



TERNA ENGINEERING COLLEGE, NERUL

7.1.2 Environmental Consciousness and Sustainability

Alternate sources of energy

Alternate sources of energy and energy conservation are two important and interconnected concepts that can help reduce our dependence on non-renewable sources of energy and mitigate the negative impact of climate change. Institute is keen on alternate sources of energy and energy conservation methods.

Following are the measures taken in the direction of alternate energy sources

Solar Energy Generation:

Solar energy generation is the process of harnessing the energy of the sun and converting it into usable electricity. Solar energy is a renewable and sustainable energy source that can be used to power homes, businesses, and even entire communities. Here are the basic steps involved in solar energy generation:

Solar Panels: Solar panels, also known as photovoltaic (PV) panels, are the primary components used to convert sunlight into electricity. These panels are made up of layers of silicon cells that absorb sunlight and release electrons, creating a flow of electricity.

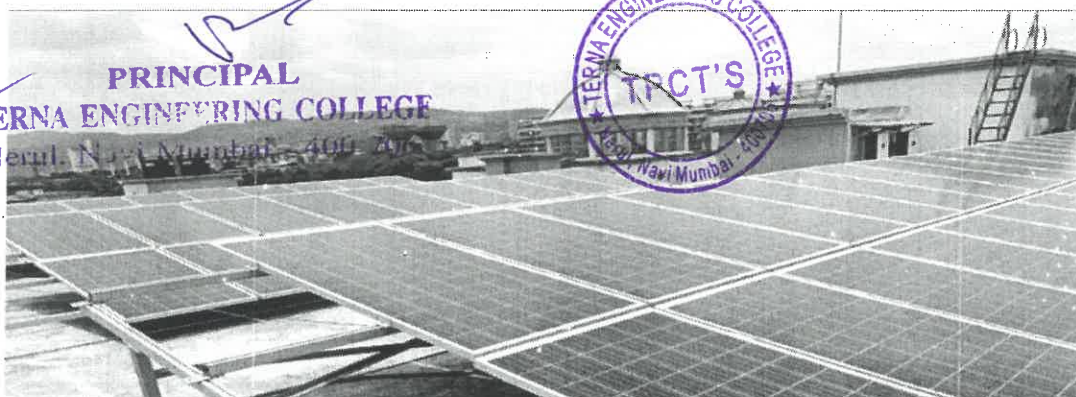
Inverter: The electricity generated by the solar panels is in the form of direct current (DC), which needs to be converted to alternating current (AC) to be used in homes and businesses. An inverter is used for this conversion.

Connection to the Grid: The AC electricity generated by the solar panels can be used to power the building where the panels are installed. Any excess electricity can be sent back to the grid for others to use, and the building can draw electricity from the grid when needed.

Monitoring: A monitoring system can be installed to track the performance of the solar panels, ensuring that they are working efficiently and providing maximum energy output.

Solar energy generation offers many benefits, including reducing greenhouse gas emissions, lowering energy costs, and increasing energy independence. With advancements in technology, solar energy is becoming more accessible and affordable, making it an increasingly popular alternative to traditional energy sources.

Solar Panels on the rooftop: Solar panels are installed to harness the energy of the sun and convert it into electricity. Solar panels of the capacity of **476 KWH are installed** on the rooftop of the Institute. By using renewable energy we don't only reduce our electricity consumption from the grid but it also helps indirectly in reducing the Air and land pollution created by burning coal in thermal power plants and disposing fly ash (major waste generated from thermal power plants).



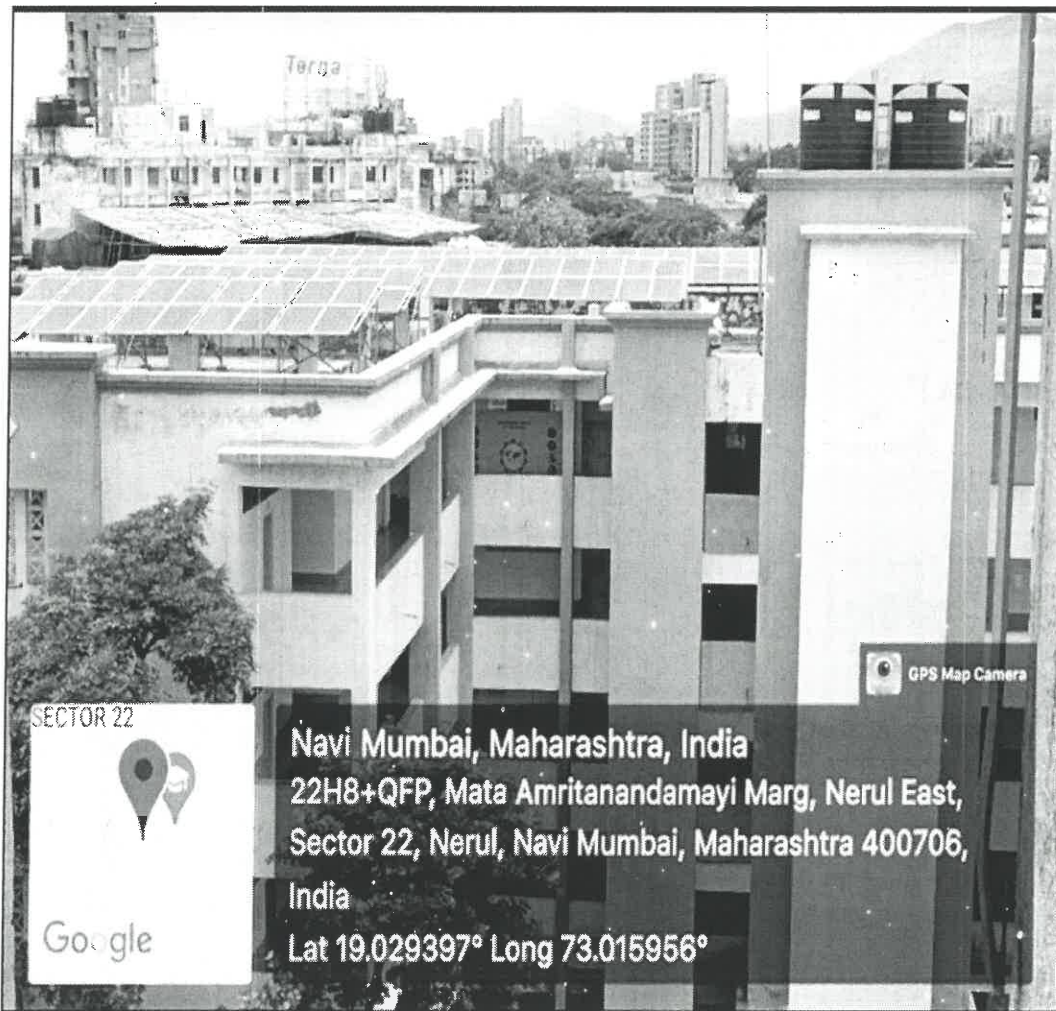

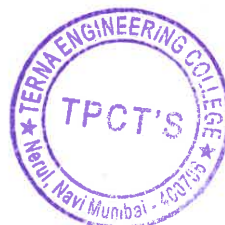


Figure 2 Solar panel on TEC building


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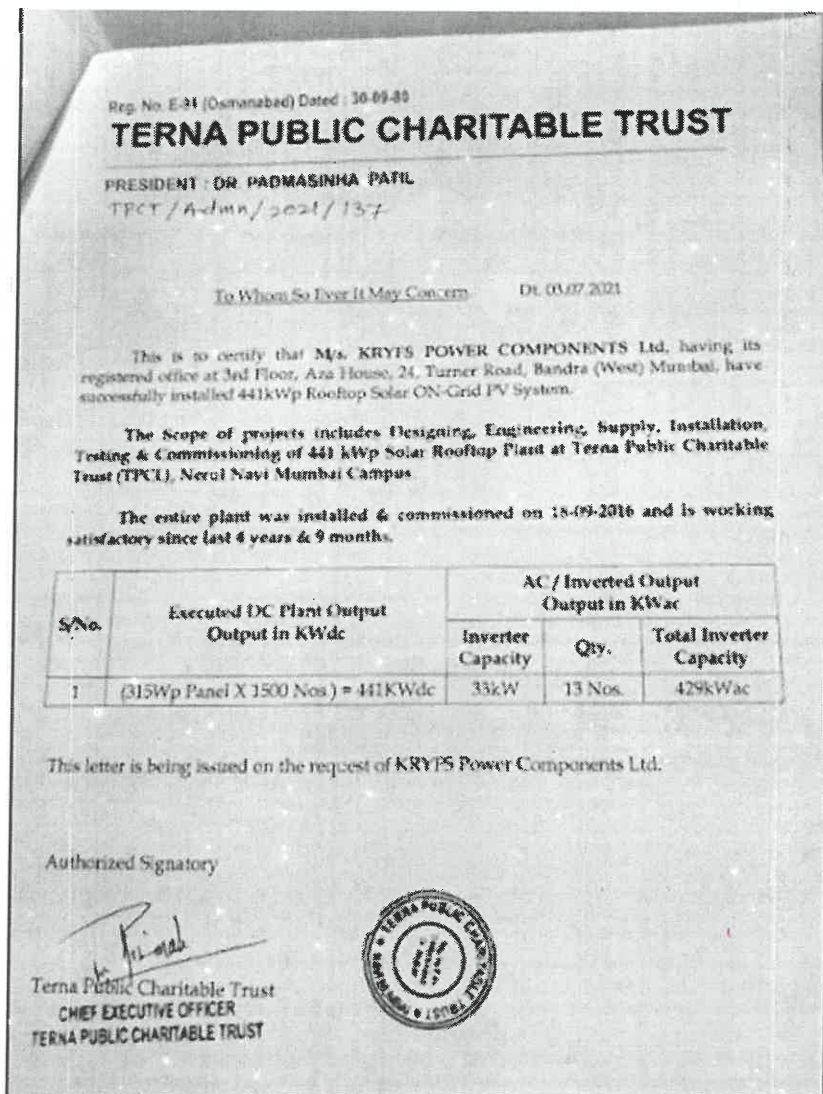


Figure 3 Solar installation

Energy Conservation Measures

Energy conservation methods include using energy-efficient appliances, turning off lights and appliances when not in use, insulating premises to reduce heating and cooling needs, and reducing energy consumption during peak hours. Energy conservation using LED bulbs and power efficient equipment is a simple yet effective way to reduce energy consumption and save money on electricity bills. Here are some ways in which LED bulbs and power-efficient equipment can help in energy conservation:

LED Bulbs: LED (Light Emitting Diode) bulbs are energy-efficient and use up to 80% less energy than traditional incandescent bulbs. This means that they require less electricity to produce the same amount of light, resulting in lower energy bills and reduced carbon emissions. They also last longer, meaning less frequent replacement and less waste.

Power-efficient Equipment: Power-efficient equipment, such as refrigerators, air

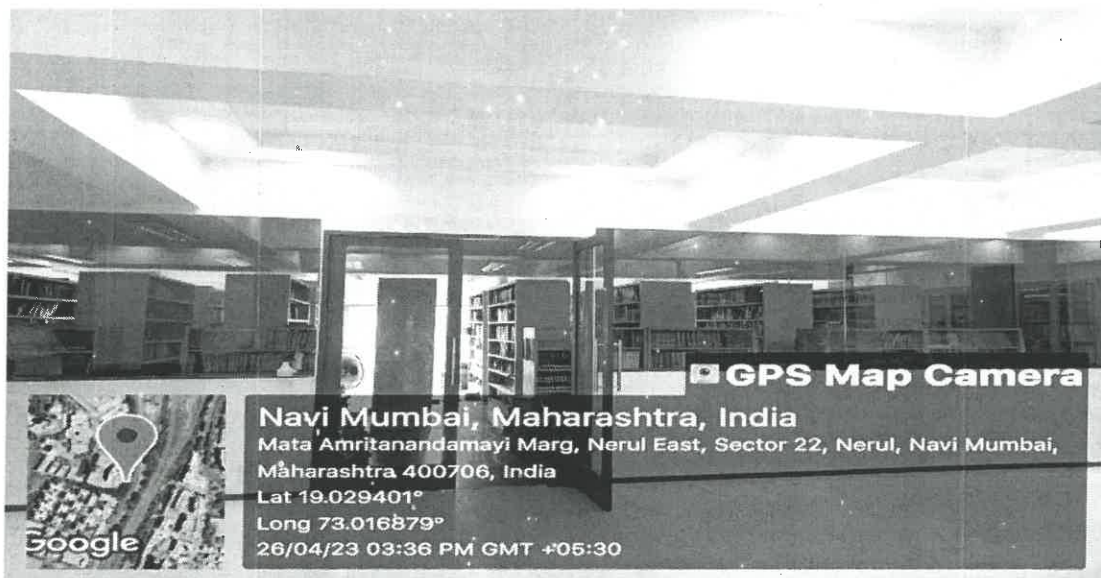
conditioners, and washing machines, are designed to use less energy while still providing the same level of functionality. They achieve this through the use of advanced technology and features such as timers, sensors, and variable speed motors. By replacing old, energy-hungry equipment with power-efficient models, significant energy savings can be achieved.


Energy Audits: An energy audit can be performed to identify areas where energy is being wasted and to suggest ways to improve energy efficiency. This can include replacing inefficient equipment, insulating buildings, and upgrading lighting to LED bulbs.

By using LED bulbs, power-efficient equipment, and implementing energy-saving practices, a significant reduction in energy consumption, carbon footprint, and energy bills is possible. Therefore, the institute has taken the initiative in this and adopted these methods of energy conservation.

LED bulbs (lights) are used in the institute building and premises. Most of the street lights have been with LED lights; the remaining bulbs of street lights & in the rooms of various hostel blocks are also being replaced whenever needed. Lights used to light the playground area are LEDs.

Power-efficient equipment: window air conditioners installed are of BEE 2 & 3 star rating. Split air conditioners installed in buildings are of 3 & 5 star rating.




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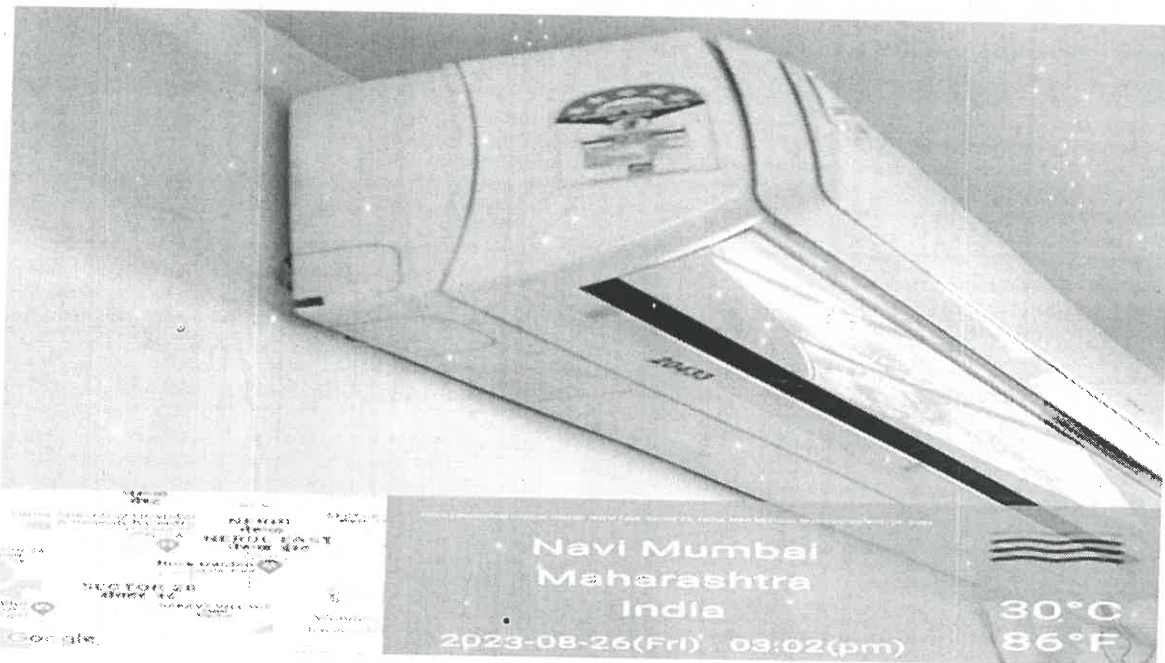
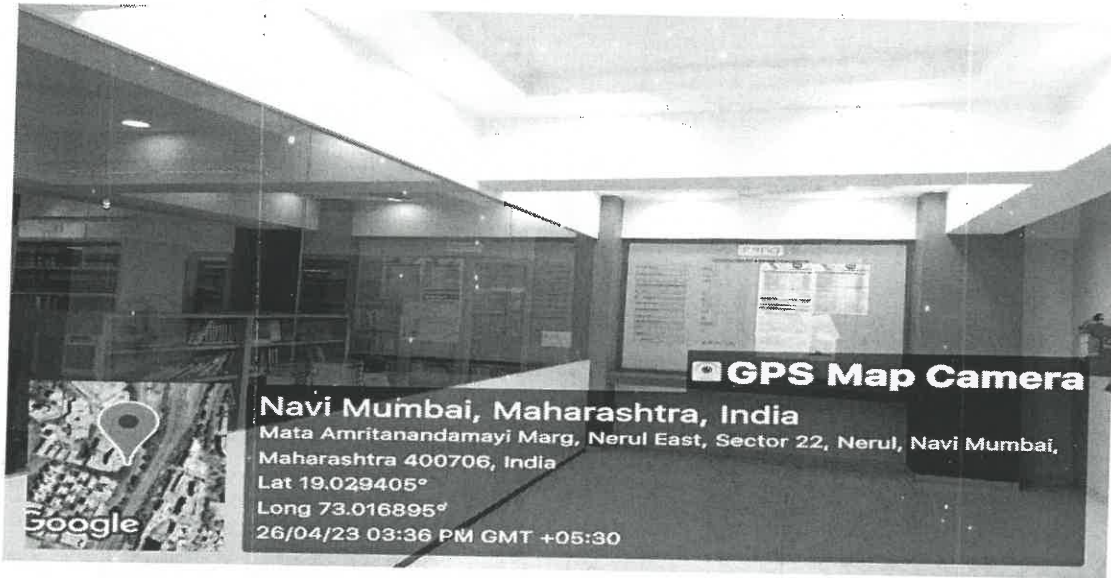


Figure 5 :5 star AC for energy saving

Management of the various types of degradable and non-degradable waste

Waste Management at Campus

TEC is conscious about waste management and takes necessary efforts towards a sustainable environment. In line with the Swachh Bharat Abhiyaan, TEC prioritizes cleanliness on campus and encourages students and staff to follow effective waste management practices which include reduction at source, segregation and implementation of 3R's i.e. **REDUCE**, **REUSE** and **RECYCLE** before disposal. TEC has a well-defined

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mechanism for waste disposal and sensitizes students and staff regularly in different ways as follows:

Solid Waste

Towards Solid Waste Management, TEC has taken the following steps:

TEC appointed Ashok Global solutions Pvt Ltd. for Housekeeping services for keeping campus clean. Solid waste is segregated at source. Organic waste is collected in **green dustbins** and non- biodegradable (Dry) waste in **blue dustbins**. The waste pickup and collection is done by housekeeping staff. The Municipality staff collects dry waste twice a day. TEC initiated a drive to REDUCE plastic usage to the minimum essential, on and off the campus.

Installed a Composting Plant where all the cafeteria organic waste and gardening waste is converted to good quality manure which is used for in-house gardening and also distributed among staff and students to promote positive practices on waste management.

Project related to handle food waste generated in campus was initiated by students.

TEC made provision for segregating dry waste as paper waste, plastic waste and metal waste which is given to vendors for recycling.

Organized a seminar to create awareness on waste management with reference to the landfill site at Turbhe dumping ground.

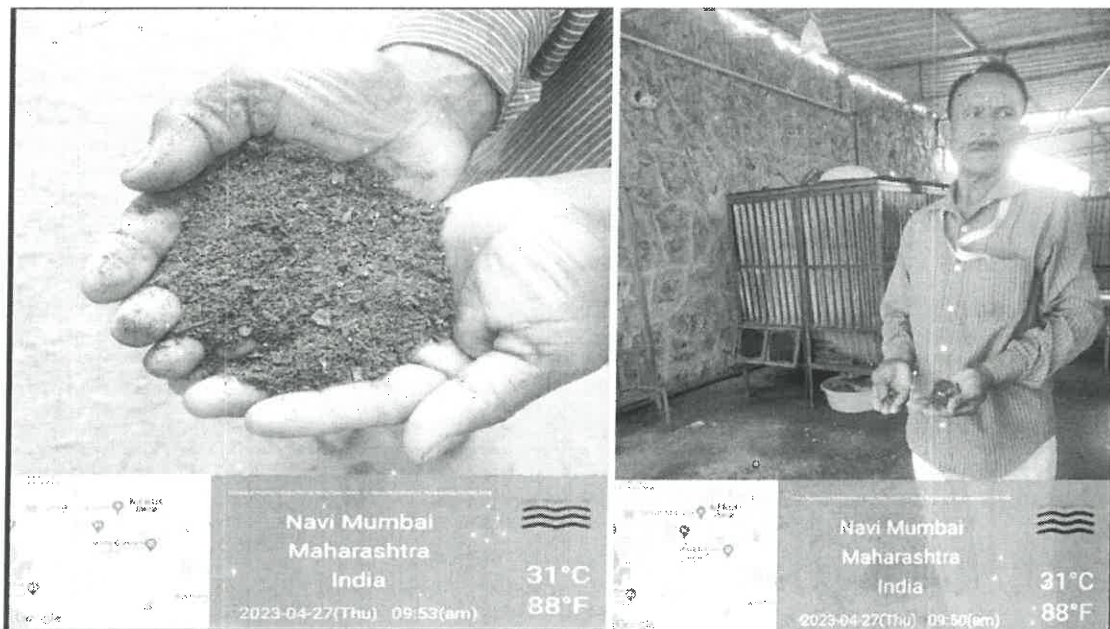


Figure 6 Compost Prepared from compost pit in campus


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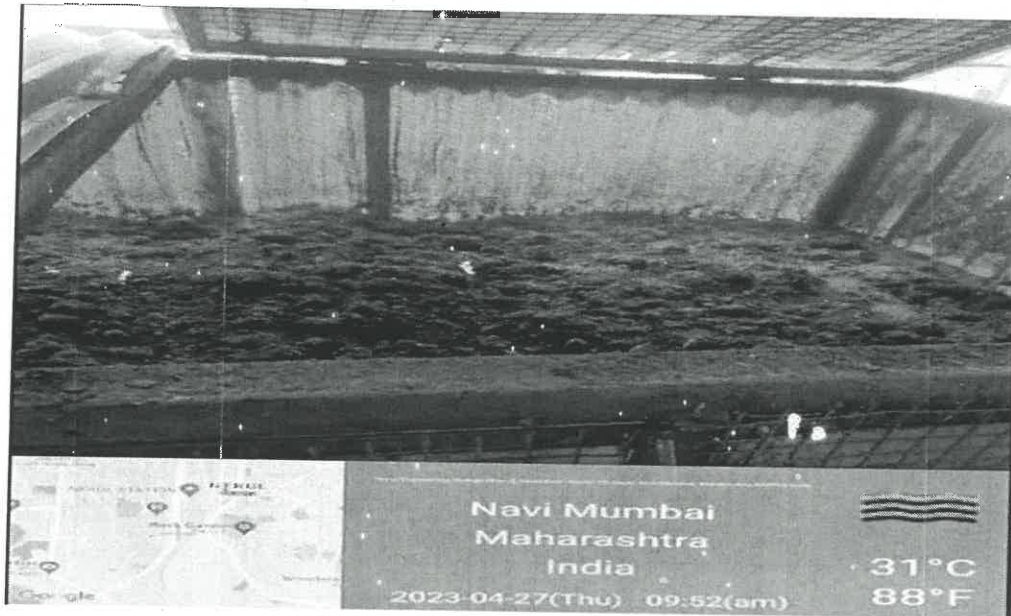


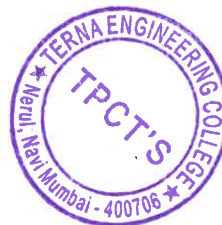
Figure 7 Composting Pit

E -waste management

Institute takes efforts to minimize e-waste. Regular maintenance by technical staff and reutilization of spare parts of discarded electronic devices is a common practice.

To sensitize students and staff on careful disposal and management of electronic waste, Non-functional computers, monitors and printers are discarded on a systematic basis. Agreement is signed with Balaji vender for Scrap disposal. The Awareness programme/campaign was an initiative to sensitize an impart knowledge among the teachers and students and NGO employees about the proper management, disposal and channelization of E-waste, thereby reducing the impact of hazardous substances on the environment and encouraging environmentally sound recycling through collective efforts of all the stakeholders involved in the entire E-waste value chain.


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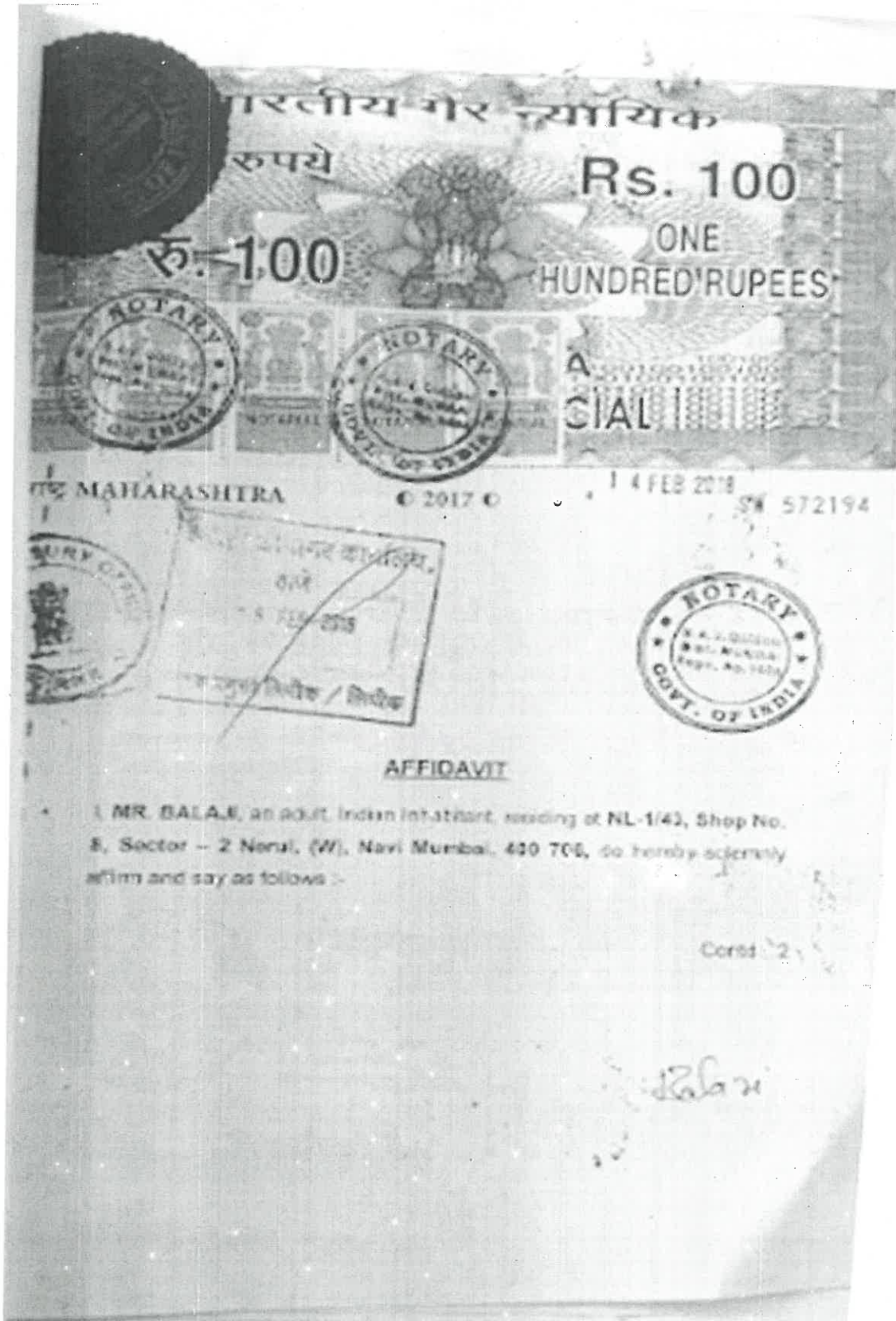



Figure 8 Agreement copy


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BALAJI COMPUTER PVT. LTD.

Shop No. 1, 1/2, 4/1/0, Sector-2, Near Rajiv Gandhi Bridge, Nerul, Navi Mumbai - 400 706

Date : 18.03.2022

To,
Terna Engineering College,
Nerul

**CERTIFICATE
FOR E-WASTE DISPOSAL**

This is to Certify that E-waste received on dated 06.12.2021
for recycling has been safely disposed of at our registered facility
in an environment friendly manner.
Waste kit is attached.

Yours faithfully,

For Balaji Computer Pvt. Ltd.
Proprietor

Proprietor

Figure 9 E waste Agreement copy


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Terna Engineering College, Nerul, Navi Mumbai

Staff Name: Mundhe P.N. / Estate Wagon
 Dept: store / office
 Designation: store keeper / supervisor
 Date: 05/02/2018
 Through Head of Dept

To: Principal
Terna Engg. college
Nerul, Navi Mumbai

Subject: विभागाच्या नागणीनुसार रद्दी पेपर देण्यास सादर
सहील विषय असून G/E Dept. च्या नागणीनुसार तोचिन
सयस्य रद्दी पेपर व इतर गरजनीती एडुग मने करनीकुन
दरपत्रके वेदुन लुलभासक दरपत्रक बनवसे आटे. व निजे विभागे
त्यामहीन सर्वांग नाम रकमेनुसार चाहीत्य खरेदी करणार
Ekolaji Computer Service, एकोन-नेरुल ह्या कंपनीस साहीत्य
देणाय तरकन नाही. मागिरोन काव.

Respected Sir,

me
 10/11
 2/18

Signature of Applicant: [Signature]
 Name: Mundhe P.N. 8070

Encl: खपतगिणुत / Requirements /
Comparative statement.

[Signature]
 05/02/18

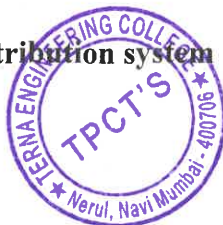
PT

Figure 10 Application for waste paper collection

3. Water conservation facilities available in the Institution:

1. Rain water harvesting
2. Bore well /Open well recharge
3. Maintenance of water bodies and distribution system in the campus

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Rain water harvesting structures and utilization in the campus

TEC has taken sustainable initiative towards conserving water through a wide expanse of well-maintained green landscape which has been deliberately included on the campus to keep the ground porous so that rainwater can be collected through natural means to recharge the water table.

It helps in improving the quality and increasing the level of ground water. It also helps in improving the overall floral system and reduces the loss of the top layer of the soil. Rainwater harvesting practices at TEC include water table recharging.

TEC focuses on water conservation, use of push taps to reduce water wastage, use of pond water for gardening. TEC students carried out project to purify pond water by using waste water techniques. These efforts have resulted in lesser usage of the NMC water supply. Students and staff are sensitized on contributing towards the importance of water conservation and reducing water wastage through events to mark World Water Day and displaying presentations and posters on digital notice boards

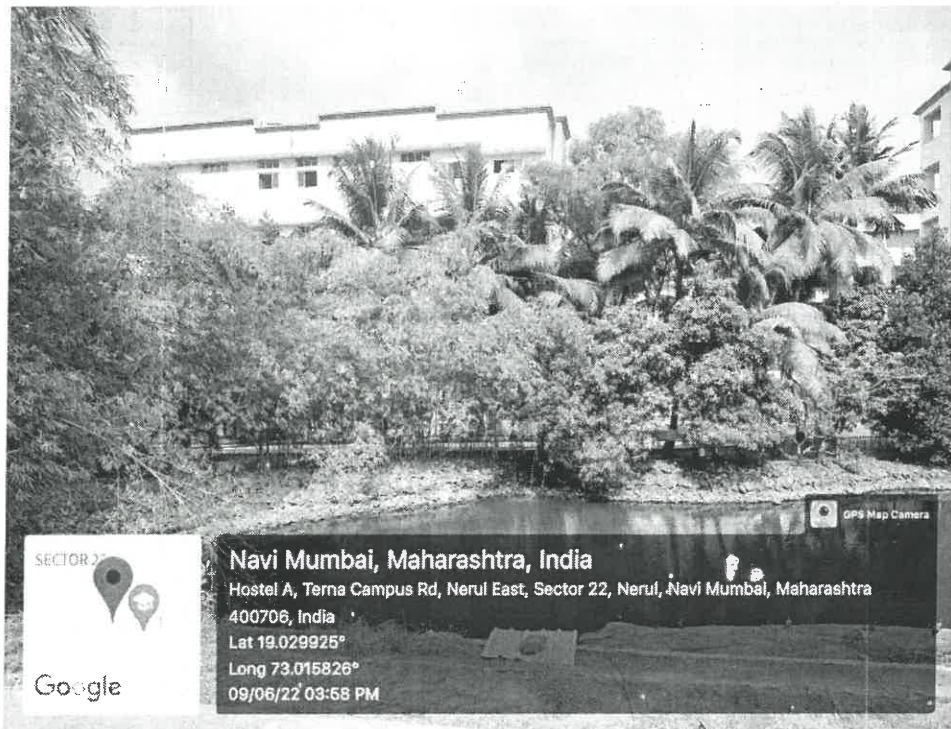



Figure 11 Terna lake in TEC campus


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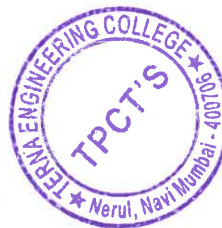




Figure 12 Rain water harvesting

TCPTS
Terna Engineering College, Nerul
Department of Civil Engineering

PURIFICATION OF TEC POND WATER

Name of Group Members: Keshar Lawane, Kajal Gaikar, Sakshi, Jadhav, Shivanu Pomendkar
Under the Guidance of: Prof. Ritesh Tandekar
Class & Semester: SE & IV

Introduction

- The pond water (TEC) is basically ground water.
- It contain large amount of physical impurity
- It's used only in gardening, washing and construction work in college

Problem Statement

- Reducing the need for freshwater.
- Reusing the TEC pond Water.

Aim & Objective

AIM:

- To Purify the Pond water
- To construct an economical filter.

OBJECTIVE:

- To purify pond water by using waste water techniques.
- To reuse pond water.

Methodology

- Literature Review
- Collecting pond water
- Preparing model formation.
- Calculating physical, biological, chemical impurities before Filtration.
- Filtration
- Calculating physical, biological, chemical impurities after filtration.
- Comparing results
- Report writing.
- Paper Publication

Result

TEST NAME	BEFORE FILTRATION	AFTER FILTRATION
TURBIDITY	9.2	1.8
pH	7.51	7.2
TSS	244 mg/l	108 mg/l
TDS	308 mg/l	258mg/l
TS	552mg/l	364mg/l
COD	20mg/l	17 mg/l
BOD	2.0 mg/l	~ 1 mg/l

Conclusion

- So we conclude that before filtration and after filtration the difference between results is much better.
- We can use that water for drinking, washing cars, for plantation and other works.
- This method is economically and environmentally friendly.

Figure 13 Water purification project

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Bore well recharge is done with rain water .It is installed in campus near to boys hostel and rain water is collected from terrace used to regenerate water in the bore well by absorbing it.



Figure 14 Bore-well Recharge

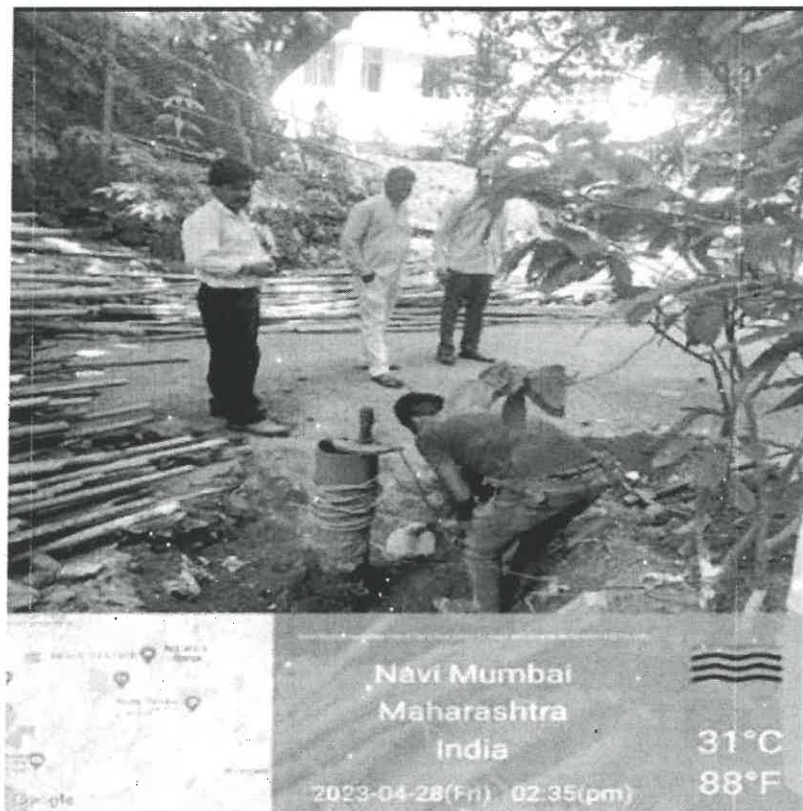
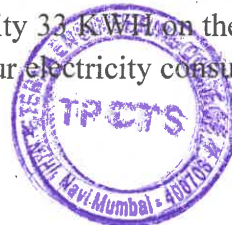


Figure 15 Bore well recharge construction

Energy conservation

We have taken a renewable energy initiative to reduce our electricity consumption and Save Energy by installing 13 Solar panels of capacity 33 kWH on the rooftop of the TEC. By using renewable energy we don't only reduce our electricity consumption from grid but



it also helps indirectly in reducing the Air and land pollution created by burning coal in thermal power plants and disposing fly ash (major waste generated from thermal power plants). LED bulbs (Lights) have been provided in all the buildings. Most of the street lights have been with LED lights, remaining bulbs of Street lights & in the rooms of various hostel blocks are also being replaced whenever needed. Playground lights also have LEDs.

Green practices on campus

TEC prioritizes green practices for a sustainable environment and inculcates an empathetic culture towards the environment among its students and staff. The buildings on the campus are thermally, visually and acoustically comfortable. They are energy, material and water efficient. TEC has implemented green practices by digitization of academic and administrative processes, and effective waste management. Students are sensitized about green practices during their orientation programmes, Environmental Studies class, poster competitions, practical assignments and celebrations like World Water Day, Environmental Day, Swaccha Bharat Abhiyan etc. Green practices are a way of life at TEC.

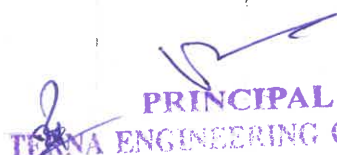
1) Students, staff using

a) Public Transport, carpooling and bicycles

TEC is well connected by various modes of public transport like suburban railway, city bus services, cab services etc.

Maximum students and staff use public transport services. Nerul railway station is within the range of 1 km from the college, convenient for students and staff. The Bus stop is also next to TEC gate. Many students avail railway concession facility. Some of the staff members use car-pooling and save fuel, and contribute towards reducing carbon emissions and conserving energy.

Some of the staff members and students use bicycles


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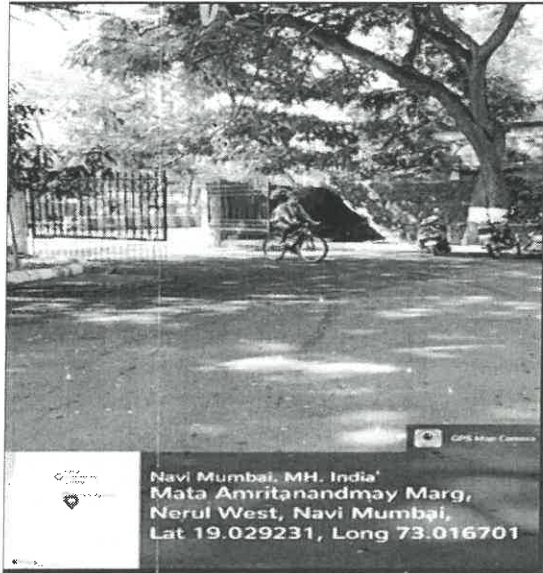


Figure 16 Car pulling by some staff members

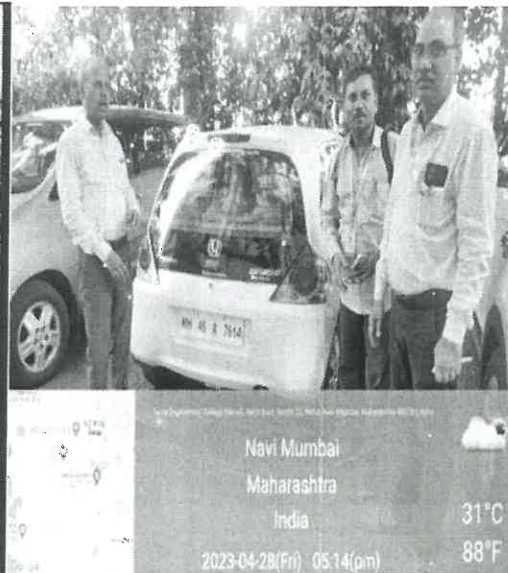


Figure 17 use of bicycle by some staff members

2) Plastic free campus campaign:

A 'No Plastic' Awareness Campaign was conducted by NSS team at TEC to share the hazards of indiscriminate use of plastic. Being conscious towards the environment, TEC prohibits the use of Styrofoam on the campus and minimizes the use of plastic.



Figure 18 no plastic zone

3) Green landscaping with trees and plants:

Green landscaping at TEC includes eco-landscaping which is designed and maintained in such a manner that it saves time, money, and energy. It contributes to reducing air, soil, and water pollution; and making healthy recreation spaces.

The TEC campus has a well-designed landscape which includes approximately 300 trees, shrubs and plants. It is maintained by water collected in pond during rainy days.

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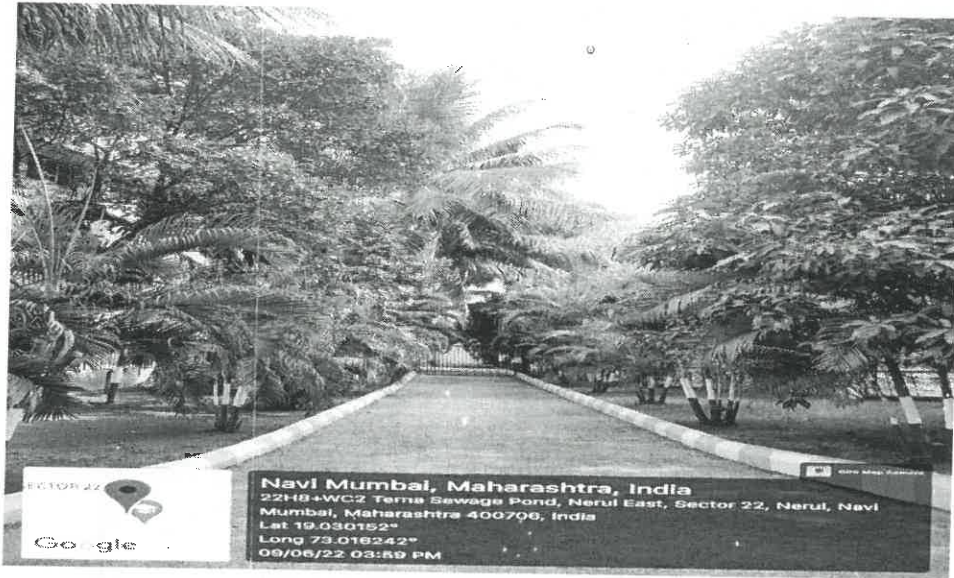


Figure 19 TEC Green campus

4) Disabled-friendly, barrier-free environment

The fundamental principles that have been followed at TEC are various facilities to meet disabled people's standards for safety, convenience, and usability. This construction and maintenance standard are followed in all categories of buildings and facilities used by the students for making accessible to and functional for physically disabled persons, as pictured below

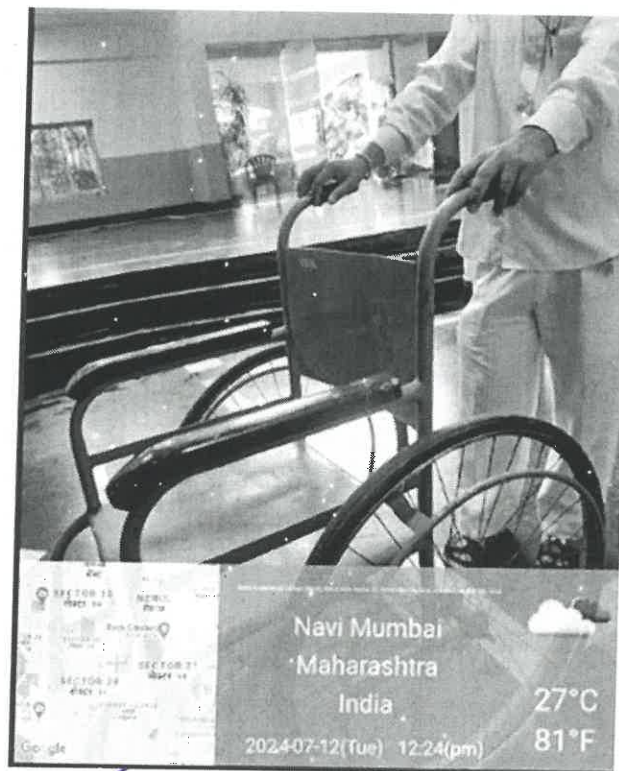
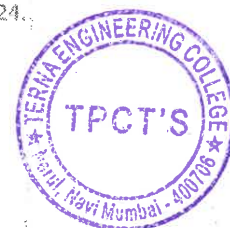


Figure 20 Wheelchair available on the ground floor near room no. 024.

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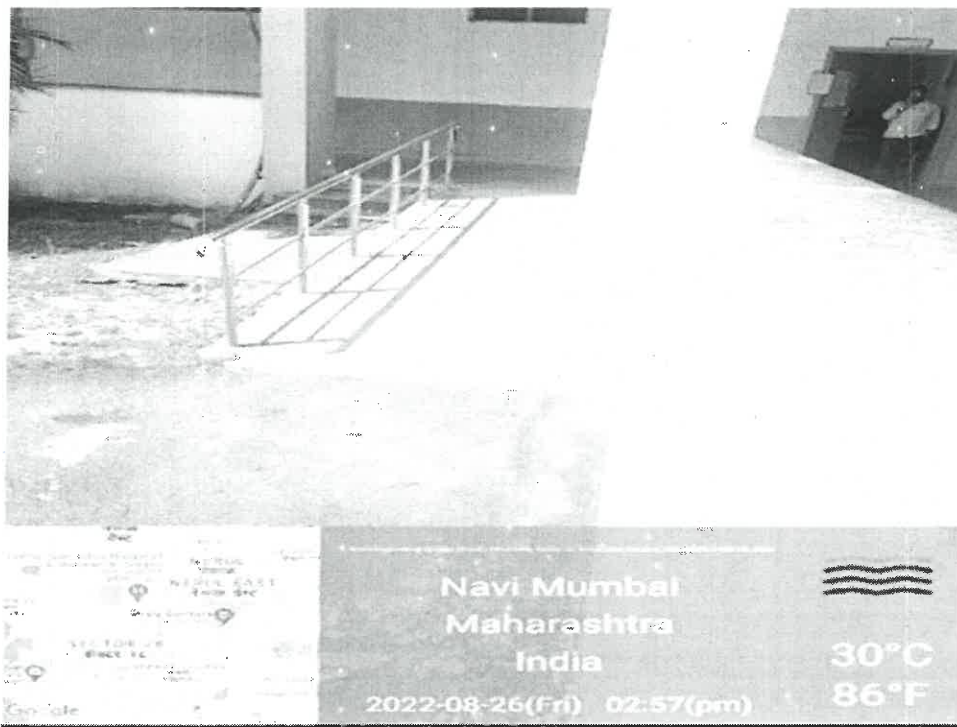


Figure 21 Ramp facility for physically disabled persons

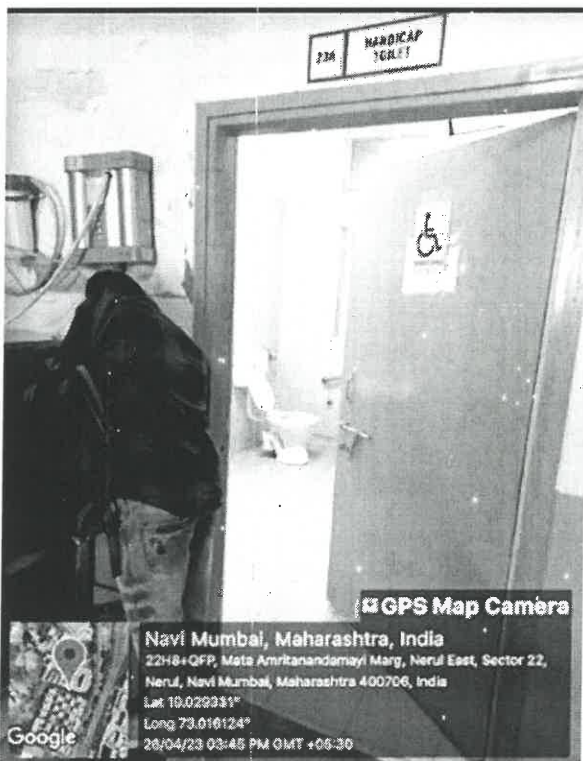
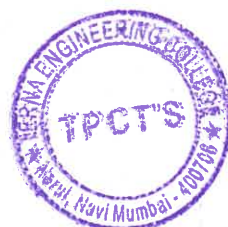


Figure 22 Washroom facility for physically disabled persons


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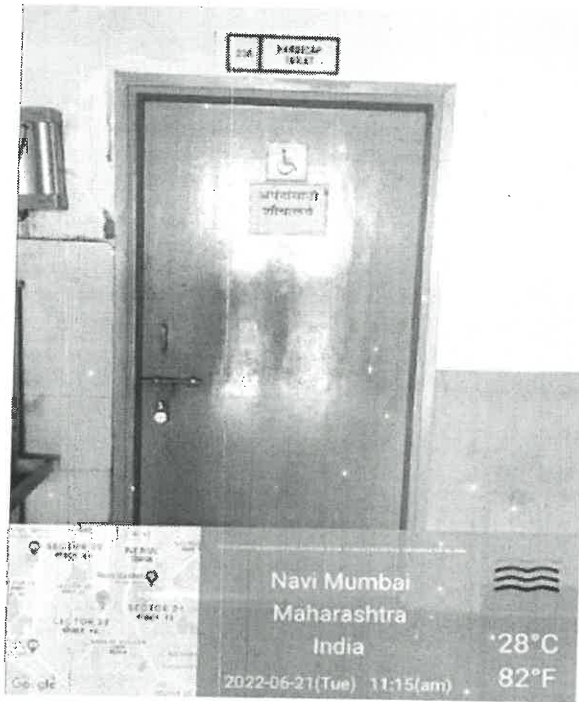


Figure 23 Washroom facility for physically disabled persons

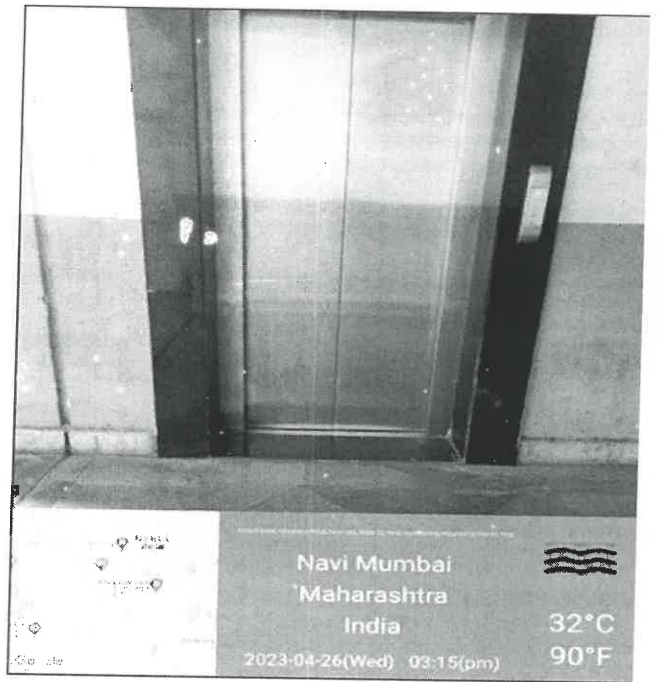


Figure 24 Lift facility near office


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