ENVIRONMENT AND GREEN AUDIT REPORT

2019 - 20

Submitted to

Patuck - Gala College of Commerce & Management

Santacruz, Mumbai

Prepared by

Roshni Udyavar & Associates

Wadala East, Mumbai

RU&A
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ARCHITECTURE . INTERIORS . ENERGY . ENVIRONMENT

Environment Audit Team

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Preface

An Environment and Green Audit is the first step to reducing a **building's water, waste, energy and carbon footprint and environmental impact**. The analysis of consumption of water and energy as well as generation of waste, is used to provide recommendations on solutions such as rainwater harvesting, water and waste management, energy management including addition of renewable energy. *The objective of the Environment Audit is to transform to be self-reliant and self-sustainable in water and energy and create a zero-waste campus.*

In the long run, such a building will have greatly reduced its operating costs, carbon footprint and impact on the city's infrastructure. Upcoming and future regulations for buildings will require to follow green norms and energy efficient measures including the Energy Conservation Building Code (ECBC). Hence, Environment Audits will help buildings to achieve the norms.

The methodology of the Environment Audit involves evaluation of the **water and waste** consumption in the building or premises through online surveys, walk-through, and detailed audit (where required). The results are analysed against existing Indian and international benchmarks and standards.

An **Environment Management Plan** is prepared as an outcome of the Audit based on detailed analysis of data collected. This has a potential to reduce consumption of resources through use of appropriate technologies, design, and planning without affecting the process or quality of an Institute's functioning. The investment and pay back calculations are provided such that the plan can be implemented in whole or phases as desired.

The benefits of conducting environment audit is a better understanding of the building systems, along with recommendations for improvement with a goal of self-reliance in resources and reduce load on public infrastructure.

Through the audit report, our endeavour is to provide cost-effective and long-term solutions in a continuous process of conservation of resources. The data collected over a period of a month has been presented through appropriate visual representations for

easy understanding of the technical information. Glossary, abbreviations, units of measurements and references are provided for those who are further interested. Any suggestions or edits in the report are welcome and can be sent to **roshniudyavar@gmail.com**

This Environment and Green Audit Report is meant for academic and research purpose only. For legal issues separate study is required, and hence the results of this report cannot be used as evidence for any legal case within India or abroad.

Acknowledgement

We extend our sincere thanks to the Management of Patuck-Gala College of Commerce & Management for taking up the initiative to conduct Quality Audits: Green Audit, Energy Audit, and Environment Audit.

We are grateful to the Chairman of Patuck Polytechnic Trust, Mr. Adil Patuck for his support and enthusiasm in taking up this venture. We acknowledge the initiative of Internal Quality Assurance Cell (IQAC) of the College, especially Incharge Principal - Dr. Meeta Pathade, IQAC Co-ordinator - Mrs. Renita Vazirani, Joint IQAC Co-ordinator - Mr. Prashant Kokane in assessing the conduct and feasibility of these Quality Audits.

We thank the Convenor of the Quality Audits, Dr. D. S. Mhaske and his team – Ms. Krupa Shah and Ms. Dhanashree Bhute for their co-ordination and co-operation. We express our gratitude to Mr. Ajit Chawan, Mr. Sagar Awalkar and Mr. Abhijit Narvankar for providing us with detailed information for the Audits and their presence during the days of the visit.

We would also like to thank the support staff for their help as and when required during the audit visits.

We convey our thanks to student volunteers – Mr. Mohd. Junaid Siddique, Ms. Rachana Renkunthala, Mr. Sandeep Jaiswar, Mr. Sanshrey Tambe and Mr. Ali Haider Khan.

Environment Audit Team

Roshni Udyavar & Associates

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Executive Summary

The premise of Patuck-Gala College of Commerce & Management premises has an annual energy consumption of **92,463 kWh** (January 2019 – December 2019), the main areas of electricity consumption being **Equipment's** at **32%** (43,232.87kWh), **AC** at **28%**, (37,060.80kWh), **Fans** at **27%** (35,593.60 kWh), and **Lights** at **13%** (16,884.92 kWh). About 10% of the College space is air-conditioned. **The Energy Performance Index (EPI)** of the building is **25.10 kWh/sq. m/ year** which is well below the Bureau of Energy Efficiency (BEE), Govt. of India's national benchmark of **150 kWh/ sq. m/ year** for institutional buildings in warm-humid climate. There is scope in reducing the energy consumption and reducing carbon footprint by using energy efficient devices.

The **monthly water consumption** of the College is 761 kilo litres. This comes to an abysmally low consumption of 32 kilo litres daily. **Rainwater harvesting** has been undertaken by the College by collecting water from the rooftop catchment and ground **water charging using a shallow ring well**. It is recommended to create **recharge pits** to accelerate and increase ground water recharge especially since the site is close to a Mithi river tributary and hence has high ground water table.

The **annual organic waste** generated by the College is **1400 kg.** It can be composted on site. The College already has developed a compost pit. It is recommended to contract the work to NGOs such as Stree Mukti Sanghatana who have trained personnel to undertake the organic composting work. **E-waste recycling facility has been provided** to collect electronic waste in collaboration with vendor E-incarnation and facility for **medical waste incineration is provided** in two girls' toilets.

The environment quality is good as there is less noise and air pollution due to presence of central big front open space and numerous trees surrounding the entire campus. It is recommended that the list of **170 trees** in the campus be **properly named with scientific and common names**.

1. Introduction

Patuck – Gala College of Commerce & Management is affiliated to University of Mumbai. At the time of its inception in 2002, the College offered Bachelor of Commerce (B. Com). In the academic year 2003-04, the College spread its wings and commenced Bachelor of Management Studies (BMS) and to meet the increasing demand in the market, the College started B.Com. (Banking & Insurance) in the academic year 2009-10. The College is NAAC accredited in 2010 and reaccredited with B++ (CGPA 2.77) in August, 2016. The College is relentlessly striving to raise the standards and create a benchmark in the field of education. In July 2017, the College was awarded the **Best Emerging Educational Institution**, by **The Indus Foundation.**

1.1 Objectives of the Environment and Green Audit

The objectives of the Environment and Green audit are as follows:

- Quantify energy, water, and waste consumption.
- Identify energy saving opportunities resulting in lowered energy bills, less use of fossil fuel-based energy and lower carbon footprint.
- Identify wastages in use – and devising solutions such as smart / automated equipment to reduce consumption.
- Introduction of renewable energy to reduce operational energy cost (if required)
- Introducing measures to reduce water consumption and optimise rainwater harvesting potentials.
- Suggesting measures to waste management.

1.2 Scope of Work

Water:

- Data collection on water usage, storage capacity, daily consumption patterns, infrastructure, and equipment.
- Data analysis to provide scope of improvement in water usage.
- Solutions for rainwater harvesting – storage or ground water recharge
- Possibility of wastewater (black or grey water recycling)

Solid Waste:

- Survey of waste in the premises – categorization and quantification
- Analysis and research on possible methods of waste disposal and treatment (of organic waste)
- Solutions for recycling – E-waste and recyclables

Environmental Quality:

- Assessment of IEQ - Visual, Thermal and Acoustic comfort, IAQ (Ventilation)
- Survey of noise and vegetation in the premises – levels and extent
- Analysis and possible solutions to reduce the noise levels and enhance the greenery and biodiversity within the campus

1.3 Understanding of the Audited Area

The total built up area is **58,666 sq. ft. (5,450.21 sq. m)** , and the audited area considered in this was **39655 sq. ft. (3684.06 sq. m)** was evaluated on the basis of existing drawings, information as well as on-site measurements as this forms the basis of assessment of the energy, water, and waste consumption with respect to existing benchmarks.

The campus basically includes 3 buildings namely the school building – having Ground and first floor, College building having Ground to fifth floors and Workshop building consisting of Ground to fifth floors.

Categorization of the spaces as administrative spaces (offices, staff rooms, etc.), common spaces (Toilets, storage, common classrooms, library, etc.), circulation spaces (staircase, corridors) and conditioned vs. non-conditioned spaces (classrooms and computer labs) was then carried out.

The analysis shows that 26% of the total built up area of the college are for common passage. The school building has classrooms, admin offices, toilet, and common passages.

The college building has classrooms for Junior and Senior Degree college, computer labs, admin offices, staff rooms, conference rooms, auditorium, library, common passages, staircase, lift etc.

The workshop building also has classrooms, computer labs, IT server rooms, staff rooms, admin section, common passages, toilet, etc. Below is a description of facilities and activities on each floor:

S. No.	Floor	Name of the Facility
	School building	
1	Ground Floor	Electrical lab, Drawing Hall, classrooms, BM lab, toilet
2	First Floor	Library, classrooms, science labs, accounts office, principal's cabin
	College Building	
3	Ground Floor	Auditorium
4	First Floor	Account office, trust room, Science and staff room, classroom, electronics lab, vice principal office, biology lab
5	Second Floor	Staff room, classroom, Maths lab, boy's toilet
6	Third Floor	Computer lab, Classrooms, Staff room, toilet, computer lab
7	Fourth Floor	Office, degree office, Principal's cabin, Classrooms, staff room, toilet
8	Fifth Floor	Reading room, Library, conference room, Classrooms, Chairman room, Exam room, toilet
	Workshop Building	
9	Ground Floor	Workshop area
10	First Floor	Classrooms, staff room, toilet
11	Second Floor	Computer lab, classrooms, toilet
12	Third Floor	Classroom, Chemistry lab, toilet
13	Fourth Floor	Classroom, physical lab, toilet
14	Fifth Floor	AV room, server room, classrooms, toilet

Table 1: Floor wise facility distribution in the College

Some sample photographs taken during the audit showing different spaces and equipment are provided:

Plate 1: Fourth floor classroom

Plate 2: Library

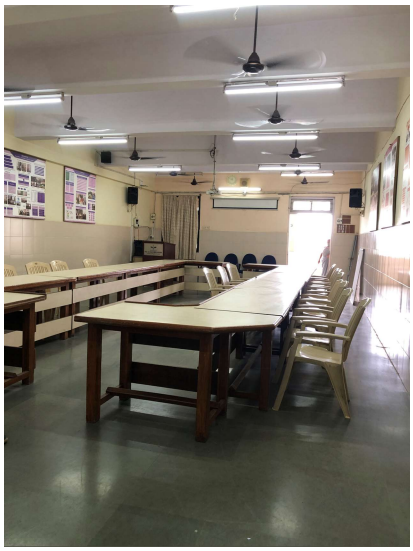


Plate 1: Conference room

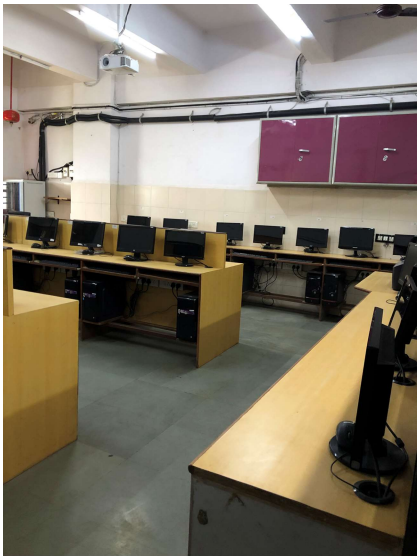


Plate 2: Third floor computer lab

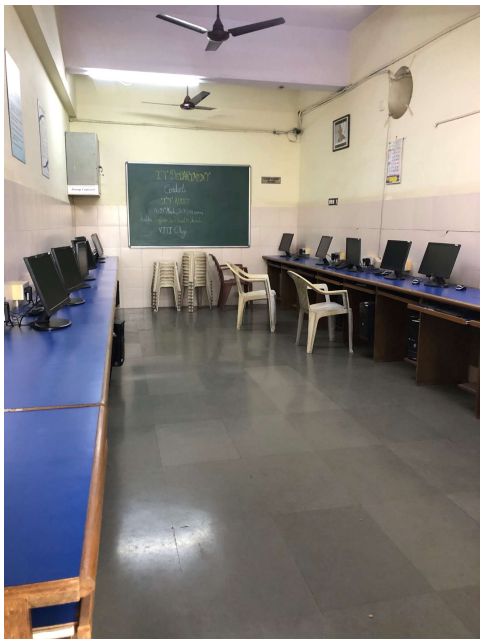


Plate 5: Small Computer lab

Plate 6: Staircase connecting workshop and college building

Plate 7: Computer lab, workshop building

Plate 8: Fifth floor Corridor

2. Audit Methodology

Five steps involved in the audit process are as follows:

Step	Objective	Activities
Step 1	Audit of historical data	• Online data collection • Building drawings, utility bills
Step 2	Screening survey or walk-through audit	• Random check of inventory of all electrical and electro-mechanical devices including lights, fans, motors, pumps, ACs, water equipment, • Inspection of site for water, waste, and environment information
Step 3	On-site investigations	• Verification of online data submitted through ground survey and observations • Inspection of water, waste and environmental issues including flooding, stormwater system.
Step 4	Data Analysis	• Analysis of all criteria and comparison with standards and benchmarks • Recommendations
Step 5	Documentation and Report	• Preparation of detailed report with documentation, calculation and all technical information, summary, and recommendations

Table 2: Steps in the Environment and Green Audit

A diagrammatic representation of the methodology is provided in the flow chart below:

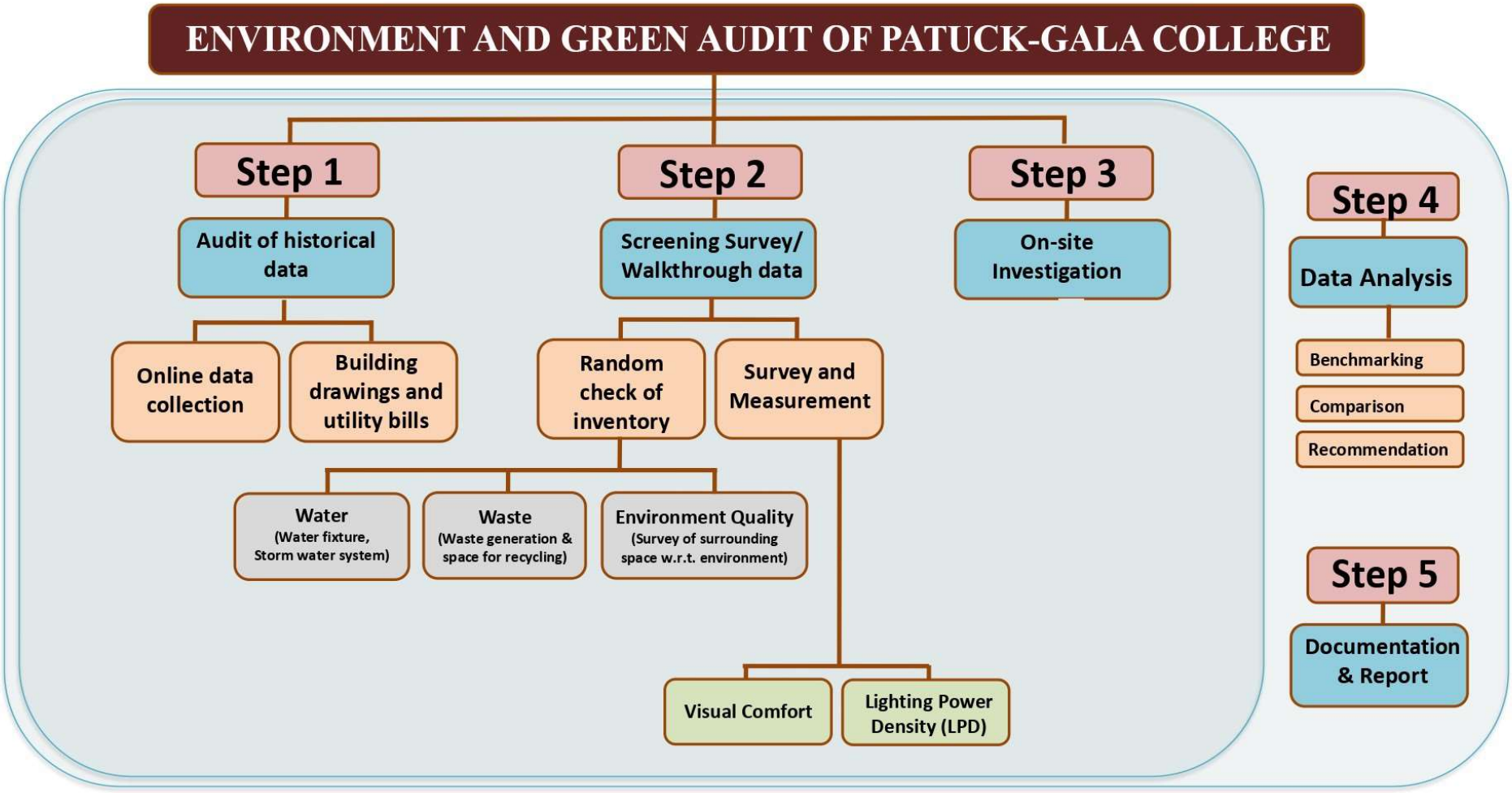


Figure 1: Methodology of the Environment Audit at Patuck-Gala College

2.1 Data Collection

General Data collection such as year of establishment of college, number of students and staff, inclusion and exclusion of spaces and equipment for the audit were obtained through one-to-one interviews and discussions with key informants who also assisted in the collection of building drawings and electricity bills for the past 3 years (2018 to 2020).

Walk-through Audit

Two walk-through Audits were conducted by the Team which were followed up by a few more visits to review the accuracy of data. Special guided visits of the campus were conducted along with Prof. Prashant Kokane, Dr. Dadarao Mhaske and his team of teachers, non-teaching staff.

Observation Check-list was used during the walk-through audits to gather information on water usage and infrastructure, rainwater harvesting, wastewater, solid and e-waste management, and greenery and biodiversity in the campus.

Schedule of Data Collection

S. No.	Audit Activity	Person	Date
1.	Online data form link provided to College	Dr. Roshni U. Yehuda	17.03.2021
2.	Online data submission	Prof. Kokane	23.04.2021
3.	Walk through and detailed audit	Ar. Twishi Shah	19.06.2021
4.	Detailed audit of air conditioning, meters, and power systems	Mr. Mahesh Harad Mr. Aseem	19.06.2021
5.	Detailed audit of Solar PV panels	Dr. Roshni U. Yehuda Mr. Rumi Engineer	30.06.2021

Table 3: Schedule of data collection based on actual visits

2.2 Data Analysis

The collected data was analysed and visually represented using pie-charts, bar graphs, tabulations in each of the audit areas. They were assessed against existing benchmarks and standards.

3. Analysis and Benchmarking

3.1 Water

The College has an OHT of capacity **39,000 litres** and an UGT of capacity **33,000 litres**. As such water consumption is low. There are 16 urinals with 25 taps, 25 toilet units with 23 taps, 12 wash basins with 18 taps, 7 flush tanks, 3 water coolers and 6 additional taps. and a total of 3 drinking water coolers. The rest of the toilet units have only ablution taps. The details are provided in Table 23. Considering 4365 persons @25 liters per person per day, the maximum total daily requirement of the College is 109 kiloliters. Monthly requirement should be 2520 kiloliters considering 23 days of operation per month.

However, as per water bills submitted by the College, monthly water consumption is approximately 761 kilo liters and annual water consumption is 9137 kilo liters. This amounts to approx. 32 kiloliters daily – a very low level of water consumption. The College pays ₹ 5 per kilo liter of water in addition to the 70% of sewerage charges.

The College campus water bill shows that the average monthly consumption is around 761 KLD and the average monthly water charges are **₹ 6857/-**

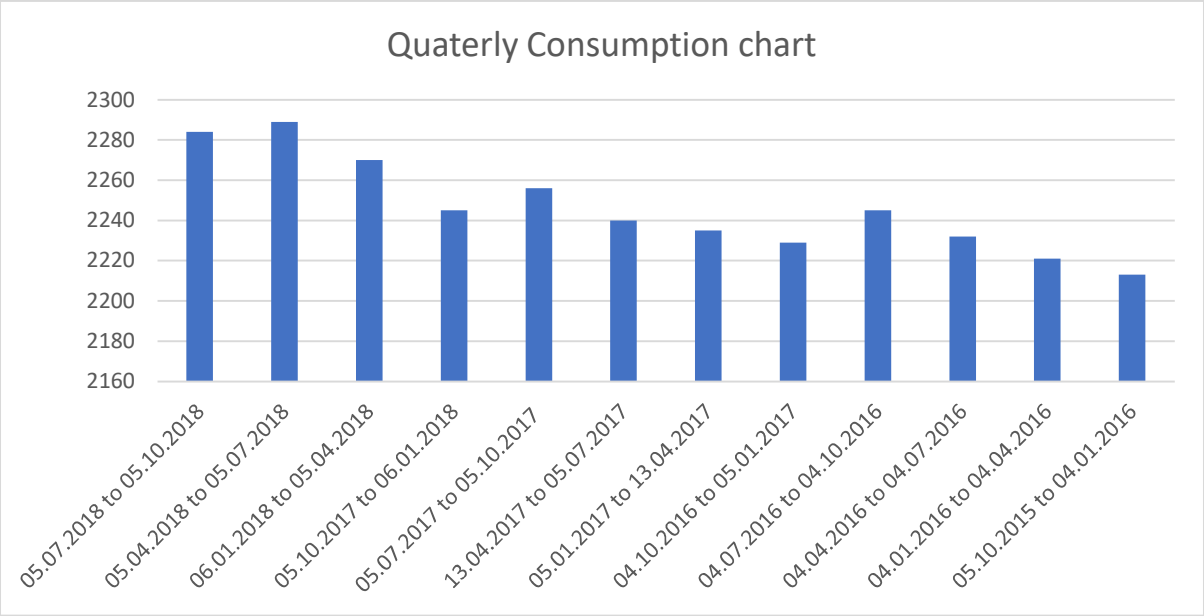


Figure 2: Chart showing Quarterly water consumption as per the water bill

Floor	B/G	Urinal	Tap	Washroom	Tap	Wash Basin	Tap	Flush Tank	Water Cooler	Tap
3rd Floor	Boys	5	5	4	3	1 + 1(Outside)	4	1	1	2
	Girls	-	-	3	3	-	-	-	-	-
TOTAL		**5**	**5**	**7**	**6**	**2**	**4**	**1**	**1**	**2**
4th Floor	Boys	5	5	4	3	1 + 1(Outside)	3	-	1	2
	Girls	-	-	3	3	1	2	-	-	-
	Staff Ladies	-	-	1	1	1	1	1	-	-
	Staff Gents	1	1	1	1	1	1	1	-	-
	Principal	-	-	1	1	1	1	1	-	-
TOTAL		**6**	**6**	**10**	**9**	**6**	**8**	**3**	**1**	**2**
5th Floor	Boys	5	5	3	3	1 + 1(Outside)	4	1	1	2
	Girls	-	-	3	3	-	-	-	-	-
	Reading Room	-	-	1	1	1	1	1	-	-
	Chairman Cabin	-	-	1	1	1	1	1	-	-
TOTAL		**5**	**5**	**8**	**8**	**4**	**6**	**3**	**1**	**2**

Table 4: Total WC, Wash Basin, Drinking Water Cooler and Flushing Tanks in the Campus

Category	Number of Occupants	Water requirement per person (LPCD)			Total water requirement (LPCD)		
		Domestic	Flushing	Total	Domestic	Flushing	Total
Students	4199	20	25	45	83980	104975	188955
Teachers	110	20	25	45	2200	2750	4950
Non-teaching staff	26	20	25	45	520	650	1170
Administrative staff	30	20	25	45	600	750	1350
Total	4365				87300	109125	196425
					87.30	**109.13**	**196.43**

Figure 3: Rainwater harvesting down-take pipe and Recharge pit provision in campus

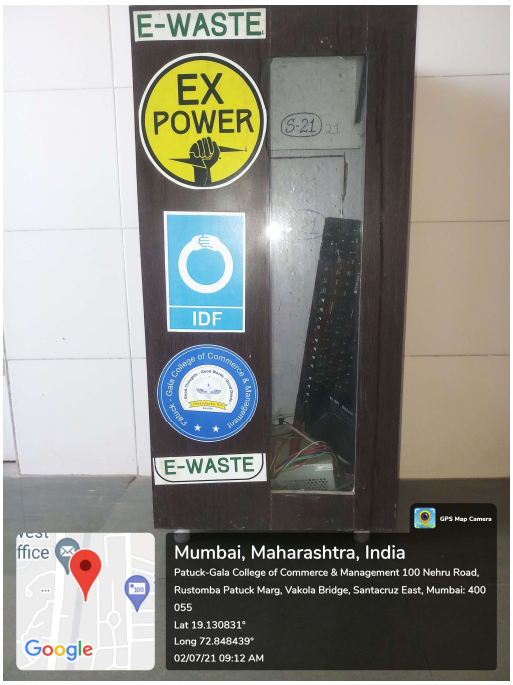
The College has successfully installed a rainwater harvesting system collecting water from the rooftop catchment through down take pipes fitted with filter which is used to recharge a 20 feet deep ring well. Considering high water table in the area and influence of tidal currents, it is recommended to construct recharge trenches along the periphery.

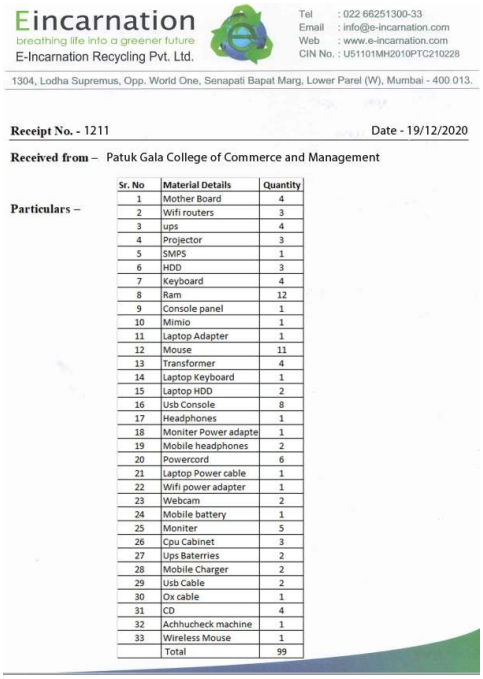
3.2 Solid Waste

The College generates approximately 5 kgs of waste per day which amounts to 1400 kg/year, which is organic / food waste from canteen. The waste is not segregated at source as per information submitted by College. There is scope to include various segregation, recycling, and composting concepts in the campus. The College has already marked out a place on campus for a compost pit.

Figure 4: Compost pits provided in campus

The College has developed an E-waste collection system in collaboration with Eincarnation Recycling Pvt. Ltd. that collects the E-waste periodically.





Eincarnation
breathing life into a greener future
E-Incarnation Recycling Pvt. Ltd.

Tel : 022 66251300-33
Email : info@e-incarnation.com
Web : www.e-incarnation.com
CIN No. : U51101MH2010PTC210228

1304, Lodha Supremus, Opp. World One, Senapati Bapat Marg, Lower Parel (W), Mumbai - 400 013.

Receipt No. - 1211 Date - 19/12/2020

Received from – Patuk Gala College of Commerce and Management

Particulars –

Sr. No	Material Details	Quantity
1	Mother Board	4
2	Wifi routers	3
3	ups	4
4	Projector	3
5	SMPS	1
6	HDD	3
7	Keyboard	4
8	Ram	12
9	Console panel	1
10	Mimio	1
11	Laptop Adapter	1
12	Mouse	11
13	Transformer	4
14	Laptop Keyboard	1
15	Laptop HDD	2
16	Usb Console	8
17	Headphones	1
18	Moniter Power adapte	1
19	Mobile headphones	2
20	Powercord	6
21	Laptop Power cable	1
22	Wifi power adapter	1
23	Webcam	2
24	Mobile battery	1
25	Moniter	5
26	Cpu Cabinet	3
27	Ups Baterries	2
28	Mobile Charger	2
29	Usb Cable	2
30	Ox cable	1
31	CD	4
32	Achhucheck machine	1
33	Wireless Mouse	1
	Total	99

Figure 5: E-waste collection point in campus and List of E-waste materials

An incinerator for medical waste is provided in one of the toilets on 3rd and 4th floor.

Figure 6: Incinerator in one of the washrooms on 3rd and 4th floor

3.3 Environment Quality

The list of trees along with their location submitted and displayed in the College is given below:

S. No	Name of the Plant	No. of Plants	Location
1	Earleaf Acacia Tree	1	Sport Room
2	Rain Tree/ Monkey Pod Tree	1	Sport Room
3	Scholar's Bark Tree	1	Gate No.3 and Passage
4	Custard Apple	2	Bungalow Playground Side, Canteen & Bungalow Playground
5	Christmas Tree	1	Triangle
6	Areca Palm	2	Driveway 2, Canteen & Bungalow Playground
7	Star Fruit	1	Driveway 1
8	Powderpuff mangrove	1	Bungalow-playground side
9	Variegated Bauhinia	1	School building
10	Papaya	5	Bungalow-playground side, Sports Room, Pumproom
11	Fishtail Palm	4	Driveway 2
12	Yellow Oleander	2	Driveway 3

13	Java Cassia	1	Canteen & Bungalow Playground
14	Golden Shower Tree	2	School building, Bungalow-playground side
15	White silk – coconut tree	1	Canteen & Bungalow Playground
16	Coconut	27	Driveway 2, Driveway 3, School building, Triangle-Audi, Triangle-Playground, Bungalow front side, Bungalow-playground side, Sports Room, Pumproom, Canteen & Bungalow Playground.
17	Flame Tree	5	Sports Room, Bungalow front side, Gate no 3 & Passage,
18	Indian Coral Tree	1	Bungalow – Playground side
19	Indian Rubber Tree	2	Driveway 2
20	Cluster Fig	2	School building, Gate no 3 & Passage
21	Bodhi Tree	2	Driveway 2, School building
22	Sea Hibiscus	1	Bungalow-playground side
23	Queen's Flower	2	Sports Room, Pumproom
24	River Tamarind	2	Bungalow-playground side, Pumproom
25	Champa	1	Triangle
26	Drumstick Tree	2	Driveway 2
27	Burflower Tree	1	Canteen & Bungalow Playground
28	Queen of The Night	2	School building, Triangle
29	Indian Pavetta	2	School building, Gate no 3 & Passage
30	Copper Pod Tree	8	Driveway 1, Driveway 3, Bust, Bungalow front side, Sports Room,
31	Star Gooseberry	1	Triangle-Playground
32	Oriental Thuja	2	Triangle, Sports Room
33	Wild Plumeria	6	Driveway 2, School building, Triangle
34	White Frangipani	1	Bust
35	Red Frangipani	1	
36	Mast Tree	9	Canteen & Bungalow Playground, Triangle, School building, Driveway 3, Driveway 2
37	Mast Tree	6	Canteen & Bungalow Playground, Triangle, School building, Driveway 3, Driveway 2
38	Pongam Oil Tree/ Indian Beech Tree	25	Driveway 1, Driveway 3, School building, Gate no 3 & Passage, Bungalow front side, Sports Room,
39	Fan Palm	1	Driveway 2
40	Guava	5	Driveway 2, School building, Sports Room
41	Buddha's Coconut Tree	3	Bungalow-playground side, Sports Room

42	Royal Bottle Palm	5	Driveway 2
43	African Tulip Tree	4	Driveway 2
44	Java Plum	1	Triangle-Playground
45	Pink Trumpet	1	Sports Room
46	Tamarind	1	Bungalow-playground side
47	Yellow Bells	1	School building
48	Teak	1	School building
49	Arjun	1	Sports Room
50	Indian Almond	6	Driveway 2, Bust, School building, Triangle-Audi, Triangle-Playground, Canteen & Bungalow Playground
51	Indian Tulip Tree	1	Gate no 3 & Passage
52	Weeping Fig	2	Gate no 3 & Passage, Triangle
53	Margosa Tree	1	Driveway 3
54	Dwarf White Bauhinia	1	Triangle
56	Wild Indian Almond	1	Gate no 3 & Passage

4. Recommendations for Environment-friendly and Green Campus and Feasibility for Patuck-Gala College

4.1 Retrofit of Water Efficient Equipment

Replacement with water efficient equipment can lead to considerable water savings:

Plate 3: Proposed water saving aerators for the wash basin faucets

S. No.	Existing equipment	Replacement of existing equipment with energy efficient equipment	No. of units	Current Water consumption (liters)	Potential Water savings with efficient equipment (liters) - Annual	Unit rate (Rs)	Estimated Investment (Rs)	Payback period (Year/ Months)
1.	Regular Wash basin faucet	Water saving aerator faucet	24	24 (Considering 1 litres)	12 (Considering 0.5 litres)	8.5/-	204/-	NA

Table 5: Retrofit for Water Efficient Equipment

4.2 Rainwater Harvesting

The College has successfully installed a rainwater harvesting system collecting water from the rooftop catchment through down take pipes fitted with filter which is used to recharge a 20 feet deep ring well. Considering high water table in the area and influence of tidal currents, it is recommended to construct recharge trenches along the periphery.

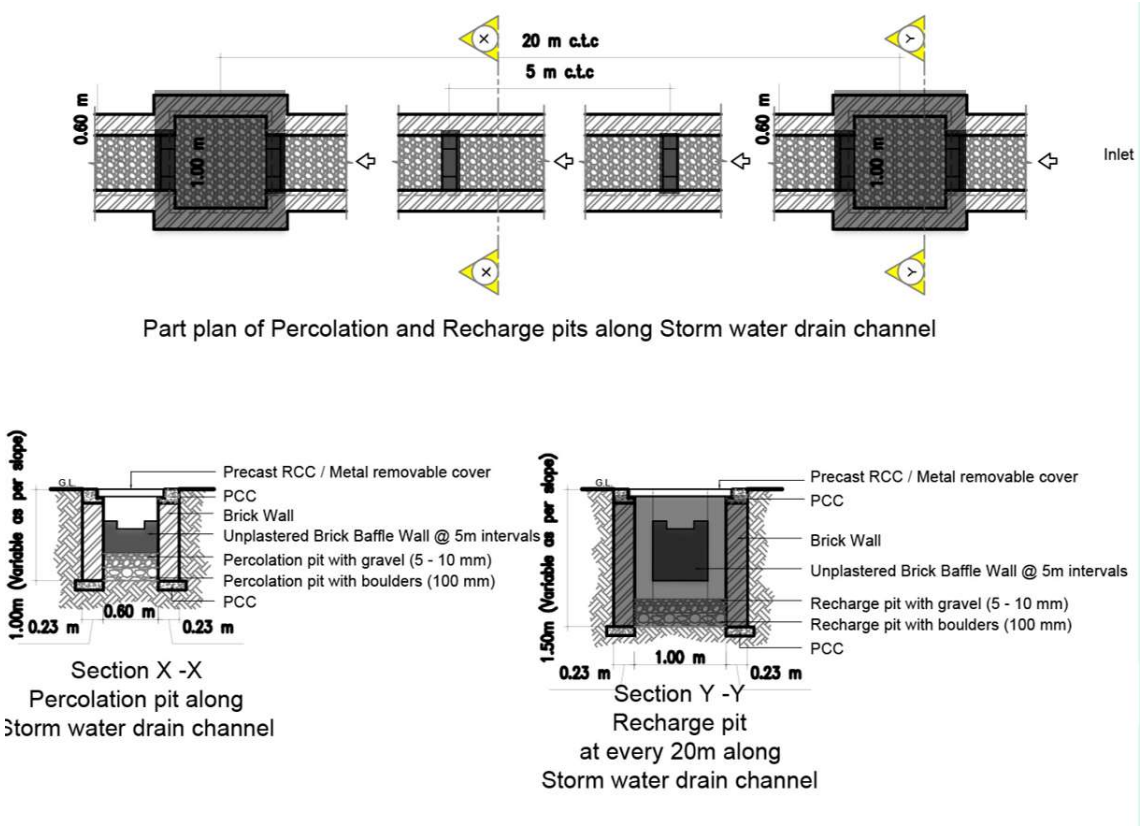


Figure 7: Section of the Recharge pit and Percolation pit

4.3 Waste Segregation, Composting and E-waste

Waste segregators to be provided in the lobby of each floor for wet / organic waste, metal, wood, paper, glass.

Plate 4: Waste segregator to be installed at each floor level

Recyclables can be disposed off through recyclers with whom the college can have an arrangement. It is recommended for the college to purchase a garden shredder to prepare finely chopped organic matter that will result in better and faster organic compost.

Organic composting and maintenance of the same can be undertaken by contract with NGO such as Stree Mukti Sanghatana (contact details provided in appendix H).

Figure 8: Garden Shredder

4.4 Indoor Air Quality

Since the building is naturally ventilated, indoor air quality is not a major concern. Indoor plants can be added in administrative areas and hanging pots in corridors can be added to increase biodiversity improve air quality can be provided in the administrative areas on all floors.

Plate 5: Indoor plants - Dieffenbachia amoena, Chlorophytum comosum and Epimnum auries

4.5 Environment Improvement

The College already has identified and listed the number of trees on campus. A list of these is displayed in the College. This list needs to be refined with correct scientific and common names. All identified trees in the campus should have a name plate displaying common name and scientific name. These could be digitized with QR code. In case of availability of space or death of a tree for any reason, new tree plantation should be considered with native and indigenous varieties

Plant and tree species that attract birds and butterflies can be planted to increase biodiversity of the campus.



Plate 6: Plant species attracting birds and butterflies

4.6 Green Rating

The College can apply for following green building rating for evaluating performance and getting green rated:

S. No.	Rating	Provided by	Performance Evaluation	Registration / Rating fees
1.	EDGE	IFC, World Bank	Water, Waste and Energy	Pre-certification plus final EDGE certification – INR 1,20,000 + INR 9 per each additional sq. m above 5,000 sq. m.
2.	IGBC – Existing buildings	CII, IGBC	Whole building	Registration fees – INR 25,000 and certification fees – INR 50,000

3.	BEE star rating	BEE, Govt. of India	Energy	Application to BEE
4.	GRIHA – Existing buildings	Green Rating for Integrated Habitat Assessment (GRIHA) Council	Whole Building	INR 2,00,000 + INR 3.5 per additional sq. m over 5,000 sq. m
5.	GEM Sustainability (Green) Certification Program - Campus (Educational/Corporate and Others)	ASSOCHAM Green & Eco-friendly Movement (GEM)	Site Area (Acres) - Less than 10 Acres	Pre-certification fee INR 1,75,000 + ASSOCHAM Certification fee INR 2,50,000

Table 6: Green Building Rating Systems

5. General recommendations to frame a Green Campus Policy

- Educating staff and students on environment-friendly and green campus.
- Encouraging research among staff and students on environment-friendly and green campus initiatives.
- Placing display boards near washrooms and wash basins on water conservation.
- Organizing seminars on waste segregation and disposal.
- Preparing a policy document on environment-friendly and green campus.

The goal of the **Energy & Environment Usage Policy** of Patuck-Gala College, Mumbai, is to reduce the environmental impact and carbon footprint and create awareness among students, faculty and staff about minimizing their impact on the environment. The Policy

aims to reduce energy usage and environmental impact of the student and teaching community of the college as well as all the building within the campus.

This Energy and Environment Usage Policy is binding on all the stakeholders of the institution and will be reflected in all activities undertaken by the Institution. It will help to incorporate energy efficiency, water recycling and conservation, waste management, use of renewable energy and other greening measures as part of the Institute's continuous efforts towards environment protection. Following will be the highlights of the policy

Highlights:

- To reduce energy consumption and carbon footprint by use of energy efficient lighting, fans, and equipment.
- To offset and reduce dependency on fossil-fuel energy by use of solar and other forms of on-site renewable energy.
- To conserve water through use of water efficient equipment such as aerators, dual flush cisterns, and drip irrigation.
- To recycle wastewater to the extent possible (given limitations of space in an urban campus).
- To harvest rainwater for use or ground water recharging.
- To manage all waste within the campus including organic waste, recyclables, medical waste, and E-waste and strive to be a net zero waste campus.
- To increase campus tree cover and biodiversity.
- To inculcate environment-friendly behaviour among students and college fraternity through educational programs, visual communication modes and active participation.
- To strive for adoption of an environmental management system ISO: 14001 and an Energy Management System ISO: 50001.
- To employ latest and appropriate technology to aid in environmental practices.
- To create a favourable environment within the campus through environmental

remediation for noise, air, and water pollution.

- To reduce carbon footprint and pollution of transportation to the campus through use of buses, public transport, walking, bicycling and E-vehicles.
- To engage with the government, municipal corporation and the affiliating university and actively work with the local organizations and local communities in the areas of environment, energy efficiency and sustainable development.
- To engage the student and teacher community in environmental conservation efforts in the campus and elsewhere through research and community-based projects.
- To monitor and respond to emerging environmental and energy issues and strive to be resilient and future ready.

6. Annexures

A. Floor Layouts

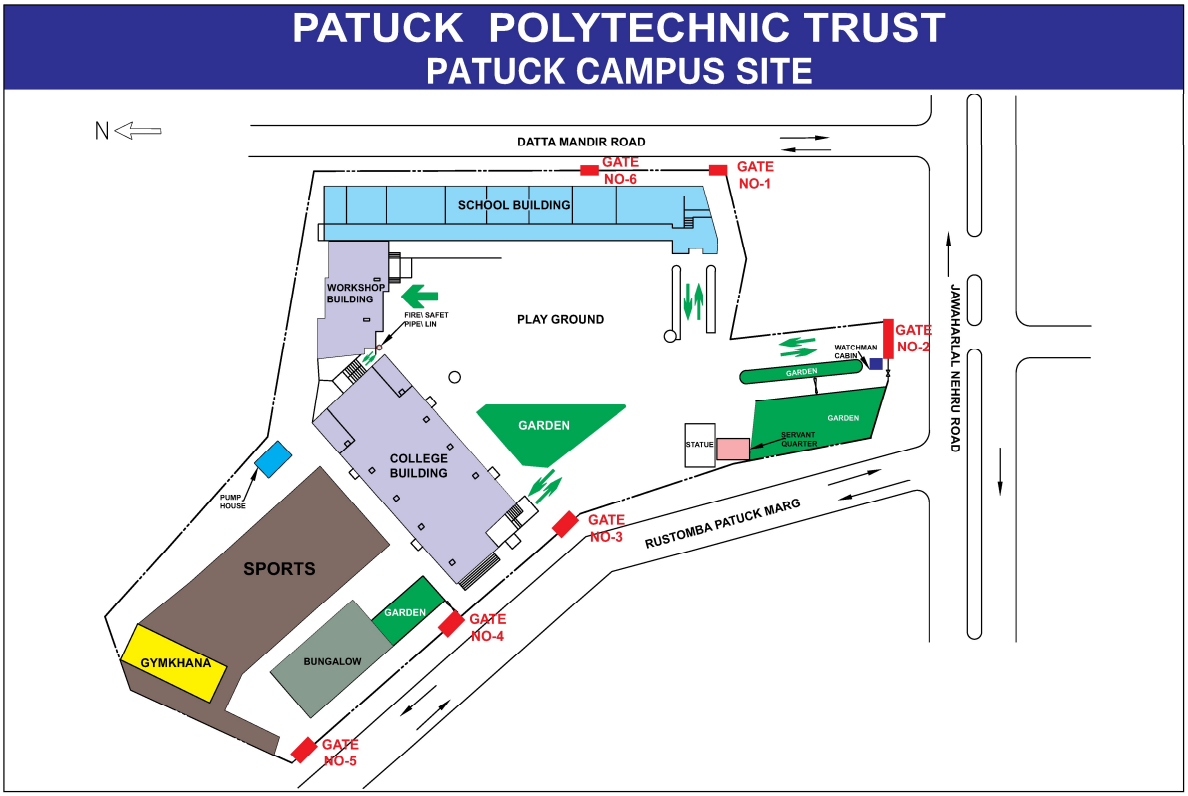


Figure 9: Campus Layout

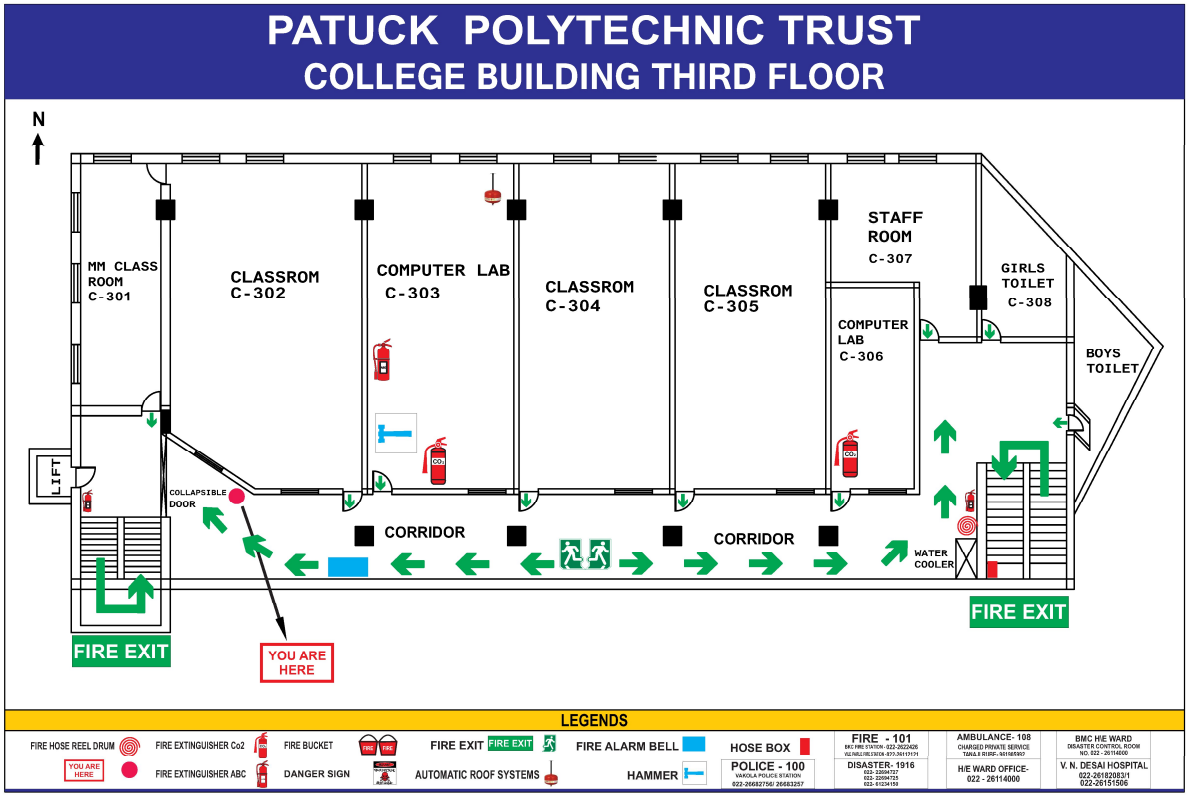


Figure 10: College Building Third Floor Plan

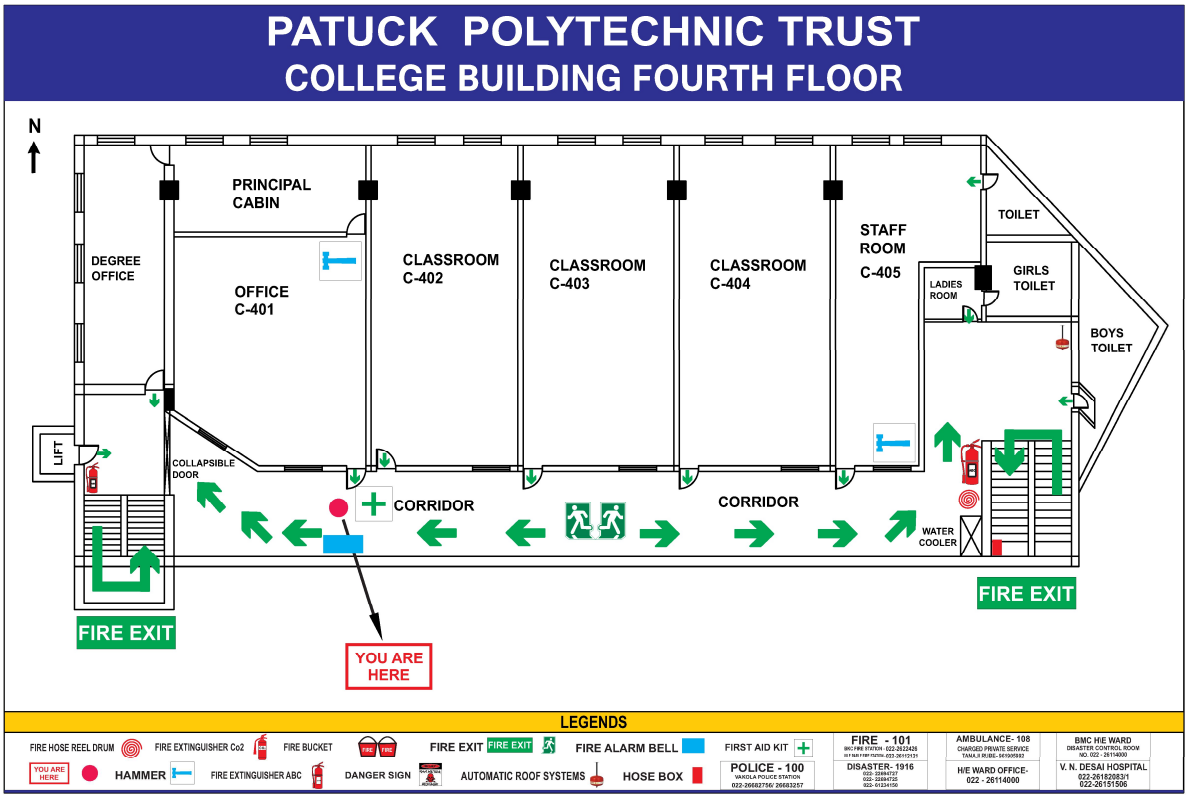


Figure 11: College Building Fourth Floor Plan

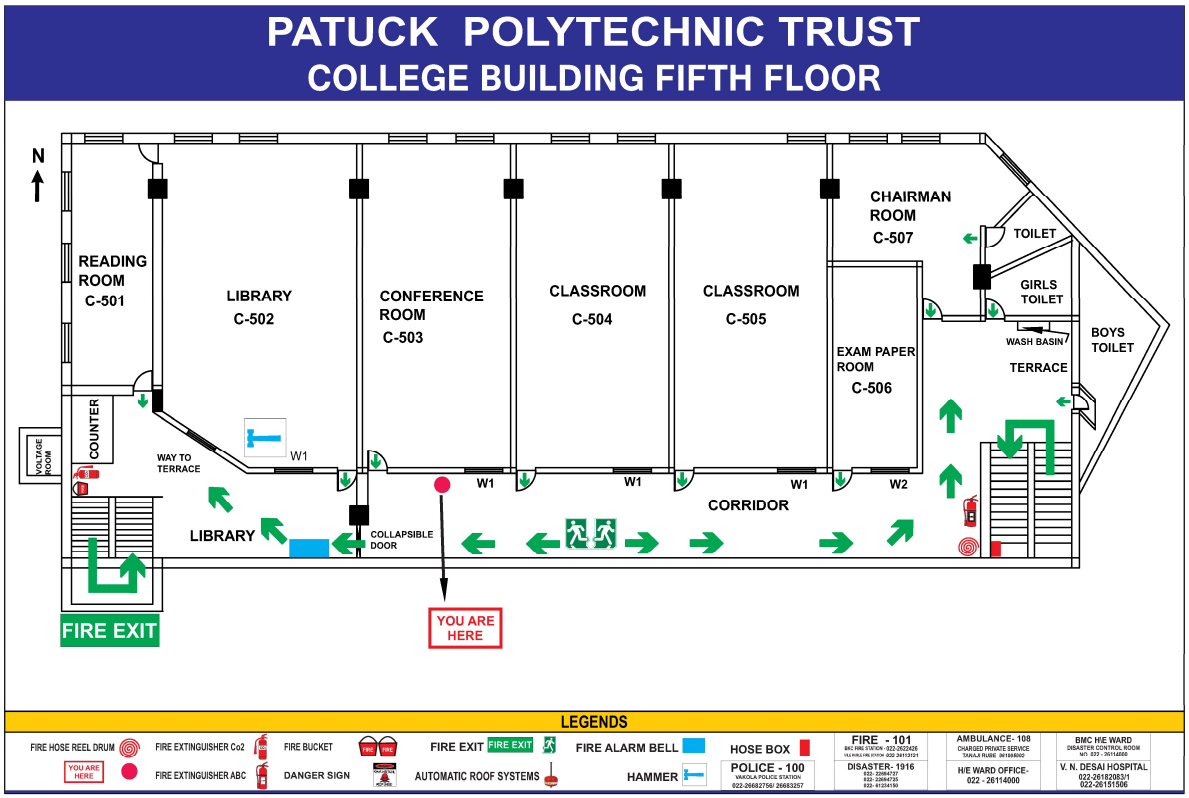


Figure 12: College Building Fifth Floor Plan

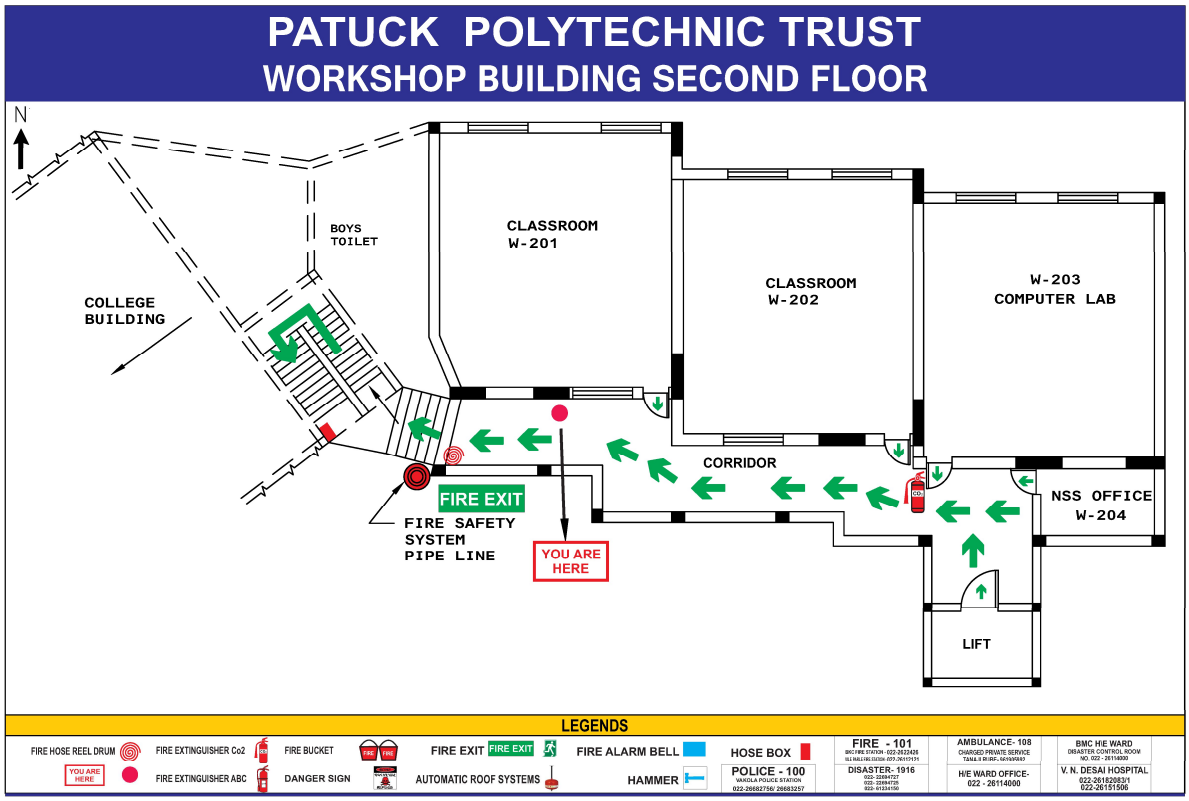


Figure 13: Workshop Building Second Floor Plan

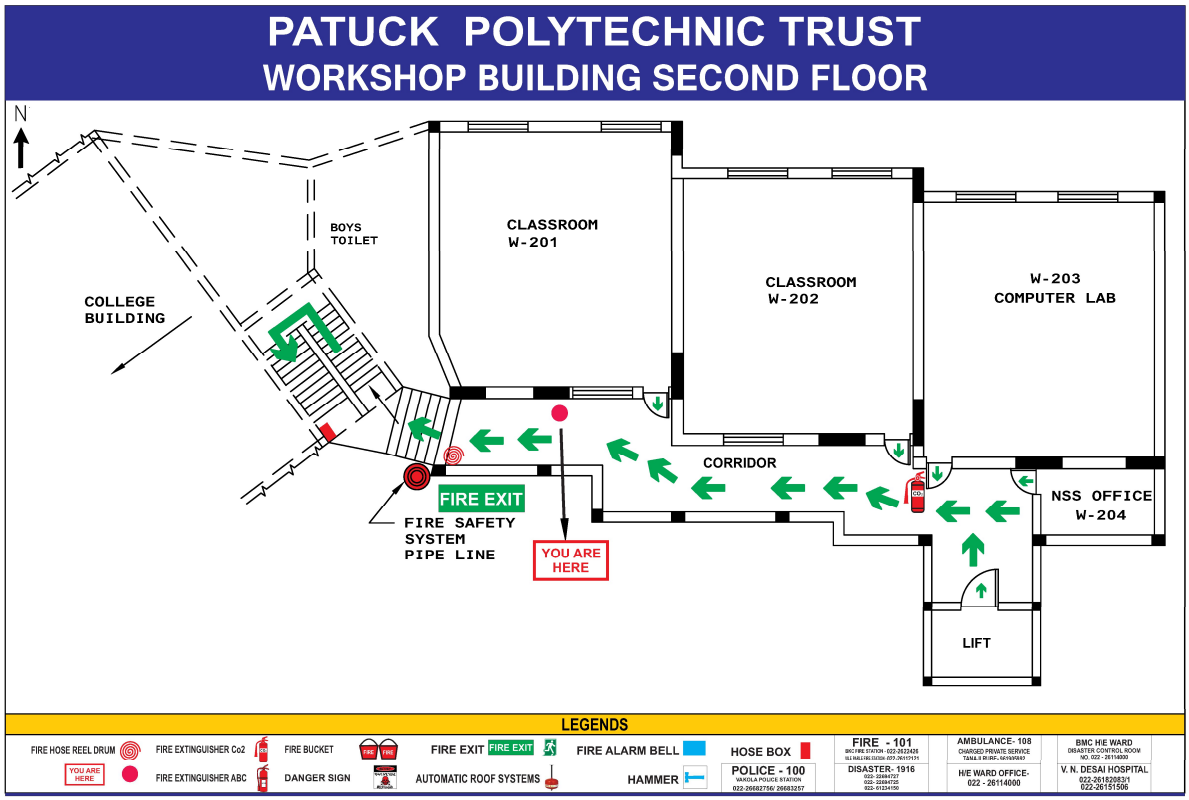


Figure 14: Workshop Building Third Floor Plan

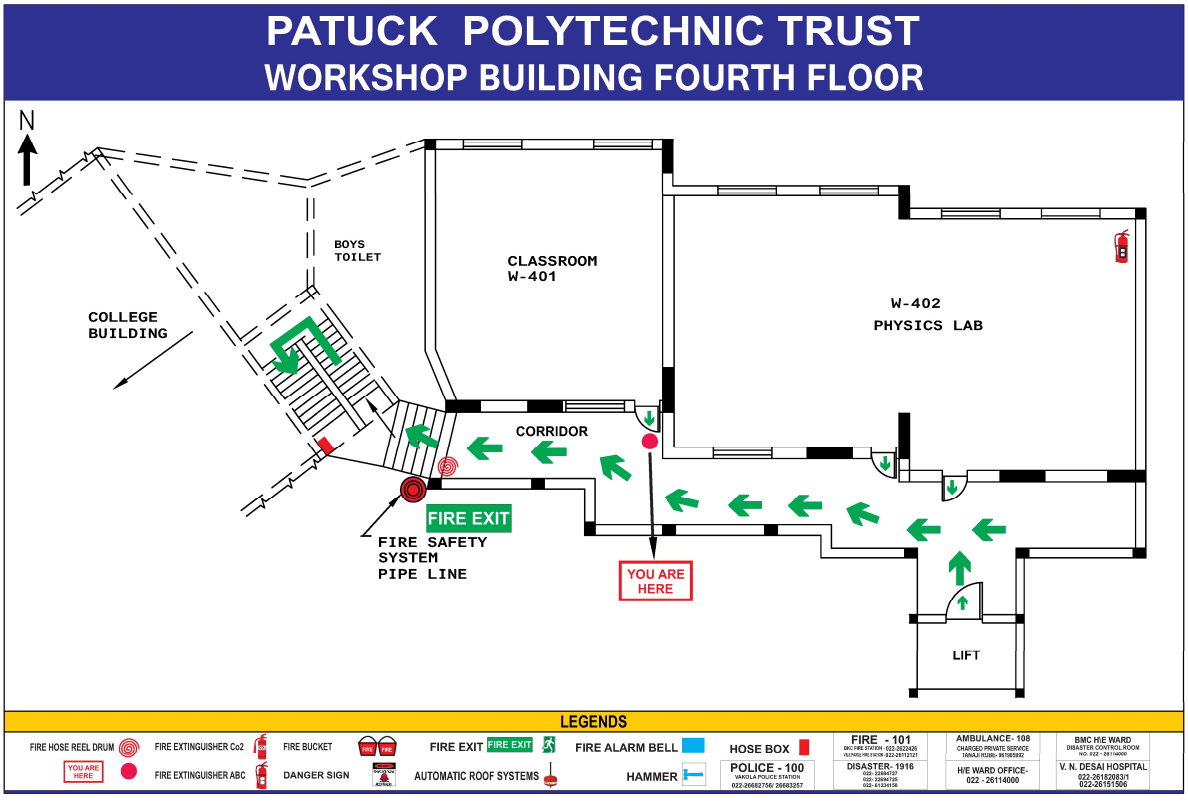


Figure 155: Workshop Building Fourth Floor Plan

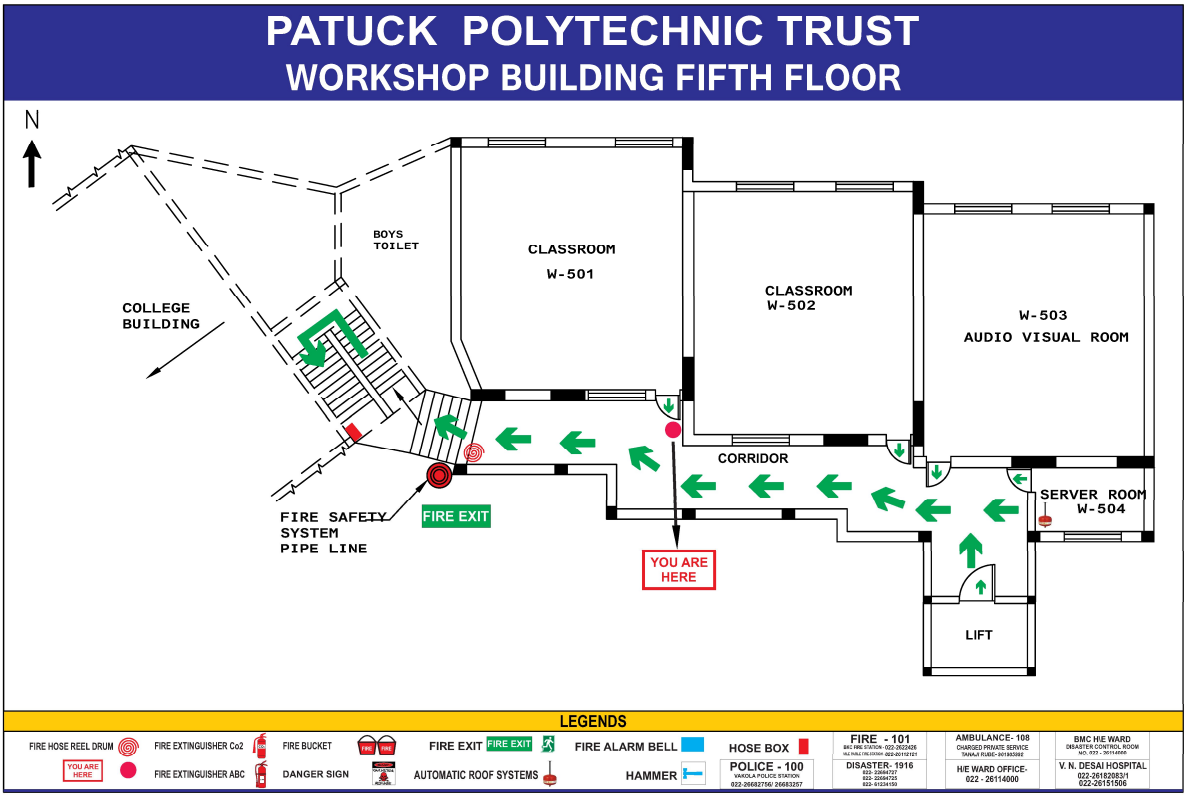


Figure 16: Workshop Building Fifth Floor Plan

B.Sample Water bill

TRUST (739)

बृहन्मुंबई महानगरपालिका

-: जल आकार देयक :-

SAC : 999111 GSTIN : 27AAALM0042L3Z4

जलजोडणी धारकाचे नाव आणि पत्ता :-

ORGANISING BOARD PATUK POLITECH TRUST,
TPS NO 123/126 VAKOLA NEHRU ROAD
SANTACRUZ EAST MUMBAI 400055

जलजोडणी क्र. (CCN)	HE@0031545
विभाग (Ward)	H/EAST-WARD
देयक क्रमांक (Bill No.)	1819HEW1291011
देयक दिनांक (Bill Date)	05-02-2019
जलजोडणी आकार (मि.मी.)	40
जलमापक आकार (मि.मी.)	40

पुस्तक / पृष्ठ क्र.	मनपा अधिनियम क्र.
H 272 / 41	169
दैनिक गरज (लिटर)	**संख्या:- सदनिका/गाळे/झोपडी**
21820	0
जलमापक मालकी	**जलमापक क्रमांक**
A	8914678

देयक कालावधी (Bill Period)	05-10-2018 to 05-01-2019
देय दिनांक (Due Date)	22-03-2019
विद्यमान देयक रक्कम (Current Bill Amount) (₹)	20573

देयक निर्मिती दिनांकास जादा जमा रक्कम (Excess Credit Amount as on Date) 05-02-2019 ₹ 0

Bill Process Date 05-02-2019

मागील दिनांक/वाचन (कि.ली.)	विद्यमान दिनांक/वाचन (कि.ली.)	दिवस
05-10-2018	05-01-2019	92
57241	0	

विद्यमान वापर (कि.ली.)	दुय्यम/समिश्र वापर सूट (कि.ली.)	प्रत्यक्ष वापर (कि.ली.)
(C1) 2284	(C2) 0	(C1-C2) 2284

जलमापक स्थिती	जलजोडणी प्रकार	दर प्रति (कि.ली.) ₹
PER	MN00	5.09

देयक तपशील (Bill Details)	₹
जलआकार (Water Charges)	11626
मलनि:सारण आकार - जलआकाराच्या ७०% (Sewerage Charges) - (70% of watercharges)	8138
जलमापक भाडे (Meter Rent)	0
अतिरिक्त आकार (Additional Charges)	809
विद्यमान देयक रक्कम (Current Bill Amount)	20573
मागील बाकी (Previous Outstanding)	21002
जमा रक्कम (Credit Amount)	0
एकूण देय रक्कम (Total Payable Amount)	41575

HE@0031545

मागील देयक कालावधी	वापर (कि.ली.)
05-07-2018 to 05-10-2018	2284
05-04-2018 to 05-07-2018	2289
06-01-2018 to 05-04-2018	2279
05-10-2017 to 06-01-2018	2245
05-07-2017 to 05-10-2017	2256
13-04-2017 to 05-07-2017	2240
05-01-2017 to 13-04-2017	2235
-10-2016 to 05-01-2017	2229
04-07-2016 to 04-10-2016	2245
04-04-2016 to 04-07-2016	2232
04-01-2016 to 04-04-2016	2221
05-10-2015 to 04-01-2016	2213

महत्वाच्या सूचना

१) देयक प्राप्त झाले नाही म्हणून देयकाचा भरणा केला नाही ही सबब ग्राह्य धरली जाणार नाही.

२) www.portal.mcgm.gov.in या बृहन्मुंबई महानगरपालिकेच्या संकेतस्थळावर तसेच मोबाईलवर MCGM 24 x 7 या app द्वारे देखील जलजोडणी क्रमांकाची नोंद करून देयकाची दुय्यम प्रत उपलब्ध होते, तसेच थकबाकीसह जलदेयकाचा भरणा करता येतो.

३) देयक आणि त्याचा भरणा केल्याची माहिती विहित वेळेत मिळण्याकरिता ग्राहकाने मोबाईल नंबर व ई-मेल संबंधित विभागीय सहाय्यक अभियंता (जलकामे) यांच्याकडे अथवा महानगरपालिकेच्या संकेतस्थळावरील KYC मध्ये नोंदवावा.

४) "Brihanmumbai Mahanagarpalika" या नावाने धनादेश काढावा व धनादेशाच्या पाठीमागे जलजोडणी क्रमांक व मोबाईल नंबर लिहावा.

५) मालमत्तेचा SAC/UID क्रमांक विभाग कार्यालयातील सहाय्यक अभियंता (जलकामे) यांच्याकडे अर्जाद्वारे अथवा महानगरपालिकेच्या संकेतस्थळावरील KYC मध्ये नोंदवावा.

6) To make Payment through NEFT
-
IFSC Code - SBIN0COLLEC
A/C. No. - BMCW000000HE10031545
Name - MCGM Water Charges

41575 L
11272 L
52847 L

जल अभियंता

इशारा

(१) देय दिनांकापर्यंत देयकाचा भरणा न केल्यास सदर देयक नोटीस समजण्यात येऊन मुंबई महानगरपालिका अधिनियम कलम २७५ अन्वये जलजोडणी खंडित करण्यात येईल. ह्या नोटीशीमुळे पूर्वीची नोटीस रद्द होत नाही.

(२) ...

(३) आपले जलमापक कायम चालू स्थितीत राहील तसेच जलमापक चेंबर, पाईप फिटिंग सुस्थितीत राहतील याची खबरदारी घेण्यात यावी.

* Available Security Deposit (उपलब्ध अनामत रक्कम) ₹ null null

नाव व टपालाचा पत्ता :-

HE@0031545 H 272 / 41

ORGANISING BOARD PATUK POLITECH TRUST
TPS NO 123/126 VAKOLA NEHRU ROAD SANTACRUZ EAST
MUMBAI 400055

पत्रव्यवहारासाठी पत्ता :-
Asst. Engineer (Water Works) H/East Ward Office Bldg., Plot No. 137, TPS-5, Road No.-2, Prabhat Colony, Santacruz (E), Mumbai-400 055.

दूरध्वनी क्र. 022-26182217/19

हे जलदेयक जागेचा अथवा मालमत्तेचा मालकी हक्क सिद्ध करण्यासाठी तसेच पुरावा म्हणून ग्राह्य धरू नये.

पाणी जपून वापरा

RU/11Feb19 1116-6486

CBC:- 450082
11/3/19

Rs. 52847/-

C.Certificate for E-waste Recycling

CERTIFICATE

OF

RESPONSIBLE RECYCLING

ISSUED TO

Patuk Gala College of Commerce and Management

This document certifies that E-Incarnation Recycling Private Limited, processes, recycles, destroys and displaces the received material in an environmentally sustainable manner that is in accordance with all local, state and central Government regulations. Further E-Incarnation Recycling Private Limited certifies that all intellectual client data will be destroyed or erased properly from the hard drives and other media.

E-Incarnation Recycling Private Limited assumes ownership, possession, title, responsibility and control of the materials received on 12th Dec, 2020 ;listed in Section A of this Certification.

Contact: 100, Nehru Road, Vakola Bridge
Santacruz (East), Mumbai - 400055

Section A: Materials Received for processing

ERPL Customer Id: 902 Transaction Id: 1211

Materials Received	Quantity
As Per List	--

Reg. No.: MPCB/RO(HQ)/Reg./15/E-waste/HWMD-258

E-Incarnation Recycling Pvt. Ltd. Mardia House, 96, C. P. Tank Road, Mumbai - 400 004.
Tel - 022 66251300-33. Fax - 022 23877102. E-Mail - recycle@E-Incarnation.com. Web - www.E-Incarnation.com.

D.List of Vendors

i) Solid Waste Management

Ms. Jyoti Mhapsekar,
President,
Stree Mukti Sanghatana (SMS)
Mobile: +91 9867724529

Chembur Center
Room No. 14 Santiniketan Chawl,
Postal colony, next to BD Shukla school
Chembur, Mumbai - 400071
Phone: 022 65745837/022 25274588
Email: smspv123@gmail.com

Govandi Office
Ahilyabai Holkar Marg, Near Jafri High School bus stop,
Govandi- Mumbai - 400043
Phone: 022 65745840
Email: smspbvs@gmail.com

Ecolibrium Energy – IOT powered Asset Intelligence Software

Contact: Bhavesh Bhatt

Mobile: 9833821814

Email: bhavesh.bhatt@ecolibriumenergy.com

ii) Name plate and QR code

Nisarg Plantation Consultancy

C/O Mr. Avinash Kubal

Email: avinashkubal@gmail.com; Phone no:93242380310