
WANJARRI GROUP
Founder LATE GOVINDRAO WANJARI
President Dr. (Smt) SUHASINI WANJARI
Secretary Adv. ABHIJIT G. WANJARRI
Principal Dr. SNEHAL FADNAVIS

GWCL/

Date: 30/08/2018

Agreement for Disposal of Paper & Cellulose Waste

This indenture is made on 31 August 2018 between Principal, **Govindrao Wanjari College of Law, Nagpur** (hereafter Party No.1) and **KGN SCRAPE,** Nagpur, sole proprietor through **Mr. Ramzan Khan Pathan** (hereafter Party No.2).

Whereas the party No.1, is running LL. B (3 Years); B.A.LL. B (5 Years); LL.M and PGDCL, Nandanwan, Nagpur. The college is recognized by Bar Council of India and affiliated with Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.

And

Whereas the Party No.1, Govindrao Wanjari College of Law, Nagpur impart Legal Education through Theory and Practical to students of LL. B; B.A.LL. B; LL.M and PGDCL

And

Whereas Students of Law undergo various practical's and record them in practical notebook, Socio Legal Research, and Dissertation

And

Whereas students undergo two semester exams in a year

And

Whereas the disposal of such papers and cellulose waste creates problem of disposal as per norms of prevailing environmental laws

And

Whereas Party No.2 is an authorized disposal agency and ready to dispose /reuse/recycle the waste provided to them.

This agreement witnesses as under

1) That Party No.1 shall provide all the paper and cellulose waste generated in the college to Party No.2 free of cost.
2) That Party No.2 agrees to reuse/recycle/dispose the paper and cellulose waste provided by the Party No.1 as per prevailing environmental law.
3) That this agreement is valid for a period of **3 Years** from **31 August 2018 to 31 August 2021**. In witness thereof signed by the Party No.1 and Party No.2

Party No.2

Party No.1

Witness

GOVINDRAO WANJARI COLLEGE OF LAW ★ NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

MOU of Cellulose Waste Handling

Mobile: 9373211640

K.G. N. SCRAPE SHOP

WASTE PAPER SUPPLIER & SCARP MERCHANT

Middle Ring Road, Hasanbagh, Nagpur.

CERTIFICATE OF PAPER AND CELLULOSE WASTE DISPOSAL

This is Certify that the Paper and cellulose waste received from **Govindrao Wanjari College of Law, Nagpur,** during the Period from 31st August 2018 to 31st August 2021 has been disposed off in environment friendly manner.

K. G. N. SCRAPE SHOP

Proprietor

Date: 05.09.2021

Authorized Signature

Cellulose waste handling certificate for 2018-21

AMAR SEWA MANDAL'S
Govindrao Wanjari College of Law
CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com
WANJARRI GROUP redefines education

Founder: LATE GOVINDRAO WANJARI
President: Dr. (Smt) SUHASINI WANJARI
Secretary: Adv. ABHIJIT G. WANJARRI
Principal: Dr. SNEHAL FADNAVIS

GWCL/

Date: 09/02/18

AGREEMENT FOR DISPOSAL OF E-WASTE

This indenture of agreement is made on **Principal, Govindrao Wanjari College of Law**, (Hereafter Party No.1) and **Pulse System**, sole proprietor through, **Mr. Palke** (Hereafter Party No.2).

Whereas the Party No.1, is running LL. B (3 Years); B.A.LL. B (5 Years); LL.M and PGDCL, Nandanvan, Nagpur. The college is recognized by Bar Council of India and affiliated with Rashtrasant Tukadoji Maharaj Nagpur

And

Whereas the Party No.1, Govindrao Wanjari College of Law, Nagpur Students are imparted with Computer Knowledge along with Practical.

And

Whereas after some period of times the Computer, Monitor, Keyboards and electronic machines become out of order

And

Whereas GWCL students bring their E- Waste from home for disposal at college and college manage the disposal of such E-Waste as per prevailing norms of Environmental Laws

And

Whereas the disposal of such E-Waste creates problem of disposal as per prevailing norms of Environmental Laws

And

Whereas Party No.2 is an authorized computer agency and ready to dispose /reuse/recycle the E-waste provided to them

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 once year.

2) That Party No.2 agrees to reuse/recycle/dispose the E-waste provided by the Party No.1 as per prevailing environmental law.

3) That this agreement is valid for a period of 3 Years from **10.02.2018 to 05 .09. 2021.**

In witness thereof signed by the Party No.1 and Party No.2.

Party No.2

Witness

Party No.1

Witness

GOVINDRAO WANJARI COLLEGE OF LAW ★ NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

MOU of E-waste Handling

PULSE SYSTEMS

✦ Computer Sales & Service ✦ Peripherals ✦ Maintenance
✦ Legal Software ✦ Networking ✦ Stabilizer ✦ UPS ✦ Printer

Office : B 01, Pratibha Sankul, Near Alankar Cinema, North Ambazari Road, Nagpur - 440 010.
Ph. : 0712 - 2536940, M : 9823017627, E-mail : pankaj.phalke@pulsesystems.co.in

Date : 05/09/2021

CERTIFICATE OF E-WASTE

This is to Certify that E-waste received form Govindrao Wanjari College of Law, Nagpur,
During the Period from 10/02/2018 To 05/09/2021

For Pulse System

Sudhir Patil

Authorized Signatory

E-waste handling certificate for 2018-21

नागपूर महानगरपालिका, नागपूर
नेहरू नगर झोन क्र. 5
(आरोग्य विभाग)

क्रमांक :- ow\668\20-S

दिनांक :- 30/7/2021

प्रमाणपत्र

प्रमाणित करण्यात येते की, नेहरूनगर झोन क्र. 5, प्रभाग क्र. 27 मधुन "गोविंदराव वंजारी विधी महाविद्यालय", नविन नंदनवन पाणी टाकी जवळ येथुन नागपूर महानगरपालिका व्दारा टाटा एस गाडीने दररोज कचरा संकलित केल्या जाते. करीता सबब प्रमाणपत्र देण्यात येत आहे.

30.7.2021

विभागीय अधिकारी (स्वच्छता)
नेहरूनगर झोन क्र. 5
म. न. पा. नागपूर.

Certificate of Nagpur Municipality for solid waste collection

AMAR SEWA MANDAL'S
Govindrao Wanjari College of Law
CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com
WANJARRI GROUP
Founder LATE GOVINDRAO WANJARI
President Dr. (Smt) SUHASINI WANJARI
Secretary Adv. ABHIJIT G. WANJARRI
Principal Dr. SNEHAL FADNAVIS

GWCL/ Date:

NOTICE

It is hereby informed to all the teaching / non-teaching staff and students that there is **Ban on Single Use Plastic** in the college premises.

GOVINDRAO WANJARI COLLEGE OF LAW NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur

3

Ban On Single Use Plastic Notice

AMAR SEWA MANDAL'S

Govindrao Wanjari College of Law

CD-2, New Nandanwan, Near Water Tank, NAGPUR.
Ph.No.: 7276033392, 7264890089, FAX: 0712-2747853
E-mail Address: 2006.gwcl@gmail.com

WANJARRI GROUP
redefines education

Founder	President	Secretary	Principal
LATE GOVINDRAO WANJARI	Dr. (Smt) SUHASINI WANJARI	Adv. ABHIJIT G. WANJARRI	Dr. SNEHAL FADNAVIS

GWCL/ Date:

NOTICE

It is hereby informed to all the teaching / non- teaching staff and students that Second Saturday of every month will be observed as " **NO VEHICLE DAY**".

GOVINDRAO WANJARI COLLEGE OF LAW ★ NAGPUR

Dr. Snehal S. Fadnavis
Officiating Principal
Govindrao Wanjari College of Law
Nagpur.

2

No Vehicle Day Notice

Annexure –XIV: Awareness / Posters

No Vehicle Day posters in college

Vruksh Dindi at RTMNU Campus on 2nd July 2019

Awareness Drive on Solid Waste Management at Pipla Fata, Hudkeshwar and Besa on 1st February 2020

Distribution of Grocery to the Needy People by Alumni of GWCL during Covid-19 Pandemic at Sakkardara Marketplace on 16th May 2020

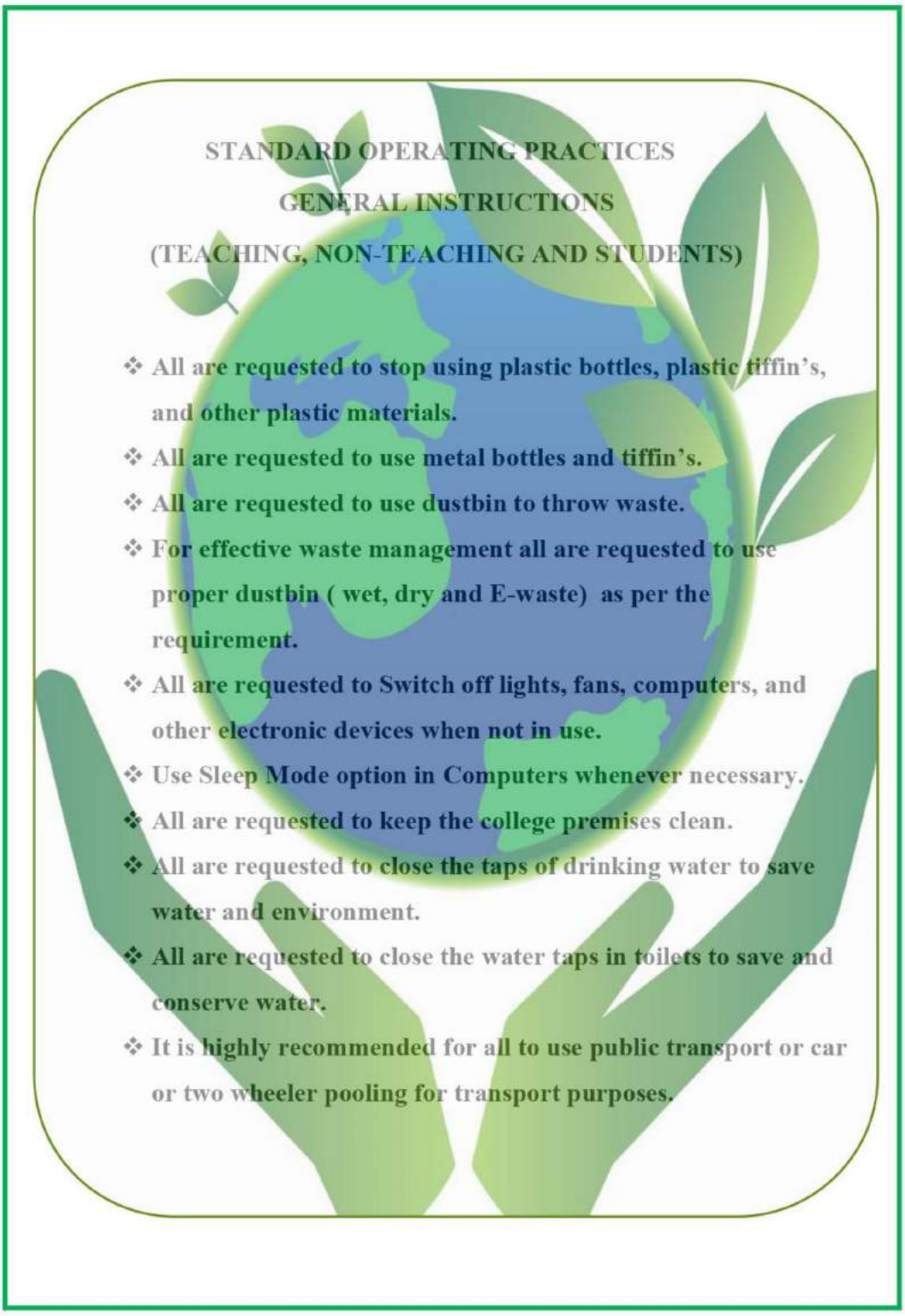
Counselling of Migrant Workers and Distribution of Mask, Sanitizer by Dr. Snehal Fadnavis Principal, Jain Kalar Bhavan, Sakkardara, Nagpur on 22nd May 2020

Distribution of Grocery Items to the Needy Persons by Adv. Abhijeet Wanjari, Secretary, Amar Sewa Mandal at Sakkardara Marketplace on 25th May 2020

Tree Plantation Week celebrated by the students at their home from 2nd July to 7th July 2020

Distribution of Sanitizer, mask and food packets to the needy at Covid Care Center, Hingna on 19th July 2020

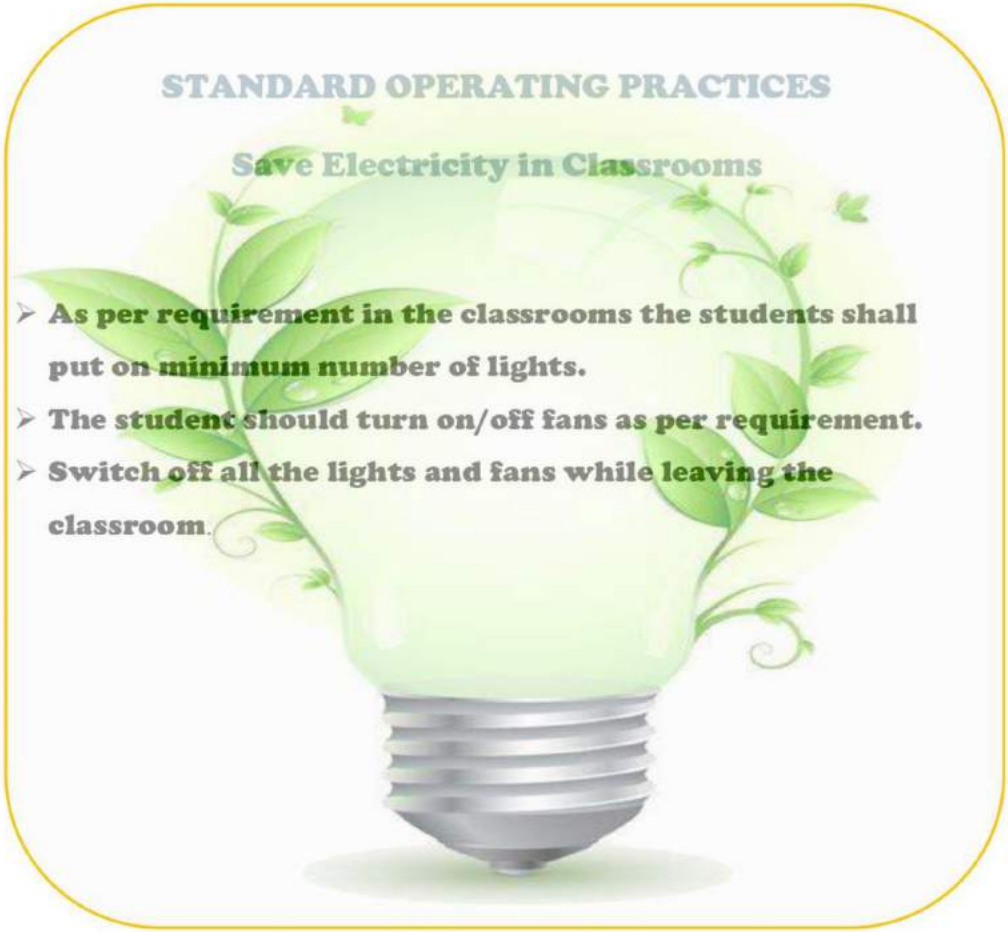
Monitoring of Body Temperature and Distribution of Mask among people of nearby locality at Hasanbagh Square, Nagpur on 21st September 2020


STANDARD OPERATING PRACTICES
GENERAL INSTRUCTIONS
(TEACHING, NON-TEACHING AND STUDENTS)
All are requested to stop using plastic bottles, plastic tiffin's, and other plastic materials.
All are requested to use metal bottles and tiffin's.
All are requested to use dustbin to throw waste.
For effective waste management all are requested to use proper dustbin (wet, dry and E-waste) as per the requirement.
All are requested to Switch off lights, fans, computers, and other electronic devices when not in use.
Use Sleep Mode option in Computers whenever necessary.
All are requested to keep the college premises clean.
All are requested to close the taps of drinking water to save water and environment.
All are requested to close the water taps in toilets to save and conserve water.
It is highly recommended for all to use public transport or car or two wheeler pooling for transport purposes.

STANDARD OPERATING PRACTICES

CLEANENESS IN COLLEGE PREMISES

- ✓ To maintain clean environment in the college premises all the students, teaching, non-teaching staff must collect waste if scattered in the college premises and put it in the proper dustbin.

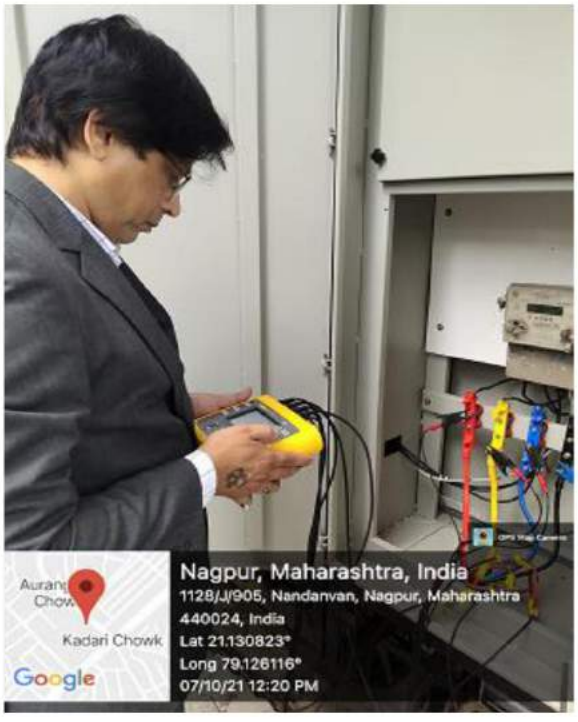

STANDARD OPERATING PRACTICES
Save Electricity in Classrooms
As per requirement in the classrooms the students shall put on minimum number of lights.
The student should turn on/off fans as per requirement.
Switch off all the lights and fans while leaving the classroom.

- All the students should pledge to stop themselves from using single use plastic for human health and for protecting Mother Earth.
- Use metal bottles and tiffin's.
- Scattered plastic and non- plastic waste must be collected and put it in the proper dustbin.
- Turn off lights, fans, computers and other electronic equipment's whenever not in use.
- Use single vehicle with a pillion rider for save environment and energy.
- Follow No vehicle Day.

Fully grown trees in the college campus

Annexure –XV: Onsite Measurements (Sample Pictures)

Onsite measurements taken by Green Audit Team




Nagpur, Maharashtra, India
1128/J/905, Nandanvan, Nagpur, Maharashtra 440024, India
Lat 21.130803°
Long 79.126145°
07/10/21 12:21 PM
Kadari Chowk
Google


Nagpur, Maharashtra, India
1128/J/905, Nandanvan, Nagpur, Maharashtra 440024, India
Lat 21.130788°
Long 79.126163°
07/10/21 12:22 PM
Kadari Chowk
Google


Nagpur, Maharashtra, India
1128/J/905, Nandanvan, Nagpur, Maharashtra 440024, India
Lat 21.130787°
Long 79.126157°
07/10/21 12:23 PM
Kadari Chowk
Google


Nagpur, Maharashtra, India
1128/J/905, Nandanvan, Nagpur, Maharashtra 440024, India
Lat 21.130788°
Long 79.126131°
07/10/21 12:24 PM
Kadari Chowk
Google

Energy Audit measurements

Green Audit Team in discussion with the Principal

Green Audit Team interviewing the Students

Green Audit Team interviewing the Staff Members

Biometric Machine for attendance

Fire Extinguisher in college

Fire Fighting system in college

Annexure –XVI: Sound and Air Quality Readings

Class Room

Office

Terrace

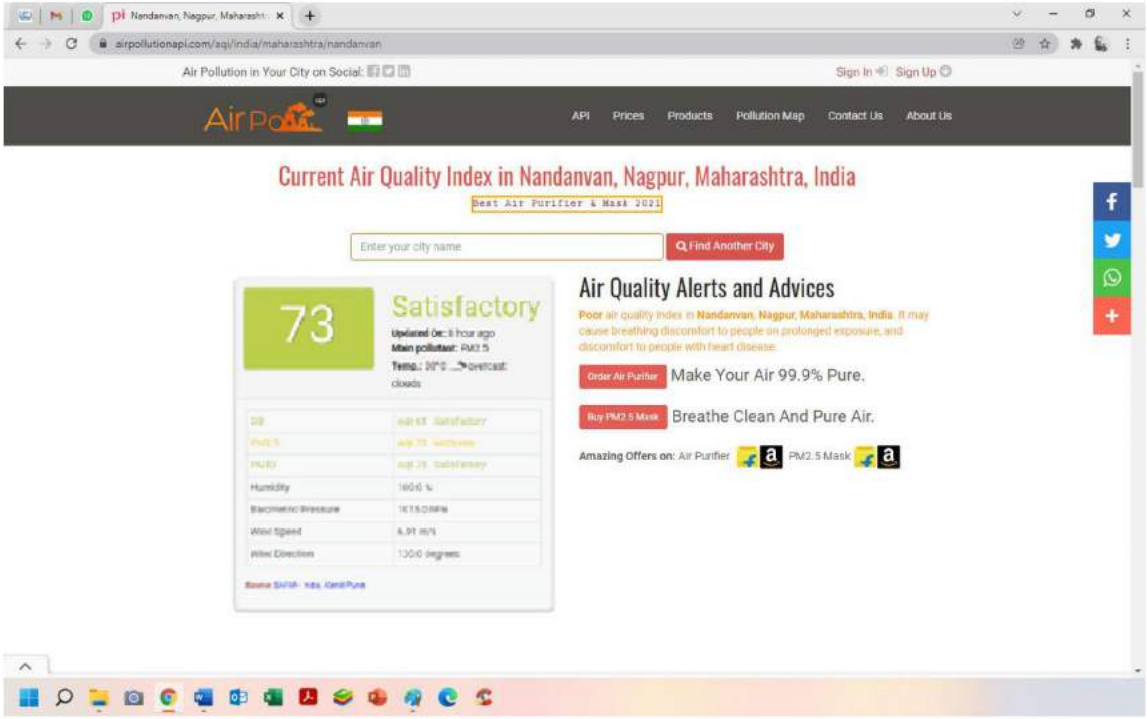
Campus

Readings of sound at various locations in college

WHO/ CPCB Guidelines for Noise[8]

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 on previous page. The college is located on the main road so the noise levels were on slightly higher side.



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.

[8] 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

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.

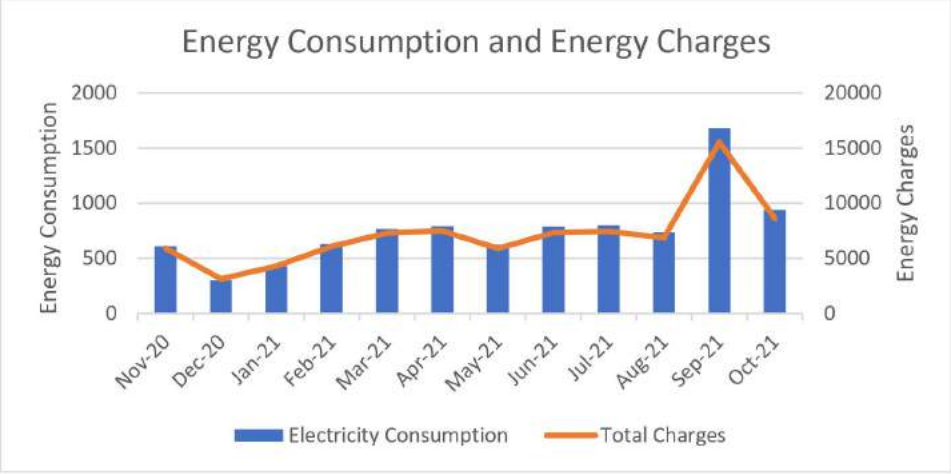
Chapter 2 – Electrical Bill Analysis

Electricity bill pattern under consideration is from Nov 2020 to Oct 2021

Consumer No: 410014950072
Tariff: 052/LT-II Comm<20 kW
Connected Load: 14.7 kW

Sr. No.	Month	Energy Consumption	Rate/kWh	Energy Charges	Total Charges
1	Oct-21	938	7.18	6734	8622
2	Sep-21	1681	7.18	12069	15538
3	Aug-21	739	7.18	5306	6881
4	Jul-21	801	7.18	5751	7424
5	Jun-21	790	7.18	5672	7327
6	May-21	626	7.18	4494	5892
7	Apr-21	792	7.32	5796	7488
8	Mar-21	766	7.36	5637	7297
9	Feb-21	631	7.36	4644	6082
10	Jan-21	432	7.36	3179	4291
11	Dec-20	302	7.36	2222	3121
12	Nov-20	612	7.36	4504	5911
Average		759.17	7.27	5500.67	7156.17
Yearly		9110		66008	85874

Table: Monthly Electricity Consumption Details (Nov 2020- Oct 2021)



Graphical Representation of Electricity Consumption and Total Energy Charges

- ***Observations from Bill Analysis for year Nov 2020- Oct 2021:***

1. Average monthly MSEDCL energy consumption is **760** Units (kWh) and avg. monthly bill is **Rs. 7156.00**
2. Average of 12 months' unit cost is Rs. **7.27**/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	VIdistortion_VA_avg	VIdistortion_VB_avg	VIdistortion_VC_avg	VIdistortion_IA_avg	VIdistortion_IB_avg	VIdistortion_IC_avg
11:31:00	237	235	233	407	407	406	11.1	13.3	10.6	2.9	2.6	2.6	6.7	9.6	5.8
11:31:10	237	234	233	407	407	405	12.6	14.8	10.6	2.9	2.7	2.6	5.8	8.9	5.8
11:31:20	237	234	232	407	407	406	12.7	15.2	10.6	2.9	2.6	2.6	5.8	9.3	6
11:31:30	238	234	233	406	407	406	12.5	15.8	10.9	2.9	2.6	2.6	6.1	9.7	5.9
11:31:40	237	234	233	406	407	406	12.5	16.3	10.9	2.9	2.6	2.6	6	9.5	5.9
11:31:50	238	234	233	406	407	407	12.6	17.6	10.9	2.9	2.6	2.6	6.1	9.2	5.8
11:32:00	238	235	233	407	407	407	12.5	18	10.9	2.9	2.6	2.7	6.1	9.2	5.7
11:32:10	238	235	233	408	407	407	12.5	18.3	10.9	2.9	2.6	2.7	6.1	9.2	5.7
11:32:20	237	238	231	407	407	407	12.5	18.5	10.9	3	2.6	2.6	6.1	9.1	5.7
11:32:30	231	253	222	407	407	406	12.5	18.6	10.9	3.2	2.4	2.4	6.1	9.2	5.7
11:32:40	231	253	222	407	407	407	12.6	18.7	10.9	3.2	2.3	2.3	6.8	9.1	5.7
11:32:50	231	253	222	408	407	407	12.6	19	10.9	3.2	2.3	2.3	6.4	9.1	5.9
11:33:00	232	253	222	408	408	407	12.6	19.1	10.9	3.2	2.4	2.4	6.2	9.1	5.7
11:33:10	232	253	222	408	408	407	12.6	19.2	10.9	3.2	2.4	2.4	6.2	9.1	5.7
11:33:20	232	253	223	409	408	408	12.6	19.3	10.9	3.2	2.3	2.4	6.2	9.1	5.7
11:33:30	232	253	223	409	408	408	12.6	19.5	10.9	3.2	2.4	2.4	6.3	9.1	5.7
11:33:40	232	253	223	408	408	407	12.6	21.3	10.8	3.2	2.4	2.4	6.2	8.5	5.8
11:33:50	232	253	223	408	408	408	12.6	20.2	10.4	3.3	2.4	2.4	6.3	8.9	6
11:34:00	232	253	223	409	409	409	12.6	20	10	3.3	2.4	2.4	6.3	9.1	6.1
11:34:10	232	254	223	409	409	409	12.6	20.7	9.6	3.3	2.4	2.4	6.4	8.8	6.1
11:34:20	232	253	223	409	409	408	12.8	21.1	8.8	3.3	2.4	2.4	6.2	8.7	6.7
11:34:30	232	254	223	409	409	408	12.7	20.3	8.7	3.3	2.4	2.4	6.3	9	6.7

11:34:40	232	254	223	409	409	409	12.9	20.3	8.5	3.3	2.4	2.4	6.8	9	6.8
11:34:50	232	254	223	409	410	409	12.8	20.5	8.4	3.3	2.4	2.4	6.6	9	6.7
11:35:00	232	254	224	408	410	408	12.8	20.7	8.4	3.3	2.3	2.4	6.4	9	6.8
11:35:10	232	254	224	408	411	409	12.8	20.8	8.4	3.3	2.3	2.4	6.4	9	6.8
11:35:20	232	254	224	408	411	409	12.8	21	8.4	3.3	2.3	2.4	6.5	8.9	6.7
11:35:30	238	236	236	409	411	409	12.8	21.2	8.7	3	2.6	2.6	6.4	8.9	6.9
11:35:40	239	235	236	409	412	410	12.8	21.3	8.9	3	2.6	2.6	6.3	8.8	6.9
11:35:50	239	235	236	409	411	409	12.8	21.5	8.9	3	2.6	2.6	6.3	8.8	6.9
11:36:00	239	236	236	410	411	409	12.9	22.3	9.9	3	2.6	2.6	6.7	8.9	7.6
11:36:10	239	236	236	410	411	409	12.8	22	9.6	3	2.7	2.6	6.4	8.7	7.1
11:36:20	239	236	236	410	411	409	12.8	22.1	9.4	3	2.7	2.6	6.4	8.5	6.8
11:36:30	239	235	236	409	410	409	14.6	24.8	11.9	2.9	2.5	2.5	14.1	12.2	17.8
11:36:40	239	234	236	409	410	409	12.8	22.7	9.5	3	2.6	2.6	6.6	8.2	7.2
11:36:50	239	234	236	409	410	409	12.9	22.8	9.4	3	2.6	2.7	6.4	7.7	6.7
11:37:00	238	234	236	408	409	409	13	23.2	9.4	3	2.6	2.7	6.6	7.4	6.8
11:37:10	239	235	236	409	410	409	13	23.4	9.4	3	2.6	2.7	6.5	7.2	6.8
11:37:20	239	234	236	408	410	410	12.9	22	9.4	2.9	2.6	2.6	6.4	6.7	6.7
11:37:30	238	236	236	409	411	409	12.9	13.3	9.5	2.9	2.7	2.6	6.4	8	6.7
11:37:40	238	237	236	410	411	409	12.9	13.3	9.5	2.9	2.7	2.7	6.3	7.9	6.8
11:37:50	238	237	235	410	411	409	13	13.3	9.5	2.9	2.7	2.7	6.4	7.9	6.8
11:38:00	237	237	235	410	411	408	13	13.3	9.5	2.9	2.7	2.7	6.5	7.9	6.8
11:38:10	238	237	236	410	411	409	12.9	13.3	9.5	2.9	2.7	2.7	6.4	7.9	6.8
11:38:20	238	237	235	410	411	409	13	13.3	9.5	2.9	2.7	2.7	6.5	7.9	6.8
11:38:30	238	237	235	409	411	408	12.9	13.4	9.5	2.9	2.7	2.7	6.4	7.9	6.8
11:38:40	237	237	236	409	411	408	12.9	13.4	9.4	2.9	2.7	2.7	6.4	7.9	6.8
11:38:50	237	237	236	409	411	409	12.9	13.3	9.4	3	2.7	2.7	6.5	7.9	6.8
11:39:00	237	237	236	409	411	409	12.9	13.3	9.4	3	2.7	2.7	6.5	8	6.8
11:39:10	238	237	236	409	411	409	12.9	13.3	9.4	3	2.7	2.7	6.3	7.9	6.8
11:39:20	238	236	236	409	412	409	12.8	13.3	9.4	3	2.7	2.7	6.2	7.9	6.8

11:39:30	238	236	237	409	412	409	12.8	13.3	9.4	3	2.7	2.7	6.2	7.9	6.9
11:39:40	238	236	237	409	412	410	12.8	13.3	9.4	3	2.7	2.7	6	7.9	6.9
11:39:50	237	237	237	409	412	409	14	15	11.2	2.9	2.6	2.7	12.5	13.4	16.1
11:40:00	238	237	237	410	413	410	13.7	14.6	10.8	2.9	2.6	2.7	11	12.2	14.3
11:40:10	238	237	237	410	413	409	12.9	13.3	9.4	2.9	2.7	2.7	5.9	7.9	6.9
11:40:20	238	237	236	410	412	408	12.9	13.3	9.4	3	2.7	2.8	5.9	7.9	6.9
11:40:30	238	237	237	411	413	409	12.8	13.3	9.4	3	2.7	2.8	6	8	6.9
11:40:40	237	237	237	410	412	408	12.9	13.3	9.5	3	2.7	2.8	5.8	8	6.9
11:40:50	237	236	237	410	412	408	12.8	13.3	9.4	3	2.7	2.8	6.2	8.1	6.9
11:41:00	238	237	236	411	412	409	12.8	13.3	9.5	2.9	2.7	2.8	6.1	8	6.9
11:41:10	237	237	236	411	412	408	12.8	13.7	9.5	2.9	2.7	2.8	6.2	7.8	6.9
11:41:20	238	237	236	411	412	409	12.8	14.1	9.4	3	2.7	2.8	6.1	7.5	6.9
11:41:30	238	237	236	411	412	409	12.9	14.1	9.4	3	2.7	2.8	5.9	7.5	6.9
11:41:40	237	237	236	410	412	408	12.9	14.1	9.4	3	2.7	2.8	5.9	7.5	6.8
11:41:50	237	237	236	410	412	408	12.9	14.2	9.4	3	2.7	2.8	6.1	7.5	6.8
11:42:00	237	237	236	410	412	408	12.9	14.9	9.4	3	2.7	2.8	5.8	7.5	6.8
11:42:10	237	237	236	410	411	408	13	14.9	9.4	3	2.7	2.8	6.8	7.4	6.9
11:42:20	237	237	236	410	411	407	13	14.9	9.4	3	2.7	2.8	6.9	7.4	6.9
11:42:30	237	237	236	410	411	408	13	14.9	9.4	3	2.7	2.8	6.9	7.5	6.9
11:42:40	238	236	236	409	411	408	12.9	14.8	9.4	3	2.7	2.8	6.6	7.4	6.9
11:42:50	238	236	236	409	411	408	12.9	14.9	9.4	3	2.7	2.8	6.6	7.4	6.9
11:43:00	238	235	236	409	410	409	12.6	16.5	9.3	3	2.7	2.8	6.6	6.8	7
11:43:10	238	235	236	409	411	409	12.6	16.5	9.1	3	2.7	2.8	6.8	6.8	7.1
11:43:20	238	235	236	409	411	409	12.6	16.5	9.1	3	2.7	2.8	6.6	6.8	7.2
11:43:30	237	235	237	409	411	409	12.6	16.5	9.1	3	2.7	2.8	6.7	6.8	7.1
11:43:40	237	236	237	409	412	409	12.6	16.5	9.1	3	2.6	2.8	6.8	6.8	7.2
11:43:50	238	236	236	409	411	408	12.6	16.5	9.1	3	2.7	2.8	6.8	6.9	7.4
11:44:00	238	236	236	409	411	409	13.2	16.5	9	3	2.7	2.8	5.8	6.9	7.5
11:44:10	238	236	237	410	412	409	13.2	16.5	9	3	2.7	2.8	5.5	6.9	7.5

11:44:20	238	236	237	409	412	409	13.2	16.5	9	3	2.6	2.8	5.5	6.9	7.6
11:44:30	238	236	237	410	412	410	13.2	16.5	9.1	2.9	2.6	2.8	5.5	6.9	7.6
11:44:40	238	236	237	410	412	409	13.2	16.5	9.1	2.9	2.7	2.7	5.4	6.8	7.6
11:44:50	238	236	237	410	412	409	13.2	16.5	9.1	2.9	2.7	2.7	5.5	6.9	7.6
11:45:00	238	237	237	410	412	409	13.2	16.5	9.1	2.9	2.6	2.7	5.6	6.9	7.6
11:45:10	238	237	237	410	412	409	13.2	16.5	9	2.9	2.7	2.7	5.8	6.9	7.6
11:45:20	238	237	236	410	411	409	13.1	16.5	9	2.9	2.6	2.7	6.2	6.9	7.5
11:45:30	238	237	235	410	411	408	13.1	16.6	9	2.9	2.7	2.7	6.1	6.9	7.5
11:45:40	238	237	235	410	411	408	13.1	16.6	9	2.9	2.6	2.7	6	7	7.5
11:45:50	238	237	235	410	411	409	13.1	16.6	9	2.9	2.7	2.7	6	7	7.5
11:46:00	238	237	235	410	411	409	13.1	16.5	9	2.9	2.7	2.7	6.1	6.9	7.5
11:46:10	238	237	235	410	411	409	13.1	16.5	9	2.9	2.7	2.7	6	6.9	7.5
11:46:20	238	237	236	410	411	410	13.2	16.5	9	2.9	2.7	2.8	6.2	6.9	7.5
11:46:30	238	237	236	410	412	410	13.1	16.5	9	2.9	2.7	2.8	6.1	6.9	7.6
11:46:40	237	238	236	410	412	409	13.1	16.5	9	2.9	2.7	2.7	6.1	6.9	7.6
11:46:50	237	238	236	411	412	409	13.2	16.6	9	2.9	2.7	2.7	6.3	6.9	7.6
11:47:00	238	238	236	410	412	409	13.2	16.6	9.3	2.9	2.7	2.7	6.2	6.9	7.6
11:47:10	237	238	236	410	412	409	13.2	16.5	9.3	2.9	2.6	2.7	6	6.9	7.6
11:47:20	237	238	236	410	412	409	13.2	16.6	9.3	2.9	2.7	2.7	6.2	6.9	7.6
11:47:30	238	238	236	411	412	410	13.2	16.5	9.3	2.9	2.7	2.7	6.1	7	7.6
11:47:40	238	237	237	411	412	410	13.1	16.5	9.2	3	2.7	2.7	6.2	6.9	7.6
11:47:50	238	237	237	411	412	410	13.1	16.5	9.2	3	2.7	2.7	6.1	6.9	7.6
11:48:00	238	237	237	410	412	410	13.1	16.5	9.2	3	2.7	2.7	6.2	6.9	7.6
11:48:10	238	237	237	411	412	410	13.1	16.5	9.2	3	2.7	2.7	6.2	6.9	7.6
11:48:20	238	237	237	411	412	410	13.2	16.8	9.9	3	2.7	2.7	6.3	7.2	7.7
11:48:30	238	236	236	410	411	410	13.5	16.6	9.8	3	2.7	2.7	6	7.1	7.5
11:48:40	238	237	236	411	412	410	13.7	16.8	10	3	2.7	2.7	7.5	8.1	9.6
11:48:50	238	235	236	410	411	410	14.9	18.4	11.6	2.9	2.6	2.6	12.8	12.1	16.9
11:49:00	238	235	237	410	411	410	13.4	16.4	9.6	3	2.7	2.7	6	7	7.3

11:49:10	238	236	237	410	412	410	13.4	16.4	9.6	3	2.7	2.8	6	6.8	7.3
11:49:20	238	236	238	410	413	411	13.4	16.4	9.6	3	2.7	2.7	6	6.8	7.3
11:49:30	238	236	238	410	412	411	13.5	16.4	9.6	3	2.7	2.8	6	6.8	7.3
11:49:40	238	236	237	410	412	411	13.5	16.4	9.6	3	2.7	2.8	6.3	6.9	7.3
11:49:50	238	237	238	410	413	411	13.5	16.4	9.6	3	2.7	2.8	6.2	6.8	7.3
11:50:00	238	237	238	410	413	411	13.5	16.4	9.6	3	2.7	2.8	6.2	6.8	7.3
11:50:10	238	237	238	410	413	411	13.9	16.4	9.6	3	2.7	2.8	6.1	6.8	7.3
11:50:20	237	237	238	410	413	410	15.2	16.4	9.6	3	2.7	2.7	6	6.8	7.4
11:50:30	237	237	238	410	413	410	14.9	16.4	9.6	3	2.7	2.8	6.2	6.8	7.4
11:50:40	237	236	238	410	413	410	14	16.4	9.6	3	2.7	2.8	6.2	6.8	7.4
11:50:50	238	236	238	410	413	411	13.5	16.4	9.6	3	2.7	2.8	6.1	6.8	7.4
11:51:00	237	237	238	410	414	410	13.5	16.4	9.6	3	2.7	2.8	6.3	6.8	7.4
11:51:10	237	237	239	410	414	410	13.6	16.4	9.6	3	2.7	2.8	6.4	6.8	7.4
11:51:20	238	236	239	410	414	411	13.5	16.4	9.6	3.1	2.7	2.8	6.2	6.8	7.4
11:51:30	237	236	239	410	413	411	13.5	16.4	9.6	3.1	2.7	2.8	6.2	6.8	7.4
11:51:40	238	236	238	410	413	411	13.5	16.8	9.6	3.1	2.7	2.8	6.1	6.7	7.4
11:51:50	238	236	238	410	413	411	13.5	17.2	9.6	3	2.7	2.8	6.2	6.8	7.4
11:52:00	238	236	239	410	413	411	13.5	18.8	9.6	3	2.7	2.8	6.1	6.5	7.4
11:52:10	238	236	239	411	413	412	13.5	17	9.3	3.1	2.7	2.8	6.2	6.9	7.7
11:52:20	238	236	239	410	414	411	13.6	16.5	9.3	3.1	2.7	2.8	6.2	7	7.7
11:52:30	238	237	239	411	414	411	13.5	16.5	9.3	3.1	2.7	2.8	6.2	7	7.7
11:52:40	238	237	239	411	414	412	13.5	16.4	9.3	3.1	2.7	2.8	6.1	6.9	7.7
11:52:50	238	237	239	410	414	412	13.5	16.4	9.3	3	2.7	2.8	6.2	6.9	7.7
11:53:00	238	237	239	410	413	411	13.5	16.4	9.3	3	2.7	2.8	6.2	6.9	7.7
11:53:10	238	236	239	410	413	411	13.6	16.4	9.3	3	2.7	2.8	6.3	6.9	7.7
11:53:20	238	236	239	410	413	411	13.5	16.4	9.3	3	2.7	2.7	6.3	6.9	7.6
11:53:30	238	237	239	410	413	411	13.5	16.4	9.3	3	2.7	2.7	6.2	7	7.7
11:53:40	238	236	238	410	413	411	13.5	16.4	9.3	3	2.7	2.7	6.2	6.9	7.6
11:53:50	238	236	239	410	413	412	13.5	16.4	9.3	3.1	2.7	2.7	6.2	6.9	7.7

11:54:00	238	237	239	410	413	411	13.5	16.5	9.3	3.1	2.7	2.8	6.2	6.9	7.7
11:54:10	238	236	238	410	413	411	13.6	16.4	9.3	3	2.7	2.8	6.2	6.9	7.7
11:54:20	238	236	237	410	412	410	13.5	16.4	9.3	3.1	2.7	2.8	6.2	6.9	7.7
11:54:30	238	236	237	410	412	410	13.5	16.4	9.3	3.1	2.7	2.7	6.2	6.9	7.7
11:54:40	238	236	237	409	412	410	13.5	16.4	9.3	3.1	2.7	2.7	6.2	7	7.7
11:54:50	238	234	237	408	411	410	13.5	16.4	9.3	3.1	2.7	2.7	6.2	7.1	7.7
11:55:00	238	234	237	408	411	409	13.5	17.8	9.3	3.1	2.7	2.7	6.2	6.7	7.7
11:55:10	238	235	237	409	411	409	13.5	17.3	9.3	3	2.7	2.7	6.1	6.8	7.7
11:55:20	238	235	237	409	411	409	13.5	16.4	9.3	3	2.7	2.7	6.1	7	7.7
11:55:30	238	235	237	409	411	410	13.5	16.4	9.3	3	2.7	2.7	6.1	7	7.6
11:55:40	238	235	236	409	411	409	13.5	16.4	9.3	3	2.8	2.7	6	7	7.7
11:55:50	238	236	236	409	411	409	13.5	16.4	9.3	3	2.8	2.7	6.1	6.9	7.7
11:56:00	238	236	236	410	411	409	13.5	16.4	9.3	3	2.8	2.7	6.1	7	7.7
11:56:10	237	235	237	409	411	409	13.5	16.4	9.3	3.1	2.7	2.7	6.1	7.1	7.7
11:56:20	237	236	236	409	411	408	13.5	16.5	9.3	3.1	2.8	2.7	6.2	7.1	7.7
11:56:30	237	236	236	409	411	409	13.5	16.4	9.3	3	2.8	2.7	6.2	7	7.7
11:56:40	237	236	237	409	411	408	13.5	18.7	9.3	3.1	2.7	2.7	6.2	7.7	7.7
11:56:50	238	235	237	409	412	409	13.5	21.6	9.3	3.1	2.7	2.8	6.2	8.1	7.7
11:57:00	238	234	237	408	411	409	13.5	22.4	9.3	3.1	2.7	2.7	6.3	8.2	7.7
11:57:10	238	234	237	408	411	409	13.5	23	9.3	3.1	2.7	2.7	6.2	8.1	7.7
11:57:20	238	235	237	409	411	409	13.5	24.8	9.3	3.1	2.7	2.7	6.2	7.8	7.7
11:57:30	238	235	237	409	411	409	13.5	24.3	9.3	3.1	2.7	2.7	6.2	8	7.7
11:57:40	238	235	237	409	412	410	13.5	24	9.3	3.1	2.7	2.7	6.2	8.2	7.7
11:57:50	238	235	237	409	412	410	13.5	24.1	9.3	3.1	2.6	2.7	6.2	8.1	7.6
11:58:00	238	234	237	408	411	409	13.5	24.3	9.3	3.1	2.6	2.7	6.1	8	7.6
11:58:10	238	233	237	408	410	409	13.5	24.5	9.3	3.1	2.7	2.7	6.2	8	7.7
11:58:20	238	234	237	408	410	409	13.5	24.7	9.3	3.1	2.6	2.7	6.2	7.9	7.7
11:58:30	238	234	237	408	410	409	13.5	24.9	9.3	3.1	2.7	2.7	6.2	7.9	7.7
11:58:40	238	234	237	409	411	410	13.5	25	9.3	3.1	2.6	2.7	6.2	7.7	7.7

11:58:50	237	234	237	408	410	409	13.5	25.3	9.3	3	2.6	2.7	6.2	7.6	7.7
11:59:00	238	234	237	408	410	409	13.5	25.9	9.3	3.1	2.7	2.7	6.3	7.4	7.7
11:59:10	237	234	237	408	411	409	13.5	26.6	9.3	3.1	2.7	2.8	6.3	7.2	7.7
11:59:20	238	233	237	407	410	409	13.5	26.6	9.3	3.1	2.7	2.8	6.3	7	7.7
11:59:30	238	232	237	407	410	409	13.5	26.8	9.3	3.1	2.7	2.7	6.3	6.6	7.7
11:59:40	238	233	238	407	410	410	13.5	26.6	9.3	3.1	2.7	2.7	6.2	6.5	7.7
11:59:50	238	234	238	408	411	410	13.5	20.8	9.3	3.1	2.7	2.7	6.3	6.5	7.7
12:00:00	237	236	237	409	412	409	13.5	17.4	9.3	3	2.7	2.7	6.3	6.7	7.7
12:00:10	238	236	236	410	411	410	13.5	16.5	9.3	3	2.7	2.7	6.1	6.9	7.7
12:00:20	239	236	236	410	411	410	13.4	16.4	9.3	3	2.7	2.7	5.9	6.9	7.7
12:00:30	239	236	236	410	411	410	13.4	16.4	9.3	3	2.7	2.7	5.8	6.9	7.7
12:00:40	238	236	236	410	411	410	13.4	16.4	9.3	3	2.7	2.7	5.8	7	7.7
12:00:50	238	236	236	410	411	410	13.4	16.4	9.3	3	2.7	2.7	5.7	7	7.7
12:01:00	238	236	236	410	411	410	13.4	16.4	9.3	3	2.7	2.7	5.7	7	7.7
12:01:10	238	236	237	410	412	410	13.4	16.4	9.3	3	2.7	2.7	5.9	6.9	7.7
12:01:20	238	235	237	409	411	410	13.4	16.4	9.3	3	2.7	2.7	5.7	6.9	7.8
12:01:30	238	236	237	410	412	410	13.3	16.4	9.3	3	2.7	2.7	5.7	6.9	7.7
12:01:40	238	236	237	410	412	410	13.3	16.4	9.3	3	2.7	2.7	5.8	6.9	7.7
12:01:50	239	235	237	409	412	410	13.3	16.4	9.3	3	2.7	2.7	5.8	7	7.7
12:02:00	238	236	237	410	412	410	13.3	16.4	9.3	3	2.7	2.7	5.9	6.9	7.7
12:02:10	238	236	237	410	412	410	13.3	16.6	9.3	3	2.7	2.7	5.9	6.8	7.6
12:02:20	238	235	237	409	412	410	13.3	18.1	9.3	3	2.7	2.7	5.9	6.4	7.7
12:02:30	238	235	237	409	412	409	13.3	16.9	9.3	3.1	2.7	2.7	5.9	6.8	7.7
12:02:40	238	235	237	408	412	409	13.3	16.4	9.3	3.1	2.7	2.7	5.8	7	7.7
12:02:50	238	235	237	408	412	410	13.3	16.3	9.3	3.1	2.7	2.7	5.8	7	7.6
12:03:00	238	234	237	408	411	410	13.4	16.4	9.3	3.1	2.7	2.7	5.9	7.1	7.7
12:03:10	239	235	237	409	411	410	13.4	16.4	9.3	3.1	2.7	2.7	5.9	7.1	7.6
12:03:20	238	234	237	408	411	410	13.3	16.3	9.3	3.1	2.7	2.7	5.8	7.1	7.6
12:03:30	238	234	238	409	411	410	13.3	16.4	9.3	3.1	2.7	2.7	5.9	7.1	7.6

12:03:40	239	235	239	410	413	410	13.3	16.4	9.3	3	2.7	2.7	5.8	7	7.6
12:03:50	239	234	239	409	412	410	13.3	16.3	9.2	3	2.7	2.7	5.9	7.2	7.5
12:04:00	238	235	238	410	413	409	13.3	16.4	9.2	3	2.7	2.8	5.9	7	7.6
12:04:10	238	236	238	410	413	409	13.3	16.4	9.2	3	2.7	2.8	5.9	7	7.6
12:04:20	238	235	238	410	412	409	13.3	16.4	9.2	3	2.7	2.8	5.9	7.1	7.6
12:04:30	238	236	237	410	411	409	13.3	16.4	9.3	3	2.7	2.8	5.9	7.1	7.6
12:04:40	237	236	237	410	411	409	13.3	16.4	9.3	3.1	2.7	2.8	5.9	7.1	7.6
12:04:50	238	236	238	410	411	410	13.3	17.3	9.2	3.1	2.7	2.8	5.9	6.9	7.5
12:05:00	238	236	237	410	412	409	13.3	17.5	9.2	3	2.7	2.8	5.9	6.8	7.6
12:05:10	237	236	238	411	412	409	13.3	16.6	9.2	3.1	2.7	2.8	5.9	7	7.6
12:05:20	237	235	239	409	411	410	13.3	16.3	9.2	3.1	2.7	2.8	5.9	7.1	7.6
12:05:30	238	234	239	409	411	410	13.3	16.3	9.2	3.1	2.6	2.8	5.9	7.2	7.5
12:05:40	238	235	239	410	412	410	13.3	17.5	8.9	3.1	2.7	2.8	5.9	6.9	7.5
12:05:50	238	237	239	411	414	411	13.3	17.6	8.9	3	2.7	2.8	5.8	6.7	7.4
12:06:00	238	237	238	411	413	411	13.3	17.4	8.9	3	2.7	2.8	5.8	6.8	7.4
12:06:10	239	236	238	411	413	411	13	15.9	8.9	3	2.7	2.7	6	6.9	7.4
12:06:20	238	237	238	411	413	411	12.4	15.9	8.9	3	2.7	2.7	6.3	6.9	7.4
12:06:30	239	237	238	411	413	412	12.4	17.5	8.9	3.1	2.8	2.8	6.3	6.7	7.4
12:06:39	239	237	238	411	413	412	12.4	15.8	8.9	3	2.7	2.7	6.3	7	7.4

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

	Voltage Variation (V) – R	Voltage Variation (V) – Y	Voltage Variation (V) –B	Current Variation (A) – R	Current Variation (A) – Y	Current Variation (A) – B
Minimum	231.00	232.00	222.00	11.10	13.30	8.40
Maximum	239.00	254.00	239.00	15.20	26.80	11.90
Average	237.38	237.33	235.59	13.18	17.47	9.45

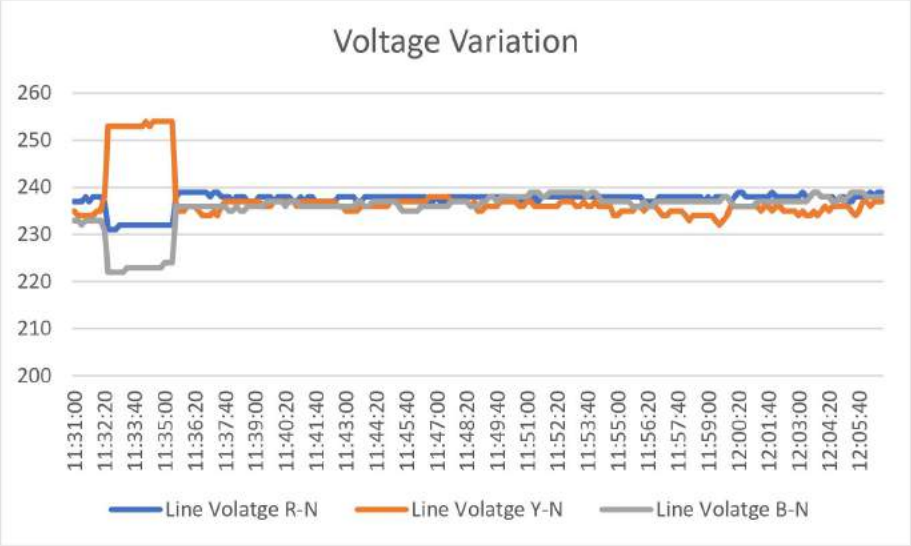
The following table gives the results of power data logging for main Feeder

	Total Harmonics Distortion – Voltage (THD R)	Total Harmonics Distortion – Voltage (THD Y)	Total Harmonics Distortion – Voltage (THD B)	Total Harmonics Distortion – Current (THD R)	Total Harmonics Distortion – Current (THD Y)	Total Harmonics Distortion – Current (THD B)
Minimum	2.90	2.30	2.30	5.40	6.40	5.70
Maximum	3.30	2.80	2.80	14.10	13.40	17.80
Average	3.02	2.66	2.70	6.28	7.55	7.42

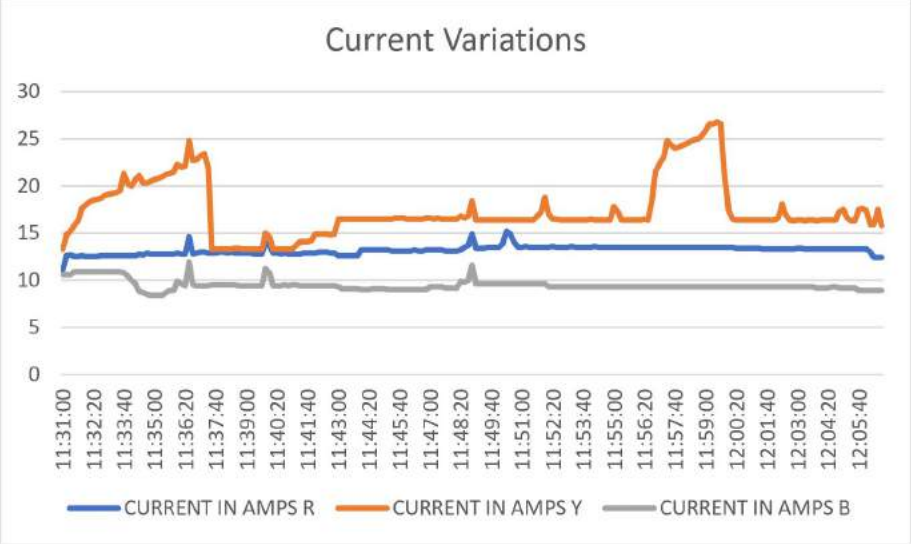
Observations for Main Feeder Logging

- Voltage harmonics are found to be within limits. While the average current harmonics is found to slightly at greater side i.e., around 7%. Harmonic stabilizer to be installed to suppress the harmonics level within 5%.
- The Phase voltages are unbalanced. Graphical representation below shows the voltage in phase L1 is higher compared to Phase L2 and L3. Same can balance by a voltage stabilizer.
- Presently Load across 3 phase is unbalanced causing unbalance current across 3 phases. Load across 3 phase is required to distributed uniformly. Y Phase is having load on higher side which can be uniformly distributed across remaining two phases.

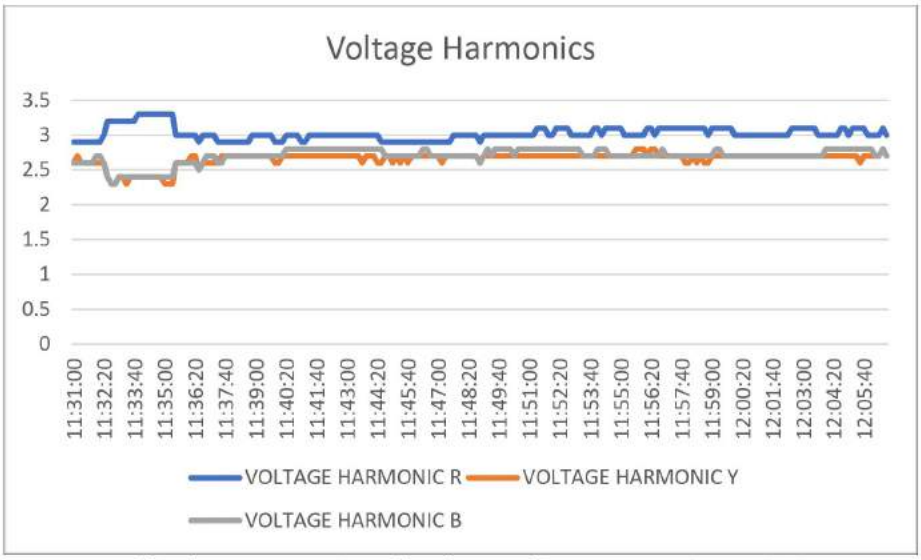
Graphical Representations of Measured Electrical Data



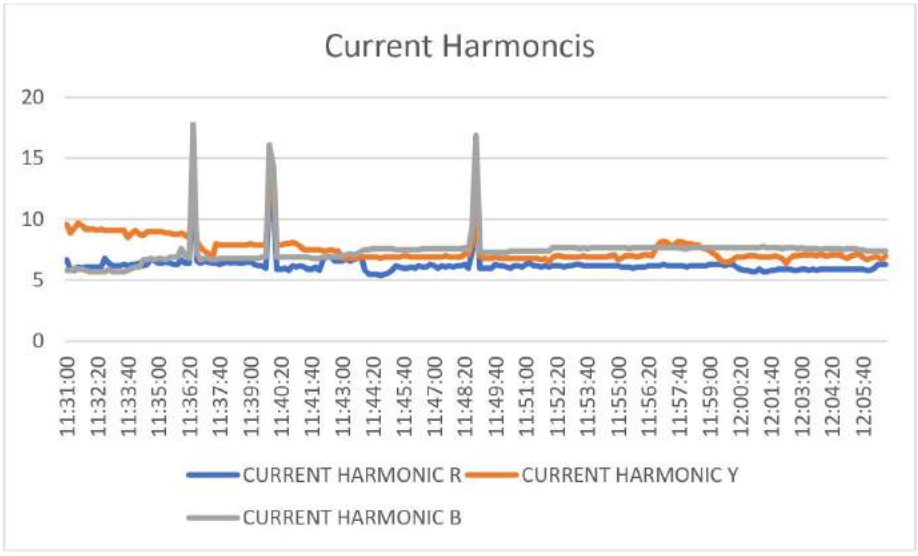
Graphical Representation of 3 Phase Voltage Variation.



Graphical Representation of 3 Phase Current Variation.



Graphical Representation of 3 Phase Voltage Harmonics Variation.



Graphical Representation of 3 Phase Current Harmonics Variation.

Chapter 4: Energy Saving Opportunities

Use of Renewable Energy:

Biogas:

Biogas is a renewable energy source which can be produced by anaerobic digestion, which digest material (such as agricultural waste, manure, municipal waste, plant material, sewage, green waste or food waste) inside a closed system. Biogas is primarily methane (CH4) which constitutes around (50-75 %) and carbon dioxide (CO2) around (25-50%) and may have small amounts of hydrogen sulfide (H2S), moisture and other materials. The gases methane, hydrogen, and carbon monoxide (CO) can be combusted or oxidized with oxygen. This energy release allows biogas to be used as a fuel; it can be used for any heating purpose.

LPG is presently used in various laboratories such as chemistry, microbiology and other labs for heating purpose. This can be replaced by biogas which is absolutely free and produced at our own campus.

Solar Thermal Hot Water-

Solar Water Heaters – A reliable solution to conserve energy. Harness the abundant and freely available energy of the sun to enjoy significant savings in your energy bills. Solar water heating systems represent the ideal solutions to cater to your hot water needs –whether domestic, commercial or industrial.

The Solar Water Heater uses energy of the sun to heat water to temperatures as high as 85C* and result in quantum savings in electricity or fuel oil.

This Heated water can be utilized in various activities in college laboratories, or can be used as heat transfer medium to heat/pre heat other materials.

Solar PV Power System-

Solar power systems are eco-friendly and reduce your reliance on energy from the utility. Instead of renting electricity from utility, you can now generate your own clean energy. Its uses sunlight which is converted into electricity with the help of Solar PV modules. Using Inverter, we convert DC generated power into AC power.

Maharashtra Electricity Regulation Commission (MERC) allows net metering where we can sell the unused remaining electricity generated to local Utility Grid.

A separate proposal for Solar PV power system has been attached which gives the maximum energy generation possible along with financials details.

1. Reference Techno Commercial Proposal for Grid Tied Solar PV

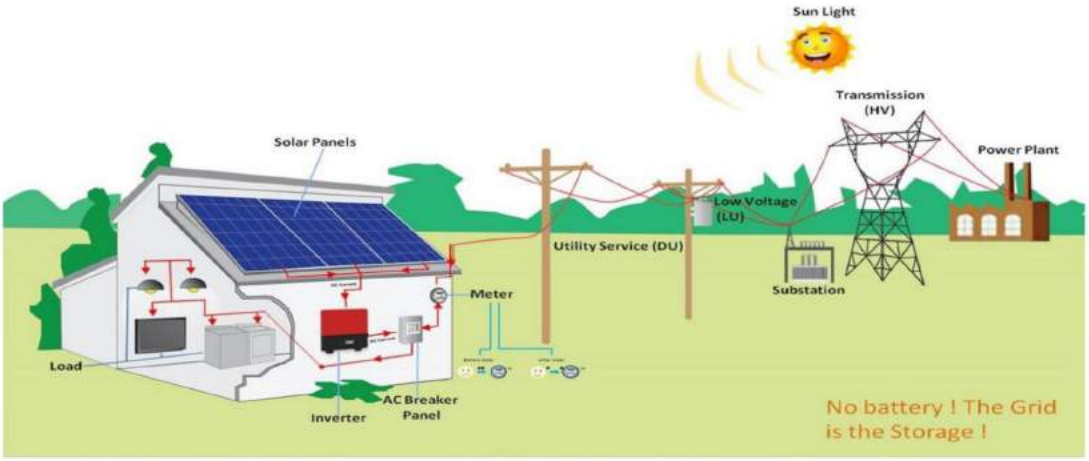
Background

A 07 kWp rooftop Solar Photo Voltaic System is proposed to be installed at your college premises at Govindrao Wanjari College of Law, Nagpur.
This proposal is based for reference and following points considered for estimating Solar Power requirement to reduce energy bills.

- You have a three phase LT connection from Maharashtra State Electricity Distribution Co. Ltd with sanctioned load of 14.7 kW.
- Considering Average electricity consumption is about 760 units per month. (Average consumption from Nov-20 to Oct-21)
- Present average electricity tariff is Rs. 7.27/kWh. (Excluding Taxes)
- Space required is 700 sq. Ft. facing south direction with clear rooftop available.

1.1 Proposed System

Based on your requirement, a grid tied three phase solar system is proposed to be installed on your space available.



A grid tied solar system generates output in synchronization with the electricity supplied from the utility (MSEDCL).

1.2 Operation Details of proposed system

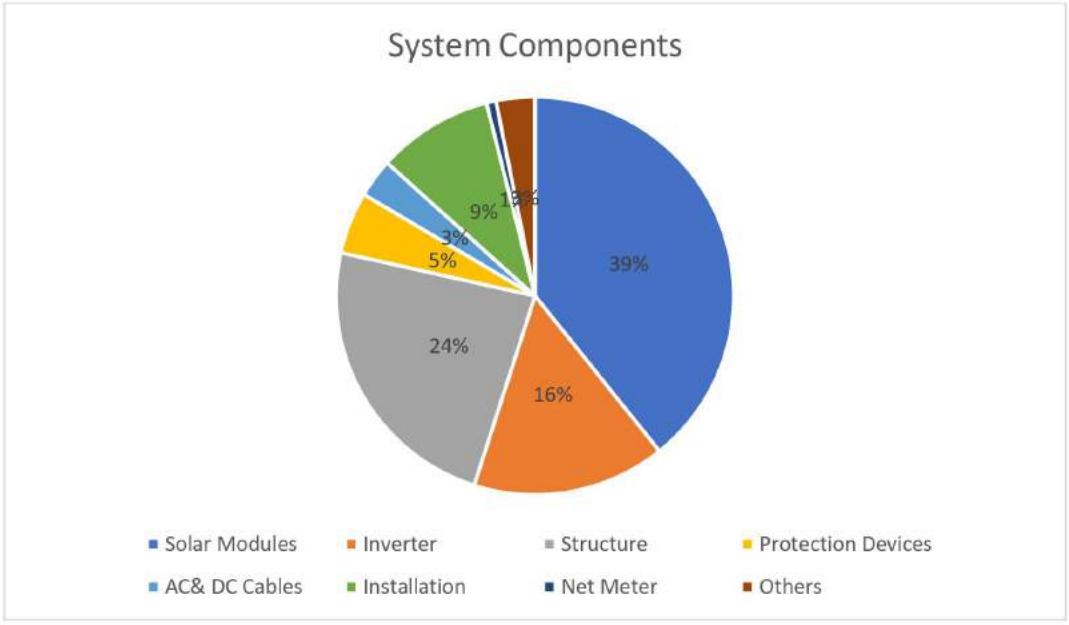
- The generated solar power is used for local consumption decreasing the demand of electricity from the grid.
- As long as the captive power requirement is more than the output of solar, the excess power required is feed by the grid.
- If the captive power requirement is lower than the output of solar, the electricity is exported to grid.
- Whenever there is no power supply from the grid, the solar PV system goes in standby mode and its output cannot be used.

1.3 Advantages and benefits

- The life of solar system is 25 years with 25 years' linear power output warranty from the manufacturer of solar module.
- Dynamic system with no moving parts, hence no wear and tear of systems.
- With no batteries connected, maintenance is limited to cleaning of solar modules once in 15 days.
- Inverter output and grid power are on same bus, there is no effect of load fluctuations on the system.
- Generation of renewable energy results in reduction of carbon footprints.
- The effective cost of power generated from solar energy is as lower as Rs. 3/kWh. Thus, any investment in solar system now gives healthy returns over next 25 years.

1.4 Technical Details

SR.NO	DESCRIPTION	DETAILS	MAKE / MODEL
1	Solar PV Module	07 kWp	Vikram/Warree/others
2	Grid Tied Inverter	07 KVA	Growatt/Delta/Polycab /Other
3	Module Structures	M S Galvanized	Own
4	DC Distribution Box	As required	Own
5	AC Distribution Box	As required	Own
	Surge Protection	Type 2 for AC and DC	Mersen/Dehn/Equivalent
6	DC Cables	As required	Polycab / Siechem/ others
7	AC Cables	As required	Polycab / Siechem/ others
8	Lightning Arrestor	As required	ISI Complaint
9	Earthing	As required	ISI Complaint
10	Net Meter	Approved by Discom	Secure



1.5 Scope of Work

Scope of work includes Supply Design, Engineering, Procurement, Supervision, Installation, Testing & Commissioning and one-year warranty on installed Solar PV system.

- Documentations and approvals
    a. Application and approval from Discom for Net metering/Gross Metering purpose.
- Design & Engineering.
    a. System design.
    b. Engineering drawings.
    c. Detailed Bill of Materials & Project Report.
- Procurement and supply of material.
    a. Solar PV Modules
    b. Solar Grid Inverter
    c. Solar Module Mounting Structure
    d. Solar Grade, UV protected DC Cable
    e. AC Cable
    f. DC and AC Distribution Box
    g. Earthing & Lightning Arrestor
    h. All other related accessories.
    i. Net Meter
- Civil Installation Work.
    a. Module mounting structure installation.
        i. The structure will be installed on pillars above terrace and on available terrace space will elevation such that a person can easily walk and use terrace.
    b. Civil work for module mounting structure.
- Electrical Works.
    a. Wiring of Modules.
    b. Cabling from modules to DC distribution box.
    c. Cabling from DC distribution box to Inverter.
    d. Cabling from Inverter to AC Distribution box.
    e. Earthing and Lightning Protection.
- Testing & Commissioning.
- Net Metering.

Exclusion

- Construction Power and Water.
- All other activities, documentation, services, etc. which are not specifically mentioned in this offer.

2. Estimated Output & Returns

- Detailed estimation of output of solar PV system is done considering location of installation, proposed direction of solar panels, data of solar irradiance at the location, system losses, and other related data.

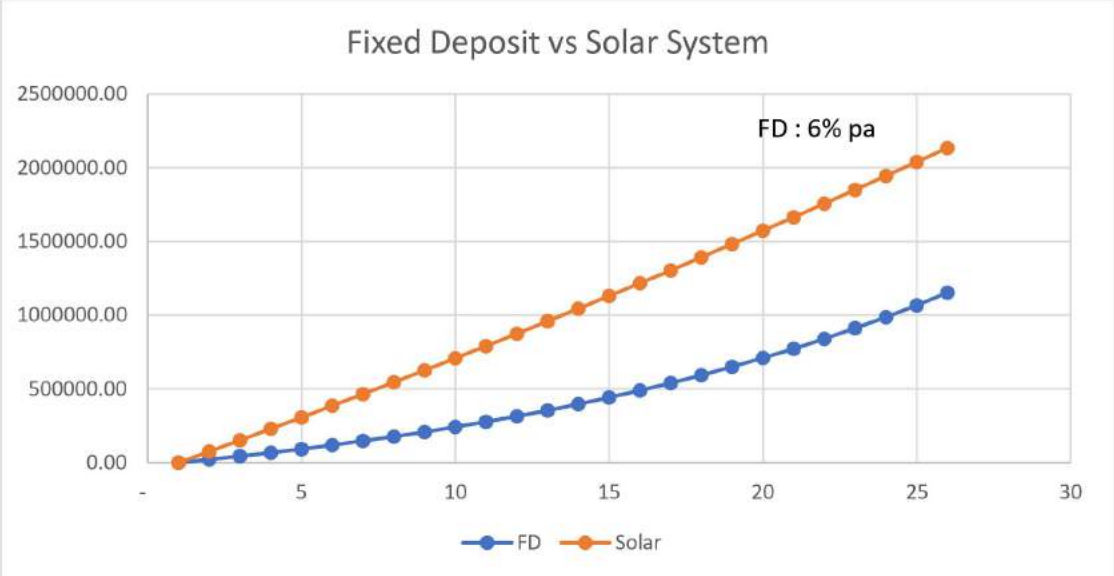
2.1 Basis of estimation

- Solar PV Capacity: 07 kWp
- Location: Govindrao Wanjari College of Law, Nagpur.
- The solar panels are expected to be free of shadow.
- Generation is based on radiation of 1000W/m2 and grid availability.
- Assumed clear sunny 330 days/year.
- Space required is 700 sq. facing south direction with clear rooftop available.
- Assumption for Cost of Electricity is Rs. 7/kWh including energy charges and Taxes.

2.2 Estimated output

- Daily generation from solar: 32 kWh/day
- Monthly generation: 945 kWh/month
- Total Annual output: 10395 kWh/annum
- Specific Production: 1485 kWh/kWp/annum

2.3 Comparison with Bank Fixed Deposit:



3. Commercial Offer

3.1 Cost of System

Description	Amount (INR)
Supply, Design, Installation, Testing and Commissioning of 07 kWp Grid Tied Solar PV System	Rs. 3,50,000.00
GST	Extra at Actual
Any other taxes and duties	Nil at present

3.2 Returns

The Solar system gives excellent result as shown below

- Estimated savings of **Rs.75,00,000** from first year.
- Return on investment: **21.59 % pa.**
- **Payback/ Breakeven** time of **5 years** out of operating life of 25 years.

No	Capital Cost	Savings in Electricity bills	Net Cash Flow	Cumulative cash flow
Year 1	350000	75571.65	-274428.35	-274428.35
Year 2		76327.37	76327.37	-198100.98
Year 3		77090.64	77090.64	-121010.34
Year 4		77861.55	77,861.55	-43148.80
Year 5		78640.16	78,640.16	35491.37
Year 6-25	Savings in Electricity of Rs. 79,000.00/Annum			

Assumptions:

- Increase in tariff rate assumed at 1% pa.
- Above pricing is for indicative purpose only and may vary depending upon specific location, plant load factor, operation and maintenance cost, location based, extra supporting structure for solar module, civil work, etc.

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

Notes:

Coordinates:

Swapnil Thanekar
Sustainability | Energy | Water
(Certified Energy Auditor – EA4416)

Plot Number 09, Shivaji Nagar,
Opposite LAD college Ground,
North Ambazari Road,
Pin- 440010, Nagpur

A-3, Flat 305, Sneha Vihar,
Dangat Patil Nagar, Shivne,
Off- NDA Road,
Pin 411023- Pune

Phone - 0091- 8149190608, 8975664570
Email: swanil_thanekar@yahoo.co.in

Appendix II

SUSTAINABILITY SOLUTIONS

Certificate

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

awarded to

Govindrao Wanjari College of Law (GWCL), Nandanvan Nagpur, Maharashtra, India for session 2018-21

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
2021-10-30