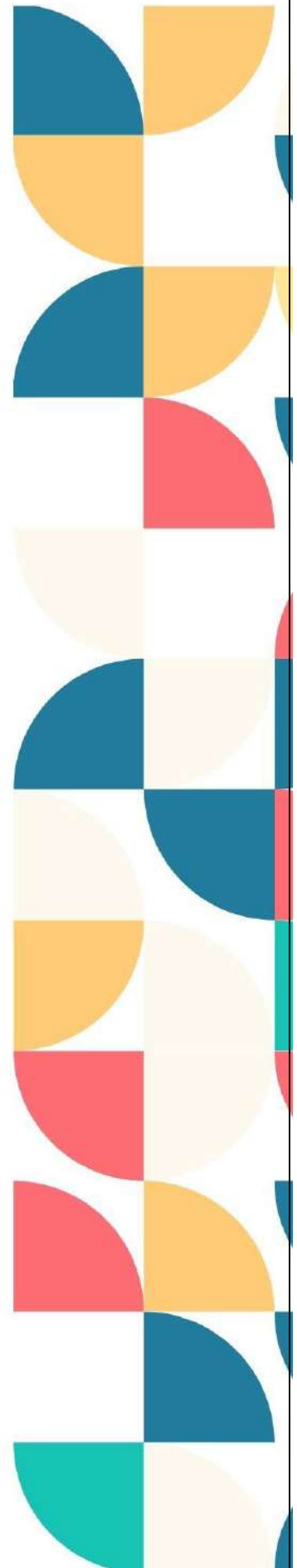# Hirasugar Institute of Technology
## Nidasoshi

# AUDIT
## REPORT
# 2022-23

**ENVIRONMENTAL & CIVIL
ENGINEERING SOLUTIONS**
ISO 9001: 2015, IEC 17025: 2017

# Editorial

In the Era of global warming and climate change every citizen has to reduce their own carbon foot prints to tackle with the adverse impacts of climate change. A green audit of any academic institution revels ways in which we can reduce energy consumption, water use and reduction in emission of carbon dioxide in the environment. It is a process to look into and ask ourselves whether we are also contributing to the degradation of the environment and if so, in what manner and how we can minimize this contribution and bring down to zero and preserve our environment for future generation.

Hirasugar Institute of Technology, Nidasoshi administration has already taken a step towards the green approach and conducted green audit of campus in the year 2022-2023. As an outcome of this institute has taken green steps to reduce its carbon foot prints by several means in campus viz. sustainable fittings, tree plantation and green computing in the administration and examination. The responsibility of carrying out the scientific green audit was given to Environmental and Civil Engineering Solutions. The organization has followed the rules and regulation of Ministry of Environment and Forest, Govt. of India and Central Pollution Control Board, New Delhi.

A questionnaire was prepared based on the guidelines and format of CPCB, New Delhi to conduct green audit. The information related to consumption of resources like water, electricity and handling of solid and hazardous waste was collected in the formats from main building support services and departments. The data collected was grouped and was tabulated in Excel sheets and analysed. The graphs of the analysed data were prepared for getting quick idea of the status. Interpretation of the overall outcomes was made which incorporates primary and secondary data, references and interrelations within. Final report preparation was carried out using this interpretation to prepare environment management plan of institute for next two years.

During the preparation of the Audit Report Audit Report Hon. Principal and Vice principal, Dean IQAC encouraged us with their full support. IQAC and other officers of the institute also gave support to carry out this work. We also thank all Heads of the departments and the Co-ordinators gave full co-operation.

**Nikhil N. Kamble**
**(C.E.O and Head)**

**Environmental and Civil Engineering Solutions**

# Acknowledgement

We express our gratitude for calling upon us for this audit, mainly the Principal and all other staff members, who were ever helpful and supported us with all the inputs needed for this audit. We thank all the teaching, non-teaching and students for helping us in conducting this audit.

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# 1. Introduction:

The modernization and industrialization are the two important outputs of twentieth century which have made human life more luxurious and comfortable. Simultaneously, they are responsible for voracious use of natural resources, exploitation of forests and wildlife, producing massive solid waste, polluting the scarce and sacred water resources and finally making our mother Earth ugly and inhospitable. Today, people are getting more familiar to the global issues like global warming, greenhouse effect, ozone depletion and climate change etc. Now, it is considered as a final call by mother Earth to walk on the path of sustainable development. The time has come to wake up, unite and combat together for sustainable environment.

Considering the present environmental problems of pollution and excess use of natural resources, Hon. Prime Minister, Shri. Narendra Modiji has declared the Mission of Swachch Bharat Abhiyan. Also, University Grants Commission has mentioned "Green Campus, Clean Campus" mission mandatory for all higher educational institutes. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

Green Audit is the most efficient ecological tool to solve such environmental problems. It is a process of regular identification, quantification, documenting, reporting and monitoring of environmentally important components in a specified area. Through this process the regular environmental activities are monitored within and outside of the concerned sites which have direct and indirect impact on surroundings. Green audit can be one of the initiative for such institutes to account their energy, water resource use as well as wastewater, solid waste, E-waste, hazardous waste generation. Green Audit process can play an important role in promotion of environmental awareness and sensitization about resource use. It can create consciousness towards ecological values and ethics. Through green audit one can get direction about how to improve the condition of environment.

## 1.1 **Need of audit:**

Green auditing is the process of identifying and determining whether institutions practices are eco-friendly and sustainable. Traditionally, we are good and efficient users of natural resources. But over the period of time excess use of resources like energy, water, chemicals are become habitual for everyone especially, in common areas. Now, it is necessary to check

whether our processes are consuming more than required resources? Whether we are handling waste carefully? Green audit regulates all such practices and gives an efficient way of natural resource utilization. In the era of climate change and resource depletion it is necessary to verify the processes and convert it in to green and clean one. Green audit provides an approach for it. It also increases overall consciousness among the people working in institution towards an environment.

## 1.2 **Goals of audit:**

Institute has conducted a audit with specific goals as:

1. Identification and documentation of green practices followed by college.
2. Identify strength and weakness in green practices.
3. Conduct a survey to know the ground reality about green practices.
4. Analyse and suggest solution for problems identified from survey.
5. Assess facility of different types of waste management.
6. Increase environmental awareness throughout campus.
7. Identify and assess environmental risk.
8. Motivates staff for optimized sustainable use of available resources.
9. The long term goal of the environmental audit program is to collect baseline data of environmental parameters and resolve environmental issue before they become problem.

## 1.3 **Objectives of Audit:**

1. To examine the current practices which can impact on environment such as of resource utilization, waste management etc.
2. To identify and analyse significant environmental issues.
3. Setup goal, vision and mission for Green practices in campus.
4. Establish and implement Environmental Management in various departments.
5. Continuous assessment for betterment in performance in green practices and its evaluation.
6. To prepare an Environmental Statement Report on green practices followed by different departments, support services and administration building.

## 1.4 NAAC criteria VII Environmental Consciousness:

Institutes are playing a key role in development of human resources worldwide. Higher education institutes campus run various activities with aim to percolate the knowledge along with practical dimension among the society. Likewise different technological problems higher education institutes also try to give solution for issues related to environment. Different types of evolutionary methods are used to assess the problem concerning environment. It includes Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), Carbon Footprint Mapping, Green audit etc

National Assessment and Accreditation Council (NAAC) which is a self-governing organization that declares the institutions as Grade according to the scores assigned at the time of accreditation of the institution. The intention of green audit is to upgrade the environmental condition inside and around the institution. It is performed by considering environmental parameters like water and wastewater accounting, energy conservation, waste management, air, noise monitoring etc. for making the institution more eco-friendly.

Students are the major strength of any academic institution. Practicing green actions in any educational institution will inculcate the good habit of caring natural resources in students. Many environmental activities like plantation and nurturing saplings and trees, Cleanliness drives, Bird watching camps, No vehicle day, Rain water harvesting, etc. will make the students good citizen of the country. Through Green Audit, higher educational institutions can ensure that they contribute towards the reduction of Global warming through Carbon Footprint reduction measures.

## 1.5 Benefits of Green Audit to an Educational Institute:

There are many advantages of green audit to an Educational Institute:

1. It would help to protect the environment in and around the campus.
2. Recognize the cost saving methods through waste minimization and energy conservation.
3. Find out the prevailing and forthcoming complications
4. Empower the organization to frame a better environmental performance.
5. It portrays good image of institution through its clean and green campus.

## 2. Overview of Institute:

Hirasugar Institute of Technology, Nidasoshi was established in the year of 1996. Institute has huge area of 48.20 acres and has been serving the mankind in the field of Engineering and technology.



The landscaped grounds of college are widely admired for their beauty. The most valuable investment any educational institution can make is "Nurturing Future Leaders". With the continuous rise in expectation of essential leadership standards, the institute has torch bearers have taken a responsibility for this investment to nurture the NextGen leaders with a vision to bridge the existing skill gap. With a firm step forward to attain an academic excellence, several Centres of Excellence, computer labs, and industry-academia associations has been setup at the College in association with the top leaders. The College believes that its primary stakeholders are the students. All aspects of education focus on the core values of contributing to national development while fostering global competencies among students. The College admits students from all social milieus and empowers them through intensive mentoring and counselling to face the challenges of life and become responsible and sensitized citizens of the country.

The institution came into existence in the year 1996 with the sole purpose of providing quality technical education in various disciplines of engineering. Since then the growth of the Institute has been guided by the proactive response to the fast changing world of technology.

The institute is approved by All India Council for Technical Education, New Delhi (AICTE, New Delhi) and is affiliated to Visvesvaraya Technological University, Belgaum (VTU, Belgaum).

Hirasugar Institute of Technology (HIT), Nidasoshi offers 4 years full time Bachelor of Engineering (B.E.) degree courses in various disciplines as mentioned below:

**UG Courses**

- Computer Science & Engineering
- Electronics & communication Engineering
- Electrical & Electronics Engineering
- Mechanical Engineering
- Civil Engineering

**Research Centre**

- Mechanical Engineering
- Computer Science & Engineering
- Electronics & Communication Engineering
- Electrical & Electronics Engineering
- Engineering Chemistry

The Institute's main objective is to provide effective technical education and make the students to become better citizens and accomplished technocrats of our nation. It also helps students to achieve success in their life by helping the students to get recruited into various national and multinational organizations.

**Our Vision**

- "To be a preferred institution in Engineering Education by achieving excellence in teaching and research and to remain as a source of pride for its commitment to holistic development of individual and society"

**Our Mission**

- "To continuously strive for the overall development of students, educating them in a state of the art infrastructure, by retaining the best practices, people and inspire them to imbibe real time problem solving skills, leadership qualities, human values and societal commitments, so that they emerge as competent professionals"

**Core values:**

- **Holistic Development:** The Students are educated in a spiritual atmosphere under the blessings of His Holiness Mahaswamiji of Shri Math by adopting self-service, participative & cooperative learning and leadership practices along with academics.

- **Student Centric Learning:** To create student centric learning atmosphere by adopting experimental learning, mini projects, students seminars, internship program, industrial visits, technical competitions, project seminars, carrier guidance activities and extracurricular activities.

- **Centre of Excellence:** To develop a centre of excellence in providing education in the field of Engineering and Technology to produce technically competent and socially responsible Engineering professionals.

- **Promoting prosperity:** The sole objective is to provide Engineering Education to the rural youth of this region for prosperous carrier and development of society.

- Environmental Consciousness: Students are educated to make optimum use of environmental resources like Soil/Land, Water and conserve the energy so that they can keep the campus clean, green & pollution free.

## 3. Methodology:
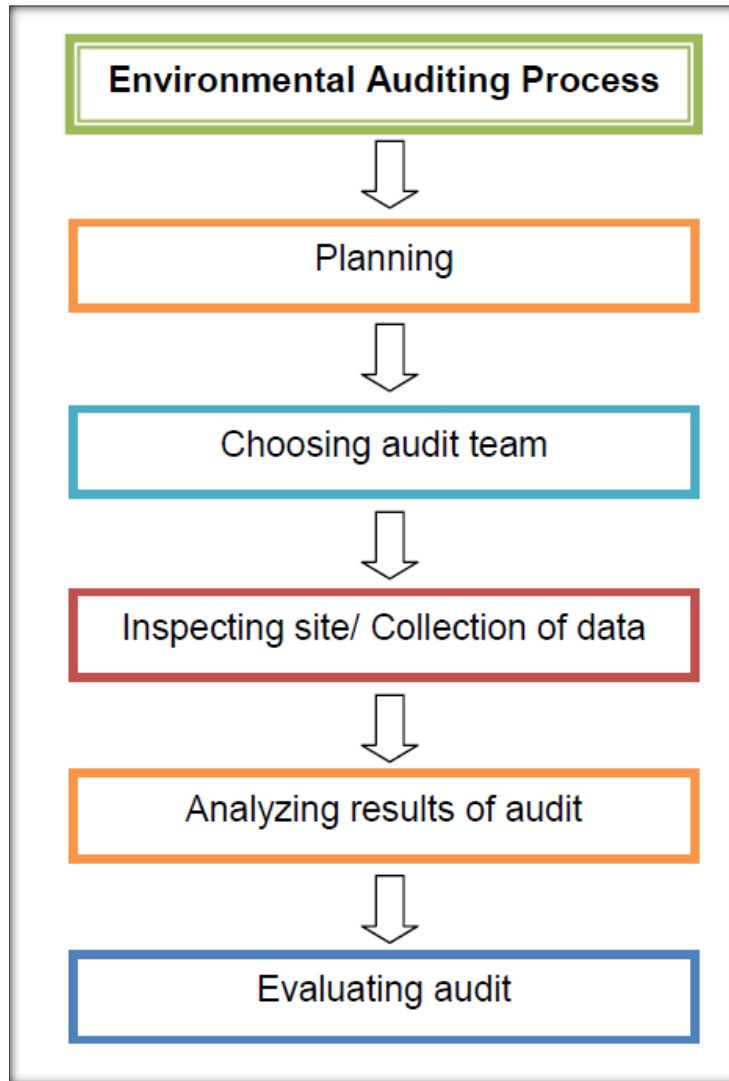


### 3.1 Audits to be carried out:

- Green and carbon footprint audit
- Energy audit
- Environmental audit
  - o Water audit
  - o Wastewater audit
  - o Solid waste audit
  - o Ambient noise audit
  - o Ambient air audit

# GREEN AUDIT

## 4. Green and Carbon footprint audit:

Green Audit is the most efficient ecological tool to solve such environmental problems. It is a process of regular identification, quantification, documenting, reporting and monitoring of environmentally important components in a specified area. Through this process the regular environmental activities are monitored within and outside of the concerned sites which have direct and indirect impact on surroundings. Green audit can be one of the initiative for such institutes to account their energy, water resource use as well as wastewater, solid waste, E-waste, hazardous waste generation. Green Audit process can play an important role in promotion of environmental awareness and sensitization about resource use. It can create consciousness towards ecological values and ethics. Through green audit one can get direction about how to improve the condition of environment.

Carbon is the basis of life on mother Earth. It is incorporated into the plants through photosynthesis, consumed by animal species through the food, presents in the form of carbon dioxide ($CO_2$) the atmosphere, locked into the rocks as limestone and compressed into the different fossil fuels such as coal and oil. As $CO_2$ level in the atmosphere continue to increase, most climate designs or project that the oceans of the world and trees will keep soaking up more than half $CO_2$ . The plants on land and in the sea, taken up carbon by over many years increased the percentage discharged during decay, and this increased carbon became locked away as fossil fuels beneath the surface of the planet. The starting of the 21st century brought growing concern about global warming, climate change, food security, poverty and population growth. In the 21st century more carbon has been released into the atmosphere than that has been absorbed. $CO_2$ is a principle component causing global warming. Atmospheric carbon dioxide levels have increased to 40 % from preindustrial levels to more than 390 parts per million $CO_2$. On this background it is a need of time to cover the research areas interrelated with climate change.

### 4.1 Green Cover:

Hirasugar Institute of Technology, Nidasoshi has got a huge green cover and has almost 20 species of vegetation inside the campus. The institute has 2.5 acres of campus and most of this is covered by green area. They have huge plantations along with variation in species Greenery is maintained well by the institute. .

*Figure 4-1 Hirasugar Institute of Technology, Nidasoshi Campus*

Institute has taken huge efforts to develop its green cover. The institute has about 5.56 acres of green cover. In the vicinity of the institute there are about approximately 601 fully grown trees and more than a 88 growing plants. The below table shows some of the common tree species found.

| Species | Count | Species | Count |
|---|---|---|---|
| Pongame oil tree | 60 | Tamrind Tree | 30 |
| Mango tree | 60 | Blue berry(Jamun) | 25 |
| Coconut | 15 | Alma tree | 4 |
| Neem tree | 80 | Custered Apple | 10 |
| Banayan tree | 25 | Cherry | 45 |
| Bamboo tree | 5 | Ashok tree | 30 |
| Fig tree | 15 | Sandalwood Tree | 15 |
| Rubber tree | 4 | Rudrakshi Tree | 4 |
| Curry leaves tree | 3 | Champk Tree | 15 |
| Guava tree | 36 | Jack fruit Tree | 5 |
| Pongame oil tree | 60 | Tamrind Tree | 30 |
| Almond Tree | 30 | Cycas Tree | 10 |
| Glorious Tree | 10 | Teak tree | 60 |

Mostly there are trees of Mango, cherry and neem etc. Due to this the institute has high carbon sequesterial values. Considering the vicinity some dry plants were observed to approximately about 3. Plants absorb sunlight, 50% is absorbed and 30% reflected so this helps to create a cooler and more pleasant climate through a 3°C temperature reduction in the vicinity. This has also leaded to increase in biodiversity as more than 18 species of birds were observed. Some off the common birds were viz. Sparrow, wild parrots, little stint, black kite etc.

## 4.2 **Carbon Footprint Audit:**

Institute has estimated its carbon footprint by factor methodology. Various factors were used to estimate the carbon emissions from Consumption of electricity, generation of solid waste, use of vehicles in campus, carbon emissions due to human breathing and emissions from buildings. At last they have also calculated Carbon sequesterial value i.e. carbon that is absorbed by the plants.

| Sr. No. | Section | Emission |
|---------|---------|----------|
| 1 | Emission from electricity | 72151.543 kg $CO_2$ eq. |
| 2 | Emission from solid waste | 8253.815 kg $CO_2$ eq. |
| 3 | Emission from Vehicles | 3720.900 Kg $CO_2$ eq. |
| 4 | Emission from human breathing | 41.200 tons of $CO_2$ eq. |
| 5 | Emission from buildings | 8055.400 kg $CO_2$ eq. |
| 6 | Carbon sequesterial | 3795.000 kg $CO_2$ eq. |

Hence as per the calculation the carbon emission for electricity is 72151.543 kg $CO_2$ eq. secondly considering emissions from human breathing; the institute has total 727 students and staff. Considering all the staff viz. junior teachers, senior teachers, Non grant, grant CHB they are total of 136. The staff's works for about averagely 6 hours a day in the institute and the students are present for 5 hours averagely daily. Vehicles emit significant amount of gases in environment and the institute has various parking sections in the campus. It was found that averagely 69 vehicles entered the institute daily and travel about 200 m of distance from the gate. Cars also enter the institute and as per observation 10 cars are observed daily. Hence, Overall the institute emits 3720.90 Kg $CO_2$ eq. Solid waste is very important as it emits significant amount of carbon through it. Institute has a good solid waste management system. Hence the institute develops about 4700 kg of waste daily in both the form of wet and dry. Overall for a year the generation is about 8253.815 kg $CO_2$ eq. Buildings play an

important role in carbon contribution. During the construction operation and use phase they emit significant amount of carbon. Hence considering total built-up area the carbon emissions could be evaluated. After the estimation the total built-up area observed was approximately about 325220.79 sq. ft. and the carbon emission were 8055.40 kg $CO_2$ eq. Carbon sequesterial in important as it is the carbon absorbed by the trees. The campus has 150 fully grown trees in the campus; hence the sequesterial value is about 3795 kg $CO_2$ eq.
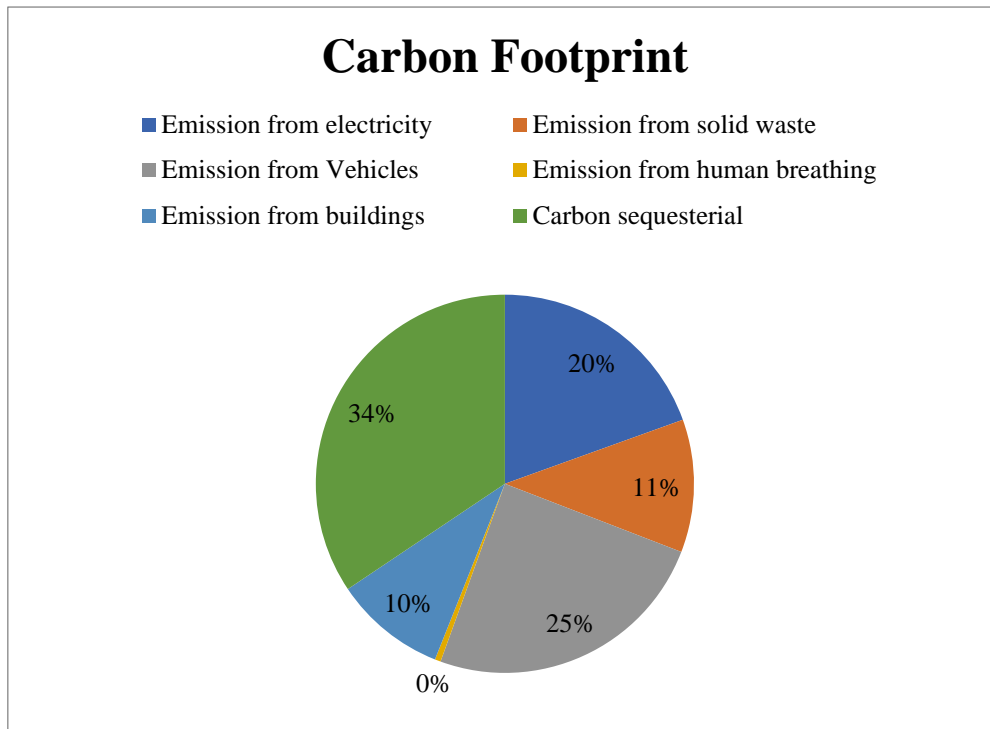


### 4.3 **Conclusion:**

- Highest carbon emission was observed from human breathing i.e. 41.20 tons of $CO_2$ eq. There is no any significant mean to reduce this number as it is not controllable.

- The next is solid waste. The emission from solid waste comprises of 8253.815 kg $CO_2$ eq. This can be significantly reduced by following simple means. Waste segregation is properly observed by the institute and they should follow the cut out plastic plans. There should be complete ban in using the plastic inside the campus. There should be minimization of food waste as it contributes highest in carbon emissions.

- Considering emission from electricity they can be significantly reduced by decrease in electricity use. This can be done by installing LED lights and using energy efficient equipment's such as machines with high star ratings which save more. Institute can

recognize renewable energy sources and have a setup in the institute. This can lead in significant saving of electricity and reduction in carbon emissions.

- Vehicles have the least emissions in the institute and it is due to the easy approached parking so that vehicles do not roam in the vicinity. All the vehicles travel hardly 200 m in the campus and this has led to lower emissions. Still institute can follows "NO Vehicle Day" on every 2nd Saturday of each month.

- Institute reduces about 3795 kg of $CO_2$ per by the means of plants. This could be increased by increasing in plantations. Institute can plant more trees in open areas avaliable.

- The plants having highest Carbon sequestration values are suggested. Cinnamomum verum, Eugenia caryophyllid, Bumelia celestina, Acacia Berland Eri, Acacia Francescana, Chinaberry tree, Moringa oleífer, Carya illusoriness, Pinus Arizonian and Buddleia cordata are some of the suggested species for plantation.

# ENVIRONMENT AUDIT

## 5. Environmental Audit:

An environmental audit is a type of evaluation intended to identify environmental compliance and management system implementation gaps, along with related corrective actions. ISO 14001 is a voluntary international standard for environmental management systems ("EMS"). ISO 14001:2004 provides the requirements for an EMS and ISO 14004 gives general EMS guidelines. An EMS meeting the requirements of ISO 14001:2004 is a management tool enabling an organization of any size or type to:

- Identify and control the environmental impact of its activities, products or services;
- Improve its environmental performance continually, and
- Implement a systematic approach to setting environmental objectives and targets, to achieving these and to demonstrating that they have been achieved.

The audit examines the potential hazards or risks posed by the institutes. Areas examined may include environmental policies and procedures, energy use practices, recycling, waste, conservation, and pollution. Then, the institute can use the results to determine what changes need to be made for compliance. In a broad sense, environmental auditing aims to help protect the environment and minimize the risks of business activities to the environment and human safety and health.

### 5.1 Water Audit and wastewater audit:

Water auditing is a method of quantifying water flows and quality in systems, with a view to reducing water usage and often saving money on otherwise unnecessary water use. Water audit is an effective management tool for minimizing losses, optimizing various uses and thus enabling considerable conservation of water. Water audits trace water use from its point of entry into the facility/system to its discharge into the sewer/river/canal etc. Wastewater audit deals with effective management of wastewater in the system. It deals with proper generation, management, treatment, transfer and disposal of wastewater.

Hirasugar Institute of Technology, Nidasoshi has carried out its water and wastewater audit and has suggested many more ways for water conservation, reuse and recycle. The detail water and waste water report is mentioned below.

## 5.2 **Water Audit report:**

Water audit for the "Hirasugar Institute of Technology, Nidasoshi" was carried out. The purpose of the water audit is to provide a thorough understanding of the water uses by identifying and measuring all water using fixtures, appliances, and practices in order to recommend potential water saving efficiencies.

### PRIMARY DATA

| Sr. No. | Title | Information |
|---|---|---|
| 1 | **Name of Institute** | Hirasugar Institute of Technology, |
| 2 | **Address** | Nidasoshi |
| 3 | **Name of company under which water audit is carried out** | Environmental and Civil Engineering Solutions, Sangli |
| 4 | **Number of floors** | G + 3 |
| 5 | **Category of building** | Educational Institute |
| 6 | **Nearest ESR location** | Campus |
| 7 | **Water supply hours** | 4 hrs. daily |
| 8 | **Water meter present** | No |

### POPULATION DETAILS

| Title | Information |
|---|---|
| **Fixed population (Working staff and Students )** | Gents: 546 |
| | Ladies: 317 |
| **Variable population (Visiting persons)** | Gents: 25 |
| | Ladies: 19 |

## SOURCE INFORMATION

| Title | Information |
|---|---|
| **Sources of water** | River water pumping and bore-well |
| **Connection details** | 1" PVC pipe inlet and 1" outlet distribution pipe |

## STORAGE DETAILS

| Title | Information |
|---|---|
| **Overhead tank type** | PVC and RCC tank |
| **Location** | On terrace |
| **Number of tanks** | Block A<br>• PVC 2000 X 2<br>• PVC 1000 X 3<br>• RCC 2 Lakh liters<br>Block B<br>• PVC 1000 X 2<br>• RCC 3 Lakh Liters<br>Block C<br>• RCC 20000 Liters<br>Block D<br>• RCC 2 Lakh Liters<br>Hostel<br>• Girls RCC 1 Lakh Liters<br>• PVC 1000 X 3<br>• Boys RCC 1 Lakh Liters<br>• PVC 1000 X 3<br>Office PVC 1000 X 2<br>Sports complex PVC 1000 X 2<br>Canteen PVC 1000 X 1 |
| **Motor connection details** | 10 Hp X 1 B Block<br><br>2 Hp X 5 D,C Block and hostel |
| **Pumping period** | 5 hours daily |
| **Underground sump** | Yes |

**WATER USAGE**

| Toilet | Number of users | Water consumption |
|---|---|---|
| **Gents toilet** | 247 users | 247 X 12 lit = 6552 |
| **Washbasin** | 552 users | 552 X 0.75 lit = 648 |
| **Ladies toilet** | 305 users | 305 X 18 lit = 5706 |
| **Toilet cleaning** | 1200 liters | 1200 liters |
| **Floor cleaning** | 1000 liters | 1000 liters |
| **Gardening** | 2500 liters | 2500 liters |
| **Laboratories** | 5000 liters | 5000 liters |
| **Total** | | **22,605 lit** |

## 5.3 **Waste water audit:**

Hirasugar Institute of Technology campus generates huge amount of wastewater. The source for wastewater in the campus is hostels, institute, mess and the washrooms and urinals inside the campus. To estimate the amount of wastewater generated all the water that is used in the washrooms, quarters and hostels is considered as wastewater.

| Sr. No. | Section | Wastewater generated in litres |
|---|---|---|
| 1 | Water usage generated in campus | **22,605** |
| | **Waste water generated** | **16,953** |

## 5.4 **Waste water treatment plant at institute:**

Hirasugar Institute of Technology lets all it waste water into sewers. Currently there is no any waste treatment facility. Sampling of waste water was done for 3 months for the parameters of COD, BOD, TKN and pH. Following table shows the characterization of wastewater.

| Sr. No. | Parameter | Reading |
|---|---|---|
| 1 | pH | 7.14 |
| 2 | COD | 211 |
| 3 | BOD | 108 |
| 4 | TKN | 22 |
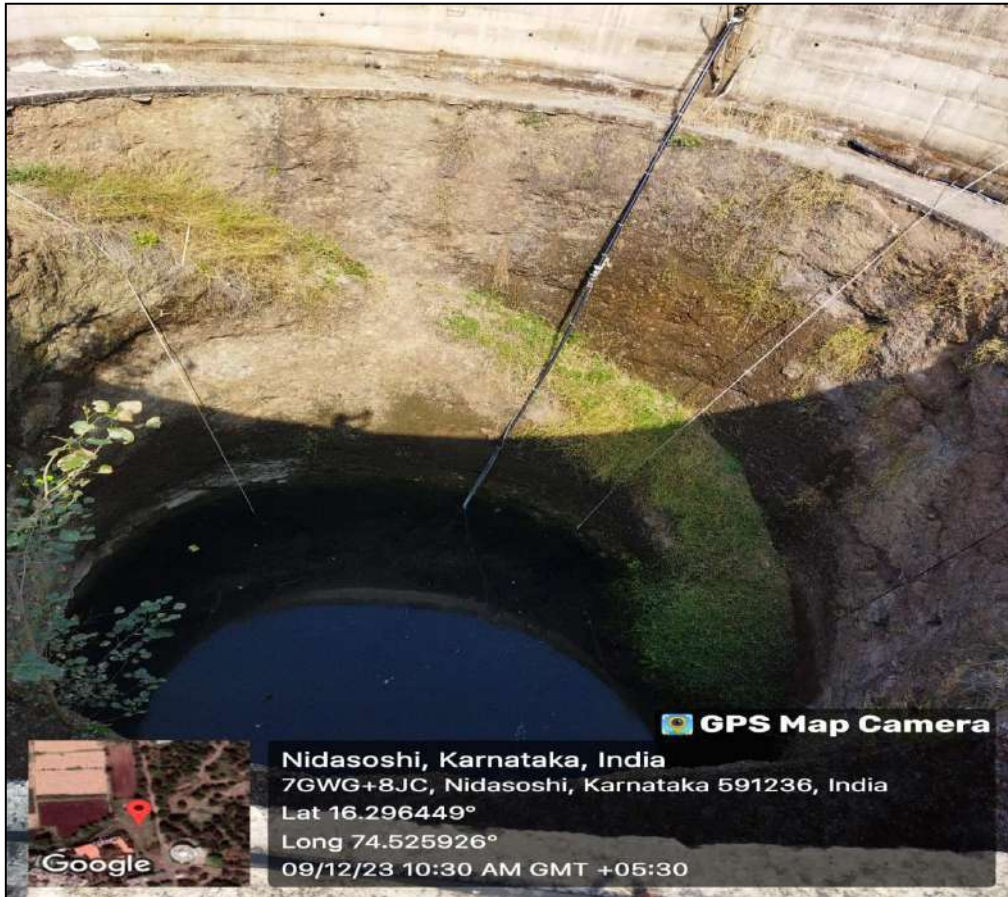
## 5.5 **Solid waste Audit:**

A waste audit is a physical analysis of waste composition to provide a detailed understanding of problems, identify potential opportunities, and give you a detailed analysis of your waste composition. A waste audit will help you clearly identify your waste generation to establish baseline or benchmark data, Characterize and quantify waste stream, Verify waste pathways, identify waste diversion opportunities and identify source reduction opportunities.

Solid waste is the unwanted or useless solid material generated from the human activities in residential, industrial or commercial area. Solid waste management reduce or eliminates the adverse impact on the environment and human health. Solid waste audit for Hirasugar Institute of Technology was carried out. The entire premise was analysed for solid waste generation and waste characterization. Overall waste was observed and characterization was done. The below table shows the components of solid waste at institute campus. Quartering method was used and 1 Kg of waste was selected.

| Sr. No. | Type of waste | Composition % |
|---------|---------------|---------------|
| 1 | Plastic | 33 |
| 2 | Paper | 25 |
| 3 | Rubber | 1 |
| 4 | Food | 16 |
| 5 | Glass | 1 |
| 6 | Metals | 1 |
| 7 | Garden trimmings | 22 |
| 8 | Cloth and fibre | 1 |
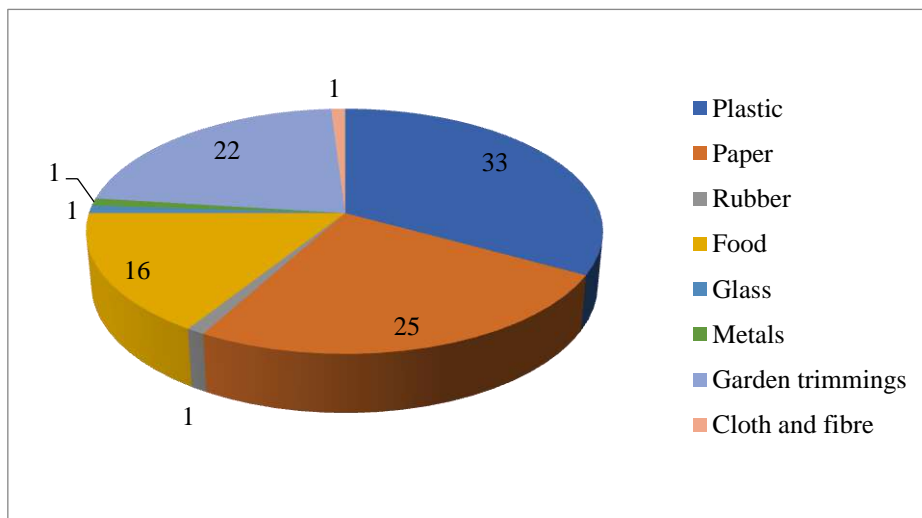
After analysing all the bins it was observed that plastic had highest contribution viz. 33% followed by the paper waste i.e. 25%. Mostly common observed plastic items were plastic wrappers of chips, soft drinks bottles and chocolate wrappers. The paper waste included paper wrappers, notebook pages, pamphlets and some pieces of cardboard. The third highest waste included garden trimmings. It included small grass, minute branches etc. The least contribution was of cloth, fibre, glass and metals.



## 5.6 **Observations and Conclusion:**

- There are separate bins for wet waste and dry waste. Hence, source segregation takes place.

- Institute has taken steps towards paper recycling. The paper waste collected from the bins is send to vendors.

- Plastic ban in campus is implemented but due to lack of seriousness in the students plastic is used in campus. Institute should conduct plastic awareness seminars for both the staff and students.

**Assessment of soil was done to determine the quality of soil:**

| Sr. No. | Test | Results |
|---------|------|---------|
| 1 | pH | **6.1** |
| 2 | NPK | **2:3:1** |
| 3 | Acidity | **144 mg/lit** |
| 4 | Hardness | **162 mg/lit** |

## 5.7 **Ambient Air Audit:**

Ambient air quality refers to the condition or quality of air surrounding us and in the outdoors. National Ambient Air Quality Standards are the standards for ambient air quality set by the Central Pollution Control Board (CPCB) that is applicable nationwide. The CPCB has been conferred this power by the Air (Prevention and Control of Pollution) Act, 1981. Hence, auditing this ambient air quality is stated as ambient air audit.

Hirasugar Institute of Technology has carried out its ambient air audit at various locations in the premises. Air quality detector machine PS-21185 was used for air audit. Parameters viz. SOx, NOx, RSPM and Air quality were assessed.
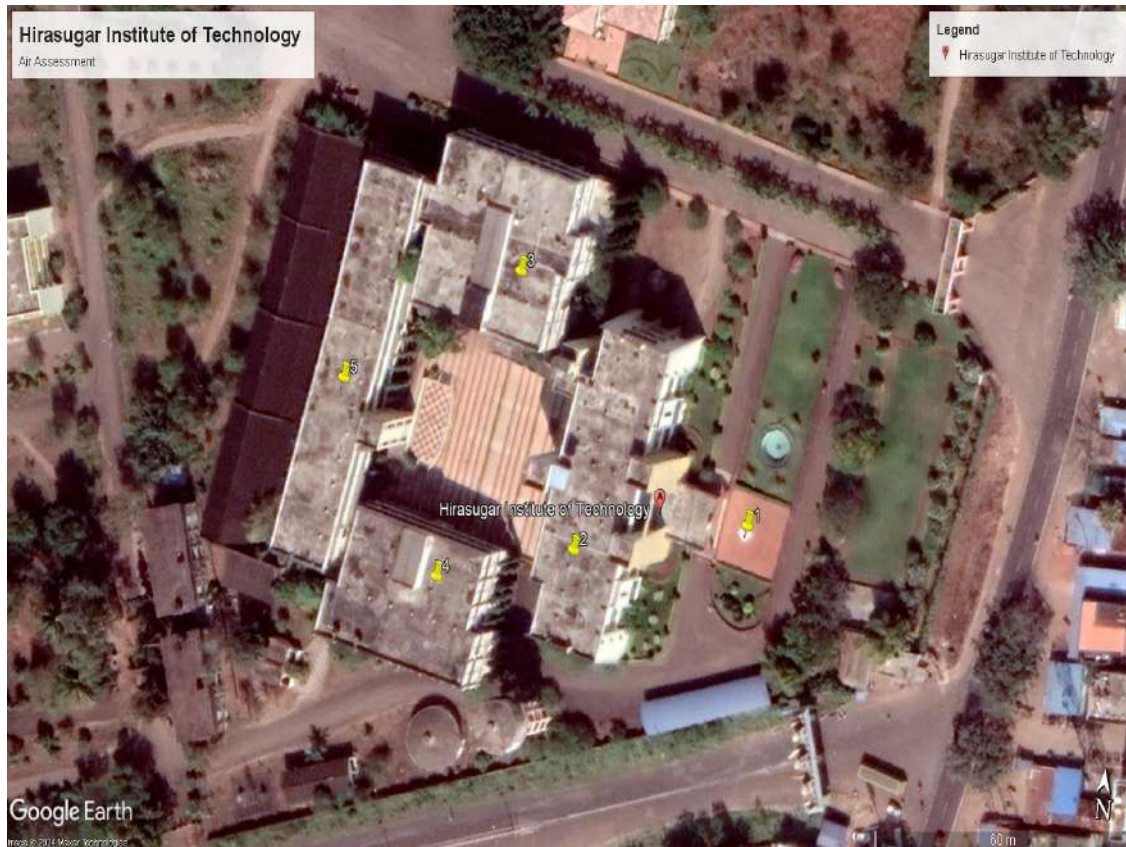
| Sr. No. | Point number | Location |
|---------|--------------|----------|
| 1 | Point No 1 | Ground |
| 2 | Point No 2 | Hall |
| 3 | Point No 3 | Office |
| 4 | Point No 4 | Classroom |
| 5 | Point No 5 | Lab |

**Results of air quality monitoring**:

| Point No | Location | SOx | NOx | RSPM | Quality |
|----------|----------|-----|-----|------|---------|
| | CPCB Limits | 80 µg/m3 | 80 µg/m3 | 80 µg/m3 | - |
| 1 | Ground | 31 | 44 | 60 | Good |
| 2 | Hall | 11 | 15 | 33 | Fresh |
| 3 | Office | 10 | 7 | 28 | Good |
| 4 | Classroom | 11 | 12 | 26 | Fresh |
| 5 | Lab | 10 | 14 | 26 | Fresh |
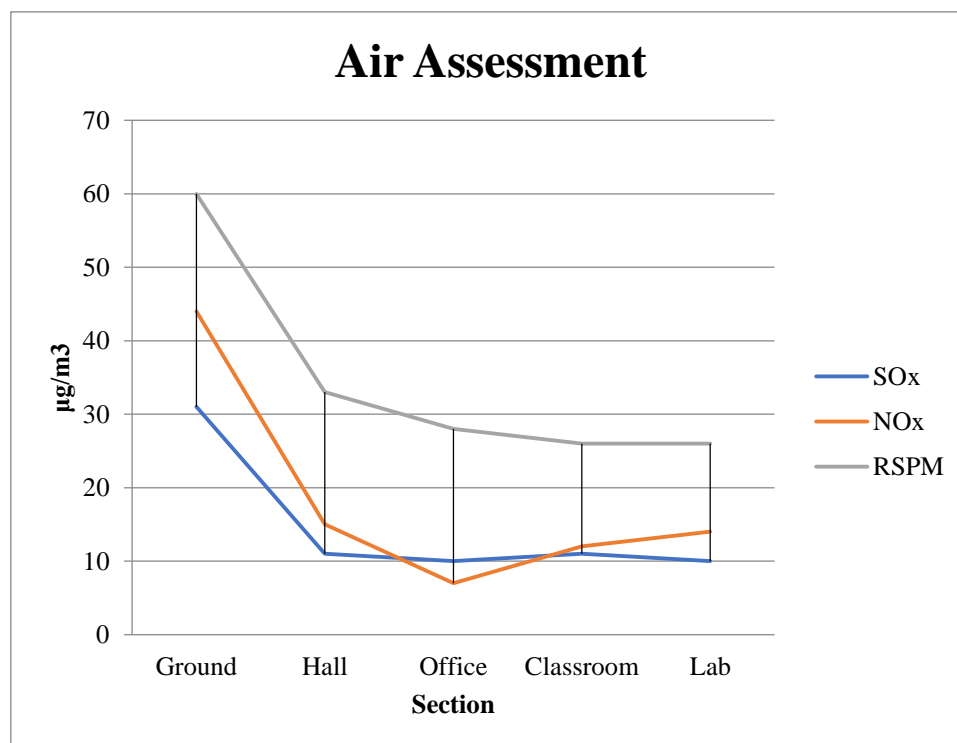
## 5.8 **Ambient Noise audit:**

Ambient sound in relation to audio refers to the background noise present at a given scene or a location. This can include noises such as rain, traffic, crickets, birds, etc. Ambient sound levels are often measured in order to map sound conditions over a specific time to understand their variation with locale and various points. Ambient noise level is measured with a sound level meter. It is usually measured in Decibel (dB). 5 points were selected based on best suitable requirement for noise monitoring. RS-2250 instrument was used. Monitoring was carried out 3 times in a day for 3 months. Readings were collected in morning section, afternoon section and evening section. In addition to this monitoring was also carried out in library section, study room section, classrooms, tutorial rooms and laboratories.
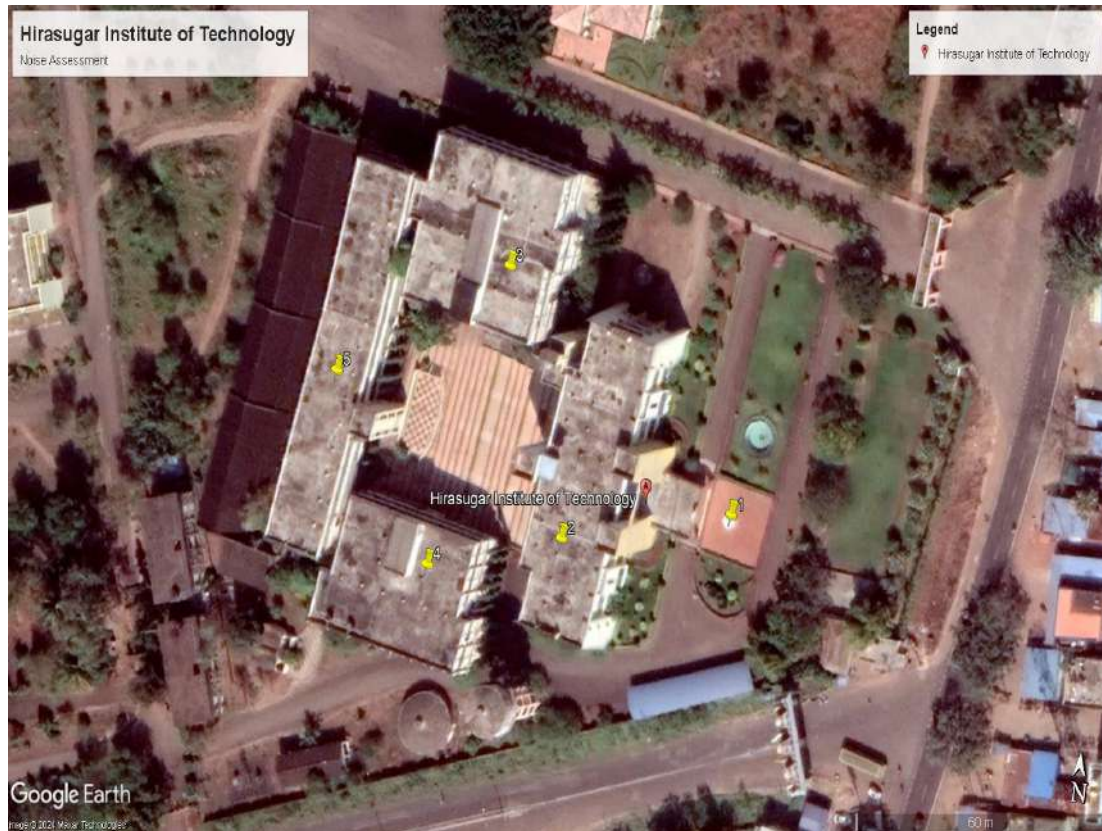


| Sr. No. | Point number | Location |
|---------|--------------|----------|
| 1 | Point No 1 | Ground |
| 2 | Point No 2 | Hall |
| 3 | Point No 3 | Office |
| 4 | Point No 4 | Classroom |
| 5 | Point No 5 | Lab |

**Results of noise assessment:**

All the values are in decibels. Assessment values present average of 3 months data and the last column present the final average of morning noon and evening.

| Point No | Location | Morning | Noon | Evening | Average |
|:---:|:---|:---:|:---:|:---:|:---:|
| **1** | Ground | 65.48 | 79.91 | 60.10 | 68.50 |
| **2** | Hall | 54.18 | 62.64 | 50.15 | 55.66 |
| **3** | Office | 61.02 | 64.68 | 70.35 | 65.35 |
| **4** | Classroom | 40.27 | 45.47 | 39.10 | 41.61 |
| **5** | Lab | 31.59 | 38.28 | 31.10 | 33.66 |
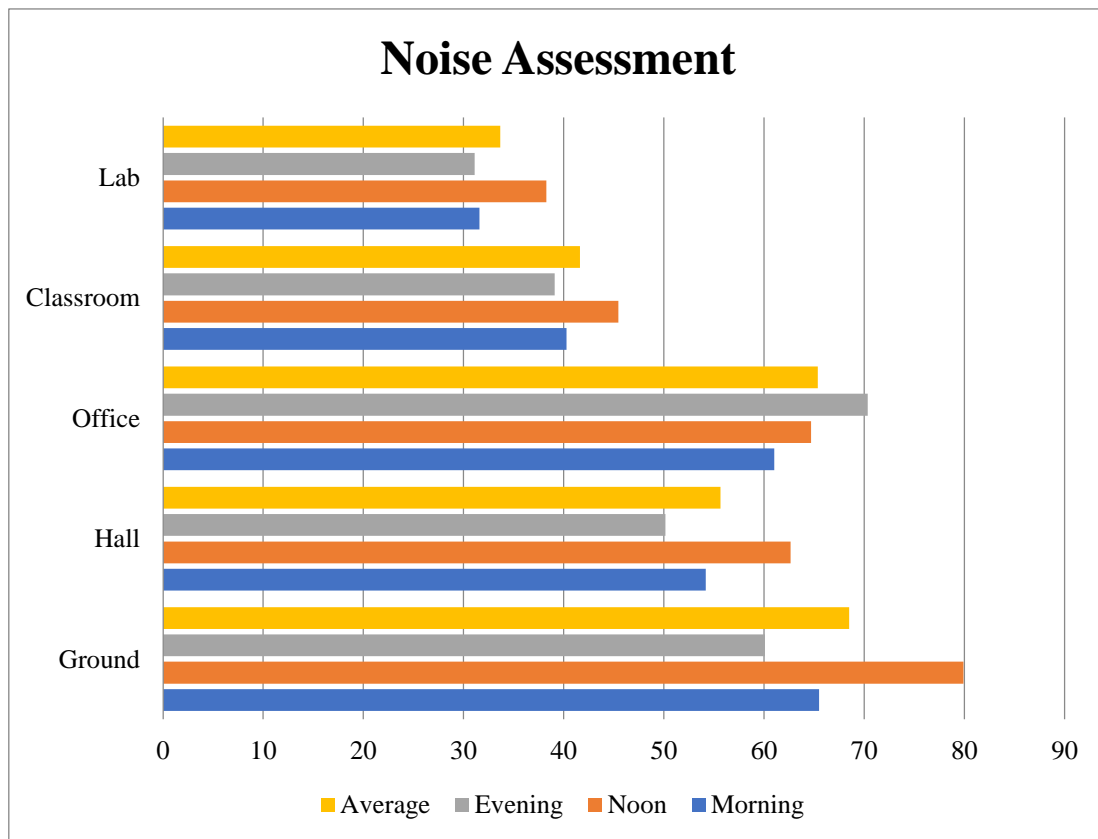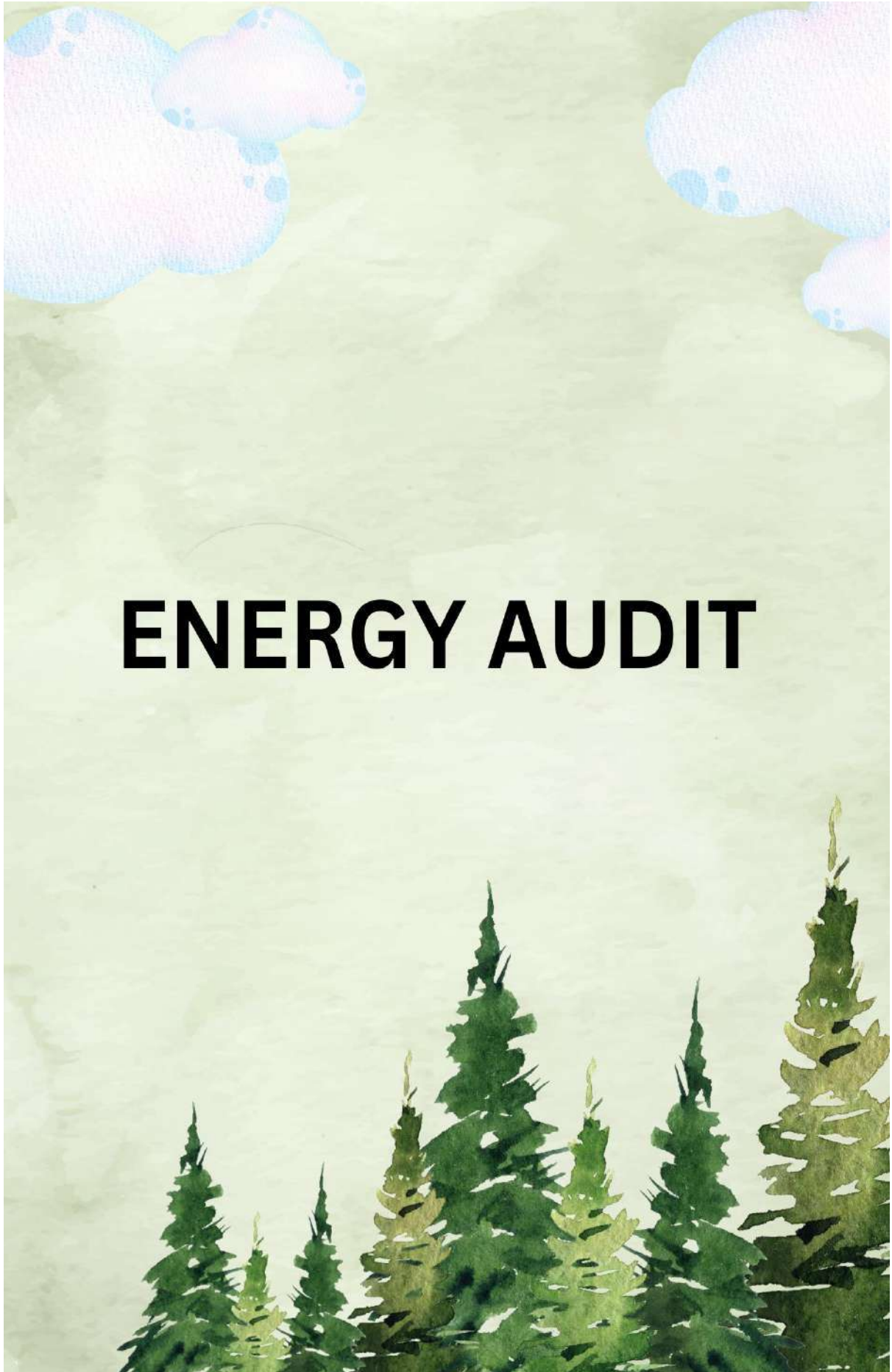
# ENERGY AUDIT

## 6. Energy Audit:

An energy audit is an inspection survey and an analysis of energy flows for energy conservation in a building. It may include a process or system to reduce the amount of energy input into the system without negatively affecting the output. In commercial and industrial real estate, an energy audit is the first step in identifying opportunities to reduce energy expense and carbon footprint.

A nation is tiring to advance in quantity and quality to the spread of education among the common India and development of their intelligence. In India the entire field of education and other fields of intelligent activities had been monopolized by a handful of men before independence. But today we are marching towards the desirable status of a developed nation with fast strides. But the development should be a sustained one. For achieving such an interminable development energy management is essential. As far as concerning electricity crisis, we are facing lack of electricity during office work. So, institutional management is taking design regarding production of electricity and saving electricity for Eco social aspect. Energy requirement of India is growing and incomplete domestic fossil fuel treasury. The country has motivated strategy to enlarge its renewable energy resources and policy to establish the nuclear power plants. India increases the involvement of nuclear power to largely electrical energy development facility from 4.2% to 9%. India's industrial demand accounted for 35% of electrical power requirement, domestic household use accounted for 28%, agriculture 21%, commercial 9%, and public lighting and other miscellaneous applications accounted for the rest. Energy conservation means reduction in energy consumption without making any sacrifice of quantity or quality. A successful energy management program begins with energy conservation; it will lead to adequate rating of equipment's, using high efficiency equipment and change of habits which causes enormous wastages of energy. By observing all these study lack of electricity and huge electricity demands. It is necessary to plan to be self-sufficient in electricity requirement.

### 6.1 Connection details:

Institute receives electricity from State Electricity Distribution. Following are the details about connection.

- **Type of connection:** HT -1
- **Tariff:** 170 HT- 2 (C) (II)

- **Contract demand:** 100 KVA
- **Feeder voltage:** 11 KV

**Tariff Structure:**

As per Distribution Company, HT and LT consumers have an option to take Time of Day (TOD) tariff instead of the normal tariff. Under TOD tariff electricity consumption and maximum demand in respect of HT consumers for different periods of the day i.e. normal period, peak load period and off-peak load period could be recorded by installing TOD meter. The maximum demand and consumption recorded in different periods could be billed on the following rates of the tariff applicable.

| TOD Tariffs | Rate % (Rs./Unit) |
|---|---|
| 0000 Hrs- 0600 Hrs & 2200 Hrs- 2400 Hrs | -1.500 |
| 0600 Hrs- 0900 Hrs & 1200 Hrs- 1800 Hrs | 0.000 |
| 0900 Hrs- 1200 Hrs | 0.800 |
| 1800 Hrs- 2200 Hrs | 1.100 |

**Power Factor:**

Power Factor (PF) is an indicator of efficient utilization of power. In an AC (Alternating Current) electrical power system, PF is defined as the ratio of real power flowing to the load, to the apparent power in the circuit and is a dimensionless number.

## 6.2 **Bill analysis:**

Bill analysis for Hirasugar Institute of Technology had been done for academic year 2022-2023.

| Sr. No. | Month | Consumption (Kw) | Bill Amount |
|---------|-------|------------------|-------------|
| 1 | **April 22** | 20395 | 201579.00 |
| 2 | **May 22** | 19809 | 199578.00 |
| 3 | **June 22** | 20267 | 203671.00 |
| 4 | **July 22** | 17867 | 181307.00 |
| 5 | **August 22** | 19002 | 197495.00 |
| 6 | **September 22** | 17206 | 180958.00 |
| 7 | **October 22** | 16203 | 177393.00 |
| 8 | **November 22** | 15253 | 168313.00 |
| 9 | **December 22** | 16575 | 180949.00 |
| 10 | **January 23** | 19839 | 211154.00 |
| 11 | **February 23** | 19275 | 205792.00 |
| 12 | **March 23** | 17231 | 186357.00 |

## 6.3 **ILER analysis:**

Lighting is provided in industries, commercial buildings, indoor and outdoor for providing comfortable working environment. The primary objective is to provide the required lighting effect for the lowest installed load i.e. highest lighting at lowest power consumption. The purpose of performance test is to calculate the installed efficacy in terms of lux/watt/m² (existing or design) for general lighting installation. The calculated value can be compared with the norms for specific types of interior installations for assessing improvement options.

| Range | Condition |
|-------|-----------|
| 0.5 or less | Urgent activity required (UAR) |
| 0.51 - 0.70 | Review Suggested (RS) |
| 0.70- above | Good |

ILER analysis for various sections in the institute was carried out. Firstly using LUX meter illumination was measured and then numerical analysis was carried out. ILER gives idea about lighting conditions and measured regarding improving them.

| Sr. No. | Section | LUX reading | ILER | Condition |
|---------|---------|-------------|------|-----------|
| 1 | Library | 177 | 0.81 | Good |
| 2 | Study room | 131 | 0.79 | Good |
| 3 | Classroom S1 | 136 | 0.77 | Good |
| 4 | Classrooms S2 | 111 | 0.88 | Good |
| 5 | Laboratories | 145 | 0.84 | Good |
| 6 | Office | 145 | 0.78 | Good |

Reasons for Good ILER:

• Proper placement of windows and doors so that natural light is available well.

• Good ventilation system.

**Inverter Details:**

Total number of Inverter: 23

UPS KVA: 111.6

Battery name: Exide

Battery Voltage: 12 V – 192 V

Count of battery: 203

**Fitting Details:**

LED: 622

Fans: 969

PC: 414

Printers: 41

## 6.4  **Sustainable practices:**

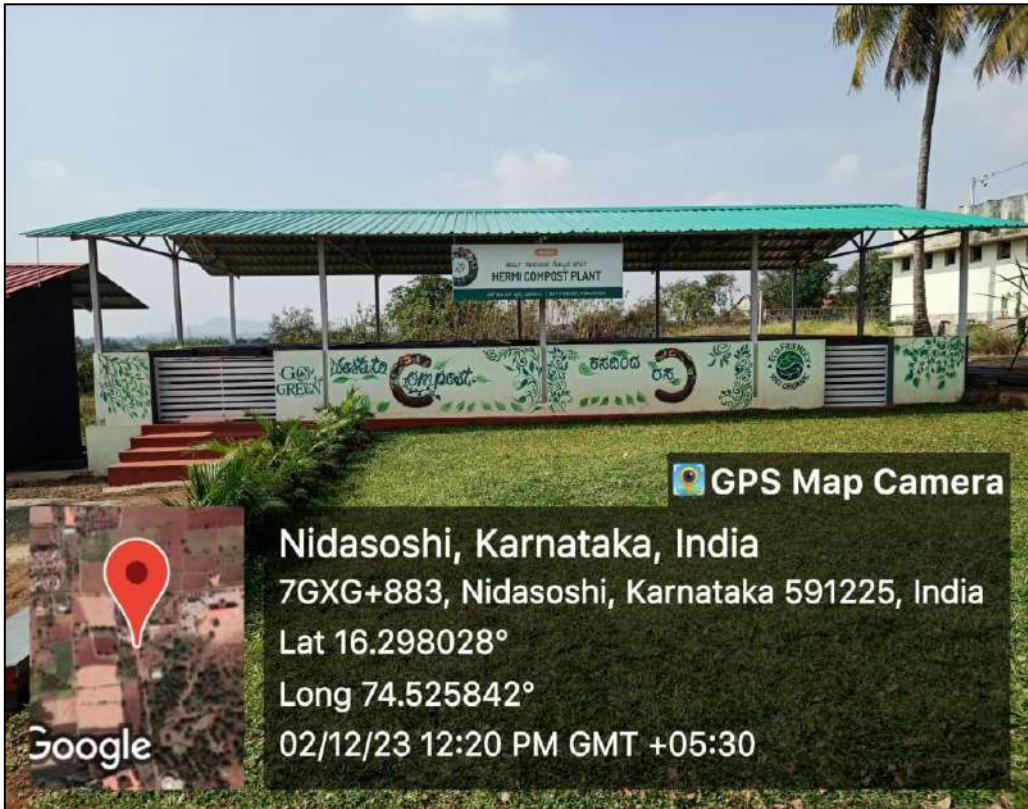**Energy Conservation program:**



**Fire Extinguisher**

**NSS activities**

**Solar panel:**



Belagavi, Karnataka, India
Unnamed Road, Karnataka, India
Lat 16.296423°
Long 74.520145°
02/12/23 10:23 AM GMT +05:30

**EV bike charging station**



Nidasoshi, Karnataka, India
NH 548B, Nidasoshi, Karnataka 591236, India
Lat 16.297722°
Long 74.528576°
02/12/23 10:17 AM GMT +05:30

**Sewage treatment plant**

# CERTIFICATE

## ENERGY AUDIT

PROUDLY PRESENTED TO

# Hirasugar Institute of Technology, Nidasoshi

Our team of Environmental Engineers have analyzed Clean and Green Energy practices followed by the Institution.

THIS CERTIFICATE WAS AWARDED BY

## Environmental and Civil Engineering Solutions

**ENVIRONMENTAL & CIVIL
ENGINEERING SOLUTIONS**
ISO 9001: 2015, IEC 17025: 2017

**SEEMA N. KAMBLE**
DIRECTOR

**NIKHIL N. KAMBLE**
AUDITOR

**AUDIT YEAR 2022-2023**

# CERTIFICATE
## GREEN AUDIT

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**AUDIT YEAR 2022-2023**

# Hirasugar Institute of Technology, Nidasoshi

# POLICY DOCUMENT ON ENVIRONMENT AND ENERGY USAGE

PREPARED BY

Environmental and Civil Engineering Solutions



**ENVIRONMENTAL & CIVIL ENGINEERING SOLUTIONS**
ISO 9001: 2015, IEC 17025: 2017

# Policy Document on Environment and Energy Usage

The environment and energy usage policy of is to manage energy in such a systematic way as to minimise its impact on the environment. The policy implies to explore the renewable energy sources to reduce the burden of the government and to find out substitute natural resources as solution to the energy crisis. This environment and energy policy is binding for all the components of the institute and applies to all its stakeholders to the various activities undertaken by the institute. It will help us to embed efficiency and environmental awareness into our everyday activities, thus helping us to realise our responsibilities and commitment to the conservation of natural resources and to limit its usage. Environmental and civil engineering solutions have prepared an environmental policy document by considering the Green initiatives undertaken by the institute.

**About the Institute:**

Hirasugar Institute of Technology, Nidasoshi was established in the year of 1996. Institute has huge area of 48.20 acres and has been serving the mankind in the field of Engineering and technology. The landscaped grounds of college are widely admired for their beauty. The most valuable investment any educational institution can make is "Nurturing Future Leaders". With the continuous rise in expectation of essential leadership standards, the institute has torch bearers have taken a responsibility for this investment to nurture the NextGen leaders with a vision to bridge the existing skill gap.

With a firm step forward to attain an academic excellence, several Centres of Excellence, computer labs, and industry-academia associations has been setup at the College in association with the top leaders. The College believes that its primary stakeholders are the students. All aspects of education focus on the core values of contributing to national development while fostering global competencies among students. The College admits students from all social milieus and empowers them through intensive mentoring and counselling to face the challenges of life and become responsible and sensitized citizens of the country.

The institution came into existence in the year 1996 with the sole purpose of providing quality technical education in various disciplines of engineering. Since then the growth of the Institute has been guided by the proactive response to the fast changing world of technology. The institute is approved by All India Council for Technical Education, New Delhi (AICTE, New Delhi) and is affiliated to VTU, Belgaum (VTU, Belgaum). The Institute's main objective is to provide effective technical education and make the students

to become better citizens and accomplished technocrats of our nation. It also helps students to achieve success in their life by helping the students to get recruited into various national and multinational organizations.

**Policies:**

- To install LED bulbs in the complete campus to save energy
- To set up and rainwater harvesting system to undertake tree plantation drive
- To reduce the $CO_2$ emissions by several percentage by considering means of transport.
- Use of electronic vehicle in the campus.
- To reduce local air pollution. use eco-friendly vehicles, including bike transport in the campus and use of pedestrian friendly roads
- To install photolytic solar panels for generation of electricity and use it as an alternative source of energy
- To develop a flora and fauna ecosystem in the campus to reduce the carbon emission produce from electricity, vehicle and solid waste
- To increase the carbon sequesterial by the means of plantation of more plants in the campus.
- To maintain a proper water balance throughout the institutional and water reduce water usage.
- To monitor the ambient air at various places and to maintain them under permissible limits.

This policy will be communicated to the students and employees of the institute by a proper communication channel and will be made available to all the stakeholders of the institutes. The main objective of this policy is to save the environment. This policy will be reviewed on regular basis under the guidance of the principal of the college

**Mr. Nikhil Nitin Kamble**
(Auditor)
**Environmental and Civil Engineering Solutions**

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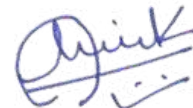
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**NIKHIL N. KAMBLE**
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**AUDIT YEAR 2022-2023**

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*Snkamble*

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**AUDIT YEAR 2022-2023**