REPORT ON

ENERGY, ENVIRONMENT AND GREEN AUDIT

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY

BADAL ROAD, BATHINDA, PUNJAB - 151 001.

AUDIT CONDUCTED AND REPORT PREPARED BY

NIN ENERGY INDIA PRIVATE LIMITED
JUSA COMPLEX, NEW NO 47, OLD NO 21/2
PONNIAMMAN KOIL STREET, KOTTUR,
CHENNAI-600085
TAMILNADU, INDIA.

MARCH 2023

ACKNOWLEDGEMENT

We thank management of MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY for awarding the Energy, Environment and Green Audit study at their facility at BADAL ROAD, BATHINDA, PUNJAB-151 001 to NIN Energy India Private Limited. This report is the result of Energy Audit conducted at MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY from 27-03-2023 to 29-03-2023.

We wish to thank the management of MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY for the support during the audit and for successful completion of the audit.

For NIN ENERGY INDIA PRIVATE LIMITED

(B. SENTHILKUMAR)

ACCREDITED ENERGY AUDITOR (AEA 023)

Table of Contents

ABBREVIATIONS

EE	Energy Efficiency
Dept	Department
EER	Energy Efficiency Ratio
INR	Indian Rupees
KLD	Kilo Litre Per Day
kWh	Kilo Watt Hour
LED	Light Emitting Diode
LPG	Liquified Petroleum Gas
tCO2	Tonne Of Co2
FTL	Fluorescent Tube Light
Engg	Engineering

1.0 INTRODUCTION ABOUT GREEN AUDIT

Green Audit is the process of assessing the environmental impact of an organization, process, project, product, etc.

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council 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.

2.0 OBJECTIVES

In recent time, the Green Audit of an institution has been becoming a paramount important for self-assessment of the institution which reflects the role of the institution in mitigating the present environmental problems.

The college has been putting efforts to keep our environment clean since its inception. Therefore, the purpose of the present green audit is to identify, quantify, describe, and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

The main objectives of carrying out Green Audit are:

- To map the Geographical Location of the college
- To document the floral and faunal diversity of the college
- To record the meteorological parameter of college
- To document the ambient environmental condition of weather, air, water and noise of the college
- To document the waste disposal system
- To estimate the Energy requirements of the college
- To report the expenditure on green initiatives during the last five years

3.0 ABOUT THE UNIVERSITY

Maharaja Ranjit Singh Punjab Technical University (MRSPTU), Bathinda is a State affiliating Technical University, established by Govt. of Punjab vide Punjab Act No. 5(2015) u/s 2(f) and approved u/s 12B of UGC Act, 1956. It caters to Education spreading over the Faculties of Sciences, Engineering & Technology, Pharmacy, Architecture, Hospitality and Tourism Management, Commerce & Management. It offers UG, PG and Doctoral programmes in various disciplines of Engg & Technology, Architecture & Planning, Management, Sciences, Pharmacy and Food Sciences, besides running Skill Development programs.

The objectives of this technical University are to provide, upgrade and promote quality technical education, training, and research in technical education to create entrepreneurship and a conducive environment for the pursuit of technical education in close cooperation with industry. In the pursuit of creating excellence in teaching, research and skill development, the University must attain highest standards by following and conforming to norms/standards policies laid down by the AICTE and UGC, New Delhi.

GZS Campus College of Engineering & Technology, MRSPT University, Bathinda is the first institute in Punjab established by state government in the year 1989 when the hon'ble Governor of Punjab Sh.S.S. Ray laid the foundation stone on 23rd October 1989. Initially set up as Government Engineering College, it was converted into an autonomous institute in the year 1992 and a "Board of Governors" (BOG) was constituted to manage the affairs of the College. This college was made a campus of Punjab Technical University in 2011. Now the campus is a constituent college of newly setup Maharaja Ranjit Singh Punjab Technical University, Bathinda and is recognized by All India Council of Technical Education (AICTE) & Council of Architecture. The institute provides an excellent academic environment under the able guidance of well-qualified and highly dedicated faculty.

GZS CCET MRSPTU, Bathinda has the distinction of being the premier degree level technical education institute established by Government of Punjab with the operational control of Board of Governors headed by the Hon'ble Minister of Technical Education, Govt. of Punjab. This institution has been engaged in shaping the destiny of budding engineers ever since it came into being in the year 1989. The College has a magnificent infrastructure spread over an area of 146 acres, which has been witnessing continuous developments over the last many years. This College is an excellent education center with state-of-the-art laboratories,

computer center, library, and workshops. The college is continuously striving hard to achieve excellence in imparting good technical education with the help of its highly qualified and dedicated faculty, which is the best in the region. The mission of the institute is to create a sustained learning environment of acquiring technical knowledge and translating theoretical knowledge into practical applications.

4.0 ABOUT NIN ENERGY INDIA PRIVATE LIMITED

NIN Energy India Private Limited is providing Energy Related services like Energy Audit, Power Quality Audit, Infrared Thermography, Thermal Audit, PAT Monitoring and Verification Audit, PAT Consultancy, Green Building Commissioning, Electrical Safety Audit, Internet of Things, Carbon Foot Printing, etc. We have experienced team and helping the customers to manage and reduce their energy consumption.

We are providing complete Energy Services under one roof at a competitive price. Our team members are having more than 10 years of experience in Energy, Renewable Energy and Environmental Engineering with good Academic background.

Our Team Strength

- Accredited Energy Auditor by Bureau of Energy Efficiency, Government of India
- Certified Energy Auditors by Bureau of Energy Efficiency, Ministry of power
- Certified Measurement and Verification Professionals (CMVP) by EVO
- Certified Level II Thermographer
- Enlisted with Tamil Nādu Energy Development Agency (TEDA) as a system Integrator for Solar PV systems.
- Lead Auditors for ISO 50001 (Energy Management System)
- Lead Auditors for ISO 14064 (Green House Gas inventory and verification)
- Lead Auditors for ISO14000 (Environmental Management System)

4.1 AUDIT TEAM

The NIN Energy India private Limited team did the green audit assessment in the university.

Team details are as follows.

Name	Designation
Mr. B SENTHIL KUMAR	• Accredited Energy Auditor by Bureau of Energy Efficiency • ISO 50001:2018 Lead Auditor • ISO 14064 Lead Auditor • ISO 14001 Lead Auditor
Mr. T. KARTHIKEYAN	Certified Energy Auditor by BEE
Mr. S HARISHRAGAVENDHAR	Sr. Engineer

4.2 INSTRUMENTS USED FOR THE AUDIT

Instruments used in the Green Audit are as follows.

S. No	Name of the instrument
1	Air quality meter
2	Noise meter
3	Lux meter
4	Thermal Imager
5	Clamp meter

5.0 LOCATION OF THE INSTITUTION

The university is located in BATHINDA, PUNJAB - 151 001.

Latitude 30°10'28.5"N

Longitude 74°55'29.5"E

6.0 ENVIRONMENTAL AUDIT

Carbon footprint is the total sum of greenhouse gases (GHG) emission caused by an organization, event, product, or person. As we are aware, the increasing concentration of GHGs in the atmosphere can accelerate climate change and global warming, it is very necessary to measure these emissions from our day-to-day activities. The first step towards managing GHG emissions is to measure them. There are some standards and guidelines to measure GHG emissions like GHG protocol, ISO 14064, the more comprehensive one Life Cycle Assessment (LCA), and market-based mechanisms. Out of them, ISO 14064 is an offset protocol and independent, voluntary GHG project accounting standard helps to quantify GHG emission of the organization, event, product, or person.

Our day-to-day activities are dependent on electricity which is mostly coming from coal-based power plants, Diesel and Petrol for our vehicles and LPG for cooking in our kitchen. All of the energy we use is derived from these fossil fuels which are GHG intensive. The following methodology helps you to calculate your carbon footprint resulting from the use of Electricity, Petrol, Diesel, and LPG.

Floristic status of the institution:

The Current situation of planted trees are as follows:

Type of Trees	Total No of Trees
No of matured trees (Age more than 10 years)	3202
No of Semi matured trees (Age below 10 years)	4606
No of plants/herbs/Shrubs	4170
No of medicinal plants	722
Any other plants details if any	1005

Carbon absorption by flora in the Institution

Carbon absorption capacity of one matured tree = 6.8 kg of CO2. Carbon absorption capacity of one full grown tree = 3.4 kg of CO2. In bushes it absorbs an average of 200 g of CO2. The carbon absorption capacity of a 10-sq.ft. area of lawn is 1 g CO2.

1. Therefore, the carbon absorption capacity of 3202 matured trees in the campus of the Institution (3202 × 6.8 kg CO2/Annum) = 21773.6 kg of CO2/Annum.
2. The carbon absorption capacity of 4606 semi-grown trees in campus of (4606 × 3.4 kg CO2/Annum) = 15660.4 kg of CO2/Annum.
3. There are 4170 bushes of various species being raised in the gardens of the Institution, total carbon absorption was calculated to be (4170 × 200 g CO2/Annum) = 834 kg of CO2/Annum

The grand total of carbon absorption by the flora in the campus is 38268 kg per year.

Description	Unit	Values
Annual emissions from electricity, tco2	tCO2 /year	1292.78
Annual emissions from LPG, tco2	tCO2 /year	133.16
Total emissions from facility	tCO2 /year	1425.94
Carbon absorption by mature trees, semi mature trees, bushes, and lawns	tCO2 /year	-38.27
Net carbon emission of the campus	tCO2 /year	1387.68
Carbon reduction opportunities by energy saving projects	tCO2 /year	565.50
Estimated carbon emissions after implementing the energy saving projects	tCO2 /year	822.18

7.0 TRANSPORTATION AT UNIVERSITY

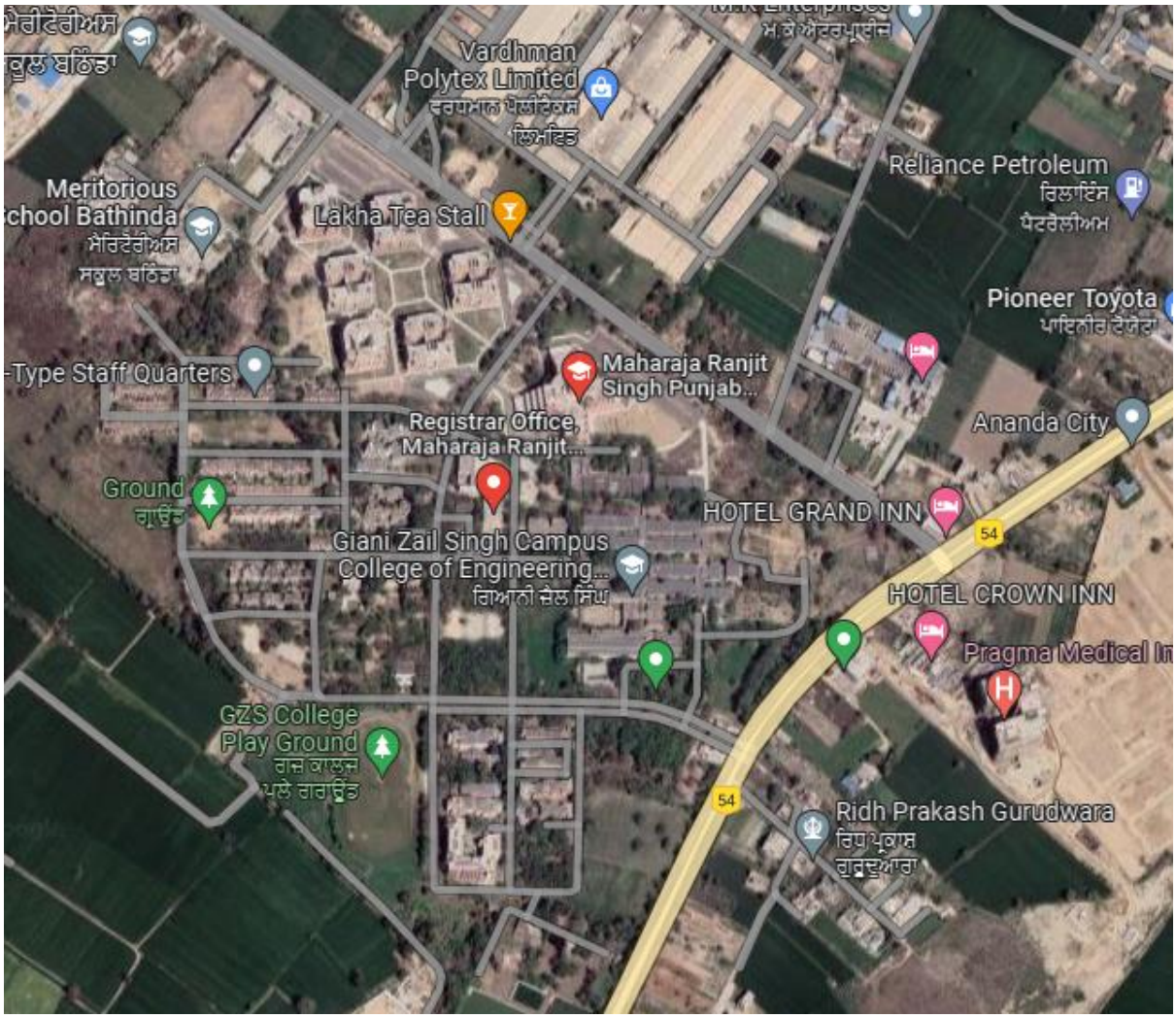
Being a largest campus in the region and located centrally, MRSPTU faculty, staff, and students commute on their own. The university is dedicated to providing its students and staff all the comfort and convenience to help them to achieve their targets. The students are encouraged to use cycles, two wheelers rather than four wheelers which leads to fuel saving and the contribution of pollutants to atmosphere is less. Student Vehicles are parked at the parking area earmarked for students (separate for boys and girls) near the Entrance gate. Staff / Faculty vehicles are parked at the peripheral parking lots away from the academic blocks.

S. No	Description	Details
1	No of Four wheelers used by students	50
2	No of Four wheelers used by staff	95
3	No of Two wheelers used by students	185
4	No of Two wheelers used by staff	95

8.0 GREEN AUDIT

8.1 LAND USE ANALYSIS

GENERAL OVERVIEW OF THE CONCEPT OF LANDUSE Land use refers to man's activities and the various uses which are carried on and derived from land. Viewing the earth from space, it is now very crucial in man's activities on natural resource. In situations of rapid changes in land use, observations of the Earth from space give the information of human activities and utilization of the landscape. Remote sensing and GIS techniques are now providing new tools for advanced land use mapping and planning. The collection of remotely sensed data facilitates the synoptic analyses of earth system, functions, patterning, and change in the local, regional as well as at global scales over time. Satellite imagery particularly is a valuable tool for generating land use map.



8.2 LAND USE (BUILT UP AREA) ANALYSIS

The built-up area of 20% (approx.) (i.e., 121694.21 m^2) consists of the following regions as stated below is the land consumption in the built-up area of MRSPTU, Bathinda.

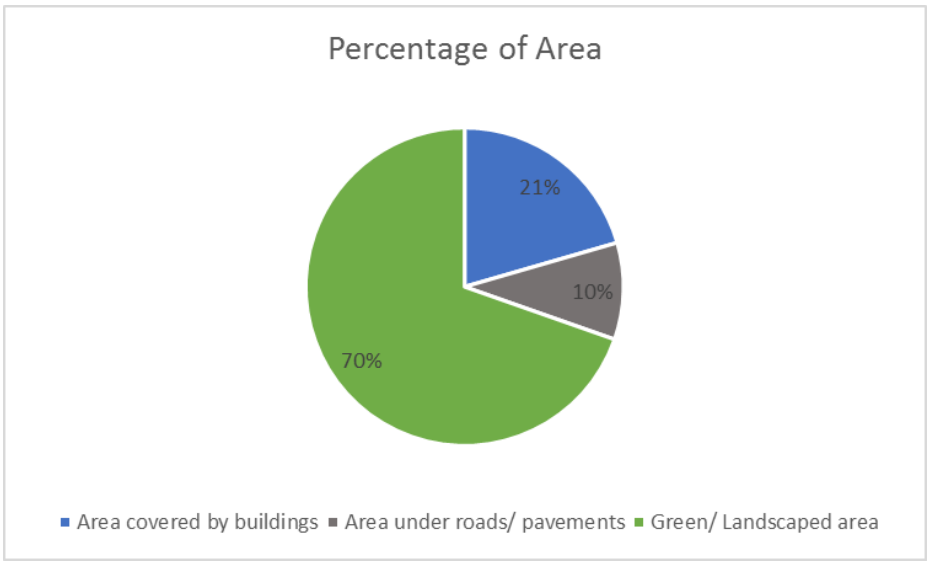
The northern and eastern regions of the MRSPTU are densely built up, having Main Administrative Block, Academic Blocks, GZSCCET Blocks, and Central Workshops The western region comprises of a faculty/staff colony, girl's hostels, a sports stadium and athletic tracks.

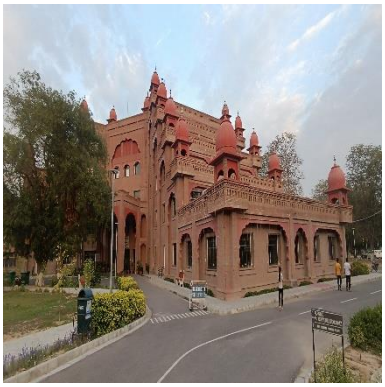
The southern region has boys' hostels, a water works area, and some sports facilities. The central region has a dispensary, student centre, open-air theatre, and shopping complex.

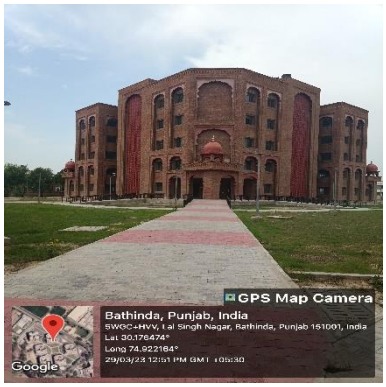
Detail of Infrastructure of University Campus				
S. No.	**Name of the Buildings**	**Year of Completion**	**Total no. of rooms**	**Total Constructed Area (in Sq. Ft.)**
1.	Administrative Block	2020	175	181077
2.	Lecture Theatre	2020	30	83850
3.	Library	2020	30	111018
4.	Academic Block	2020	440	298858
5.	Academic Buildings	Before 2006	73 Hall/ Labs, 98 rooms, 10 Toilet Block	310087
6.	P.G Lecture Hall Blocks	2011	8 Rooms	9472
7.	Gymnasium	Before 2006	01 Hall 2 Rooms	5167
8.	Dispensary	Before 2006	6 Rooms	2831
9.	Shopping Complex	Before 2006	(5 shops, ATM & Bank)	2088
10.	Student Centre	2017	6 Rooms, 4 Halls	18299
11.	Guest House	Before 2006	9 Rooms	2992
12.	Campus Director Residence	Before 2006	5 Rooms	2756
13.	Pump room at water treatment plant	Before 2006	2 Pump Chambers	3229
14.	P-Type Houses	Before 2006	4 room (each)	28793
15.	AP-Type Houses	Before 2006	4 room (each)	23390
16.	L-Type Houses	Before 2006	3 room (each)	48007
17.	C-Type Houses	Before 2006	3 room (each)	25198

Detail of Infrastructure of University Campus				
S. No.	**Name of the Buildings**	**Year of Completion**	**Total no. of rooms**	**Total Constructed Area (in Sq. Ft.)**
18.	D-Type Houses	Before 2006	2 Rooms	29999
19.	Boys Hostel No.1	Before 2006	Common room, 60 rooms, 1 mess hall	16393
20.	Boys Hostel No.2	Before 2006	Common room, 60 rooms, 1 mess hall	15145
21.	Boys Hostel No.3	Before 2006	Common room, 168 rooms, 1 mess hall	18083
22.	Boys Hostel No.4	Before 2006	Common room, 160 rooms, 1 mess hall	17567
23.	Boys Hostel No.5	2017	Common room, 140 rooms, 1 mess hall	17760
24.	Girls Hostel No. 1	Before 2006	Common room, 107 rooms, 1 mess hall	19203
25.	Girls Hostel No. 2	After 2006	Common room, 112 rooms, 1 mess hall	18643
Total Area of Building, m2				**121694**

Parameter	Area (in sq. ft)	Percentage of Area
Overall, Area of university	6385888	100%
Area covered by buildings	1309904	21%
Area under roads/ pavements	627729	10%
Green/ Landscaped area	4442337	70%


Percentage of Area
21%
10%
70%
Area covered by buildings
Area under roads/ pavements
Green/ Landscaped area

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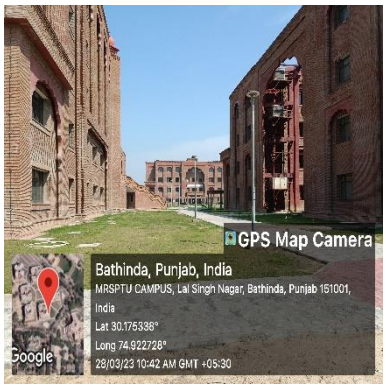
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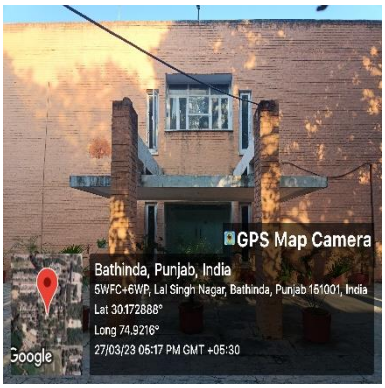
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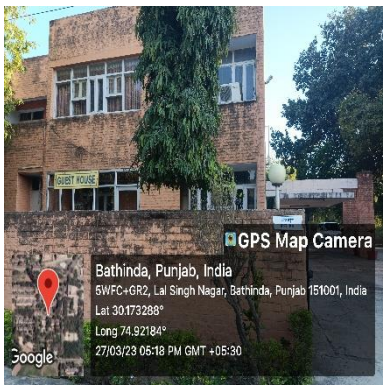
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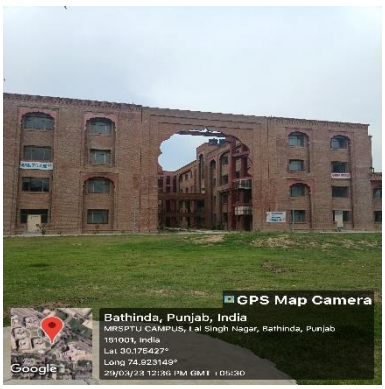
GPS Map Camera
Bathinda, Punjab, India
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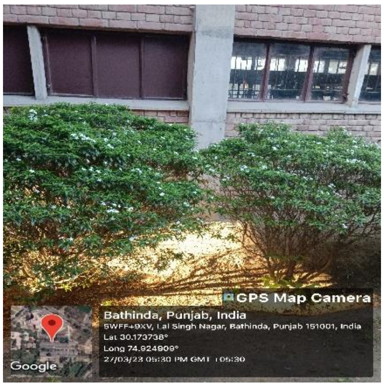
8.3 TREE DIVERSITY OF UNIVERSITY CAMPUS

S. No	Botanical Name	Common Name	Nos
1	Azadirachta indica	Neem	225
2	Tectona grandis	Burma dek	900
3	Dalbergia sissoo	Tahli	550
4	Saraca Indica	Ashoka	320
5	Albizia lebbeck	Siri	240
6	Pongamia Pinata	Sukh chain	98
7	Alstonia scholaris	Alstonia	70
8	Acacia nilotica	Acacia	210
9	Cassia Fistula	Amaltas	95
10	Epiphyllum oxypetalum	Queen flower	06
11	Delonix Regia	Gulmohar	35
12	Dendrocalamus Strictus	Bamboo	24
13	Emblica Officinalis	Amla	65
14	Mangigera Indica	Mango	80
15	Ficus Benghalensis	Bohar	25
16	Ficus Religiosa	Pipal	30
17	Morus Alba	Toot	140
18	Bauhinia variegata	Kachnar	80
19	Manilkara zapota	Safeda	65
20	Populus deltoides	Poplar	27
21	Prosopis cineraria	Jand	24
22	Areca catechu	Palm	80
23	Ficus benghalensis	Banyan	25
24	Toona ciliata	Toon	140
25	Mimusops elengi	Moulsari	13
26	Holoptelea integrifolia	Chilbil	03
27	Terminalia arjuna	Arjan	90
28	Syzygium cumini	Jamun	60
29	Acacia karoo	Kikar	170
30	Ficus racemosa	Gular	18
31	Neolamarckia cadamba	Kadam	02
32	Putranjiva roxburghii	Putranjiva	20
33	Vachellia nilotica	Pahaii kikar	220
34	Casuarina equisetifolia	Casuarina	08
35	Mangifera Indica	Amrapali Mango	146
36	Aegle marmelos	Bael	15
37	Cassia javanica	Cassia nadusa	25

S. No	Botanical Name	Common Name	Nos
38	Anthocephalus Kadamba	Kadamba	02
39	Tectona grandis	Teak	12
40	Ficus virens	Pilkhan	35
41	Pinus roxburghii	chil	01
42	Hibiscus syriacus	Hibiscus	30
43	Sesbania bispinosa	havelia	32
44	Jatropha curcas	Jatropha	85
45	Tecoma stans	Tecoma	60
46	Cascabela thevetia	Kaner	180
47	Psidium guajava	Guava	85
48	Tabernaemontana divaricata	Chandni	190
49	Ficus benjamina	Ficus	1100
50	Moringa Oleifera	Sohanjana	110
51	Citrus limon	lemon	22
52	*Melaleuca citrina*	Bottle brush	140
53	Punica granatum	pomegranate	14
54	Prunus domestica	Plum	20
55	Kajorina tapori	Tapori	08
56	Bambusa vulgaris	Bamboo	150
57	Thuja Orientalis	Mor pankh	86
58	Plumeria alba	Champa	36
59	Citrus deliciosa	Kinnow	15
60	Jacaranda mimosifolia	Jacaranda	30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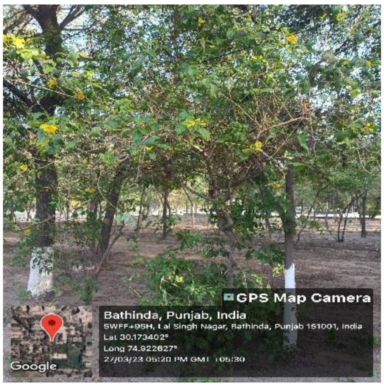
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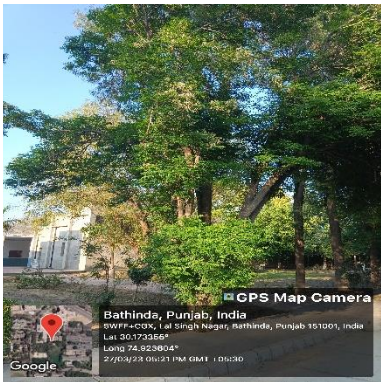
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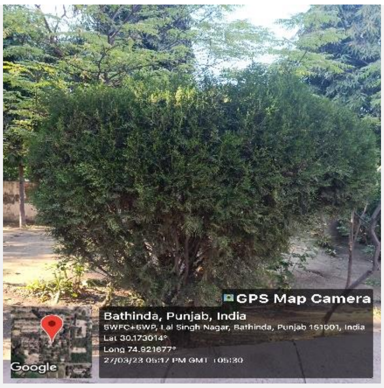
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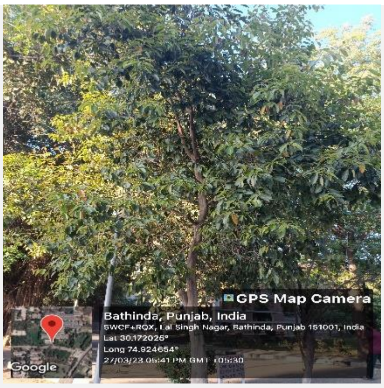
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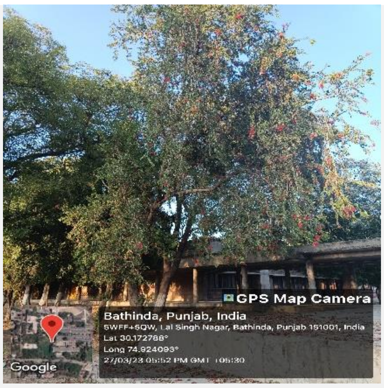
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Bathinda, Punjab, India
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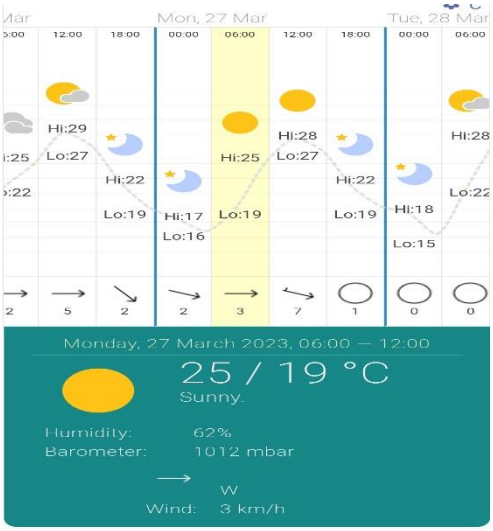
8.4 FAUNAL IN UNIVERSITY CAMPUS

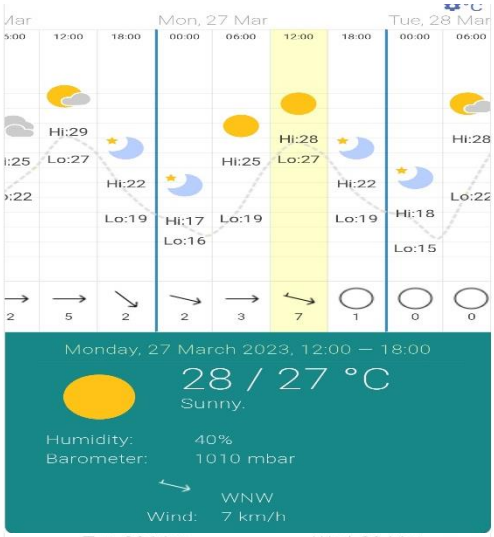
S. NO	COMMON NAME	SCIENTIFIC NAME	IMAGES
1	Dove	Colum Bidae	
2	Pigeon	Columbidae Livia	
3	Sparrow	Passer Domesticus	
4	Grey Crow	Corvous Tristis	

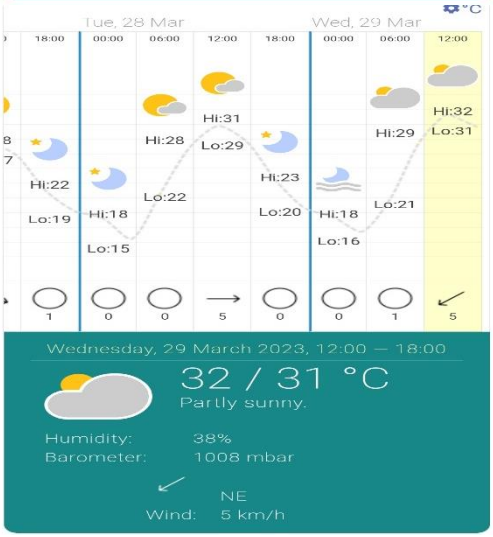
S. NO	COMMON NAME	SCIENTIFIC NAME	IMAGES
5	Green Parrot	Psittacula Eupatria	
6	yellow-billed babbler	Turdoides affinis	
7	squirrel	Sciuridae	
8	Myna	Acridotheres tristis	

9.0 WEATHER DATA OF UNIVERSITY

Weather data during the Green Audit period is as follows. (27th March 2023 to 29th March 2023).





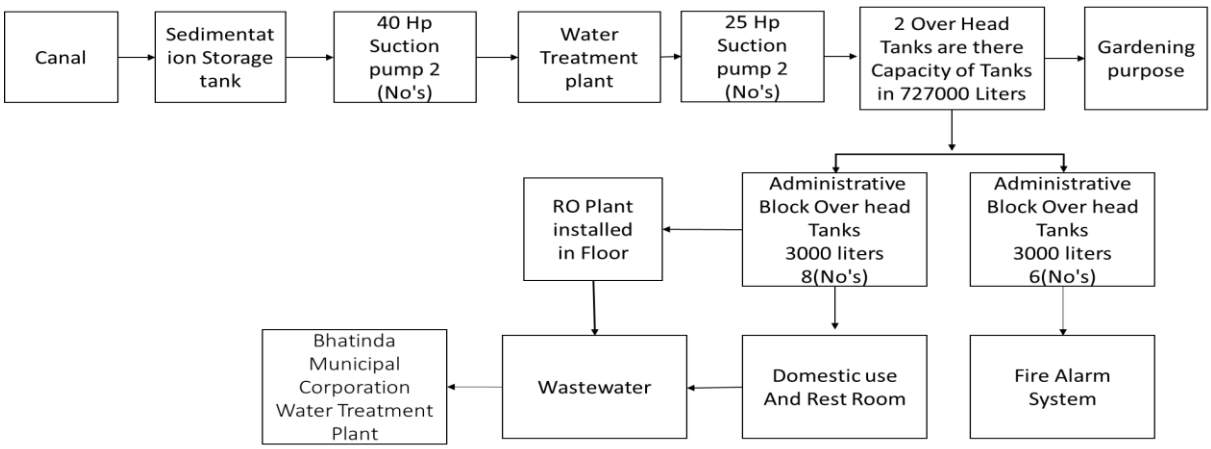


10.0 WATER AUDIT

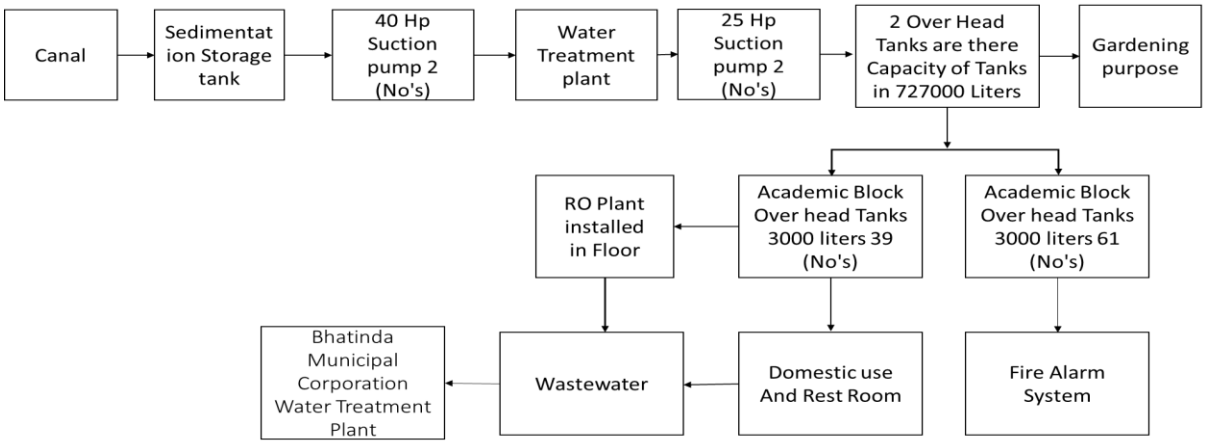
S. No	Parameters	Response
1	Source of water	Canal based
2	No of Wells	Nil
3	No of motors used	8
4	Overall average water consumption in the institution per day (in liters)	233750
5	Average drinking water consumption in the hostel per day (in liters)	20100
6	Average drinking water consumption in the college per day (in liters)	25178
7	Average Water consumption for washroom per day (in liters)	105000
8	Average Water consumption for gardening per day (in liters)	98000
9	Any water wastage	No
10	Whether wastewater from labs mixed with ground water	No
11	Rainwater harvests available. If yes, Mention number of units	15

10.1 DIFFERENT SOURCES OF WATER AND QUANTITY RECEIVED ON MONTHLY BASIS AND AREAS OF UTILIZATION

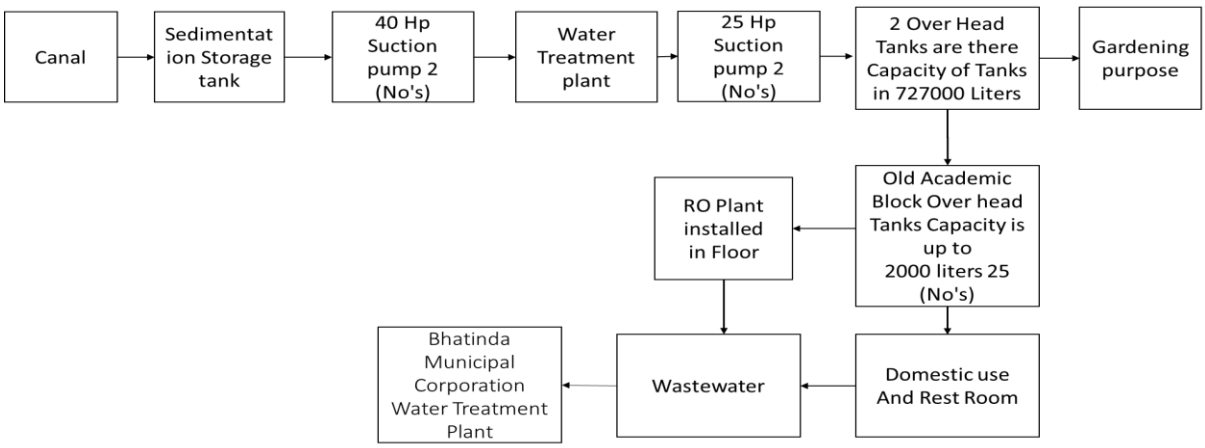
ADMINISTRATIVE BLOCK WATER RESOURCE LAYOUT



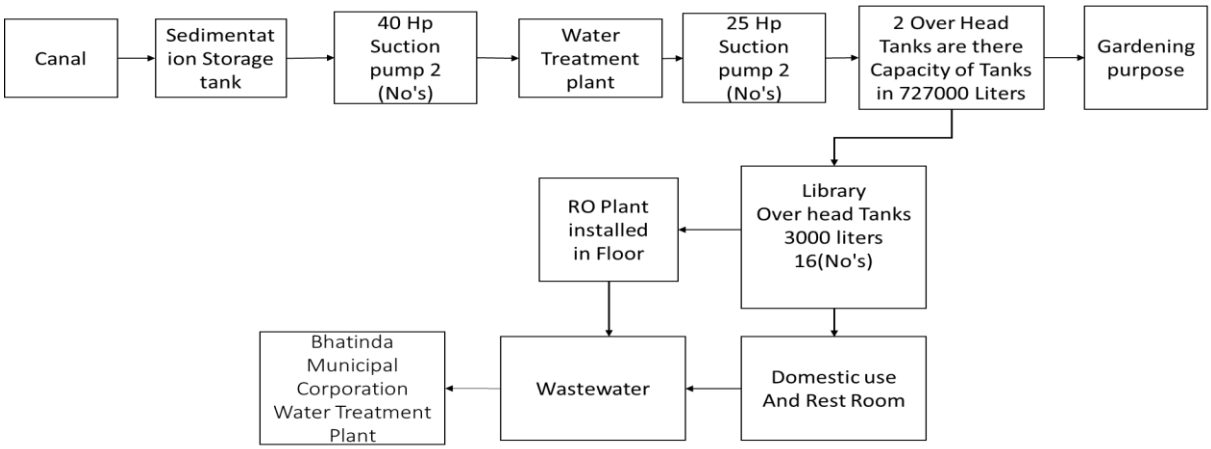
ACADEMIC BLOCK WATER RESOURCE LAYOUT



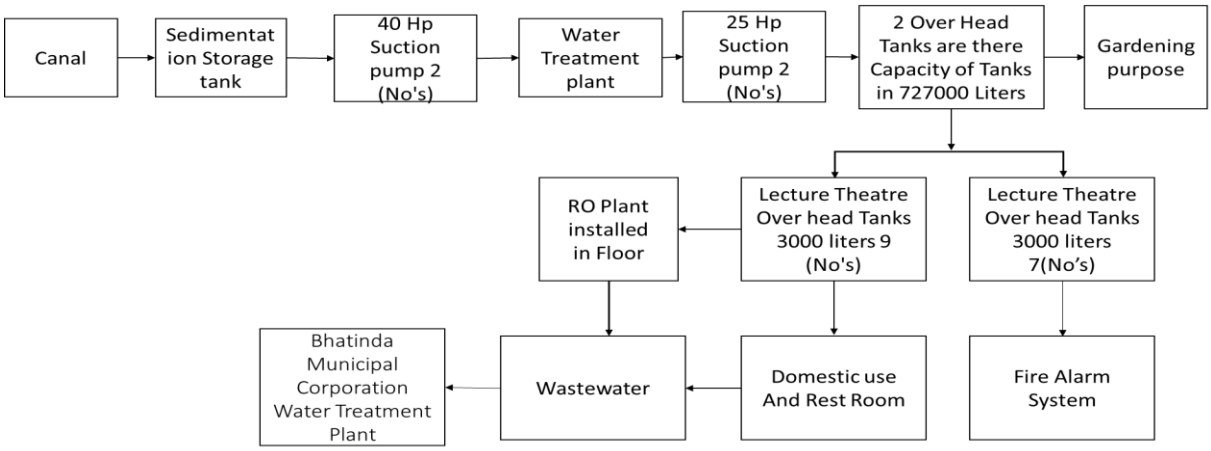
OLD ACADEMIC BLOCK WATER RESOURCE LAYOUT



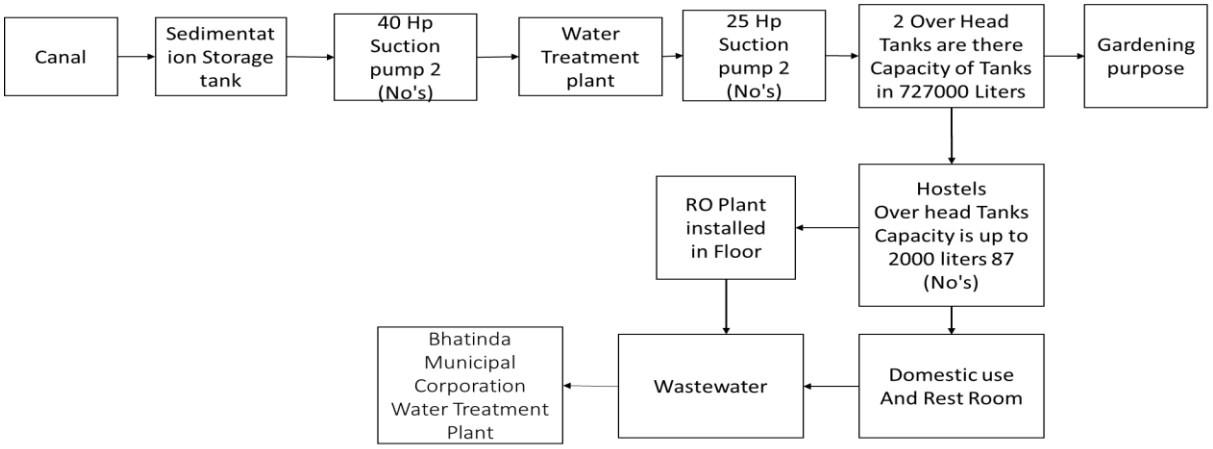
Library BLOCK WATER RESOURCE LAYOUT



Lecture Theatre BLOCK WATER RESOURCE LAYOUT



HOSTELS BLOCK WATER RESOURCE LAYOUT

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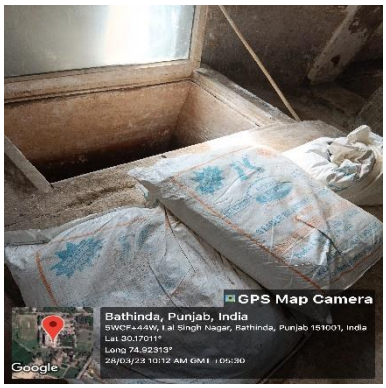
Google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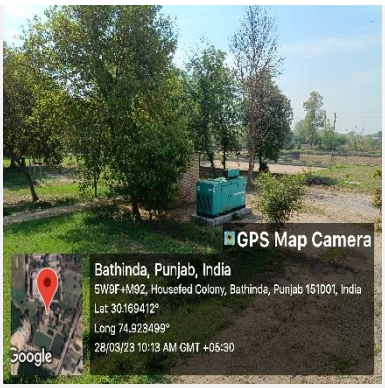
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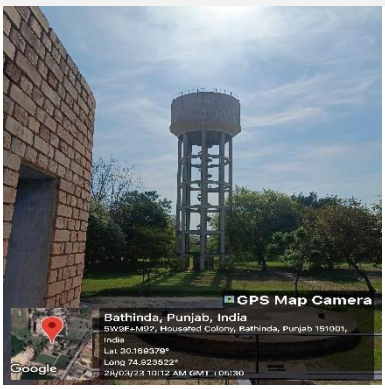
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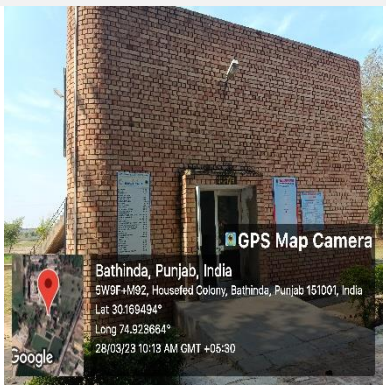
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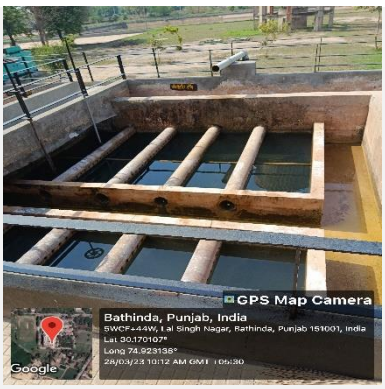
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Google

Report No.-DWTL/Bti/506/2021

DISTRICT WATER TESTING LABORATORY

(TECH. MISSION)

WATER SUPPLY AND SANITATION DEPTT.PUNJAB

ANALYSIS REPORT FOR PHYSICAL AND CHEMICAL TEST

EXAMINATION OF WATER SAMPLE

PARTICULARS OF SAMPLE

Name of Place	:- **Bathinda**	Whether water chlorination or Not :-	----
Block	:- Bathinda	Date of collection :-	29-06-2021
District	:- Bathinda	Name and designation of person :	Sh.Surjeet Singh
Source of sample	:- Water Sample from Water Works at MRSPTU	collecting sample	Pump Operator
Spring level (mt)/ft	:- ----	Date of receipt :-	29-06-2021
Depth level (mt)/ft	:- ----	Date of commencing examination :-	01-07-2021

	TEST RESULT	Permissible Limit	Permissible Limits(max)
Turbidity(JTU)	0.78	1.00	5.00
Colour(Unit on Pt-Co scale)	Colourless	5	15
Taste&Odour(Qualitative)	Ordinary	Agreeable	Agreeable
PH	7.54	6.5-8.5	No Relaxation
Total Dissolved Solids(mg/l)	158	500	2000
Total Alkalinity(CaCo3)mg/l	66	200	600
Total Hardness(CaCo3)mg/l	102	200	600
Calcium(Ca)mg/l	54	75	200
Magnesium(Mg)mg/l	16	30	100
Chlorides(Cl)mg/l	42	250	1000
Sulphates(SO4)mg/l	38	200	400
Flourides(F) mg/l	0.35	1.00	1.50
Nitrates(NC2)mg/l	8	45	No Relaxation
Iron(Fe)mg/l	0.02	0.03	1.00
Residual Chlorine mg/l	----	0.02	1.00
Bacteriological Test			
Coliform Organism MPN/100 ml	Not Detected		

REMARKS:-

Chemist
Distt. Water Testing Laboratory
W/S & Sanitation Department
Bathinda

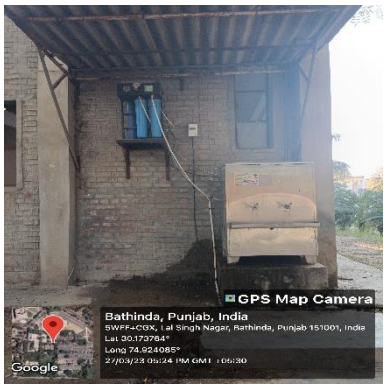
Note -The above conclusion is on the basis of avobe Parameter tested only

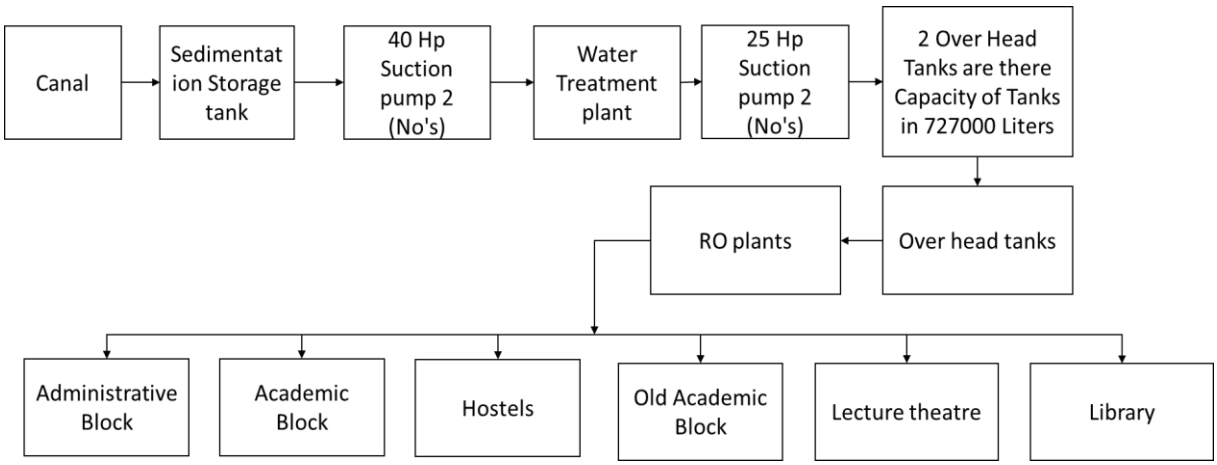
1. This report is not for legal purpose.
2. Whole sample consumed in testing.

Save Water, Every drop counts.

RO PLANT DETAILS

S. No	Description	Details
1	No of Ro plant installed in campus	17
2	No of 25 LPH Capacity RO plant installed in campus	3
3	No of 250 LPH Capacity RO plant installed in campus	4
4	No of 150 LPH Capacity RO plant installed in campus	10
5	Average drinking water consumption in the hostel per day (in litters)	20100
6	Average drinking water consumption in the college per day (in litters)	25178



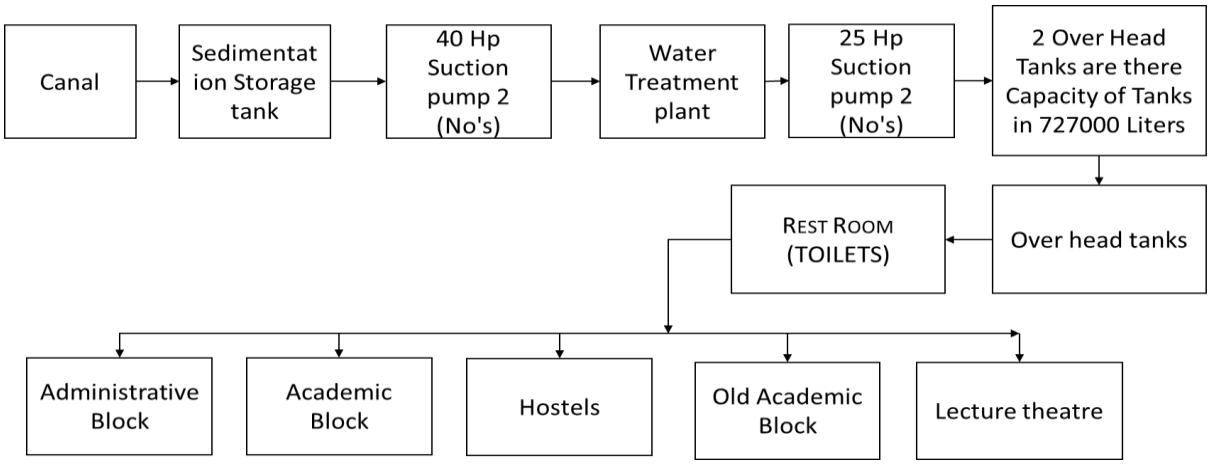


COOKING

LPG CYLINDER		
S. No	**Description**	**Details**
1	No of students in a hostel	821
2	Average LPG cylinder usage per day	7.66
3	Average LPG cylinder usage per month	227.67
4	Average LPG cylinder usage per Year	2745.06
5	Cost of one LPG cylinder	1150
6	Food wasted by students/staff per day	29

REST ROOM (TOILETS)

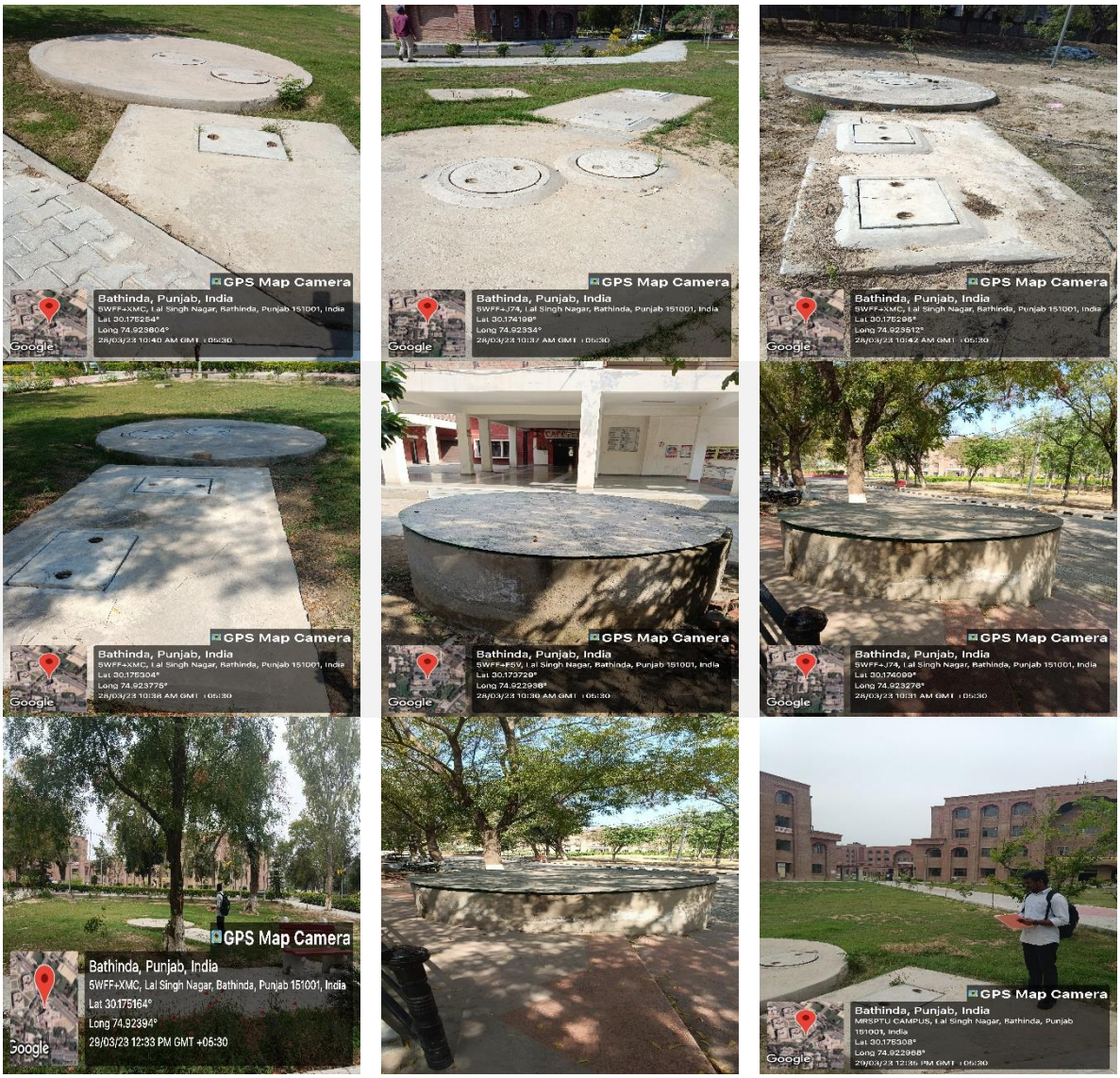
HYGIENIC MEASURES		
S. No	**Description**	**Details**
1	No of rest rooms available in the campus	704
2	Availability of lighting and ventilation facilities	YES
3	Frequency of cleaning the rest rooms per day / week	per day
4	Average Water consumption for washroom per day (in litters)	105000



10.2 WATER CONSERVATION FACILITIES AVAILABLE IN THE INSTITUTION

10.2.1 Rainwater harvesting

The campus has installed 15 rain harvesting pits. 10 rain harvesting pits in Administrative Block and New Academic Block another 5 in Old Academic Block. All 15 pits are rechargeable pits.

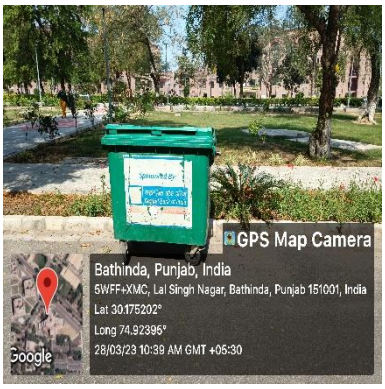


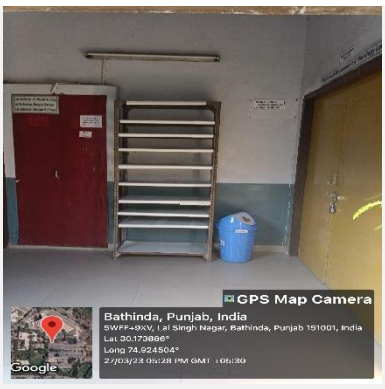
11.0 WASTE DISPOSAL UNIVERSITY

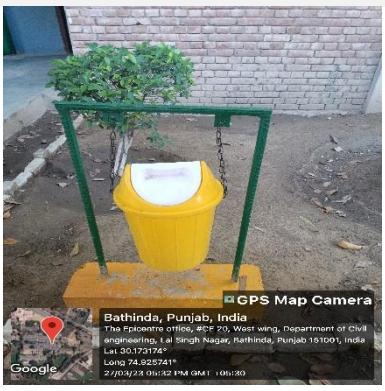
University is maintaining the different dust bins for different types of waste. Blue, yellow, and green dustbins are placed at different locations throughout the university Campus. These bins help with collecting the waste material in a segregated manner. Also, the garbage from different locations, such as hostels, the administrative block, the staff colony, etc., is collected on a daily basis in the morning.

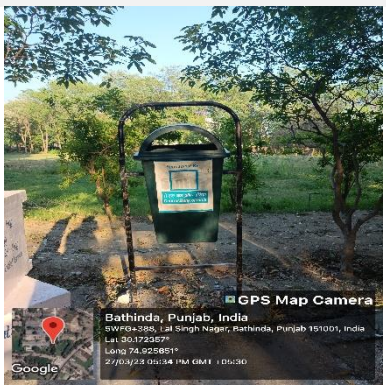
This segregated waste is then taken away by the Municipal Corporation and Bathinda workers by means of a truck on a daily basis from the university campus to further process the collected waste at their waste management plant located on the outskirts of the city. A copy of the agreement is attached.

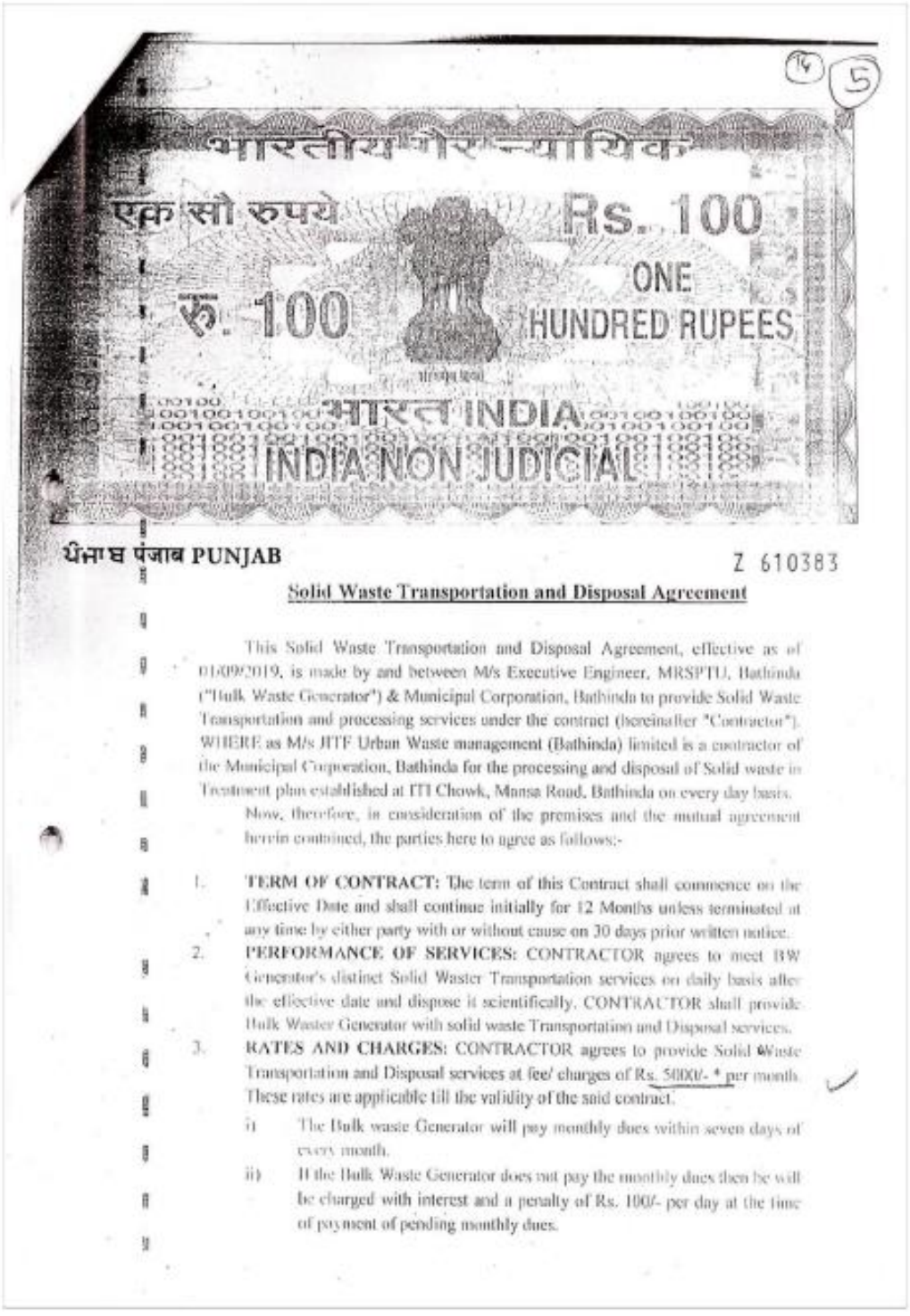
WASTE MANAGEMENT		
S. No	**Description**	**Details**
1	Waste disposal methods adopted and followed in the campus	Removed by Bhatinda Municipal Corporation
2	Way of disposing normal dry waste in the campus	Vermicompost
4	No of dustbins available in the campus	290
5	Food wasted by students/staff per day, kg	29











भारतीय गैर-न्यायिक

एक सौ रुपये Rs. 100

रु. 100 ONE HUNDRED RUPEES

भारत INDIA

INDIA NON JUDICIAL

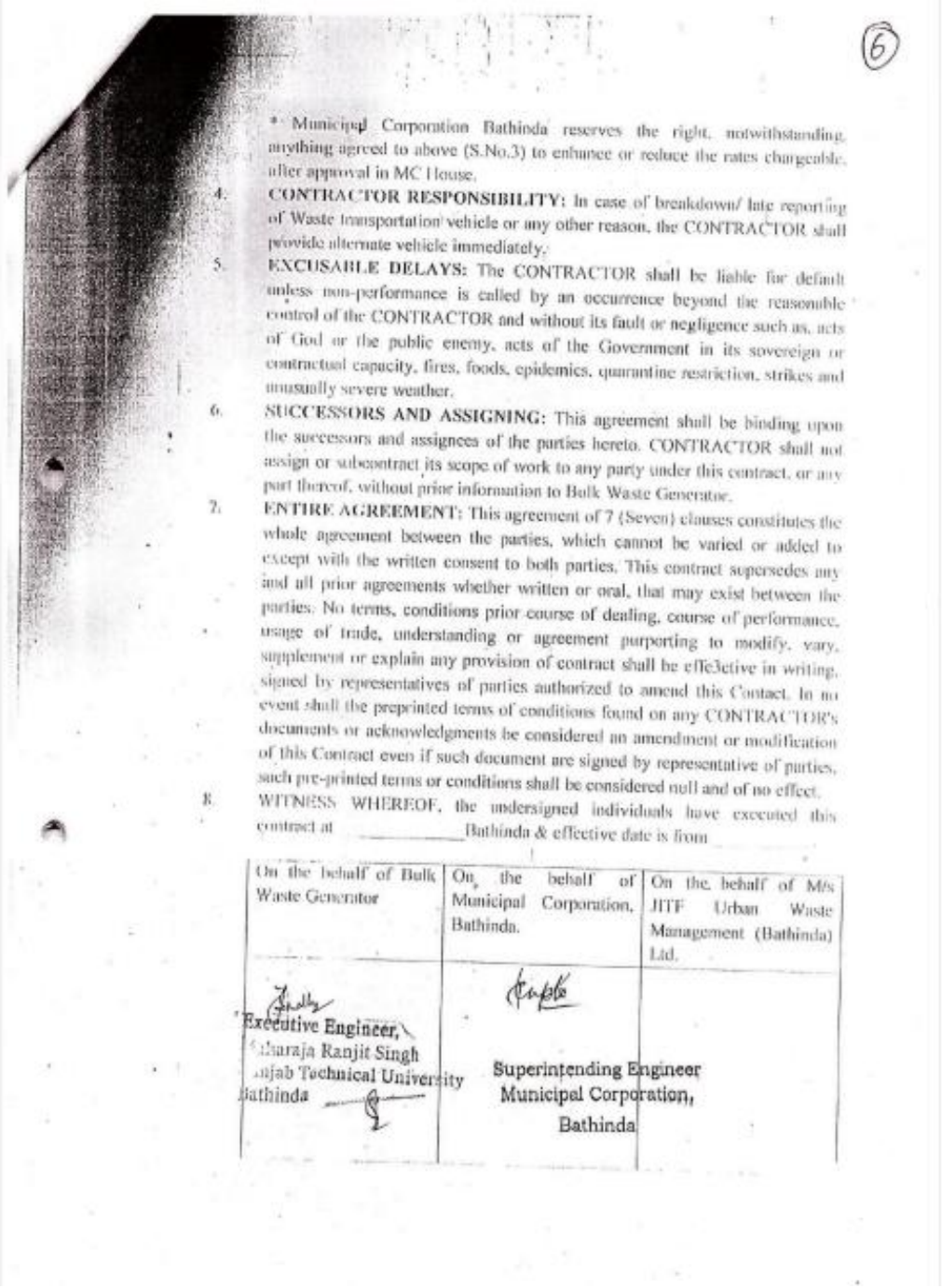
पंजाब PUNJAB Z 610383

Solid Waste Transportation and Disposal Agreement

This Solid Waste Transportation and Disposal Agreement, effective as of 01/09/2019, is made by and between M/s Executive Engineer, MRSPTU, Bathinda ("Bulk Waste Generator") & Municipal Corporation, Bathinda to provide Solid Waste Transportation and processing services under the contract (hereinafter "Contractor"). WHERE as M/s JITF Urban Waste management (Bathinda) limited is a contractor of the Municipal Corporation, Bathinda for the processing and disposal of Solid waste in Treatment plan established at ITI Chowk, Mansa Road, Bathinda on every day basis.

Now, therefore, in consideration of the premises and the mutual agreement herein contained, the parties here to agree as follows:-

1. **TERM OF CONTRACT:** The term of this Contract shall commence on the Effective Date and shall continue initially for 12 Months unless terminated at any time by either party with or without cause on 30 days prior written notice.
2. **PERFORMANCE OF SERVICES:** CONTRACTOR agrees to meet BW Generator's distinct Solid Waster Transportation services on daily basis after the effective date and dispose it scientifically. CONTRACTOR shall provide Bulk Waster Generator with solid waste Transportation and Disposal services.
3. **RATES AND CHARGES:** CONTRACTOR agrees to provide Solid Waste Transportation and Disposal services at fee/ charges of Rs. 5000/- * per month. These rates are applicable till the validity of the said contract.
   i) The Bulk waste Generator will pay monthly dues within seven days of every month.
   ii) If the Bulk Waste Generator does not pay the monthly dues then he will be charged with interest and a penalty of Rs. 100/- per day at the time of payment of pending monthly dues.



(6)

* Municipal Corporation Bathinda reserves the right, notwithstanding anything agreed to above (S.No.3) to enhance or reduce the rates chargeable, after approval in MC House.

4. **CONTRACTOR RESPONSIBILITY:** In case of breakdown/ late reporting of Waste transportation vehicle or any other reason, the CONTRACTOR shall provide alternate vehicle immediately.

5. **EXCUSABLE DELAYS:** The CONTRACTOR shall be liable for default unless non-performance is called by an occurrence beyond the reasonable control of the CONTRACTOR and without its fault or negligence such as, acts of God or the public enemy, acts of the Government in its sovereign or contractual capacity, fires, floods, epidemics, quarantine restriction, strikes and unusually severe weather.

6. **SUCCESSORS AND ASSIGNING:** This agreement shall be binding upon the successors and assignees of the parties hereto. CONTRACTOR shall not assign or subcontract its scope of work to any party under this contract, or any part thereof, without prior information to Bulk Waste Generator.

7. **ENTIRE AGREEMENT:** This agreement of 7 (Seven) clauses constitutes the whole agreement between the parties, which cannot be varied or added to except with the written consent to both parties. This contract supersedes any and all prior agreements whether written or oral, that may exist between the parties. No terms, conditions prior course of dealing, course of performance, usage of trade, understanding or agreement purporting to modify, vary, supplement or explain any provision of contract shall be effective in writing, signed by representatives of parties authorized to amend this Contact. In no event shall the preprinted terms of conditions found on any CONTRACTOR's documents or acknowledgments be considered an amendment or modification of this Contract even if such document are signed by representative of parties, such pre-printed terms or conditions shall be considered null and of no effect.

8. WITNESS WHEREOF, the undersigned individuals have executed this contract at _____Bathinda & effective date is from _____

On the behalf of Bulk Waste Generator	On the behalf of Municipal Corporation, Bathinda.	On the behalf of M/s JITF Urban Waste Management (Bathinda) Ltd.
Executive Engineer, Maharaja Ranjit Singh Punjab Technical University Bathinda	Superintending Engineer Municipal Corporation, Bathinda	

12.0 AIR QUALITY OF UNIVERSITY

The Air (Prevention and Control of Pollution) Act 1981 was enacted by the Central Government with the objective of arresting the deterioration of air quality. The Air (Prevention and Control of Pollution) Act 1981 describes the main functions of the Central Pollution Control Board (CPCB) as follows:

- To Advise the Central Government on any matter concerning the improvement of the quality the air and the prevention, control, and abatement of air pollution.
- To plan and cause to be executed a nation-wide programme for the prevention, control and abatement of air pollution.
- To provide technical assistance and guidance to the State Pollution Control Board.
- To carry out and sponsor investigations and research related to prevention, control and abatement of air pollution.
- To collect, compile and publish technical and statistical data related to air pollution; and
- To lay down and annul standards for the quality of air.

Particulate Matter (PM10 & PM2.5)

A mixture of particles with liquid droplets in the air forms particulate matter. PM 10 are particles that have a size of less than or equal to 10 microns whereas PM2.5 are ultra-fine particles having a size of less than or equal to 2.5 microns.

Sources:

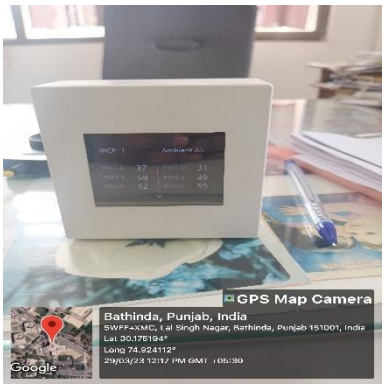
Particulate Matter is released from constructions, smoking, cleanings, renovations, demolitions, constructions, natural hazards such as earthquakes, volcanic eruptions, and emissions from industries such as brick kilns, paper & pulp, etc.

Related effects:

These particles, when inhaled, can penetrate deeper into the respiratory system, and cause respiratory ailments such as asthma, coughing, sneezing, irritation in the airways, eyes, nose, throat irritation, etc. Studies have also shown links between PM exposure and diabetes.

S. No	LOCATION	Air Quality level		
		PM 1.0	PM 2.5	PM 10
1	New Admin Block_ Ground Floor_ Admin-029.	33	47	58
2	New Admin Block_ Third Floor_ Secrecy Branch_ Admin-301.	38	59	71
3	New Admin Block_ Second Floor_ CDC_ Admin-213.	33	49	57
4	New Admin Block_ Second Floor_ CDC_ Admin-215.	32	46	58
5	New Admin Block_ Examination_ Admin-221.	34	50	60
6	New Admin Block_ Second Floor_ DEC Cell 40 Cm.	31	45	56
7	New Admin Block_ Second Floor_ Admin 202.	31	45	56
8	New Admin Block_ First Floor_ Admin-117.	32	51	62
9	New Admin Block_ First Floor_ Register Office Staff_ Admin-132.	32	49	62
10	New Admin Block_ First Floor_ Admin-141.	32	47	58
11	New Admin Block_ Ground Floor_ Admin-014.	28	46	55
12	New Admin Block_ Ground Floor_ Admin-024.	35	54	68
13	A-Block_ Ground Floor_ Wing-D_ Lecture Room_ A 015	34	54	65
14	A-Block_ Third Floor_ Wing-D_ Inorganic Chemistry Lab	34	52	62
15	A-Block_ First Floor_Wing-2_ UG Lab A 132	29	48	59
16	A-Block_ First Floor_Wing-2_ A 127	30	41	48
17	A-Block_ Second Floor_Wing-2_ A 226	31	49	60
18	B-Block_ Ground Floor_Wing-1_ B 014	29	49	55
19	B-Block_ Second Floor_Wing-2_ B 230	22	31	37
20	B-Block_ Second Floor_Wing-2_ B 224	25	38	46
21	B-Block_ Second Floor_Wing-2_ B 221	27	39	47
22	B-Block_ Third Floor_Wing-2_ B 325	26	40	45
23	B-Block _ Third Floor_ Wing-2_ B 313	25	38	42
24	B-Block_ First Floor_ Wing-2_ B 111	26	38	43
25	D-Block_ Ground Floor_Wing-1_ D 0009	27	40	51
26	D-Block_ First Floor_ Wing-1_ Studio-4	26	39	43
27	D-Block_ First Floor_ Wing-1_ Studio-3	26	40	41
28	D-Block_ Third Floor_ Wing-1_ D 312	24	32	36
29	D-Block_ Second Floor_ Wing-2_ D 233	27	39	41
30	C-Block_ First Floor_ Wing-1_ C 114	26	42	44
31	C-Block_ Second Floor_ Wing-1_ C 212	28	44	55
32	Department of ME_ Ground Floor_S2	24	34	35
33	Department of ME_ Ground Floor_ Hydraulic Machine Lab	28	42	46
34	Department of ME_ Ground Floor_M02	28	42	49
35	Department of ME_ Ground Floor_M04	28	41	47
36	Department of CE_ Ground Floor_ LA-1	26	40	45
37	Department of CE_ Ground Floor_ CE 03	25	36	41
38	Department of CE_ Ground Floor_ CE 10	26	39	48
39	Department of CE_ Ground Floor_ Concrete Lab	26	39	51
40	Department of EEE_ Ground Floor_ L1	26	40	48
41	Department of EEE_ Ground Floor_ L2	26	41	49
42	Department of EEE_ Ground Floor_ L3	27	43	47

S. No	LOCATION	Air Quality level		
		PM 1.0	PM 2.5	PM 10
43	Department of EEE_ Ground Floor_ L4	26	40	47
44	Department of EEE_ Ground Floor_ L5	24	43	49
45	Department of EEE_ Ground Floor_ L6	25	42	48
46	Department of EEE_ Ground Floor_ L7	26	43	49
47	Department of EEE_ Ground Floor_ L8	26	41	47
48	Department of EEE_ Ground Floor_ Control System Lab	26	39	46
49	Department of EEE_ Ground Floor_ A 115	23	34	36
50	Department of EEE_ Ground Floor_ A 114	33	33	35
51	Department of ECE_ Frist Floor_ A 223	26	40	44
52	Department of CSC_ Ground Floor_ B 106	26	35	39



13.0 NOISE LEVEL IN THE SURROUNDING OF UNIVERSITY

THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000

The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.

Ambient Air Quality Standards in respect of Noise

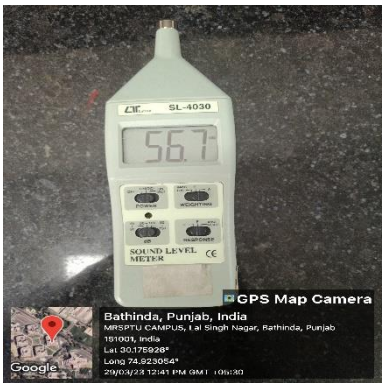
Area Code	Category Of Area/Zone	Limits In dB(A) Leq*	
		Day Time	Night-time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

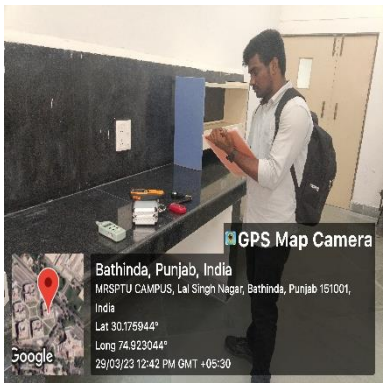
Note: -

1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
2. Night-time shall mean from 10.00 p.m. to 6.00 a.m.
3. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places, or any other area which is declared as such by the competent authority.
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
5. * dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.
6. A “decibel” is a unit in which noise is measured.
7. “A”, in dB(A) Leq, denotes the frequency weighting in the measurement of
8. noise and corresponds to frequency response characteristics of the human ear.
9. Leq: It is an energy mean of the noise level over a specified period.

S. No	LOCATION	Noise Level dB
1	New Admin Block_ Ground Floor_ Admin-029.	89.3
2	New Admin Block_ Third Floor_ Secrecy Branch_ Admin-301.	69.7
3	New Admin Block_ Second Floor_ CDC_ Admin-213.	62.7
4	New Admin Block_ Second Floor_ CDC_ Admin-215.	60.2
5	New Admin Block_ Examination_ Admin-221.	67.2
6	New Admin Block_ Second Floor_ DEC Cell 40 Cm.	68.6
7	New Admin Block_ Second Floor_ Admin 202.	68.6
8	New Admin Block_ First Floor_ Admin-117.	61.3
9	New Admin Block_ First Floor_ Register Office Staff_ Admin-132.	62.1
10	New Admin Block_ First Floor_ Admin-141.	66.6
11	New Admin Block_ Ground Floor_ Admin-014.	60.4
12	New Admin Block_ Ground Floor_ Admin-024.	66.9
13	A-Block_ Ground Floor_ Wing-D_ Lecture Room_ A 015	64.8
14	A-Block_ Third Floor_ Wing-D_ Inorganic Chemistry Lab	65.2
15	A-Block_ First Floor_Wing-2_ UG Lab A 132	68.4
16	A-Block_ First Floor_Wing-2_ A 127	61.5
17	A-Block_ Second Floor_Wing-2_ A 226	63.2
18	B-Block_ Ground Floor_Wing-1_ B 014	64.8
19	B-Block_ Second Floor_Wing-2_ B 230	62.4
20	B-Block_ Second Floor_Wing-2_ B 224	60.2
21	B-Block_ Second Floor_Wing-2_ B 221	66.6
22	B-Block_ Third Floor_Wing-2_ B 325	67.1
23	B-Block _ Third Floor_ Wing-2_ B 313	59.0
24	B-Block_ First Floor_ Wing-2_ B 111	60.0
25	D-Block_ Ground Floor_Wing-1_ D 0009	62.9
26	D-Block_ First Floor_ Wing-1_ Studio-4	60.3
27	D-Block_ First Floor_ Wing-1_ Studio-3	60.9
28	D-Block_ Third Floor_ Wing-1_ D 312	60.0
29	D-Block_ Second Floor_ Wing-2_ D 233	62.3
30	C-Block_ First Floor_ Wing-1_ C 114	62.2
31	C-Block_ Second Floor_ Wing-1_ C 212	62.6
32	Department of ME_ Ground Floor_S2	66.3
33	Department of ME_ Ground Floor_ Hydraulic Machine Lab	63.2
34	Department of ME_ Ground Floor_M02	66.0
35	Department of ME_ Ground Floor_M04	60.5
36	Department of CE_ Ground Floor_ LA-1	69.0
37	Department of CE_ Ground Floor_ CE 03	63.3
38	Department of CE_ Ground Floor_ CE 10	63.2
39	Department of CE_ Ground Floor_ Concrete Lab	64.0
40	Department of EEE_ Ground Floor_ L1	62.0
41	Department of EEE_ Ground Floor_ L2	62.5

S. No	LOCATION	Noise Level dB
42	Department of EEE_ Ground Floor_ L3	61.0
43	Department of EEE_ Ground Floor_ L4	70.0
44	Department of EEE_ Ground Floor_ L5	63.0
45	Department of EEE_ Ground Floor_ L6	61.0
46	Department of EEE_ Ground Floor_ L7	69.0
47	Department of EEE_ Ground Floor_ L8	62.0
48	Department of EEE_ Ground Floor_ Control System Lab	65`
49	Department of EEE_ Ground Floor_ A 115	67.4
50	Department of EEE_ Ground Floor_ A 114	62.6
51	Department of ECE_ Frist Floor_ A 223	60.2
52	Department of CSC_ Ground Floor_ B 106	67.0





14.0 LUX LEVEL

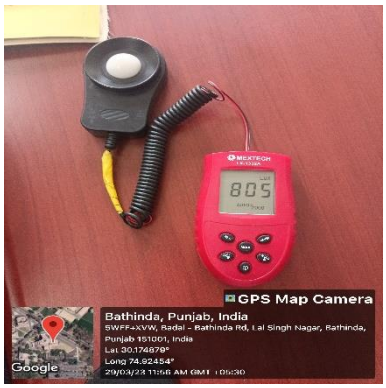
The lux level survey is carried out in various location of campus and details are as follows.

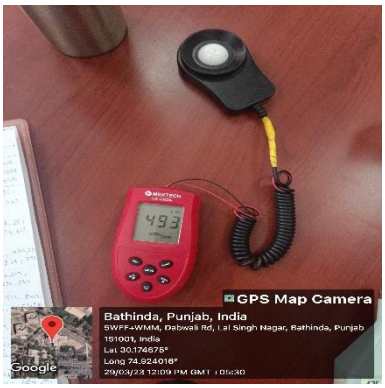
S. No	LOCATION	Average Lux level
1	New Admin Block_ Ground Floor_ Admin-029.	664
2	New Admin Block_ Third Floor_ Secrecy Branch_ Admin-301.	335
3	New Admin Block_ Second Floor_ CDC_ Admin-213.	443
4	New Admin Block_ Second Floor_ CDC_ Admin-215.	346
5	New Admin Block_ Examination_ Admin-221.	315
6	New Admin Block_ Second Floor_ DEC Cell 40 Cm.	485
7	New Admin Block_ Second Floor_ Admin 202.	475
8	New Admin Block_ First Floor_ Admin-117.	478
9	New Admin Block_ First Floor_ Register Office Staff_ Admin-132.	477
10	New Admin Block_ First Floor_ Admin-141.	341
11	New Admin Block_ Ground Floor_ Admin-014.	471
12	New Admin Block_ Ground Floor_ Admin-024.	482
13	A-Block_ Ground Floor_ Wing-D_ Lecture Room_ A 015	798
14	A-Block_ Third Floor_ Wing-D_ Inorganic Chemistry Lab	746
15	A-Block_ First Floor_Wing-2_ UG Lab A 132	474
16	A-Block_ First Floor_Wing-2_ A 127	536
17	A-Block_ Second Floor_Wing-2_ A 226	891
18	B-Block_ Ground Floor_Wing-1_ B 014	382
19	B-Block_ Second Floor_Wing-2_ B 230	356
20	B-Block_ Second Floor_Wing-2_ B 224	533
21	B-Block_ Second Floor_Wing-2_ B 221	619
22	B-Block_ Third Floor_Wing-2_ B 325	672
23	B-Block _ Third Floor_ Wing-2_ B 313	255
24	B-Block_ First Floor_ Wing-2_ B 111	278
25	D-Block_ Ground Floor_Wing-1_ D 0009	428
26	D-Block_ First Floor_ Wing-1_ Studio-4	762
27	D-Block_ First Floor_ Wing-1_ Studio-3	762
28	D-Block_ Third Floor_ Wing-1_ D 312	546
29	D-Block_ Second Floor_ Wing-2_ D 233	600
30	C-Block_ First Floor_ Wing-1_ C 114	806
31	C-Block_ Second Floor_ Wing-1_ C 212	170
32	Department of ME_ Ground Floor_S2	111
33	Department of ME_ Ground Floor_ Hydraulic Machine Lab	110
34	Department of ME_ Ground Floor_M02	559
35	Department of ME_ Ground Floor_M04	124
36	Department of CE_ Ground Floor_ LA-1	71
37	Department of CE_ Ground Floor_ CE 03	84

S. No	LOCATION	Average Lux level
38	Department of CE_ Ground Floor_ CE 10	147
39	Department of CE_ Ground Floor_ Concrete Lab	145
40	Department of EEE_ Ground Floor_ L1	62
41	Department of EEE_ Ground Floor_ L2	58
42	Department of EEE_ Ground Floor_ L3	63
43	Department of EEE_ Ground Floor_ L4	62
44	Department of EEE_ Ground Floor_ L5	63
45	Department of EEE_ Ground Floor_ L6	56
46	Department of EEE_ Ground Floor_ L7	64
47	Department of EEE_ Ground Floor_ L8	65
48	Department of EEE_ Ground Floor_ Control System Lab	56
49	Department of EEE_ Ground Floor_ A 115	87
50	Department of EEE_ Ground Floor_ A 114	50
51	Department of ECE_ Frist Floor_ A 223	102
52	Department of CSC_ Ground Floor_ B 106	42

Remarks:

It is observed that the lux level is good in campus. Only few areas lux level needs to be improved by adding addition light.





15.0 ENERGY AUDIT

The Maharaja Ranjit Singh Punjab Technical University is getting 11kV power supply from PSPCL (Punjab State Power Corporation Limited). The account number of the supply connection is 50213293251. The contract demand for this facility is 1629.8 kVA.

15.1 PRESENT ELECTRICAL ENERGY SYSTEM AND ELECTRICAL BILL ANALYSIS

Source of Electricity - 1

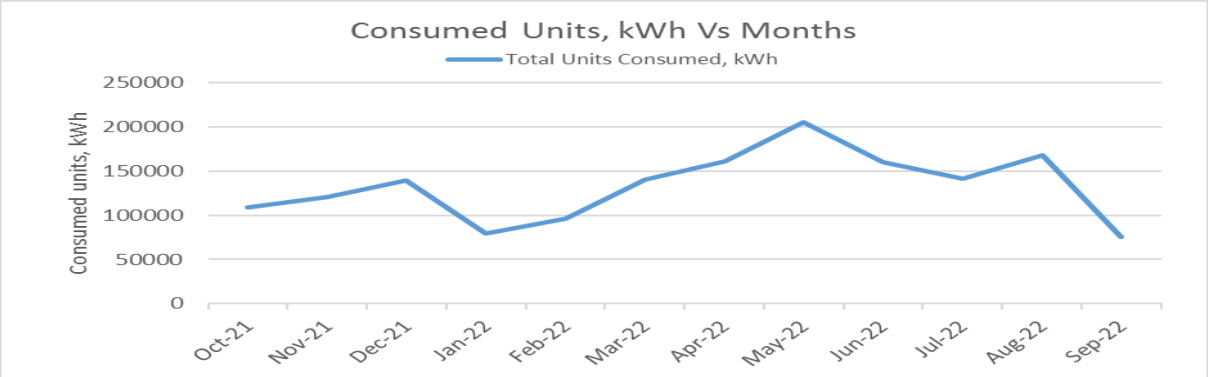
The university receives HT EB supply from PSPCL. The HT Supply details as follows.

Source Of Power Supply	**:**	**PSPCL**
Electric Power Supply is received from PSPCL	:	HT supply
Service number	:	50213293251
Sanction Load, kVA	:	1629.8
Annual Electricity Consumption, kVAh	:	137061
Unit charges, INR/kWh	:	6.63

The one-year Electricity Bills for 2021-22 bill has been analysed and details as follows.

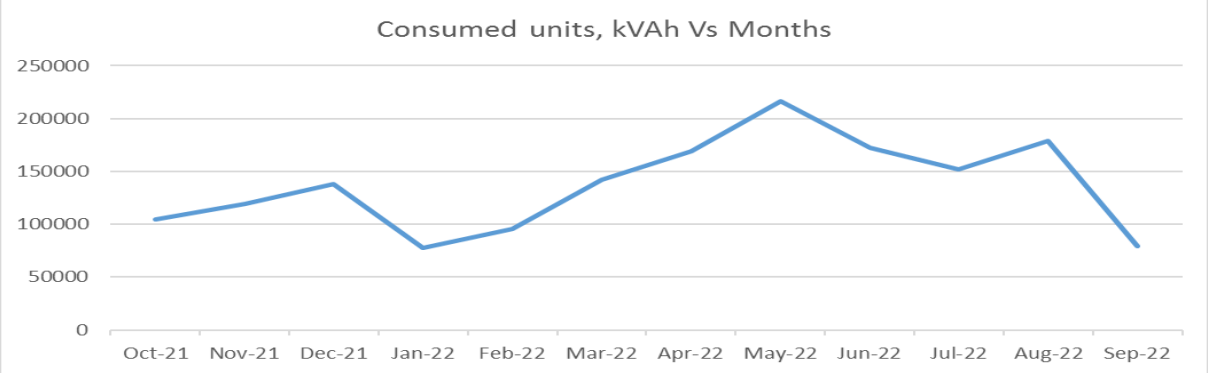
Month	Sanctioned demand, kVA	80% of Contract Demand (KVA)	Total Units Consumed, kVAh	Total Units Consumed, kWh	Electricity consumption charges, INR	Solar Energy consumed, kwh	Solar Energy Charges, INR	Electricity consumption charges, INR
Oct-21	1629.8	1303.8	104150	108690	401180	77210	256337	401180
Nov-21	1629.8	1303.8	119306	120770	664990	58280	193490	664990
Dec-21	1629.8	1303.8	138253	139546	918580	47616	158085	918580
Jan-22	1629.8	1303.8	77603	79014	289730	64254	213323	289730
Feb-22	1629.8	1303.8	95603	96651	261410	84271	279780	261410
Mar-22	1629.8	1303.8	142237	140726	408210	108966	361767	408210
Apr-22	1629.8	1303.8	168699	160788	772140	93808	311443	772140
May-22	1629.8	1303.8	216277	205463	541060	101519	337043	541060
Jun-22	1629.8	1303.8	172076	160023	916950	75973	252230	916950
Jul-22	1629.8	1303.8	152222	141134	564400	104994	348580	564400
Aug-22	1629.8	1303.8	179009	167990	798180	100750	334490	798180
Sep-22	1629.8	1303.8	79302	75232	415660	37192	123477	415660

The units, kWh consumed over the period of one year is shown below.



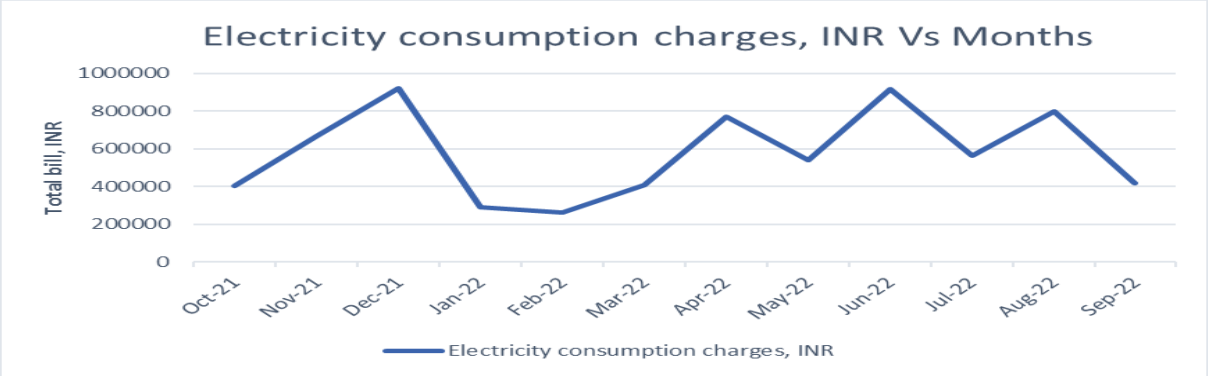
The maximum unit is consumed in the month of May 2022 and minimum unit is consumed in the month of September 2022.

The units, kVAh consumed over the period of one year is shown below.



The maximum unit is consumed in the month of May 2022 and minimum unit is consumed in the month of September 2022.

The bill details over the period of one year is shown below.



The maximum bill is paid in the month of December 2021 and minimum in the month of February 2022.

16.0 LIGHT DETAILS

The light details of the campus are as follows.

S. NO	NAME OF THE BLOCK	FLOOR	TYPE OF LIGHT	NO OF LIGHTS	WATTAGE
1	Admin	GF, FF, SF, TF, 4TH	2x2 LED	833	36
2		GF, FF, SF, TF, 4TH	TB LED	27	20
3		GF, FF, SF, TF, 4TH	4*1 LED	484	36
4		GF, FF, SF, TF, 4TH	LED	7	15
5		GF, FF, SF, TF, 4TH	LED	59	18
6		GF, FF, SF, TF, 4TH	LED	159	15
7		GF, FF, SF, TF, 4TH	LED	380	15
8		GF, FF, SF, TF, 4TH	LED	21	10
9	BLOCK- B	GF, FF, SF & TF	LED	452	36
10		GF, FF, SF & TF	LED	10	20
11		GF, FF, SF & TF	LED	108	36
12		GF, FF, SF & TF	LED	134	15
13		GF, FF, SF & TF	LED	46	18
14		GF, FF, SF & TF	LED	97	15
15		GF, FF, SF & TF	LED	44	15
16		GF, FF, SF & TF	LED	14	10
17	BLOCK- A	GF, FF, SF & TF	LED	370	36
18		GF, FF, SF & TF	LED	19	20
19		GF, FF, SF & TF	LED	212	36
20		GF, FF, SF & TF	LED	131	15
21		GF, FF, SF & TF	LED	44	18
22		GF, FF, SF & TF	LED	106	15
23		GF, FF, SF & TF	LED	39	15
24		GF, FF, SF & TF	LED	14	10
25	BLOCK- D	GF, FF, SF & TF	LED	446	36
26		GF, FF, SF & TF	LED	24	20
27		GF, FF, SF & TF	LED	178	36
28		GF, FF, SF & TF	LED	66	15
29		GF, FF, SF & TF	LED	26	18
30		GF, FF, SF & TF	LED	80	15
31		GF, FF, SF & TF	LED	34	15
32		GF, FF, SF & TF	LED	14	10
33	BLOCK- C	GF, FF, SF & TF	LED	317	36
34		GF, FF, SF & TF	LED	12	20
35		GF, FF, SF & TF	LED	292	36
36		GF, FF, SF & TF	LED	114	15
37		GF, FF, SF & TF	LED	40	18
38		GF, FF, SF & TF	LED	100	15

S. NO	NAME OF THE BLOCK	FLOOR	TYPE OF LIGHT	NO OF LIGHTS	WATTAGE
39		GF, FF, SF & TF	LED	50	15
40		GF, FF, SF & TF	LED	14	10
41	VC RESIDENCE	GF & FF	LED	45	20
42		GF & FF	LED	32	15
43		GF & FF	LED	83	6
44	SUBSTAION	GF	LED	23	20
45	MAIN GATE NO 2	GF	LED	8	36
46		GF	LED	3	15
47	LECTURE THEATRE	GF, FF, SF, TF, 4th	LED	25	20
48		GF, FF, SF, TF, 4th	LED	500	36
49		GF, FF, SF, TF, 4th	LED	20	18
50		GF, FF, SF, TF, 4th	LED	78	15
51		GF, FF, SF, TF, 4th	LED	273	15
52		GF, FF, SF, TF, 4th	LED	18	10
53	LIBRARY	GF, FF, SF, TF, 4th & 5TH	LED	830	36
54		GF, FF, SF, TF, 4th & 5TH	LED	18	20
55		GF, FF, SF, TF, 4th & 5TH	LED	207	36
56		GF, FF, SF, TF, 4th & 5TH	LED	25	15
57		GF, FF, SF, TF, 4th & 5TH	LED	28	18
58		GF, FF, SF, TF, 4th & 5TH	LED	128	15
59		GF, FF, SF, TF, 4th & 5TH	LED	191	15
60		GF, FF, SF, TF, 4th & 5TH	LED	20	10
61	ANIMAL HOUSE	GF	LED	22	20
62		GF	LED	2	18
63		GF	LED	27	15
64	LINKING CORRIDOOR	GF	LED	79	15
65	OPEN YARD & PARKING MRSPTU	GF	LED	164	72
66	OPEN YARD & PARKING MRSPTU	GF	LED	135	45
67	ADMIN BLOCK GZSCET	GF, FF, SF	FLUORESCENT TUBE LIGHT	414	40
68	ADMIN BLOCK GZSCET	GF, FF, SF	FLUORESCENT TUBE LIGHT	85	80
69	ADMIN NEW BLOCK GZSCET	GF, FF, SF	FLUORESCENT TUBE LIGHT	152	40
70	civil extension right side	GF	FLUORESCENT TUBE LIGHT	52	40
71	civil extension right side	GF	FLUORESCENT TUBE LIGHT	15	80
72	GYM	GF	FLUORESCENT TUBE LIGHT	23	40
73	GYM	GF	FLUORESCENT TUBE LIGHT	32	80

S. NO	NAME OF THE BLOCK	FLOOR	TYPE OF LIGHT	NO OF LIGHTS	WATTAGE
74	MECHNICAL ENGG-1	GF	FLUORESCENT TUBE LIGHT	151	40
75	MECHNICAL ENGG-1	GF	FLUORESCENT TUBE LIGHT	34	18
76	MECHNICAL ENGG-1	GF	LED	13	15
77	ME -II	GF	FLUORESCENT TUBE LIGHT	242	40
78	WORKSHOP	GF	FLUORESCENT TUBE LIGHT	32	40
79	WORKSHOP	GF	FLUORESCENT TUBE LIGHT	91	80
80	POWER LAB	GF	FLUORESCENT TUBE LIGHT	28	80
81	CIVIL ENGG DEPTT.	GF	FLUORESCENT TUBE LIGHT	153	40
82	APLIED SCIENCE	GF	FLUORESCENT TUBE LIGHT	217	40
83	PG BLOCK	GF	CFL	137	30
84	PG BLOCK CORRIDOOR	GF	CFL	10	22
85	HOSTEL -1	GF, FF, SF	FLUORESCENT TUBE LIGHT	100	40
86	HOSTEL -1	GF, FF, SF	LED TUBE	78	22
87	HOSTEL -2	GF, FF, SF	FLUORESCENT TUBE LIGHT	110	40
88	HOSTEL -2	GF, FF, SF	LED TUBE	64	22
89	HOSTEL -3	GF, FF, SF	FLUORESCENT TUBE LIGHT	120	40
90	HOSTEL -3	GF, FF, SF	LED TUBE	50	22
91	HOSTEL -4	GF, FF, SF	FLUORESCENT TUBE LIGHT	220	40
92	HOSTEL -4	GF, FF, SF	LED TUBE	53	22
93	GIRL HOSTEL-1		FLUORESCENT TUBE LIGHT	200	40
94	GIRL HOSTEL-1		LED LAMP	37	20
95	GIRL HOSTEL -2		FLUORESCENT TUBE LIGHT	202	40
96	GIRL HOSTEL -2		LED LAMP	250	20
97	GUEST HOUSE	GF, FF	FLUORESCENT TUBE LIGHT	43	40
98	GUEST HOUSE	GF, FF	FLUORESCENT TUBE LIGHT	10	80
99	GUEST HOUSE	GF, FF	FLUORESCENT TUBE LIGHT	4	20
100	DIRECTOR RESIDENCE	GF, FF	FLUORESCENT TUBE LIGHT	6	20

S. NO	NAME OF THE BLOCK	FLOOR	TYPE OF LIGHT	NO OF LIGHTS	WATTAGE
101	DISPENSRY	GF	FLUORESCENT TUBE LIGHT	21	40
102	WATER WORKS	GF	FLUORESCENT TUBE LIGHT	6	40
103	HOSTEL NO 5	GF, FF, SF, TF,4TH, 5TH	CONCEALED DOWN LIGHT	14	36
104	HOSTEL NO 5	GF, FF, SF, TF,4TH, 5TH	HPSV	36	150
105	HOSTEL NO 5	GF, FF, SF, TF,4TH, 5TH	T-5	783	28
106	HOSTEL NO 5	GF, FF, SF, TF,4TH, 5TH	CFL	361	22
107	GLOB LIGHT	GF	LED	138	20
108	STREETLIGHT	GF	LED	100	20
109	PLAYGROUND	GF	MH	15	400
110	STUDENT CENTRE	GF, FF	T-5 FLUORESCENT TUBE LIGHT	92	28
111	STUDENT CENTRE	GF, FF	LED	4	20
112	STUDENT CENTRE	GF, FF	LED BLUB	25	18
113	STUDENT CENTRE	GF, FF	MIRRON LIGHT FLUORSCENT	67	44
114	CLASSROOM	GF	FLUORESCENT TUBE LIGHT	64	40
115	Admin Block GZSCCET	GF	T-5 FLUORESCENT TUBE LIGHT	14	20
116	Admin Block GZSCCET	FF	LED Down Lighter	8	20
117	Admin Block GZSCCET	3rd F	LED Down Lighter	10	20
118	Admin Block GZSCCET	3rd F	LED Down Lighter	6	20
119	Admin Block GZSCCET	3rd F	LED Down Lighter	6	20
120	Admin Block GZSCCET	3rd F	LED Down Lighter	12	20
121	Mechanical Engg Dept.	GF	LED Down Lighter	12	20
122	Mechanical Engg Dept.	GF	LED Down Lighter	8	20
123	Mechanical Engg Dept.	GF	LED Down Lighter	2	20
Total No of Lights					**13833**

17.0 FAN DETAILS

17.1 CEILING FAN DETAILS

S. NO	NAME OF THE BLOCK	FLOOR	NO OF FANS	WATTAGE
2	ADMIN BLOCK	GF, FF, SF, TF, 4TH	463	50
3	BLOCK -B	GF, FF, SF, TF	277	50
4	BLOCK -A	GF, FF, SF, TF	267	50
5	BLOCK -D	GF, FF, SF, TF	300	50
6	BLOCK -C	GF, FF, SF, TF	281	50
7	VC RESIDENCE	GF, FF	29	50
8	SUBSTATION	GF	6	50
9	MAIN GATE NO 2	GF	4	50
10	LECTURE THEATRE	GF, FF, SF, TF, 4TH	406	50
11	LIBRARY	GF, FF, SF, TF, 4TH	339	50
12	ANIMAL HOUSE	GF	13	50
13	ADMIN BLOCK GZSCET	GF, FF, SF	42	65
14	ADMIN BLOCK GZSCET	GF, FF, SF	367	80
15	ADMIN NEW BLOCK GZSCET	GF, FF, SF	20	65
16	ADMIN NEW BLOCK GZSCET	GF, FF, SF	115	80
17	civil extension right side	GF	54	80
18	GYM	GF	8	65
19	GYM	GF	3	80
20	MECHNICAL ENGG-1	GF	55	65
21	MECHNICAL ENGG-2	GF	59	80
22	ME -II	GF	26	65
23	ME -II	GF	214	80
24	WORKSHOP	GF	5	65
25	WORKSHOP	GF	102	80
26	POWER LAB	GF	42	80
27	CIVIL ENGG DEPTT.	GF	9	65
28	CIVIL ENGG DEPTT.	GF	99	80
29	APLIED SCIENCE	GF	131	80
30	PG BLOCK	GF	56	60
31	PG BLOCK CORRIDOOR	GF	17	22
32	HOSTEL -1		142	65
33	HOSTEL -1		17	80
34	HOSTEL -2		129	65
35	HOSTEL -2		22	80
36	HOSTEL -3		168	65
37	HOSTEL -3		23	80
38	HOSTEL -4		164	65
39	HOSTEL -4		22	80
40	HOSTEL NO 5		390	60
41	GIRL HOSTEL-1		89	65
42	GIRL HOSTEL-1		65	80
43	GIRL HOSTEL-2		172	65
44	GUEST HOUSE	GF, FF	22	65
45	GUEST HOUSE	GF, FF	8	80

S. NO	NAME OF THE BLOCK	FLOOR	NO OF FANS	WATTAGE
46	DIRECTOR RESIDENCE	GF, FF	8	80
47	DISPENSRY	GF	4	65
48	DISPENSRY	GF	12	80
49	WATER WORKS	GF	2	65
50	STUDENT CENTRE	GF, FF	75	55
51	CLASSROOM	GF	64	65
Total No of Conventional Fan				**3819**

17.2 WALL MOUNTED FAN DETAILS

S. NO	NAME OF THE BLOCK	FLOOR	LOCATION	NO OF FANS	WATTAGE
1	ADMIN BLOCK	GF	Networking Switch	3	60
2	BLOCK -B	GF	Networking Switch	2	60
3	BLOCK -A	GF	Networking Switch	2	60
4	BLOCK -D	GF	Networking Switch	2	60
5	BLOCK -C	GF	Networking Switch	3	60
6	LIBRARY	FF, SF, TF		145	60
7	ARCHITETCH COMPUTER LAB			4	60
8	COMPUTER CENTRE	FF		10	60
9	PHARMACY			15	60
10	STUDENT CENTRE			8	60
11	Admin Block GZSCCET	GF	Archi Den	14	60
12	Admin Block GZSCCET	FF	Computer CentreA110	8	60
13	Admin Block GZSCCET	3rd F	A301	10	60
14	Admin Block GZSCCET	3rd F	A302	6	60
15	Admin Block GZSCCET	3rd F	A307	6	60
16	Admin Block GZSCCET	3rd F	A310	12	60
17	Mechanical Engg Dept.	GF	Computer Lab 1	12	60
18	Mechanical Engg Dept.	GF	Computer Lab 2	8	60
19	Mechanical Engg Dept.	GF	HOD Office	2	60
Total No of Wall Mounted Fans					272

17.3 PEDESTAL FAN DETAILS

S. NO	NAME OF THE BLOCK	FLOOR	LOCATION	NO OF FANS	WATTAGE
1	CHECK POST			2	65

18.0 AIR CONDITIONER DETAILS

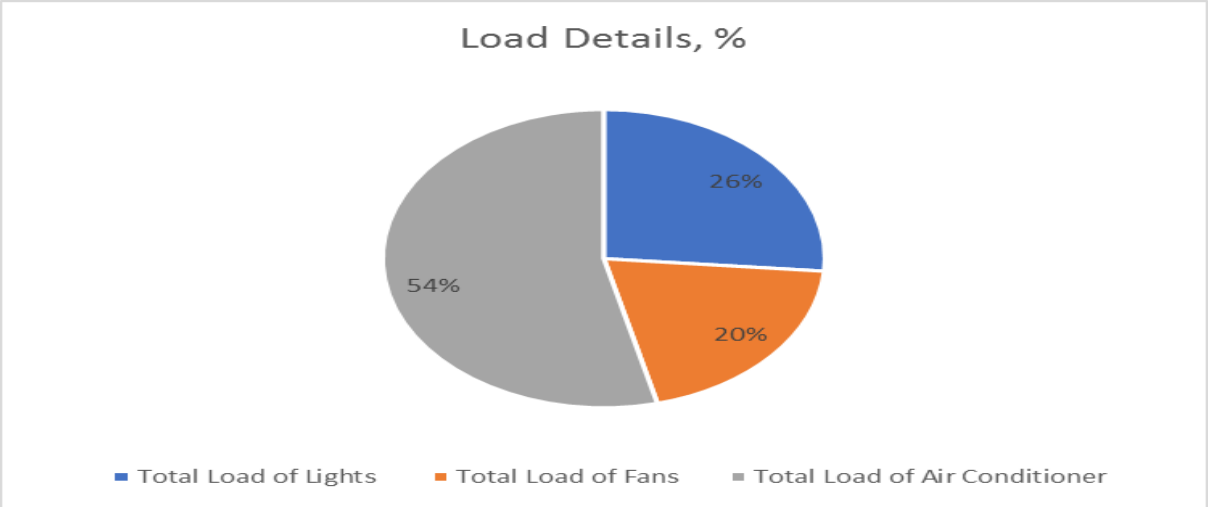
S. NO	NAME OF THE BLOCK	LOCATION	MAKE	MODEL (Split / Window)	TR	STAR RATING	EER	NO OF AC'S
1	ADMIN	AUDITORIUM	HITACHI	DUCTABLE	11	-	3.70	4
2	ADMIN	VC OFFICE	HITACHI	DUCTABLE	11	-	3.70	3
3	ADMIN	VC OFFICE	HITACHI	DUCTABLE	8.5	-	3.70	2
4	LIBRARY	LIBRARY	HITACHI	DUCTABLE	11	-	3.70	5
5	LIBRARY	LIBRARY	HITACHI	DUCTABLE	8.5	-	3.70	7
6	Administrative block	Admin 08	CARRIER	SPLIT	1.5	3	3.60	1
7	Administrative block	10	CARRIER	SPLIT	1.5	3	3.60	1
8	Administrative block	15	VESTAR	SPLIT	2	3	3.20	1
9	Administrative block	39	HITACHI	SPLIT	2	3	3.23	1
10	Administrative block	142	HITACHI	SPLIT	2	3	3.23	1
11	Administrative block	140	HITACHI	SPLIT	2	3	3.23	1
12	Administrative block	134	HITACHI	SPLIT	2	3	3.20	1
13	Administrative block	132	HITACHI	SPLIT	2	3	3.20	1
14	Administrative block	215/213	VESTAR	SPLIT	2	3	3.20	1
15	Administrative block	214	CARRIER	SPLIT	2	3	3.60	1
16	Administrative block	118	HITACHI	SPLIT	2	3	3.23	1
17	Administrative block	116	HITACHI	SPLIT	2	3	3.23	1
18	Administrative block	112/111	CARRIER		1.5	3	3.60	1
19	Administrative block	113	HITACHI	SPLIT	2	3	3.20	1
20	Administrative block	120	CARRIER	SPLIT	1.5	3	3.60	1
21	Administrative block	122	CARRIER	SPLIT	2	3	3.60	1
22	Administrative block	30	VESTAR	SPLIT	2	3	3.20	1
23	Administrative block	29	VESTAR	SPLIT	2	3	3.20	1
24	Administrative block	32	VOLTAS	SPLIT	1.5	3	2.95	1
25	Administrative block	202	HITACHI	SPLIT	2	3	3.23	1
26	Administrative block	203	SIDWAL	SPLIT	2	-	3.30	1
27	Administrative block	207	HITACHI	SPLIT	2	3	3.50	1
28	Administrative block	204	HITACHI	SPLIT	2	3	3.23	1
29	Administrative block	210	VOLTAS	SPLIT	1.5	3	3.50	1
30	Administrative block	225	VESTAR	SPLIT	2	3	3.20	1
31	Administrative block	225	VOLTAS	SPLIT	1.5	5	3.51	1
32	Administrative block	220	VESTAR	SPLIT	2	3	3.20	1
33	Administrative block	226	DAIKEN	SPLIT	2	3	3.25	1
34	Administrative block	228	DAIKEN	SPLIT	2	3	3.25	1
35	Administrative block	302	VESTAR	SPLIT	2	3	3.20	1
36	Administrative block	303	VESTAR	SPLIT	2	3	3.20	1
37	Administrative block	306	L LOYD	SPLIT	1.5	3	3.60	1
38	Administrative block	301	VESTAR	SPLIT	2	3	3.20	3
39	Administrative block	24	CARRIER	SPLIT	1.5	3	3.60	1
40	Administrative block	16	HITACHI	SPLIT	2	3	3.23	1

S. NO	NAME OF THE BLOCK	LOCATION	MAKE	MODEL (Split / Window)	TR	STAR RATING	EER	NO OF AC'S
41	Administrative block	14	VESTAR	SPLIT	2	3	3.20	1
42	Administrative block	17	VESTAR	SPLIT	2	3	3.20	1
43	A-block	A-128	HITACHI	SPLIT	2	3	3.50	1
44	A-block	A-222	HITACHI	SPLIT	2	3	3.50	1
45	A-block	A-123	HITACHI	SPLIT	2	3	3.50	1
46	A-block	A-103	VOLTAS	SPLIT	2	-	3.50	1
47	C-block	C-020	HITACHI	SPLIT	2	3	3.23	1
48	C-block	C-021	HITACHI	SPLIT	2	3	3.65	1
49	C-block	C-113	HITACHI	SPLIT	1.5	3	3.80	1
50	C-block	C-022	HITACHI	SPLIT	2	3	3.23	1
51	B-block	B-002	VESTAR	SPLIT	2	3	3.20	1
52	B-block	B-003	VESTAR	SPLIT	2	3	3.20	1
53	B-block	B-013	VESTAR	SPLIT	2	3	3.20	1
54	B-block	B-020	VESTAR	SPLIT	2	3	3.20	4
55	B-block	B-015	VESTAR	SPLIT	2	3	3.20	1
56	B-block	B-120	HAIER	SPLIT	2	3	3.20	1
57	B-block	B-008	VESTAR	SPLIT	2	3	3.20	7
58	C-block	HOD ARCH.	VESTAR	SPLIT	2	3	3.20	1
59	Student center		HITACHI	SPLIT	2	3	3.50	1
60	A-block	A-201	SIDWAL/VOLTAS	SPLIT	2	-	3.30	3
61	A-block	A-202	O GENERAL/ VESTAR	WINDOW	2	-	3.30	2
62	A-block	A-203	VOLTAS	SPLIT	2	-	3.30	1
63	A-block	A-204/A-205	SIDWAL	SPLIT	2	-	3.30	1
64	A-block	A-207	SIDWAL	SPLIT	2	-	3.30	1
65	B-block	B-211	VOLTAS	SPLIT	1.5	-	3.30	1
66	Conference Hall (archiden)		O GENERAL	SPLIT	2	-	3.30	2
67	Conference Hall (archiden)		O GENERAL	WINDOW	2	-	3.30	4
68	A-block	221	VESTAR	SPLIT	2	3	3.20	1
69	A-block	A-118	VOLTAS	SPLIT	1.5	3	3.30	1
70		Reading Hall Library	VESTAR	SPLIT	1.5	3	3.20	2
71	A-block	E-104	VESTAR	SPLIT	2	3	3.20	1
72	A-block	A-103	SIDWAL	WINDOW	2	-	3.30	1
73	Mechanical Department		SIDWAL	SPLIT	2	-	3.30	3
74	Mechanical Department		VESTAR	SPLIT	2	3	3.20	2
75	Mechanical Department		VESTAR	WINDOW	1.5	-	3.30	2
76	Mechanical Department	M-26	SIDWAL	WINDOW	2	-	3.30	1
77	Mechanical Department	M-01	SIDWAL	WINDOW	2	-	3.30	1
78	Mechanical Department	M-05	HITACHI	SPLIT	2	-	3.30	2
79	Administrative block	A-302	VOLTAS	WINDOW	1.5	-	3.30	1
80	Civil Department	CE 01	SIDWAL	WINDOW	1.5	-	3.30	1

S. NO	NAME OF THE BLOCK	LOCATION	MAKE	MODEL (Split / Window)	TR	STAR RATING	EER	NO OF AC'S
81	Civil Department	CE 04	VOLTAS	SPLIT	1.5	-	3.30	1
82	Civil Department	CL-08	SIDWAL	WINDOW	2	-	3.30	3
83	Civil Department	CL-08	VESTAR	SPLIT	2	3	3.20	1
84	Administrative block	A-110	-	WINDOW	1.5	-	3.30	3
85	Administrative block	A-209	MITSHUBISHI	SPLIT	2	-	3.30	1
86	Administrative block	A-208	SIDWAL	SPLIT	2	-	3.30	1
87	Administrative block	A-222	SIDWAL	SPLIT	2	-	3.30	1
88	Administrative block	A-112	SIDWAL	SPLIT	2	-	3.30	1
89	Administrative block	A-115	BLUE STAR	WINDOW	1.5	-	3.30	1
90	Administrative block	A-111	VOLTAS	SPLIT	1.5	-	3.30	1
91	Administrative block	A-210	SIDWAL	SPLIT	2	-	3.30	1
92	Administrative block	A-211	SIDWAL	SPLIT	2	-	3.30	8
93	Administrative block	A-312	HITACHI	SPLIT	2	-	3.30	2
94	Administrative block	A-310	SIDWAL	SPLIT	2	-	3.30	2
95	Administrative block	A-310	SIDWAL	SPLIT	2	-	3.30	2
96	Administrative block	A-308	HITACHI	SPLIT	2	-	3.30	1
97	Administrative block	A-307	HITACHI	SPLIT	2	-	3.30	3
98	Administrative block	A-302	HITACHI	SPLIT	2	-	3.30	3
99	Administrative block	301 A	VESTAR	SPLIT	2	3	3.20	2
100	Administrative block	301 B	VESTAR	SPLIT	2	3	3.20	2
101	Administrative block	AS-03	VESTAR	WINDOW	1.5	-	3.30	1
102	Administrative block	AS-04	HITACHI	SPLIT	1.5	-	3.30	1
103	Applied science dept		DAIKEN	SPLIT	2	-	3.30	1
104	B-block	B-101	VESTAR	SPLIT	2	3	3.20	1
105	B-block	B-206	SIDWAL	WINDOW	1.5	-	3.30	1
106	B-block	B-110	SIDWAL	SPLIT	2	-	3.30	3
107	Workshop (HOD)		WHIRLPOOL	SPLIT	1.5	-	3.30	1
108	Dispensary		SAMSUNG	WINDOW	1.5	-	3.30	1
109	Dispensary		CARRIER	SPLIT	1.5	3	3.60	1
110	Dispensary		VOLTAS	SPLIT	1		3.30	1
111	VC Residence		HITACHI	SPLIT	2	3	3.50	3
112	VC Residence		DAIKEN	SPLIT	2	-	3.30	4
113	VC Residence		VOLTAS	SPLIT	1.5	-	3.30	1
114	VC Residence		DAIKEN	SPLIT	1.5	3	3.30	1
115	DIRECTOR RESIDENCE		O GENRAL	WINDOW	1.5	-	3.30	1
116	Guest House		WHIRLPOOL	WINDOW	1.5	-	3.30	8
Total No of Air Conditioners								**190**

19.0 CONNECTED ELECTRICAL LOAD

S. No	Description	Details
1	Total Load of Lights	26%
2	Total Load of Fans	20%
3	Total Load of Air Conditioner	54%



20.0 EXECUTIVE SUMMARY

S. No	Energy Efficiency Measures	Estimate annual Energy Savings, kWh/Annum	Estimated Investment, INR	Monetary Savings, INR	payback Period, Years
1	Replace existing 2910 no's FTL to LED Lights	83,808	1,746,000	679,124	3
2	Replace existing 5109 no's Conventional Fans to BLDC Fan	245,232	15,327,000	1,618,531	**9**
3	Replace existing 272 no's wall mounted fans to wall mounted BLDC Fan	13,056	680,000	86,170	**8**
4	Replace existing 116 no's Air Conditioners to wall energy efficiency Air Conditioners	356,046	4,060,000	2,349,906	**2**

Annual Electrical Energy consumption, kWh/Annum	**1,596,027**
Annual Electrical Energy Savings, kWh/Annum	698142
Electrical Energy Savings, %	**43.7**

21.0 ENERGY CONSERVATIVE MEASURES

21.1 Replace existing FTL to LED Light

Observation:

During audit it was observed that few FTL lights were used for illumination purpose. FTL lights consumes high power than LED Lights.

Recommendation:

It is recommended to replace those FTL lights with LED lights for better lumens and to lower the power consumption. The lumens of FTL light are 63 per watt whereas the lumens of LED light are 120 per watt.

Estimated Savings:

Replace existing FTL to LED Light		
Description	**Units**	**Values**
Quantity of existing FTL light	Nos	2,910
Average Wattage Consumption of FTL	W	40
Present operating hours	Hours/Annum	1,600
Average unit cost	INR/kWh	6.63
Energy Consumption by existing FTL Lights	kWh/Annum	186,240
Wattage of LED	W	18
Energy Consumption by LED	kWh/Annum	83,808
Cost of one LED	INR	600
Energy savings	kWh/Annum	102,432
Cost Savings	INR/Annum	679,124
Investment	INR	1,746,000
Payback Period	Years	3

21.2 Replace existing Conventional Fans to BLDC Fan

Observation:

During audit it was observed that conventional ceiling fans were used for ventilation purposes.

Recommendation:

It is recommended to replace those conventional ceiling fans with Energy efficient BLDC fans to observe the following energy savings.

Estimated Savings:

Replace existing Conventional Fans to BLDC Fan		
Description	**Units**	**Values**
Total Number of Conventional Fans	Nos	5109
Installed Capacity of Conventional Fans	kW	318
Annual operating hours	Hours/Annum	1600
Wattage of BLDC	W	30
Estimated Annual power Savings of BLDC	kW	153
Annual Energy Savings, kWh	kWh	245232
Annual Cost Savings	INR	1618531
Cost of one BLDC	INR	3000
Investment	INR	15327000
Payback	Years	9

21.3 Replace existing wall mounted fans to wall mounted BLDC Fan

Observation:

During audit it was observed that conventional wall mounted fans were used for ventilation purposes.

Recommendation:

It is recommended to replace the conventional fan to BLDC fan to reduce energy consumption.

Estimated Savings:

Replace existing wall mounted fans to wall mounted BLDC Fan		
Description	**Units**	**Values**
Total Number of wall mounted fans	Nos	272
Installed Capacity of wall mounted fans	kW	16
Annual operating hours	Hours/Annum	1600
Wattage of wall mounted BLDC Fan	W	30
Estimated Annual power Savings of wall mounted BLDC Fan	kW	8
Annual Energy Savings	kWh	13056
Annual Cost Savings	INR	86169.6
Cost of one wall mounted BLDC Fan	INR	2500
Investment	INR	680000
Payback	Years	8

21.4 Replace existing Air Conditioners to energy efficient Air Conditioners

Observation:

During audit it was observed 3-star Air Conditioners that were used for ventilation purposes.

Recommendation:

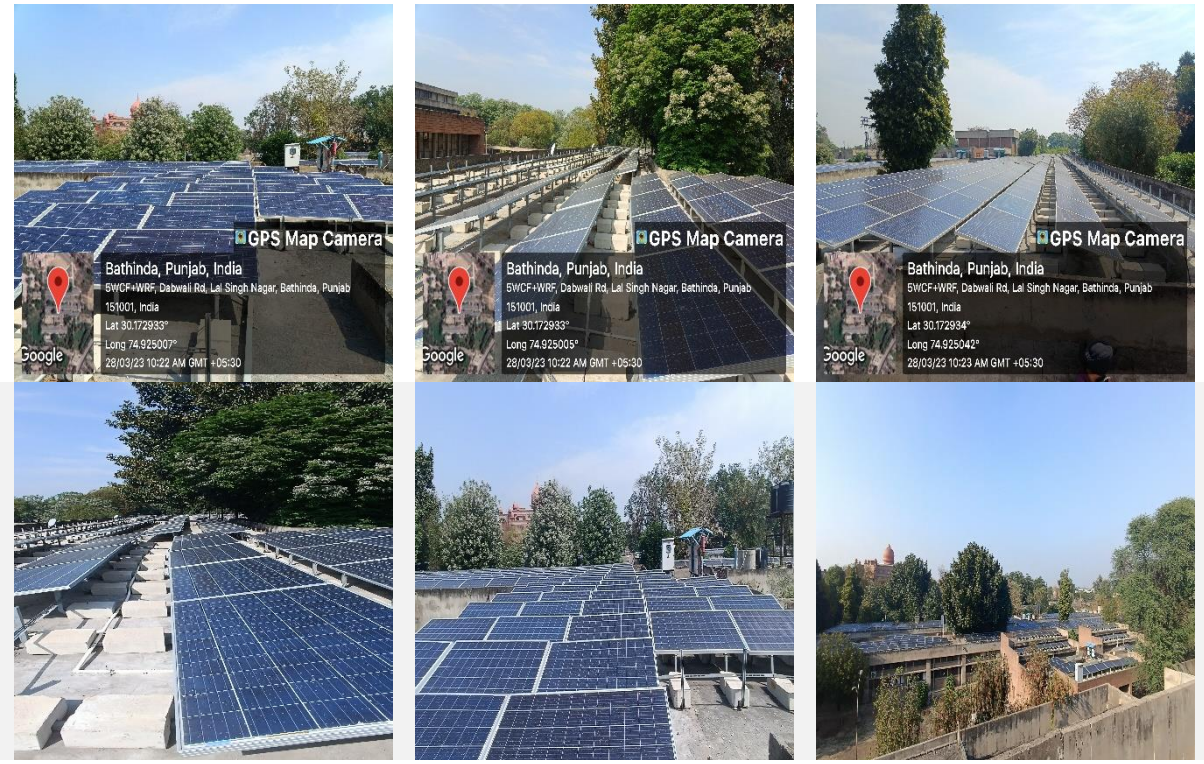
It is recommended to replace those Air Conditioners with energy efficient Air Conditioners to observe the following energy savings.

Estimated Savings:

Replace existing Air Conditioners to energy efficient Air Conditioners		
Description	**Units**	**Values**
Total Number of Air Conditioners in the facility	Nos	116.00
Installed Capacity	kW	911.11
Estimated Annual Energy Consumption	kWh/Annum	1093326.42
Estimated Annual Energy Savings	kWh/Annum	356046.42
Estimated Cost Savings	INR/Annum	2349906.34
Investment	INR	4060000.00
Payback period	years	1.73

22.0 ALTERNATE SOURCES OF ENERGY AND ENERGY CONSERVATION MEASURES

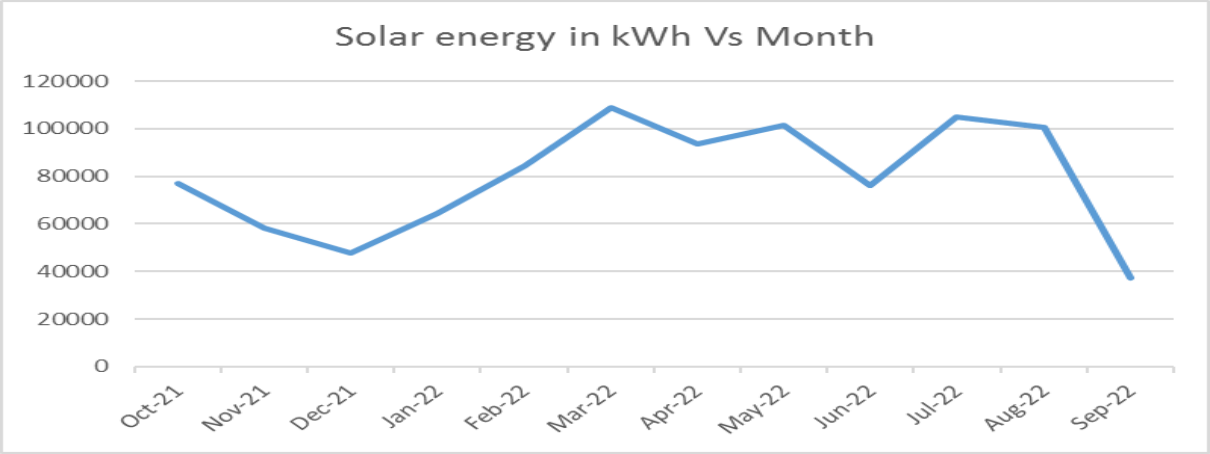
1 MW Solar power plant is installed in the facility and utilising the renewable energy power during the day time.



The one-year Solar Energy produced for 2021-22 bill has been analysed and details as follows.

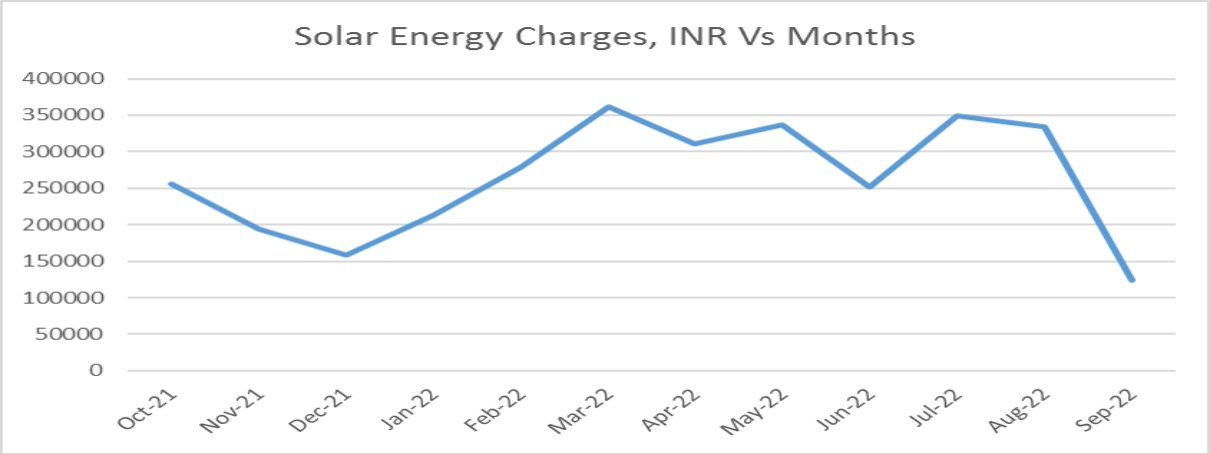
Month	Solar Energy consumed, kWh	Solar Energy Charges, INR
Oct-21	77210	256337
Nov-21	58280	193490
Dec-21	47616	158085
Jan-22	64254	213323
Feb-22	84271	279780
Mar-22	108966	361767
Apr-22	93808	311443
May-22	101519	337043
Jun-22	75973	252230
Jul-22	104994	348580
Aug-22	100750	334490
Sep-22	37192	123477
TOTAL	**79569**	**264170**

The units, kWh consumed over the period of one year is shown below.



The maximum unit is consumed in the month of March 2022 and minimum unit is consumed in the month of September 2022.

The bill details over the period of one year is shown below.



The maximum bill is paid in the month of March 2022 and minimum unit is consumed in the month of September 2022.

23.0 ACCREDITED ENERGY AUDITOR CERTIFICATES

ENERGY IS LIFE
BEE
CONSERVE IT

BUREAU OF ENERGY EFFICIENCY

Examination Registration No. : EA-3201

Accreditation Registration No.: AEA-0023

Certificate of Accreditation

This is to certify that Mr./Ms. B. Senthilkumar having its trade/registered office at Chennai has been given accreditation as accredited energy auditor. The certificate shall be effective from 26th day of February 2013

The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No. 0023 in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this 26th day of May 2014

Secretary,
Bureau of Energy Efficiency
New Delhi

iqms

In association with

SWISO

THIS IS TO CERTIFY THAT

B. Senthil Kumar

has successfully completed a course approved by the
Institute of Environmental Management & Assessment in

ADVANCED EMS AUDITOR
(ISO 14001:2004)

(achieving an overall mark of 75%)

13th to 17th October 2008

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Business & Innovation Centre
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Fax: +44 (0)870 8708199
email: enquiries@iqms.co.uk
Web: www.iqms.co.uk

Signed for iqms

Swiso India Private Limited
507 Pragati Tower • 26 Rajendra Place
New Delhi • 110 008 • (India)
Tel: +91-11-41539720
Fax: +91-11-41539721
email: info@swisoindia.com
Web: www.swisoindia.com

Signed for Swiso India Private Limited

IQ – EMS42357
CERTIFICATE NUMBER
iqms Course No: IQM/EMS4/07308/UK approved by IEMA

SGS

CERTIFICATE

SGS Taiwan GHG Group

This to certify that .

B SENTHIL KUMAR

has successfully passed the course assessment and examination for

ISO14064:2006 GHG Inventory and Verification

Held on: 2nd-4th March 2009
Location: Gurgaon, India

Richard Huang
Technical Manager
SGS Taiwan GHG Group

TW-I-0082
Certificate Number

SGS United Kingdom Limited
Climate Change Programme

ऊर्जा दक्षता ब्यूरो
(भारत सरकार, विद्युत मंत्रालय)
BUREAU OF ENERGY EFFICIENCY
(Government of India, Ministry of Power)

15 YEARS OF CELEBRATING THE MAHATMA

स्पीड SPEED POST

F.No.09/06/07/IMPL/ECBC/5977-6028

August 21, 2019

Shri Praveen Kumar Yadav
Environmental Design Solution Pvt Ltd
A-4/3, Basement, Vasant Vihar,
New Delhi - 110057

Subject: Empanelment of ECBC Expert Professional

Dear Shri Praveen,

This has reference to your application for empanelment of ECBC Expert Professional for implementing the Energy Conservation Building Code (ECBC). We are pleased to inform that you have been shortlisted to act as the ECBC Expert professional for helping in building technical capacity, compliance with code and effective implementation of it. The validity of the empanelment is for two years or till the creation of a pool of Certified Energy Auditors (Buildings), whichever is earlier. A brief on roles and responsibilities of professionals will be as per the prevailing ECBC Rules, 2018, is enclosed herewith.

It may be further noted that "**the professional working with ECBC Cell in States/UTs shall not work on the projects for the same State/UT during their tenure as a part of ECBC cells and after one year from the last date of their incumbent in the ECBC cell. Such professionals may provide technical assistance in other State/UT for other projects.**"

With best regards.

Yours sincerely,

(Saurabh Diddi)
Director

Encl: As above

TM

Factual Assessments - Global Certifications

Certificate of Compliance

This is to certify that

NIN Energy India Private Limited

JUSA Complex, New No 47, Old No 21/2, Ponniamman Koil Street, Kottur, Chennai - 600085 (Tamil Nadu), India.

has been assessed by RSI and found to comply with the requirements of

ISO/IEC 17020:2012

Operation of various types of bodies performing inspection - Requirements

for the following activities:

Mandatory Energy Audit, Environment Audit, Green Audit, PAT Measurement and Verification (M&V), Power Quality Audit, Infrared Thermography, Electrical Safety Audit, Energy Management Training, Energy Management System, Measurement & Verification, Green Building Services, Renewable Energy Services, Carbon Foot Printing and Water Audit

Certificaat Nummer / Certificate No. : IE-BV-2207-5410

Datum Van Publicatie / Date of Issue : 27/07/2022
Vervaldatum / Date of Expiry : 26/07/2025
Ist Annual surveillance audit due on : 26/06/2023
IInd Annual surveillance audit due on : 26/06/2024

Director (Certification)

Royal Stancert B.V.

Feitelijke Beoordelingen - Wereldwijde Beoordelingen

Certificaat Nummer / Certificate No. : Q-xx-xxxx-xxxxx

Regd. Office - Joop Geesinkweg 701, 1114 AB Amsterdam. The Netherlands.
(KvK-Nummer 71431802 / RSIN 858713159 - Rechtsvorm - Besloten Vennootschap).

This certificate remains the property of **Royal Stancert B.V.** and must be returned whenever demanded. The validity of this certificate can be verified at http://www.royalstancert.org. **Royal Stancert B.V.** is an independent system, product and personal assessment body accredited by Global Euro Accreditation Centre, Georgia. (GCIN - 654). Email: info@royalstancert.org

Global Euro Accreditation Centre GEAC Global Euro Accreditation Centre

PAC-GEAC-1506-299