

Green Audit Report of

NAGAR YUWAK SHIKSHAN SANSTHA

New Horizon College of Commerce



Prepared

By

Endutech Consultancy Services Pvt Ltd
Navi Mumbai
2022-2023



Janika

PRINCIPAL
New Horizon College of Commerce
Plot # 5, Sector- 13, Airoli,
NAVI MUMBAI 400 708.



ACCREDITED
ISO 9001: 2015
QMS Certification CAB # 118005

ENDUTECH CONSULTANCY SERVICES PVT LTD

Ref No. ECS-GAR-18-2022

Date- 18/10/2022

GREEN AUDIT CERTIFICATE

This is to certify that Green Audit has been carried out in the campus and buildings of Nagar Yuwak Shikshan Sanstha Airoli, New Horizon College of Commerce, Plot No. 5, Sector-13, Airoli, Navi Mumbai- 400708, Maharashtra, in the month of October 2022.

The scope, coverage, findings and suggestions are submitted in the report ECS-GAR-18-811022 dated October 18, 2022.

For,
ENDUTECH Consultancy Services

Dr. D. Santosh (Govt. Reg. No. CEA-12141)
Director

Caring For Energy Environment Education
ENDUTECH CONSULTANCY SERVICES PRIVATE LIMITED
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Executive Summary Observations and Recommendations

1. Trees are well maintained and taken care by the institute.
2. The trees may be provided with QR codes showing technical/ botanical information.
3. Floor and room plan to be disseminated at all locations in the building.
4. The emergency contact numbers are displayed at all locations in the campus.
5. Higher Star rated devices may be procured as green energy initiative.



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Chapter-I

Green Audit

1.1 Background of the study:

According to National Assessment and Accreditation Council (NAAC), the Green Audit is defined as the process of assessing the environmental impact of an organization, process, project, product, etc.

Green audit was originated with the beginning of 1960's with the purpose of examining the work conducted within the establishments whose activities can cause risk to the health of inhabitants and the environment.

It exposes the authenticity of the proclamations made by multinational industries and governments with the concern of health issues as the consequences of environmental pollution. Each organization should carry out the Green Audit of ongoing processes for various reasons such as; to make sure whether they are performing in accordance with relevant rules and regulations, to improve the procedures and ability of materials, to analyze the potential duties and to determine a way which can lower the cost and add to the revenue. Through Green Audit, the organization gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit.

Green Audit is assigned to the Criteria VII of NAAC, which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation.

The aim of organizing Green Audit is to upgrade the environment condition in and around the institutes, colleges, industries and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmentally friendly institute.



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This green audit report presents the analysis of the data collected, observations made at the facility and is governed by the objectives, scope of work, methodology etc. discussed in the ensuing paragraphs.

Objectives:

The basic objectives of the Green Audit Study are to,

- assess the green culture of an educational institute.
- assess the flora-fauna of an educational institute.
- assess the green infrastructure of an educational institute.
- assess the safety systems in the educational institute.
- make sure that rules and regulations are followed.

Methodology:

Following methodology is adopted to conduct the green audit at NHCC.

1. Prior to start of the Audit session, list of data required along with the execution plan is submitted to the NHCC.
2. The team of Project Engineers for this task is deputed.
3. The visit was undertaken in October 2022.
4. The field training was given to the engineers about data collection.
5. The data about trees types, tree height, number of trees is recorded with photographs.
6. The data about infrastructure like draining system, seepage in the building and parking area is collected.
7. The data of elevators, staircases, firefighting system is noted down.
8. The data about green culture of NHCC is noted down.



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Team:

The team members of the audit study.

1. Dr S D Dalvi, Certified Energy Auditor (CEA-12141)
2. Mr. Mahesh Sahebrao Bhadane, Associate Auditor
3. Mr. Harshal Shirsath, Project Engineer

Acknowledgment:

Endutech consultancy services Pvt Ltd wish to record their gratitude to the management of NHCC for awarding this assignment.

We extend our thanks to the Mr. V Jayaraman (Director), Mr R. K. Varma (Principal) for initiating the work.

We are very much thankful to Mrs. Varsha Joshi (Course coordinator), Mrs. Shilpa Mudbidri (Registrar), Mr. Dinesh Mhatre (Librarian) for extending all possible help and co-operation from their side.



Varsha Joshi
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Chapter-II

Trees & Plantation

2.1 Brief Description:

Many trees are planted in the campus of NHCC. Trees and plants covers all directions of the college.

Potted trees are seen in the campus.

The trees and plants are taken care by maintenance team of the institute.

2.2 Observation/Suggestions:



The trees may be provided with QR codes showing technical/ botanical information.



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Chapter-III

Infrastructure

3.1 Introduction:

NHCC is, the brain child of the Visionary founder Dr Subir Kumar Banerjee who envisioned to lay the foundation of an acme of educational distinction; an institution to foster commerce education par excellence for young minds ready to spread their wings to establish themselves in the industry/market.

With an idea of education from KG (Kindergarten) to PG (Post-graduation) under an unified educational assemblage, he laid the foundation of NHCC under the patronage of NAGAR YUWAK SHIKSHAN SANSTHA.

In a sprawling campus, monumental design structure greatly appealing to the Mumbai populace, green abundance, open spaces, cutting edge infrastructure NHCC was established in 2011, in the midst of an opulent upcoming and developing area in the suburbs of Mumbai.

NHCC affiliated to the Mumbai University, with UGC Approved status is in its twelfth year of its academic journey, with five courses in Under Graduate Programme BMS, B.Com (Accounting & Finance), B. Com (Banking & Insurance), B.Com (Financial Markets), and Post Graduate Programme M.Com (Business Management) with continuous promise to keep growing constantly with our clear vision, as excellence in academics is the hallmark of any good institution. The college offers specialization in Human Resource, Marketing and Finance for BMS Students.

We aim for creating leadership in commerce, address the critical needs of industry and society so that we can facilitate the Commerce graduate students as our contribution to society.



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Moving ahead on the path of excellence, our institution is ready to effectively take a leap and accept the forthcoming challenges in diversified domains.

The College also focuses on co-curriculum and extra co-curriculum activities for the overall development of the students. The college provides internship, training, and placement to the students in renowned companies like TATA, CMA-CGA, e-clerx, etc.

3.2 Movements and Parking Facility:

NHCC campus is provided with staircases as well as SIX elevators with necessary entrances to ensure quick and effective movement in normal as well as emergency conditions.



Ease of Movements at NHCC (Elevators)



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Ease of Movements at NHCC(Staircase)

The movement of vehicle inside the campus is restricted and separate parking areas are provided in the campus.



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Four-Wheeler Parking Facility at NHCC



Bicycle Parking Facility at NHCC

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Two-Wheeler Parking Facility at NHCC

The students and many of the faculty members avail public transport system which is very convenient due to proximity to Airoli railway station and bus stop, auto rikshaw stands.

Floor plans to be disseminated at all locations in the building.

Draining system:

The drains from the washrooms are connected to the municipal drainage, which is a common practice in the colleges in the NMMC region.

Seepage in the building:

The organization is inspected for seepages.

Minor cracks observed inside the classrooms, which need to be repaired.



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Termite Attack in Classroom No. 106



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Cracks and Seepage



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Chapter-IV

Safety

4.1 Introduction:

Healthy and safety environments are inevitable to conduct all Educational, Research, Service and campus activities in any institutions.

In any organization, human resource is the most important one, especially in the educational institute. Safety practices are aimed at preventing accidents which cause injury to the persons and damage to the properties.

Accidents invariably cause some kind of damage – injury to the personnel and/or damage to property. However, accidents are preventable, if proper care is taken in the safety guidelines for any kind of activity. Unsafe conditions and unsafe acts during a particular work cause accident. These can be avoided by ensuring:

- Safe working conditions in workshop/machine shop.
- Proper maintenance of tools and equipment.
- Availability of first-aid.
- Training of safety to the students and faculty members

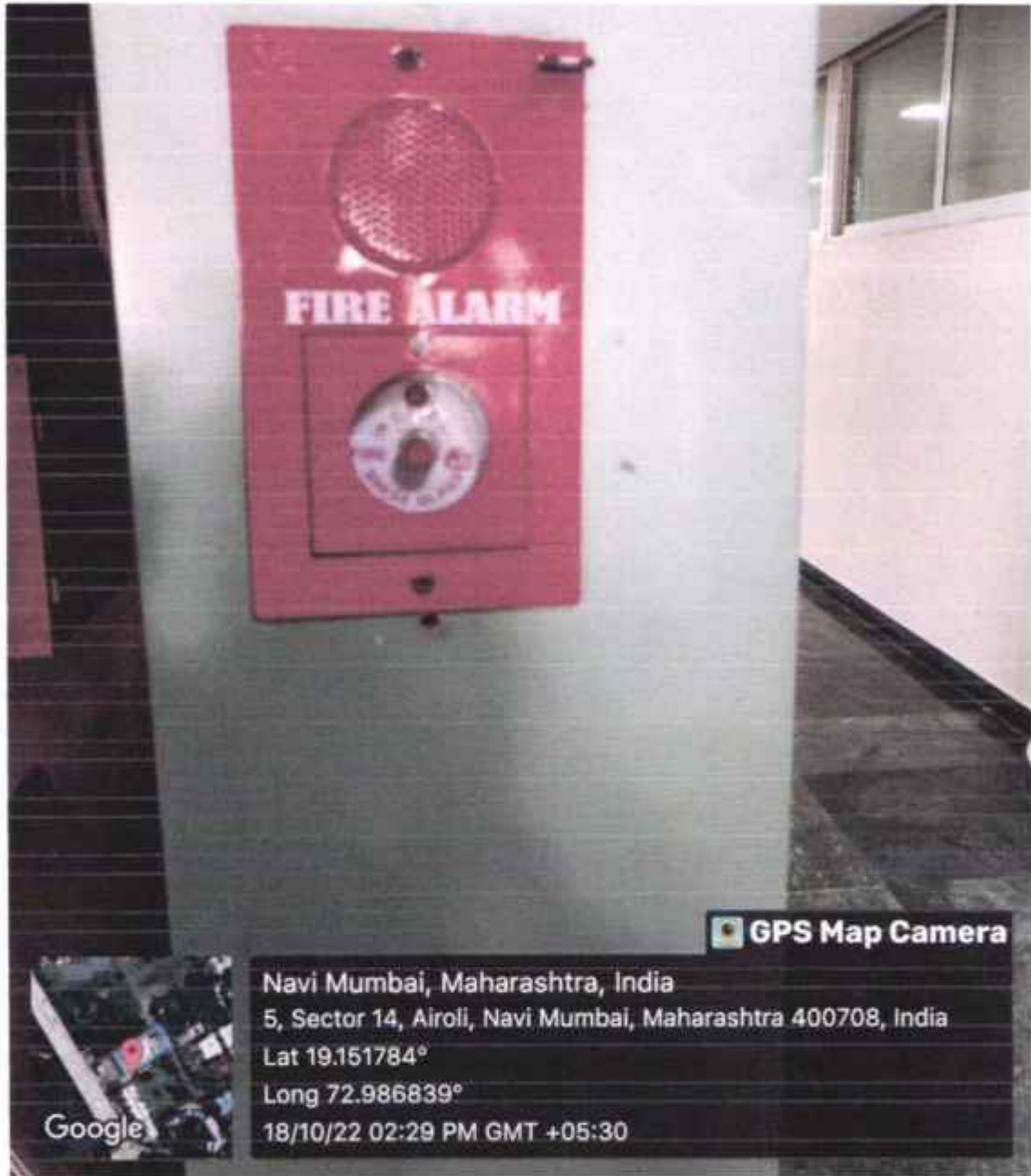
4.2 Fire-fighting system:

There are 2 fire extinguishers for NHCC building; which are checked / refilled as per the stipulated frequency. The capacity varies from 2 to 4 kg.

Few of the fire extinguishers, fire alarm and fire-fighting systems are shown below.



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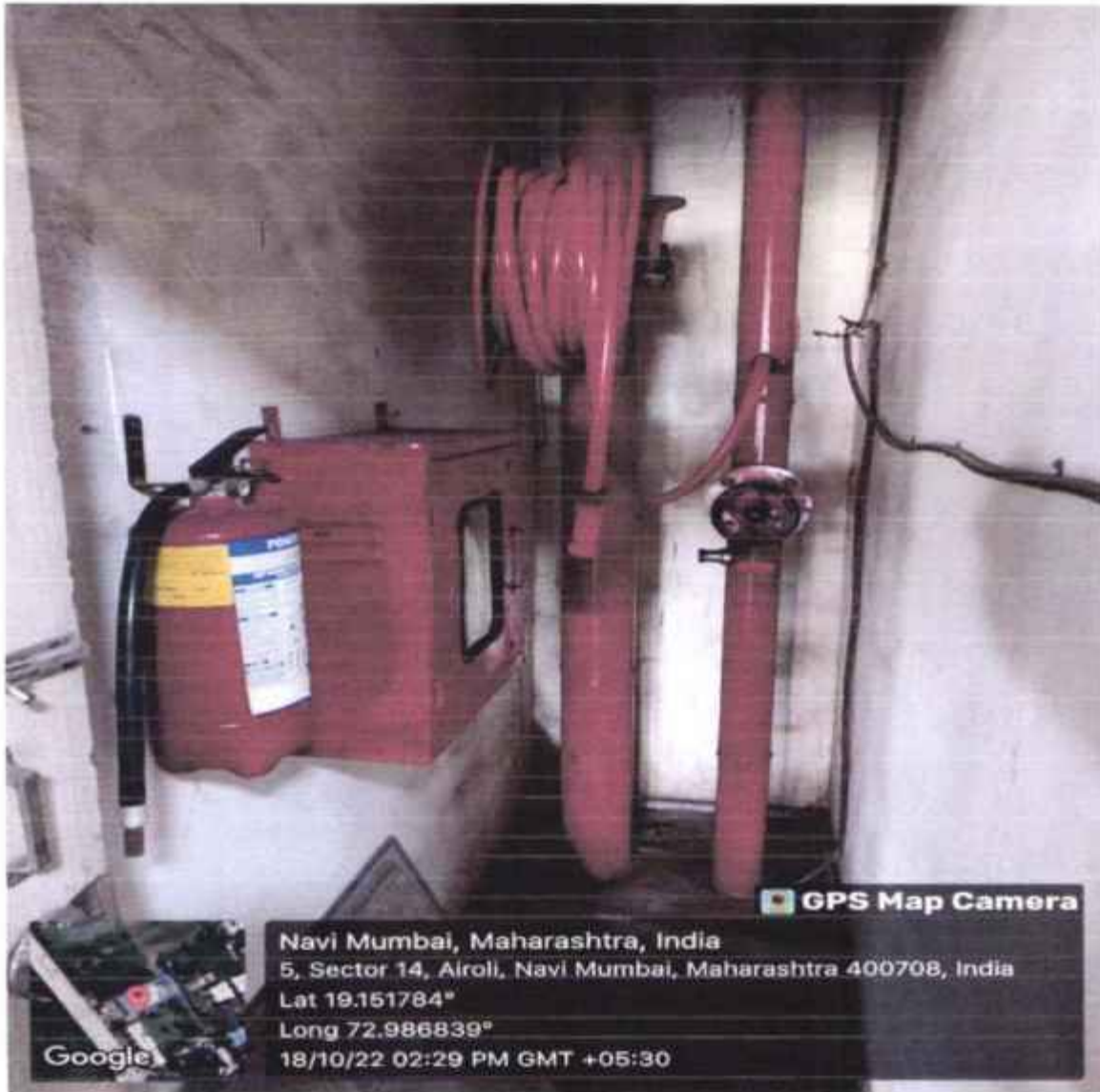
Fire alarm & Fire Extinguishers at NHCC

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Fire extinguishers at NHCC



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Fire water lining at NHCC

4.3 Observations & Suggestions:

Fire sand buckets may be provided in the building as it is easy and quick remedy on fire.

Fire extinguisher balls may be fixed in the building as it is easy and quick remedy on fire.

4.4 First Aid:

NHCC has set up wellness center at first floor to get the first aid immediately. Also admission facility is available with multiple beds.



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of Commerce



Wellness Centre at NHCC

4.5 Safety:

NHCC campus is fitted with CCTV at all possible locations.

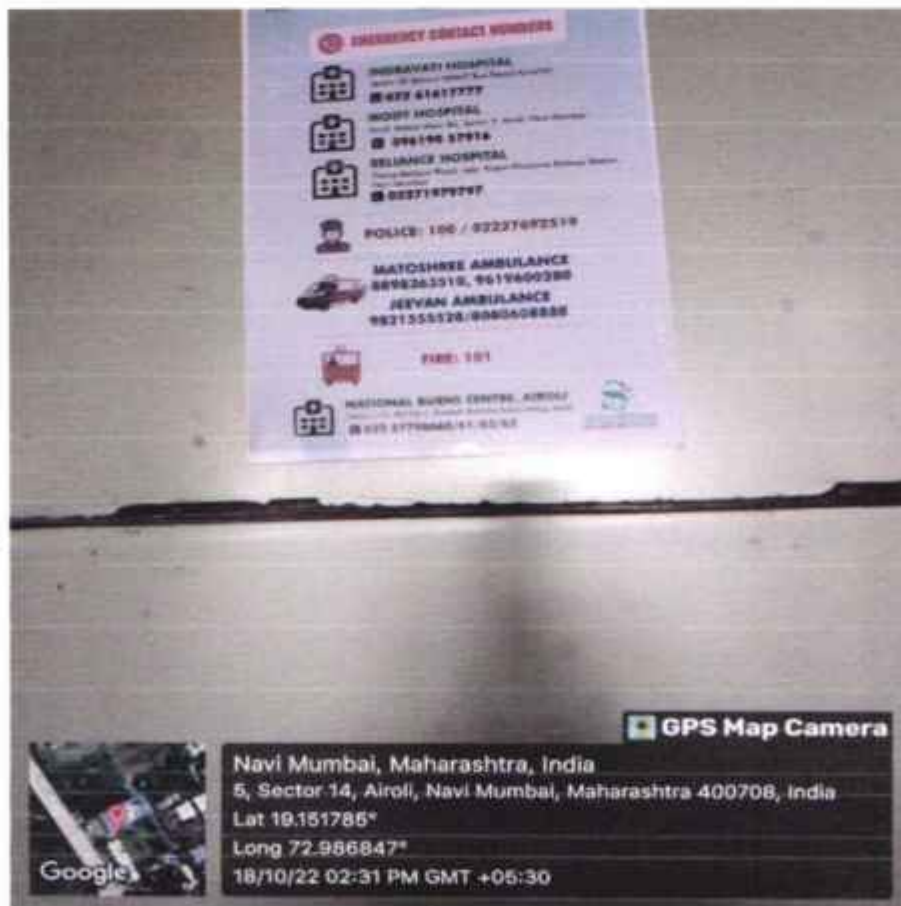


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CCTV system at NHCC



The emergency contact numbers are displayed at important locations.



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**NAGAR YUWAK SHIKSHAN SANSTHA AIROLI
NEW HORIZON COLLEGE OF COMMERCE, AIROLI**

GENERATOR



DG system at NHCC

In case of emergency or electricity failure the campus of NHCC is backed with the help of Diesel Generator.



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Chapter-V

Green Culture

5.1 Description:

Green culture is a collective belief toward an ecological, environment-friendly working procedures followed by institutions. NHCC organizes the green activities like Cleaning of Village Areas, Cleaning of Common Water Bodies at Adopted villages, Beach Cleaning after Ganapati festival etc.

NHCC students and teachers regularly participate in plantation in nearby area.

NHCC has procured the star rated, energy efficient devices like

1. Air-conditioners
2. LED/LCD displays
3. Projectors

The following steps may be initiated to further enhance efficiency of the systems.

1. An efficient power management system may be incorporated to
 - a. Switch off the display if not in use.
 - b. Put the computer in Sleep mode / switching off the machines, if not used for prolonged period.
2. Optimize brightness of the screen.
3. Discourage use of screen savers, which has similar power consumption.

Digital communication:

The internal communication is through electronic medium. Leave applications, domain name ownership are the few examples of digital communication at NHCC.

Digital Teaching-Learning:



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The institute has adopted the method of paperless submission of subject journals for students. NHCC delivers the subject notes to the students in digital form.

Green Campus and Awareness Initiatives:

NHCC is very keen to conserve the energy at their premises. The energy conservation quotes are displayed near the electric switch boards and panels.

Water Conservation Initiatives:

NHCC also emphasizes to conserve the water at their premises. The water conservation quotes are displayed near the water consumption points.

Cleanliness Initiatives:

NHCC actively participates in the schemes/competitions organized throughout the year.

The waste is well segregated in the NHCC premises, including the separate bin for collecting the plastic waste.



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ANNEXURE
Fire Fighting Testing Certificate

Mob.: 9324209051

9511710106

Email : akshayenterprises60@gmail.com



AKSHAY ENTERPRISES

ALL TYPES OF FIRE FIGHTING SYSTEM INSTALLATIONS & MAINTENANCE

Shop No. 6, Plot No. E/3, Seawood Avenue, Rajaram Complex, Sector - 03, Kharghar, Navi Mumbai - 410 210.

Govt. Approved Licensed

Ref. No. : NHSS(NUSS)/41/22-23

FORM B

[See section 3(3) and rule 4(2)]

Six monthly certificate to be given in every January and July by the owner or the occupier for compliance of the Fire Prevention and Life Safety Measures.

CERTIFICATE

Certified that I/We have carried out inspection of the Fire Prevention and Life Safety Measures installed in the following building or premises, namely:-

M/s. NAGAR YUVAK SHIKSHAN SANSTHA

(New Horizon Scholar School)

(Ground + 7th upper floors)

Plot No. 5, Sector - 13, Airoli, Navi Mumbai

I/We further certify that these installations in the above mentioned buildings are maintained in good repair and efficient conditions during the period **1st July 2022 to 31st December, 2022**, as required under the provisions of the Maharashtra Fire Prevention and Life Safety Measures Act, 2006 (Mah III of 2007). The details of the inspection of installations carried out by me/us are mentioned in the report appended herewith.

LICENSE NOS. :-

Maharashtra Fire Services License No.

MFS/LA/RF-44/RD-40 Dtd.: 21.01.2023 to 20.01.2024

Place : Kharghar, Navi Mumbai

Date : 01.02.2023

71.5 159 | 2023
07/02/2023
अभिषेक नाईक
अभिषेक नाईक
अभिषेक नाईक

For AKSHAY ENTERPRISES

NAIK AKSHAY
NARENDRA

Digitally signed by NAIK AKSHAY
NAARENDRA
Date: 2023.02.01 11:47:49 +05'30'

(N. A. Naik)
Proprietor



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Environment Audit Report of

NAGAR YUWAK SHIKSHAN SANSTHA

New Horizon College of Commerce



Prepared

By

**Endutech Consultancy Services Pvt Ltd
Navi Mumbai
2022-2023**



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Ref No. ECS-EVAR-18-2022

Date- 18/10/2022

ENVIRONMENT AUDIT CERTIFICATE

This is to certify that Environment Audit has been carried out in the campus and buildings of Nagar Yuwak Shikshan Sanstha Airoli, New Horizon College of Commerce, Plot No. 5, Sector-13, Airoli, Navi Mumbai- 400708, Maharashtra, in the month of October 2022.

The scope, coverage, findings and suggestions are submitted in the report ECS-EVAR-18-811022 dated October 18, 2022.

For,
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Dr. D. Santosh (Govt. Reg. No. CEA-12141)
Director

Caring For Energy Environment Education

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Executive Summary Observations and Recommendations

1. Composting facility is required (needs certification and testing).
2. NHCC need to arrange the dustbins in the campus.
3. Rain water harvesting facility is required (quantification required).
4. STP facility for liquid waste management is required (needs certification and testing).
5. All kind of wastes are handled carefully including plastic, glass etc. in NHCC.
6. The quality of air is excellent in the campus.



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Chapter-I

Environment Audit

1.1 Introduction:

An environmental audit evaluates and quantifies the environmental performance.

Environmental Auditing is an independent assessment performed by different organizations to ensure that they are complying with the Environmental Policies.

It examines the amount of risk or injury or actual harm caused by operational procedures and determines the types of Pollution produced by assessing the range of locations, procedures and activities.

Objectives:

The basic objectives of the Environment Audit Study are to,

- Evaluate waste management practices of an organization.
- Determine pollution level in the organization.
- Assess energy conservation practices
- Assess water conservation practices



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Methodology:

The environment audit methodology is given below.

1. Reviewing the Institutes Environmental Protection Policy along with the applicable regulations

2. Structuring a plan for the audit for the applicable activities

3. Gathering of information and all relevant data

4. Evaluating the overall performance of the institution

5. Identifying the zones that require being focused on improvement

6. Submitting the Report of the Audit conducted to the management.

Team:

The team members of the audit study.

1. Dr S D Dalvi, Certified Energy Auditor (CEA-12141)
2. Mr. Mahesh Sahebrao Bhadane, Associate Auditor
3. Mr. Harshal Shirsath, Project Engineer



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Instruments

The following instruments were utilized for measurement during the environment audit study.

1. Power meter
2. Hygro-temperature meter
3. Lux meter
4. Air Quality meter

Acknowledgment:

Endutech consultancy services Pvt Ltd wish to record their gratitude to the management of NHCC for awarding this assignment.

We extend our thanks to the Mr. V Jayaraman (Director), Mr R. K. Varma (Principal) for initiating the work.

We are very much thankful to Mrs. Varsha Joshi (Course coordinator), Mrs. Shilpa Muddidri (Registrar), Mr. Dinesh Mhatre (Librarian) for extending all possible help and co-operation from their side.



Varsha Joshi
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Chapter-II

Water Management

2.1 Introduction to water management:

Water conservation and management include the policies, framework, and strategies to manage water effectively and efficiently.

The different methods of water conservation are as follows.

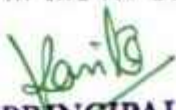
1. Rainwater Harvesting- It is the process of collection and storage of rainwater, rather than allowing it to run off. Rainwater is collected from the roof and is redirected to a tank, reservoir, cistern, or natural tanks, etc.
2. Groundwater Harvesting- It is a method for saving water placed under the ground to control the groundwater flow in an aquifer and to raise the water table.
3. Water-wise Habits- There are various good habits to conserve water for a long time. Some of them are Fixing leaky taps, Keeping the tap closed while brushing, taking a shower of 5 mins instead of long baths are a few examples of saving water.
4. Sensor based water conservation- Using IoT (Internet of Things) is a flexible solution designed for the water utility industry, allowing for smarter decisions while optimizing the use of existing city resources and investments.

2.2 Water Consumption:

The water is supplied by NMMC to NHCC and the frequency of billing is 60 days through ONE water meter. The connection type is commercial.

The average consumption of water is 2500 liter in the AY 2022-23.



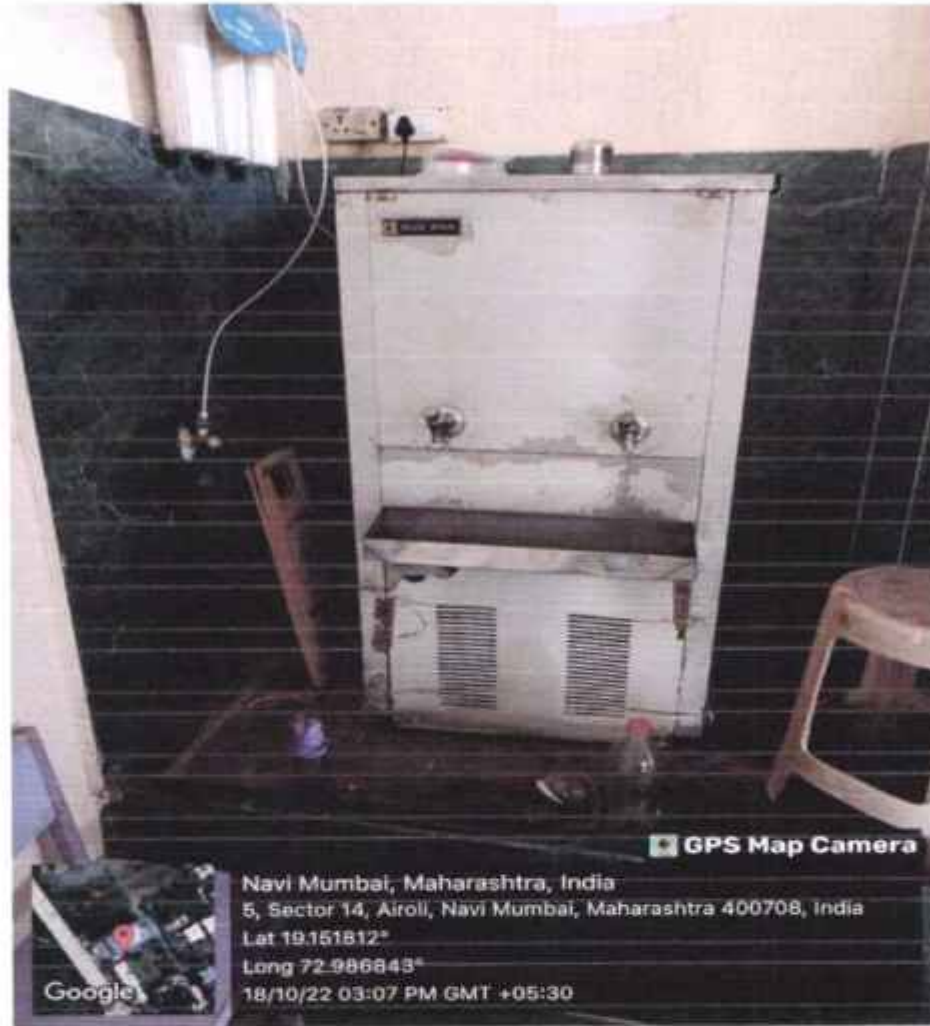

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The basic uses of water at NHCC are as below.

1. Drinking
2. Gardening
3. Kitchen
4. Wash Rooms
5. Others



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Water Purifier and Cooler System at NHCC

2.3 Rain Water Harvesting System:

NHCC need to install the facility of rain water harvesting with bore well discharge arrangement.

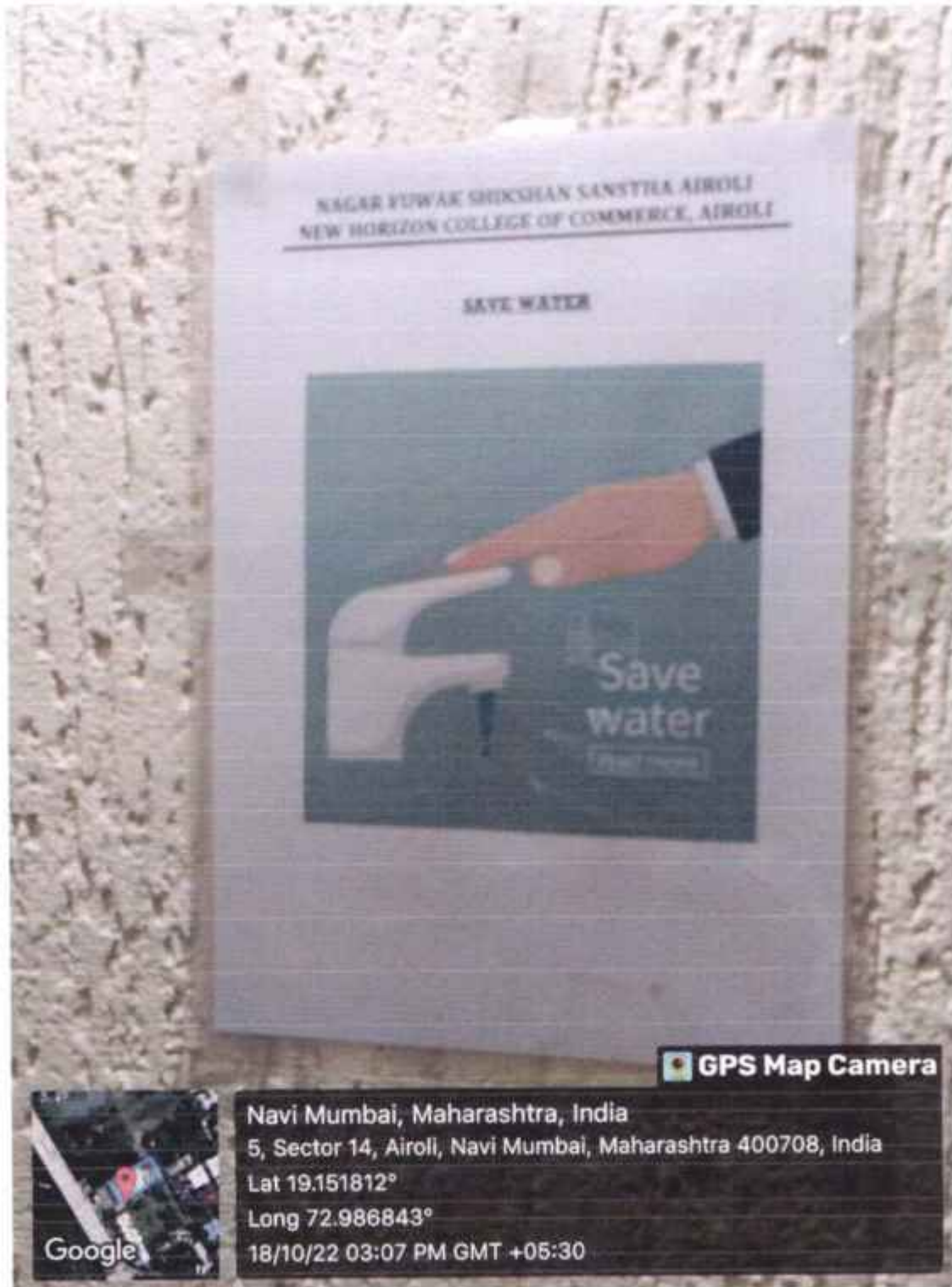
2.4 Observations and Suggestions:

- Rainwater harvesting system is required in the institute.
- RWH measurements need to be highlighted near the RWH facility.
- RWH meter to be fitted for actual measurement of water amount.
- The distribution network and piping are satisfactory and adequate.



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- o The washrooms may be provided with sensor in order to conserve the water.



Water conservation Initiatives at NHCC



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Chapter-III

Solid Waste Management

3.1 Introduction:

Solid waste management mainly refers to the complete process of collecting, treating and disposing of solid wastes.

It addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. and recycling.

Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair, and reuse.

Unscientific handling of solid waste can create threats to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus.

One of the ways solid management is through the 3 R's — Reduce, Reuse, Recycle.

- Reduce means to cut back on the amount of trash we generate.
- Reuse means to find new ways to use things that otherwise would have been thrown out.
- Recycle means to turn something old and useless (like plastic milk jugs) into something new and useful (like picnic benches, playground equipment and recycling bins).



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3.2 Dry Waste Management:

NHCC has to set up composting facility, for treating the dry waste generated in the premises like garden waste, garlands etc.

3.3 Observations and Suggestions:

- NHCC is handling the environmental issues very carefully and taking all possible steps towards sustainability.
- The waste is segregated in the separate green, red and blue dustbins after collecting in the dustbin bags.
- The food waste is disposed by institute through NMMC.
- NHCC need to purchase the dustbins for classrooms and the staffroom.



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Chapter-IV

Liquid Waste Management

4.1 Introduction:

Liquid waste is a major problem in the world, due to approximately 71% of the Earth's surface being covered in water.

According to the Environmental Protection Agency (EPA), liquid waste is defined as any waste material that passes the definition of a "liquid." This means that the material must, "pass through a 0.45 micron filter at a pressure differential of 75 psi," according to the EPA's provided definition of a liquid (1). The main producers of liquid waste are animals and human beings as natural excretion of waste is flushed into sewage and waste lines.

Liquid waste is such an important category of waste management because it is so difficult to deal with. Unlike solid wastes, liquid wastes cannot be easily picked up and removed from an environment. Liquid wastes spread out, and easily pollute other sources of liquid if brought into contact. This type of waste can also soak into objects such as soil and groundwater. This pollution then carries over to pollute the plants we eat, the animals in the ecosystem, as well as the humans within the area of the pollution.

At the NHCC, no hazardous/chemical liquid waste is generated in the institute.




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4.2 Observations and Suggestions:

NHCC has to set up sewage treatment plant, for treating the liquid waste generated in the premises.

The treated water is used for gardening purpose.

4.3 Observations and Suggestions:

Liquid waste handling certification may be done from competent authority after installation.



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Chapter-V

Hazardous - Waste Management

5.1 Brief Description:

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life.

This makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

5.2 Observations and Suggestions:

- E-waste generated in the NHCC campus is very less in quantity.
- NHCC Administration conducts the awareness programs regarding E-waste Management.
- The E-waste and defective items from computer laboratories are being disposed properly.
- NHCC has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner.

Recommendations are as below.

- Recycle or safely dispose of white goods, computers and electrical appliances.
- Use reusable resources and containers and avoid unnecessary packaging where possible.
- Always purchase recycled resources where these are both suitable and available.
- Bins may be kept at the ground floor, for E-waste collection at NHCC.



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5.3 Hazardous Waste:

Hazardous waste is defined as any substance or material that can have harmful effects on the health of people and the environment.

"The Environment (Protection) Act, 1986" which provides the Government wide ranging powers to enact rules to deal with various issues concerning environmental protection. Various Rules were enacted under Environment (Protection) Act to address specific issues such as The Noise Pollution Regulation and Control Rules, 2000, Hazardous Waste Management and Handling Rules, 1989, The Municipal Solid Waste Management and Handling Rules, 1989, The Manufacture, Use, Import, Export Storage of Hazardous Micro Organisms, Genetically Engineered Organisms or Cell rules, 1989 and whole gamut of Rules to govern Hazardous Chemicals Manufacture, Use and Storage, Chemical Accidents etc.

5.4 Observations and Suggestions:

- Hazardous waste generated in the NHCC campus is less in quantity.
- NHCC Administration conducts the awareness programs regarding hazardous waste Management.
- The plastic waste collection bin may be kept so that students will be aware and use the facility.



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Chapter-VI

Air Quality Analysis

6.1 Brief Description:

The air quality was checked by measuring the Carbon Dioxide and VOC contents at various locations in the college classrooms and the administrative areas.

6.2 Observations

The Carbon dioxide and VOC levels are within the limits at all the places.

The standard norm is - Carbon dioxide level below 400 ppm and VOC level below 0.25 ppm.

S N	Location	CO2	TVOC	HCHO
1	Library	387	0.0235	0
2	Room no 101	385	0.023	0
3	Room no 102	385	0.019	0
4	Room no 103	386	0.025	0
5	Room no 105	385	0.0188	0
6	Room no 106	385	0.019	0
7	Room no 107	384	0.0185	0
8	Room no 108	386	0.025	0
9	Room no 109	390	0.019	0



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10	Room no 110	385	0.019	0
11	Room no 112	370	0.0193	0
12	Room no 113	385	0.019	0
13	AV Room (Auditorium)	388	0.02	0
14	Lobby	367	0.0197	0
15	Washroom (L)	385	0.023	0
16	Washroom (G)	385	0.019	0



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Chapter-V

Hazardous - Waste Management

5.1 Brief Description:

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life.

This makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

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- NHCC has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner.

Recommendations are as below.

- Recycle or safely dispose of white goods, computers and electrical appliances.
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- Always purchase recycled resources where these are both suitable and available.
- Bins may be kept at the ground floor, for E-waste collection at NHCC.



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5.4 Observations and Suggestions:

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- NHCC Administration conducts the awareness programs regarding hazardous waste Management.
- The plastic waste collection bin may be kept so that students will be aware and use the facility.



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Chapter-VI

Air Quality Analysis

6.1 Brief Description:

The air quality was checked by measuring the Carbon Dioxide and VOC contents at various locations in the college classrooms and the administrative areas.

6.2 Observations

The Carbon dioxide and VOC levels are within the limits at all the places.

The standard norm is - Carbon dioxide level below 400 ppm and VOC level below 0.25 ppm.

S N	Location	CO2	TVOC	HCHO
1	Library	387	0.0235	0
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7	Room no 107	384	0.0185	0
8	Room no 108	386	0.025	0
9	Room no 109	390	0.019	0



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10	Room no 110	385	0.019	0
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12	Room no 113	385	0.019	0
13	AV Room (Auditorium)	388	0.02	0
14	Lobby	367	0.0197	0
15	Washroom (L)	385	0.023	0
16	Washroom (G)	385	0.019	0



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Energy Audit Report of

NAGAR YUWAK SHIKSHAN SANSTHA

New Horizon College of Commerce



Prepared

By

Endutech Consultancy Services Pvt Ltd
Navi Mumbai
2022-2023



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ENDUTECH CONSULTANCY SERVICES PVT LTD

ACCREDITED

ISO 9001: 2015

QMS Certification CAB 8 118005

Ref No. ECS-EAR-18-2022

Date- 18/10/2022

ENERGY AUDIT CERTIFICATE

This is to certify that Energy Audit has been carried out in the campus and buildings of Nagar Yuwak Shikshan Sanstha Airoli, New Horizon College of Commerce, Plot No. 5, Sector-13, Airoli, Navi Mumbai- 400708, Maharashtra, in the month of October 2022.

The scope, coverage, findings and suggestions are submitted in the report ECS-EAR-18-811022 dated October 18, 2022.

For,
ENDUTECH Consultancy Services

Dr. D. Santosh (Govt. Reg. No. CEA-12141)
Director

Caring For Energy Environment Education

ENDUTECH CONSULTANCY SERVICES PRIVATE LIMITED

301/246, Parmarth Niketan Marg, Block A, Sector 28, Vashi, Navi Mumbai-400703

Email: director@endutech.co.in



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Executive Summary - Energy Audit

1. NHCC is effectively disseminating the energy conservation quotes/slogans.
2. Additional discounts per month may be availed by electricity bill payment initiatives.
3. 48 number of ceiling fans and wall mounted fans may be replaced by energy efficient fans to save Rs. 16,450 per year by initial investment of Rs. 1,68,000. But payback period is not much attractive (10.21 Years)
4. CFL's to be replaced by LED lights/bulbs.
5. Rooftop Solar is strongly recommended to cut down the electricity cost.
6. Solar water heating, and Solar cooking arrangements may be initiated to further cut down the cost of HLP.



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Chapter-I

Introduction

1.1 Background of the study:

The fundamental purpose of the energy audit is not only to identify the potential saving areas but also to establish energy monitoring and control system to reap the gains on sustainable basis. It is with this purpose that NAGAR YUVAK SHIKSHAN SANSTHA's NEW HORIZON COLLEGE OF COMMERCE, Airoli, Thane Maharashtra, assigned Endutech Consultancy Services Pvt Ltd, Navi Mumbai to carry out Energy Audit.

This energy audit report presents the analysis of the data collected, observations made at the facility and is governed by the objectives, scope of work, methodology etc. discussed in the ensuing paragraphs.

Objective:

The basic objectives of the Energy Audit Study are to,

- Identify key result areas for energy saving along with their broad Cost Benefit Analysis.
- Suggest energy monitoring and control mechanism to realize the savings on the sustainable basis.

Methodology:

Prior to start of the Audit session, submitted a list of data required along with the execution plan.

Then deputed a team of Project Engineers for this task. The visit was undertaken in the month of October 2022. The field training was given to the engineers about data collection. The team was trained about operation and handling of the instruments used in the energy auditing.



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The prime objectives of these visits were:

- To hold discussions with Principal, to understand Energy consumption pattern, to get acquainted with the efforts already put in for energy conservation
- To meet the NAAC criteria VII in-charges and make aware of the Energy Auditing.
- To collect historic data regarding energy consumption and maintenance practices.

Team:

The team members of the audit study.

1. Dr S D Dalvi, Certified Energy Auditor (CEA-12141)
2. Mr. Mahesh Sahebrao Bhadane, Associate Auditor
3. Mr. Harshal Shirsath, Project Engineer

Instruments

The following instruments were utilized for measurement during the energy audit study.

1. Power meter
2. Hygro-temperature meter
3. Anemometers
4. AC power meter
5. Lux meter



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Acknowledgment:

Endutech consultancy services Pvt Ltd wish to record their gratitude to the management of NHCC for awarding this assignment.

We extend our thanks to the Mr. V Jayaraman (Director), Mr R. K. Varma (Principal) for initiating the work.

We are very much thankful to Mrs. Varsha Joshi (Course coordinator), Mrs. Shilpa Mudbidri (Registrar), Mr. Dinesh Mhatre (Librarian) for extending all possible help and co-operation from their side.



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Chapter-II

Consumption Pattern

2.1 Brief Description & Consumption data:

Present Scenario:

- The electricity is supplied to NHCC by MSEB (MAHADISCOM).
- The electricity is jointly consumed by NHCC and NHSS.
- The total average monthly consumption is around 9000 kWh.
- The average monthly payment made towards electricity consumption Rs. 1,25,000/-.
- The noted cost of power is Rs 13.62/- per kWh AY 2022-2023.

As can be seen the major consumption is of

- Air conditioners
- Ceiling fans
- Computers
- Illumination

The other unaccounted consumptions are of centrifugal pumps, printers, scanners, ups etc.

2.2 Electricity Consumption:

Electricity is supplied through LT connections. This tariff category is applicable for electricity used at educational premises for normal consumption meant for operating various appliances used for purposes such as lighting, heating, cooling, cooking, washing/cleaning and water pumping etc.



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2.3 Energy Saving Analysis:

The observations are as below.

1. Prompt Payment Discount (PPD) per month may be availed in all the bills.
2. Digital Payment Discount per month may be availed in all the bills.
3. Go Green Discount (GGD) per month per bill may be availed.



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Chapter-III

Computers

3.1 Brief Description:

In NHCC there are 37 LCD computers counted as observed. Projectors, Printers and scanners used for administrative and teaching-learning process.

General Suggestions:

1. An efficient power management system may be incorporated to
 - a. Switch off the display if not in use.
 - b. Put the computer in Sleep mode / switching off the machines, if not used for prolonged period.
2. Optimize brightness of the screen.
3. Discourage use of screen savers, which has similar power consumption
4. LCD displays may be replaced by LED displays.

3.2 Computers Display Analysis


Location	Display Type
	LCD
Staff Room (Room No. 110)	16
Computer Lab (Room No. 105)	20
Library	01



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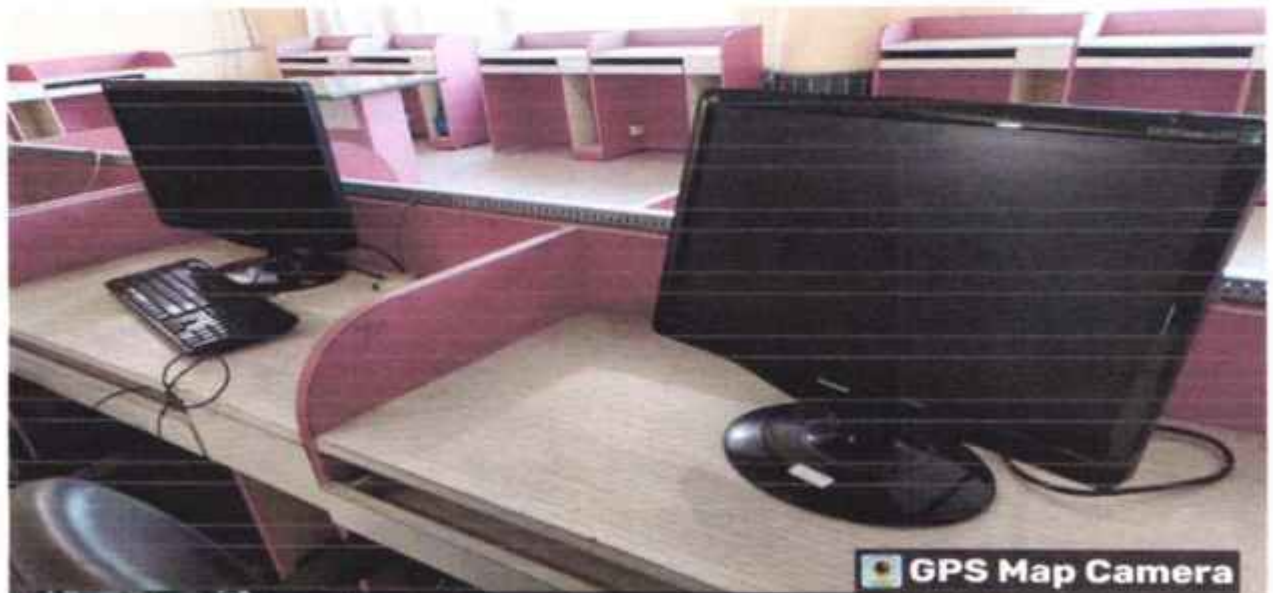



 **GPS Map Camera**



Google

Navi Mumbai, Maharashtra, India
5, Sector 14, Airoli, Navi Mumbai, Maharashtra 400708, India
Lat 19.151812°
Long 72.986843°
18/10/22 02:53 PM GMT +05:30



 **GPS Map Camera**

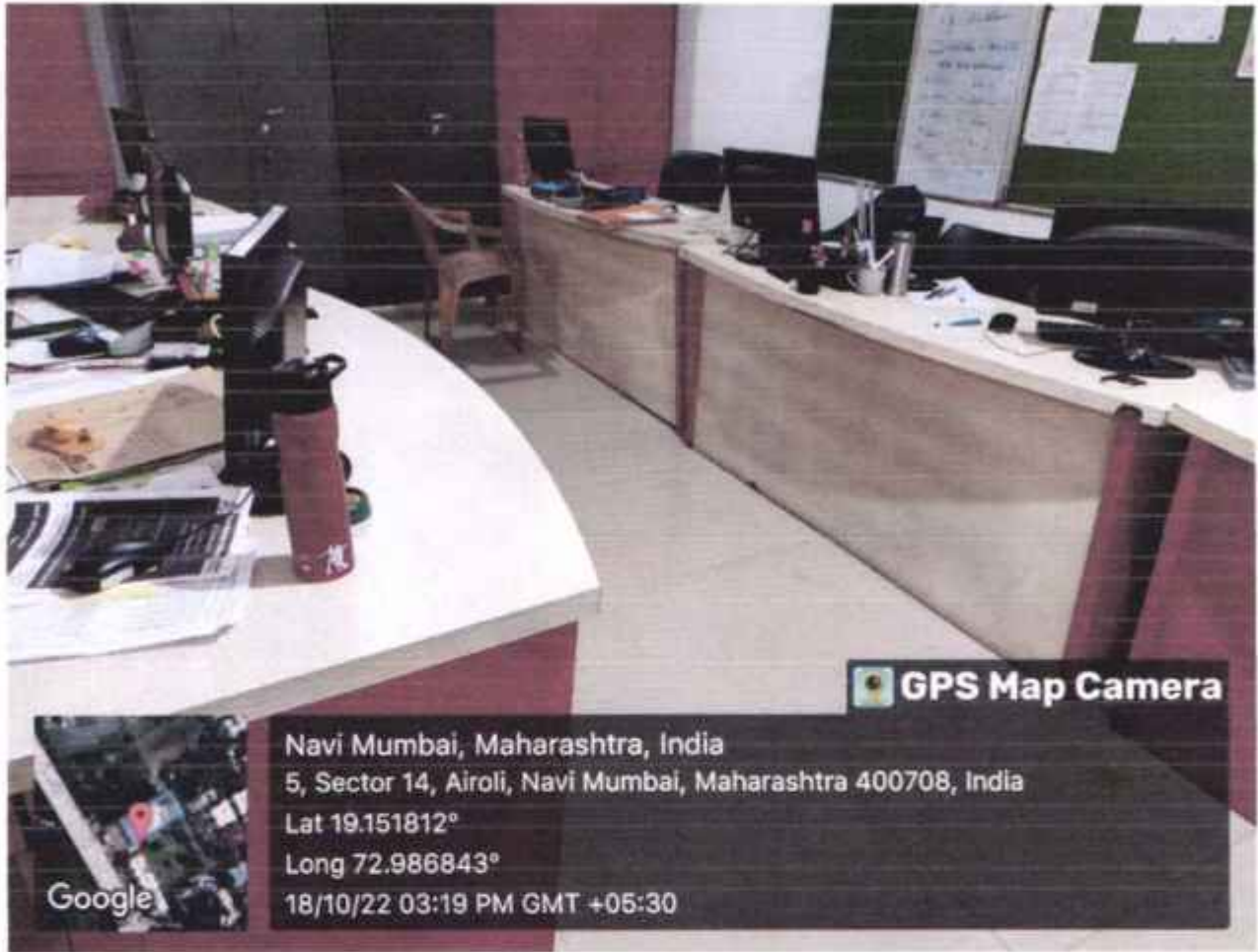


Google

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LCD Computers at Computer Laboratory of NHCC



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Chapter-IV

Air Conditioners

4.1 Brief Description:

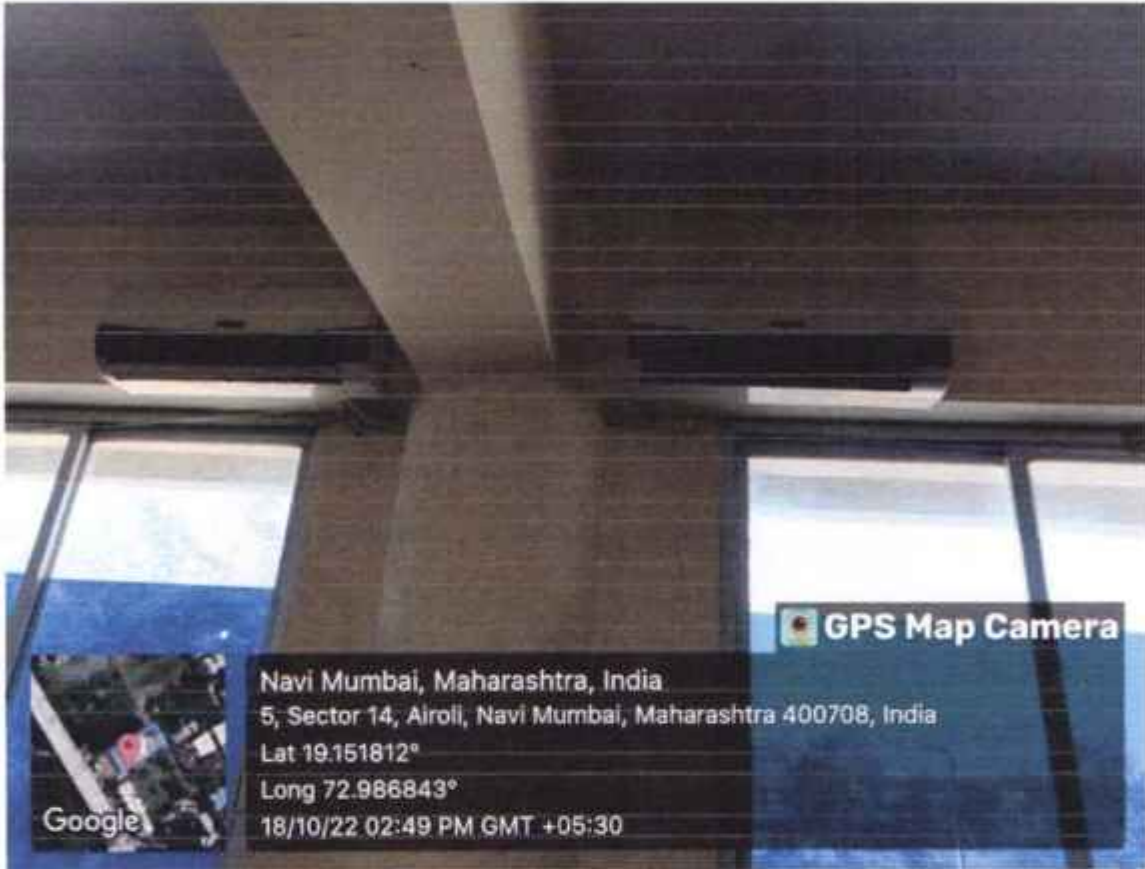
Air conditioning system is basically provided to maintain comfortable ambience inside the premises by maintaining the temperature (and relative humidity, at times) at appropriate levels. The performance of human being is optimal at the temperature of 24 ± 2 °C and at relative humidity (RH) of $60 \pm 5\%$.

The warmer and humid air from the premises is drawn and fed to the Air Conditioning System by a circulating fan. This air is chilled in an evaporator by vaporizing the refrigerant and is distributed throughout the conditioned area. The refrigerant is pressurized by a compressor and subsequently is cooled and condensed by an air-cooled condenser. The compressor and condenser are placed in an outdoor unit, located on the external side of the premise. While the circulating fan and evaporator is placed in an indoor unit located inside the premises.



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Air Conditioners at Classrooms of NHCC



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4.2 Air conditioner (A/c) Survey:

The survey of air conditioners was carried out for inspection of type of A/c, STAR rating, outdoor unit, indoor unit and tubes insulation condition.

The details are as below.

Location	Number	Inlet		Outlet		Star Rating	Condition
		T	RH	T	RH		
Room No 101	2	-	-	-	-	-	NW
Room No 102	2	-	-	-	-	-	NW
Room No 103	2	-	-	-	-	-	NW
Room No 105	2	-	-	-	-	-	NW
Room No 106	2	25	73	19	59	3	W
Room No 107	2	24	71	20	61	3	W
Room No 108	2	24	72	20	64	3	W
Room No 109	2	-	-	-	-	-	NW
Room No 110	2	23	70	19	65	3	W
Room No 112	2	-	-	-	-	-	NW
Room No 113	2	-	-	-	-	-	NW
AV Room (Auditorium)	2	24	75	23	66	3	W

4.3 Observation:

Total 24 split air-conditioners are fitted in the institute. The star rating of the air conditioners is observed as 3.

More the star rating, more is the energy efficient air conditioner.



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Chapter-V

Illumination

5.1 Brief Description:

Energy efficient tube-lights are fitted in the institute except at few places.

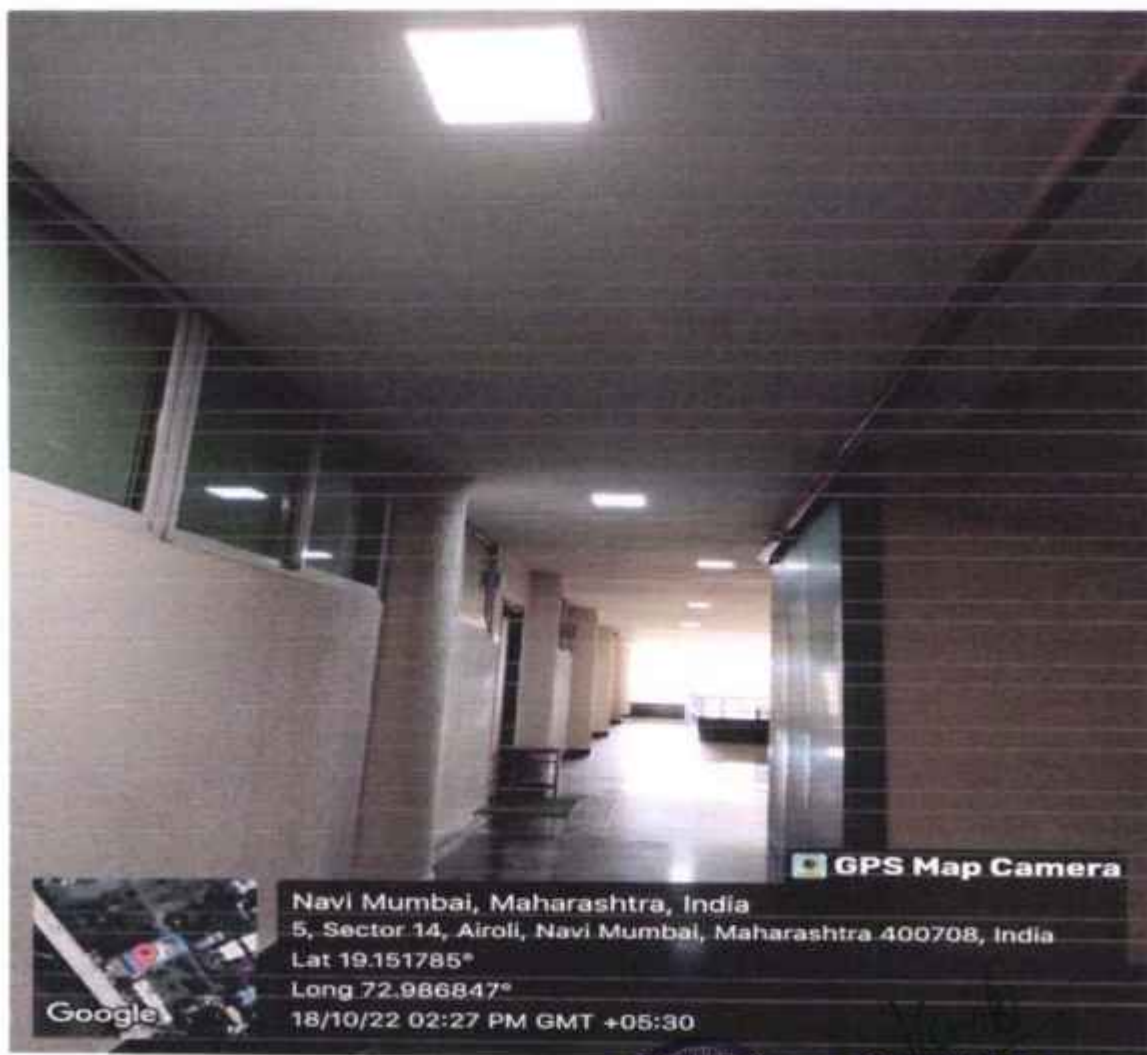
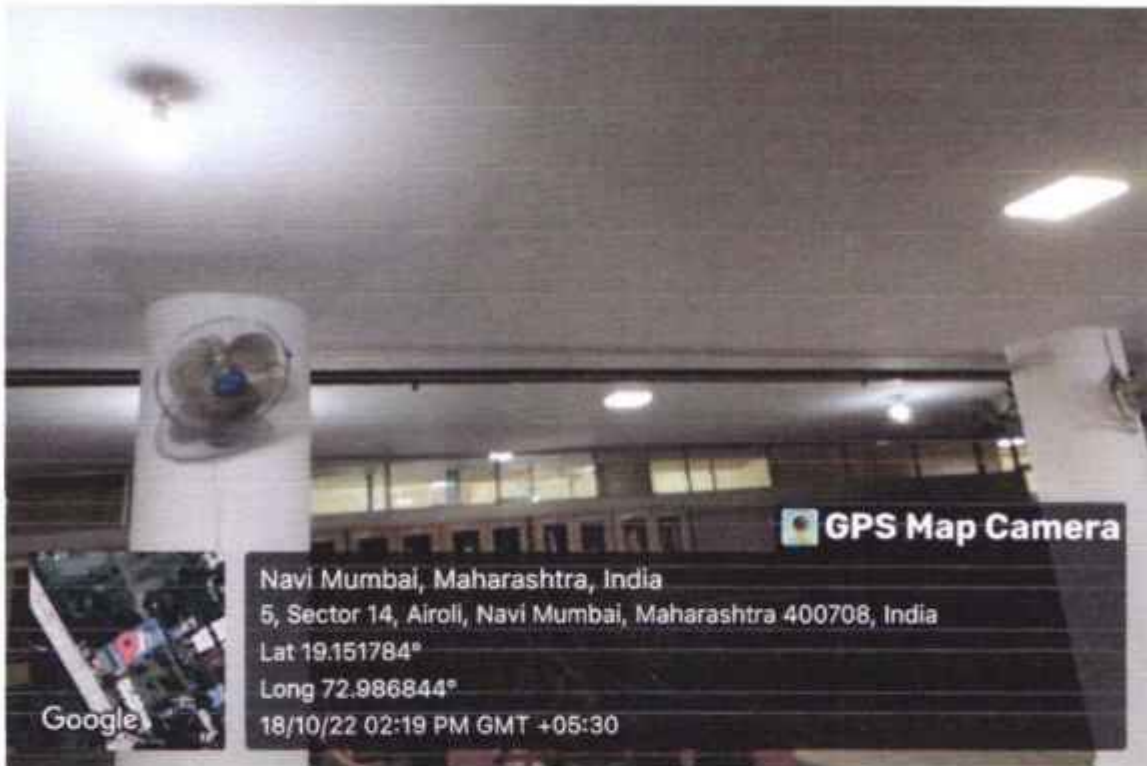
The lux level is also measured using lux meter.

The detail list of light fitting is as under.

Location	LED (TL)	CFL	LED (Bulb)
	23w	25w	20w
Library	4	1	5
Room no 101	-	-	6
Room no 102	-	-	6
Room no 103	-	-	6
Room no 105	-	2	4
Room no 106	-	4	6
Room no 107	-	-	6
Room no 108	-	-	6
Room no 109	-	-	6
Room no 110	-	-	5
Room no 112	-	-	6
Room no 113	-	-	6
AV Room (Auditorium)	10	-	-
Lobby	-	-	23
Washroom (L)	-	-	7
Washroom (G)	-	-	5



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The lux level is measured using lux meter at different locations. The data is tabulated below. The lux level is found satisfactory except at few places including staffroom, library etc. It may be improved by fitting a greater number of LED lights at appropriate aperture.

Location	LUX Level				Average
	1	2	3	4	
Library	43	100	262	89	123.5
Room no 101	98	238	179	214	182.25
Room no 102	121	214	120	158	153.25
Room no 103	127	250	300	170	211.75
Room no 105	320	116	200	230	216.5
Room no 106	178	337	291	201	251.75
Room no 107	250	340	291	140	255.25
Room no 108	140	280	300	170	230.8
Room no 109	223	358	431	588	400
Room no 110	low 30	27	40	41	36
Room no 112	152	357	425	148	270.5
Room no 113	451	540	1033	450	618.5
AV Room (Auditorium)	301	255	220	359	289.3
Lobby	43	100	262	89	123.5
Washroom (L)	98	238	179	214	182.25
Washroom (G)	121	214	120	158	153.25

5.2 Opportunity for Conservation of energy:

Electronic Ballast:

The conventional ballast may be replaced with electronic ballast. The magnetic ballast generally consumes 15 W of power; while the electronic ballast consumes just about 3 W and delivers 10% more light output. However, these ballasts are usually tuned to save about 15 W of power while providing slightly lower light output (about 5%).

Thus, energy saving of over 30% can be realized by replacing conventional ballast by electronic ballast. The expected annual savings shall be around Rs 500/- per tube light; while the cost of installing a ballast shall be Rs 250/-

But this option is not economical over the option of replacing by LED tube lights.



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5.3 Observations:

The illumination level is not satisfactory at few places in wing A, B, C and E wing. The minimum level required is 200 -300 lumen according to BEE (Bureau of Energy Efficiency, India). For this purpose, additional illumination may be provided by improving the number of LED lights

5.4 LED Lamps:

A 15 W LED lamp can provide similar illumination level to that of 18 W TFL. It is thus possible to save about 3 W of power by replacing 18 W TFL (with conventional ballast). Thus, energy saving of over 16.66 % can be realized by replacing TFL with LED lamp.




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Chapter-VI

Ceiling Fans

6.1 Brief Description:

Total 38 ceiling fans and 10 wall mounted fans are counted in the available locations of the campus. For comparison purpose 45W rating of the ceiling fan is considered for all locations.

6.2 Ceiling Fan Survey:

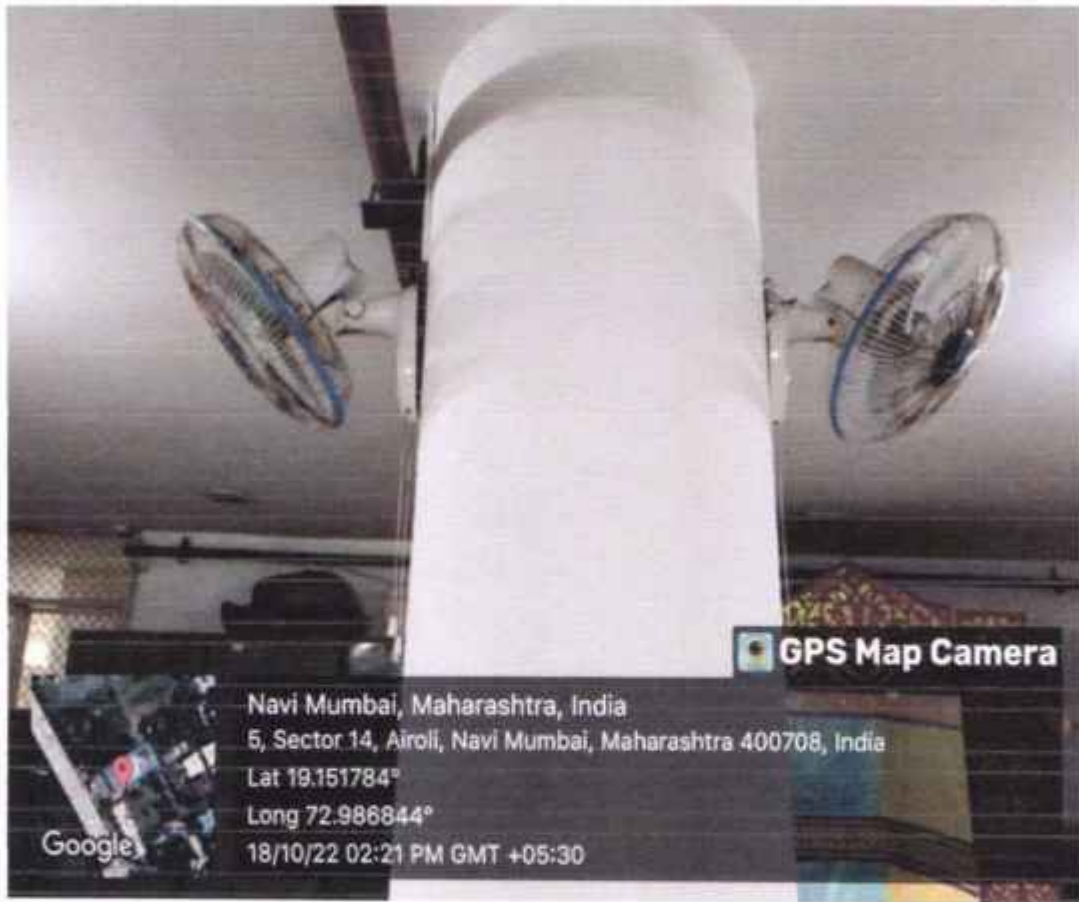
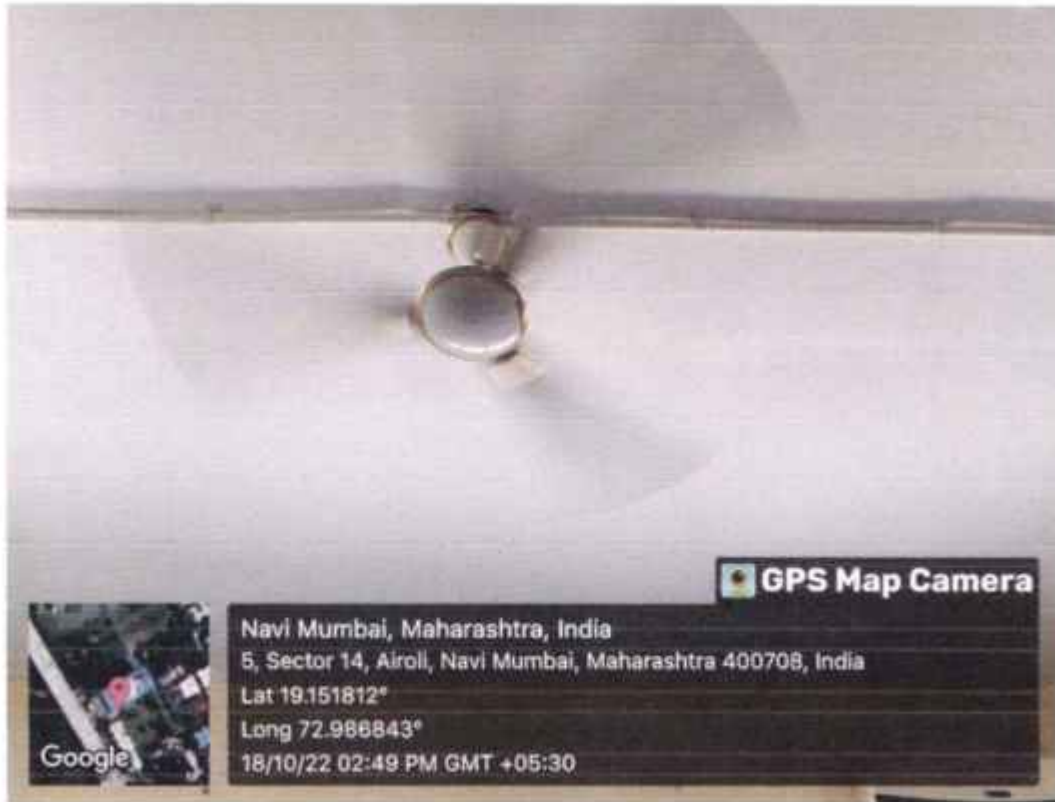
The survey of ceiling fan in the NHCC campus is given in the table below.

Sr No	Location or Room No	Operation		Ceiling Fan Details	Rating	Energy Efficient Fan	Saving		
		hr/d	d/m	48'		28W@speed 5	Rs 11/kWh		
				Fitted		Rating	W	kWh	Rs. /Month
1	Library	6	20	6w	45	28	17	12.24	171.36
2	Room no 101	6	20	4	45	28	17	8.16	114.24
3	Room no 102	6	20	4	45	28	17	8.16	114.24
4	Room no 103	6	20	4	45	28	17	8.16	114.24
5	Room no 105	6	20	4	45	28	17	8.16	114.24
6	Room no 106	6	20	4	45	28	17	8.16	114.24
7	Room no 107	6	20	4	45	28	17	8.16	114.24
8	Room no 108	6	20	4	45	28	17	8.16	114.24
9	Room no 109	6	20	4	45	28	17	8.16	114.24
10	Room no 110	6	20	6w	45	28	17	12.24	171.36
11	Room no 112	6	20	4	45	28	17	8.16	114.24
12	Room no 113	6	20	4	45	28	17	8.16	114.24
13	AV Room (Auditorium)	6	20	6	45	28	17	12.24	171.36
14	Lobby	6	20	0	45	28	17	0	0
15	Washroom (L)	6	20	0	45	28	17	0	0
16	Washroom (G)	6	20	0	45	28	17	0	0



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Crompton Ceiling and wall Fans in Classrooms of NHCC



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Energy Conservation Initiatives at NHCC



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Chapter-VII


Miscellaneous Consumers

7.1 Brief Description:

The other consumers include elevators, street lighting, passage lighting, water pumps, fire pumps, xerox machines, printers and computers.

The consumption of above equipment was not possible due to unavoidable circumstances.




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Chapter-VIII

Renewable Energy

8.1 Brief Description:

The terrace of NHCC has ample area for utilization of solar energy.

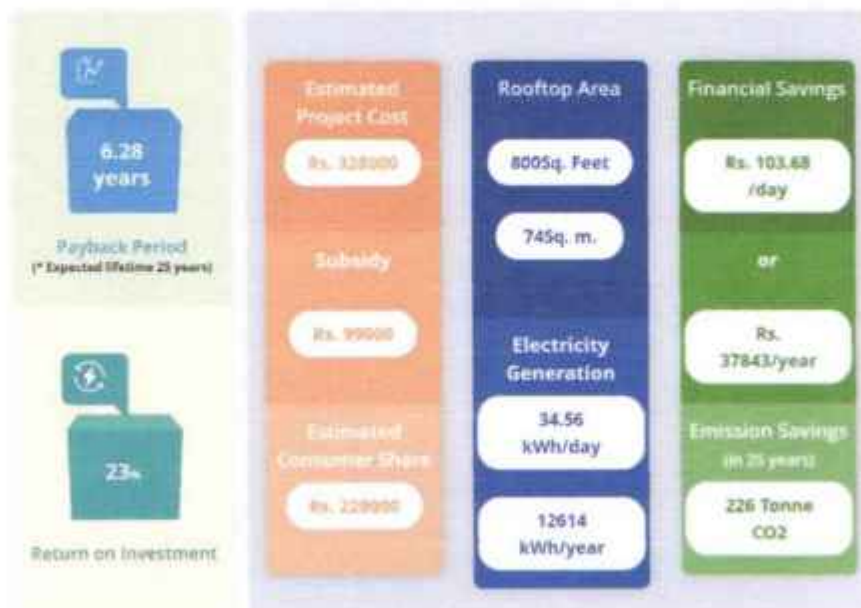
The college campus has good solar irradiation required to produce solar power.

The institute should prefer the installation of solar system.

It is possible to cut down the cost of HLP to great extent.

Also, solar water pumping must be considered which will save significant electricity as presently consumed by conventionally operated centrifugal pumps.

Figure below shows the tentative solar plant calculation for area of 800 Sq feet or 74 Sq Meter.



Source: https://solarrooftop.gov.in/rooftop_calculator



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