

A REPORT ON GREEN AUDIT
OF
GOVERNMENT HAMIDIA ARTS AND
COMMERCE COLLEGE, BHOPAL (M.P.)



Submitted by

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INTRODUCTION: GREEN AUDIT

BACKGROUND

Criterion 7.1.2 under Criterion 7 i.e. "**INSTITUTIONAL VALUES AND BEST PRACTICES**" of Guidelines for National Assessment and Accreditation Council (NAAC) Accreditation checks Environmental Consciousness and Sustainability/Alternate initiative taken by the institute. Green audit is a tool which not only checks Environmental Consciousness and Sustainability/Alternate Energy initiatives but also suggests the improvement practices can be adopted

GREEN AUDIT

The last century observed increased use chemical and petroleum product lead to degradation of environment. Restoration of degraded environment and sustaining it for future generation is global challenge. Now it is time for academic leaders to take initiative setup an example for society to follow.

The academic activity of delivering and grasping knowledge through an education system need infrastructure. The infrastructure consists of building, teachers and other facility like library and laboratory. These as a whole creates conducive environment for academic activity.

The term "Green" generally misunderstood with natural greenery, eco-friendly or not damaging the environment. Whereas "Green" here green refers to sustainability i.e. using all the resources without comprising on the right to uses these resources by generation to come.

The campus Green audit has been introduced NAAC accreditation in recent years. In adherence to this requirement the College management intended to go for Green audit of the campus. A campus Green audit is both a summary and a report card for a campus and a way to evaluate where and how resources are being used. A Green audit is also the first step in being able to quantify whether or not current and/or future green efforts are actually making a difference. As

such, a green audit is the beginning of the sustainability planning process. The results can be used to quantify what kinds of impacts the campus community has on the environment and what steps the college can take to reduce these impacts.

By this exercise it is anticipated that this will serve as a guide for educating people on the current practices and resource use as well as provide direction to the user to attain sustainability.

A comprehensive Green audit will ensure planned, efficient application of capital and operational budgets for College buildings, to ensure:-

- Maximized useful life of each facility
- Protection of assets
- Cost savings over the long term
- Enhanced Public safety
- Reduced disruption of services and greater efficiencies

The process of “Green Audit” is systematic observation of system under study, identifying the gaps in system, quantifying them for recording and analysis. There is no true standard for conducting “Green Audit” each consultant differs in content as well as process.

The overall objective of Green Audit has five fold:

- To introduce management to real concerns of environment and its sustainability
- To analyse the pattern and extent of resource use on the Campus
- To establish a baseline data to assess future sustainability plans
- To make the College management a more environmentally sustainable institution of higher learning
- To bring out a status report on environmental compliance

It is hoped that the results presented in this audit will serve as a guide for educating people on the current practices and resource use at College force all the stack holders for new initiatives.

COMPONENT OF GREEN AUDIT

A Green audit involves examining a facility on many different levels and results in specific recommendations. A Green valuation carried out to determine status of the following:

- The property and Maintenance Practices
- Water management
- Energy use and its management
- Solid waste management
- Heat island impact
- Carbon accounting
- Occupational health and general safety of users

THE GENERAL CONDITION OF AN EXISTING PROPERTY

Building deteriorates with time good maintenance practices upkeep the property in its original form. A general assessment of existing properties is obtained for commercial real estate projects to determine current conditions, immediate improvement needs, and replacement reserve recommendations. The property condition analysis determines the structural and operational integrity of real estate collateral and estimates the repair, replacement and reserve requirements that impact cash flow for operating expenses and debt service coverage

TO IMPLEMENT HOUSEKEEPING AND MAINTENANCE PRACTICES AS PER GREEN BUILDING NORMS

It might be possible that the constructed property is not a Green rated property. But implementing Green practices in Housekeeping and Maintenance can enhance occupant health, happiness and well-being.

ENERGY AUDIT & ENERGY MANAGEMENT

Energy Audit will help your business in following ways

- Use less Energy
- Deferred Maintenance and Increased system Reliability
- Improve Comfort and Productivity of Staff

WATER MANAGEMENT

Water resource management is the activity of planning, developing, distributing and managing the optimum use of water resources. It is a sub-set of water cycle management. Ideally, water resource management planning has regard to all the competing demands for water and seeks to allocate water on an equitable basis to satisfy all uses and demands. As with other resource management, this is rarely possible in practice

PURPOSE OF WORK

This work is a systematic, independent system verification process of objectively obtaining and evaluating audit evidence to determine whether institute is meeting Criterion 7.1.2 of Guidelines for National Assessment and Accreditation Council (NAAC) Accreditation, which checks Environmental Consciousness and Sustainability/Alternate initiative taken by the institute

SCOPE OF WORK

- Walk-through condition study of the property to evaluate structural integrity, capacity, condition and life expectancy, and efficiency of major systems (including but not limited to: mechanical, electrical, plumbing and roof components).
- Identification of recent or on-going improvements at the property (e.g. face lifts, new windows and doors, etc.) that is completed, underway, or anticipated.

- Assessment of site conditions: maintenance, paving, curbs, sidewalks, drainage, landscaping, Fire shifty, universal design etc.
- Compliance with applicable codes, ordinances and regulatory requirements; confirmation of status of building, occupancy and applicable operating permits and licenses necessary for the intended use of the property.
- General conformance to IS 4563:1987 Recommendations for Building and Facility for physically handicapped.
- General conformance to NBC Part-4 (Vol.-1) Recommendations for Fire and lift safety.
- Identification of possible environmental concerns (e.g., the existence of asbestos in the building and plans of abatement).
- Suggestions for additional investigations or comprehensive analyses of possible concealed conditions as external observation warrants.
- Study of the existing system of Housekeeping and Maintenance practices and identification of possible improvement.
- Suggest and alter the existing system of Housekeeping and Maintenance practices with green house keeping system.
- Site Visit to understand existing energy system, process and review of facility equipment and systems with staff, collect energy usage and equipment data. The systems studied and assessed as part of the Energy Audit and Management Strategy devising process included the following:
 - HVAC Systems: Split ACs, Cassette ACs
 - Lighting Systems: TFL Lights and CFL Bulbs.
 - Equipment like computers etc.
 - Architectural Features: Glazing, Doors
- Develop inventory of all energy use equipment grouped by process
- Use a portable power meter, data loggers and available with us to verify energy use.
- Comparison of energy use data with annual energy bills to verify data.
- Development of energy conservation strategies.
- Developing system of energy accounting and implementing the same.

- Site Visit to understand existing water supply drainage and sewage system with end use.
- Develop inventory of all water consuming areas. Grouped them according to use and disposal of water.
- Use a portable meter and other measuring system to verify water end use.
- Comparison of water use with standards.
- Development of water conservation strategies.
- Developing system of water accounting and implementing the same.

Client's input

- The client will provide the following information:
- Facility O&M manuals & site drawings.
- Specification data for all major equipment (i.e. pumps curves, performance data).
- Copy of recent 12 months energy bills (electric, natural gas and fuel oil) and monthly energy bill for accounting.
- List of all major equipment with specification
- Copy of recent energy bills (electric, natural gas, water and fuel oil) and monthly energy bill for accounting.
- Insure hindrance free accessibility for site

Limitations

- We rely on the accuracy of any information provided by Client in the performance of our services, and will not be held responsible for errors or inaccuracies contained in information provided to us.
- Detailed building energy simulations and audit will not be performed. The study will employ techniques that rely on historical information compiled over the years from similar facilities. Individual building performance will not be modeled in great detail. Rather, building type, size and occupancy will be used to form a rough calculation model of the building (or specific equipment) energy usage for use in determining the estimated results of energy conservation measures. Likewise, costs of addition and

alteration required due to this service will also be based on historic data compiled from similar installations, and engineering opinion

METHODOLOGY

The work is executed in two phase

Phase I –General introduction and Data collection

- A walk through audit was conducted to familiarize with property and its use.
- Interview of management to understand system in use.
- Bills of water and Fuel used in college along with site plan property are collected
- Photography of property was done to collect evidence of existing system.
- Portable equipment are used to check quality of electricity, status of light, ventilation, noise, Earthing and heat island effect.

Phase II - Data analysis and Recommendation

The collected data correlated with with standard regulation and/or best practices io industry. Stagy and recommendations were framed to improve and enhance the existing system with relevant IS code, standard regulation and/or best practices ionindustry.

REPORT ORGANIZATION

Submit report after each audit. This report contain

- Introduction
- Overview of Current Systems in Place
- Data analysis and findings
- Recommendations recommendations were framed to improve and enhance the existing system.

PROJECT DETAIL

Govt. Hamidia Arts & Commerce College is a Co-ed college situated at, Bhopal. Established in 1946 at civil lines area of Bhopal and shifted in this campus about 15 years back. The college is situated on the banks of lower lake at Hathikahna Budhwara (located in old Bhopal)

This is a government institution and comes under the department of higher education, gov. of Madhya Pradesh affiliated to Barkatullah University (formerly Bhopal university, Bhopal). It provides an innovative, state-of-the-art approach to higher education with a view to aid the growth of its students into well balanced, value oriented, socially sensitive and responsible members of the society. Housed in their own building and the financial assistance is provided by University Grants Commission and State Government.

The college was established with the aim of providing quality Higher education to population in and around Bhopal. The college is situated on main road connecting kamla park and Char Batti . All the basic facilities like Bus Stop, Dispensary, shopping Centers, STD booth, Post Office, Bank are all located in the proximity of the college. This makes the college an ideally located one.

The college is providing undergraduate as well as post graduate courses in Arts and commerce both boys and girls .

INFRASTRUCTURE AND LEARNING RESOURCES

The Govt. Hamidia Arts & Commerce College is housed in buildings comprised of 13 different blocks, spread over an area of 7 acres. Details are as follows:

Description	Numbers
Computer Lab	01
Conference room	01
Class Rooms	41 (Including Classes engaged in departments)

Description	Numbers
Laboratories (Geog., Psy., D&P)	03
LCD Projectors	03
Principal' Chamber	01
Well-equipped administrative office	02
Examination Cell/control room	01
UGC Cell Career and Placement Cell	01
NSS room	01
NCC room	03
Departments with required furnished adequate electrical supply and internet facility	14
Staff Room	01
Library	01
Reading Rooms	02
Sports Department	01
Canteen (only tea facility)	01
Common boys toilets	09
Common girls toilets	09
Parking facilities	3 open garages 3 open sheds
Sports ground	02
Garden	02
Staff Quarters	04

Auditorium is the latest building constructed in the campus. The college has a workshop with limited infrastructure facility, which caters to minor problems of various departments.

COURSES OFFERED

S.No.	Programme Level	Name of the Programme/Course	Sanctioned/ approved Student Strength	No. of Students admitted
1	Under- Graduate	B.A.	1500	387
		B.Com.	2400	906
		B.Com. Computer application	240	152
		BCA	240	170
2	Post- Graduate	M.A. Hindi	120	28
		M.A. English	120	18
		M.A. Sanskrit	80	17
		M.A. Urdu	80	9
		M.A. Drawing	80	6
		& Painting		
		M.A. Philosophy	40	8
		M.A.	80	12
		Psychology		
		M.A. Geography	80	22
		M.A. History	120	24
		M.A. Sociology	120	26
		M.A. Economics	120	34
M.A. Political Science	120	14		

		M.Com	600	269
3	Ph.D.	Ph.D.	224	179
Total Student strenght			6364	2281

STRENGTH OF COLLEGE

S.No.	Description	Numbers (approx..)
1	Student	2281
2	Teaching staff	75
3	Non Teaching staff	60

PARKING FACILITY

There are three covered parking shades and three open garages places in institute. Other than this people park their vehicle under tree or in open space.

OBSERVATIONS

THE GENERAL CONDITION OF EXISTING PROPERTY

The college is having their own building and land. College is operational in this building from fifteen years. Before this Government Maharani Laxmi Bai Girl's PG College, Bhopal was operational from this campus. Maximum infrastructure was developed in MLB era except New auditorium building. The old buildings are naturally ventilated load bearing structure constructed with stone/Brick wall and thick plaster over it. New auditorium building is a RCC framed structure with cement plastered brick partition wall. The building is having corridor with adjoining class room or other rooms. Building is painted with exterior colour from out side. Inside it is painted with light colour destemper on the walls .



EARTHQUAKE IMPACT ON BUILDING

The Indian sub-continent has a history of devastating earthquakes. Depending upon the intensity of earthquake India is divided into four seismic zone .Zone two is least vulnerable whereas zone five is most vulnerable to the earthquakes. Bhopal lies in Seismic zone two least vulnerable to the earthquakes. The building infrastructure can sustain intensity of earthquake occurring in Zone two.

It is observed that there are adequate entry and exit in the buildings opening in central courtyard . This courtyard can be used as assembly area in case of emergency evacuation.

PHYSICAL STATUS OF BUILDING

Although the building is old but structurally it is stable. The building is robust enough to sustain fire and earthquakes.

CONNECTIVITY WITH CITY

The college is at the heart of the city. It has only one entry opening the road connecting Kamla park with Char , here all type of public conveyance are available.

PLANTATION AND GREENERY IN CAMPUS

It is a lush green campus trees planted along the building and boundary. Ample numbers of trees are planted every year by staff and students.

Plants of 15 to 20 years average life. Some of the plants spread over the campus are as old as institute.



greenery in campus

FIRE SAFETY AND EVACUATION PROCESS

No comprehensive fire safety system is placed in the Institute. Although some fire extinguisher are observed at some places but no evacuation plans was observed. there is no caution boards on main electrical panel board. No records was provided regarding annual maintenance of these fire extinguishers.



The electrical wiring is either loose or there is web of wire lead to major accident.



The building is robust enough to take heat load of moderate capacity for more than two hours. The building has been analysed for need of evacuation. There are adequate entry points at ground floor, whereas staircase and ramps connecting upper floors can be easily approached in case of disaster. The corridors are opening directly to outside. The ground floor height is only 10 feet from outside. Hence evacuation through windows is possible without causing heavy injury.

Staircases are naturally ventilated to avoid suffocation in case of fire. Ramps provided in buildings will help in evacuation of injured and disabled persons.

There is thick plantation with falling leafs .There are chances of fire in dry leaves , for this is no preparedness.

UNIVERSAL ACCESSIBILITY AND USE

Almost all the buildings are having ramps at entry level. There is no provision for guidance path for blinds path. There is no provision of handicap toilet for disabled persons.









PUBLIC HEALTH

The campus is not pedestrian friendly. It has been observed that people use their vehicle for short distance movement.

The number of sign boards showing tobacco or smoking prohibition are not inadequate .

HOUSE KEEPING

General cleanness is good with clean toilets.





NOISE CONDITION

The observation of Noise level taken in between 12 noon to 3 pm on working day with window closed. The observed noise level is in between 50 to 55 dbel.

PEST CONTROL TREATMENT

There are traces of termite, mosquito and other rodent on the building.

MAINTENANCE PRACTICES

Maintenance is a practice to upkeep building in its original shape. The damages observed are attended to make the facility functional. The minor defects and maintenance issues are addressed by Institute itself but major maintenance is taken care by MPPWD.

The building are old need special maintenance, especially student toilets in old building are damaged need immediate repair. Similarly wiring on electrical board is not proper.



Maintenance of Electrical Infrastructure

PARKING

At a time round about 100 vehicles were parked in the campus at different locations mostly two wheelers





ENERGY AUDIT & ENERGY MANAGEMENT

This is a day use campus, using electricity for Lighting, Ventilation, Operation of computers and other equipment. Electricity is supplied by Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited (MPMKVVCL). Record of electricity consumption need improvement. The connected load of electrical system is 100 kW.

ELECTRICAL SUPPLY

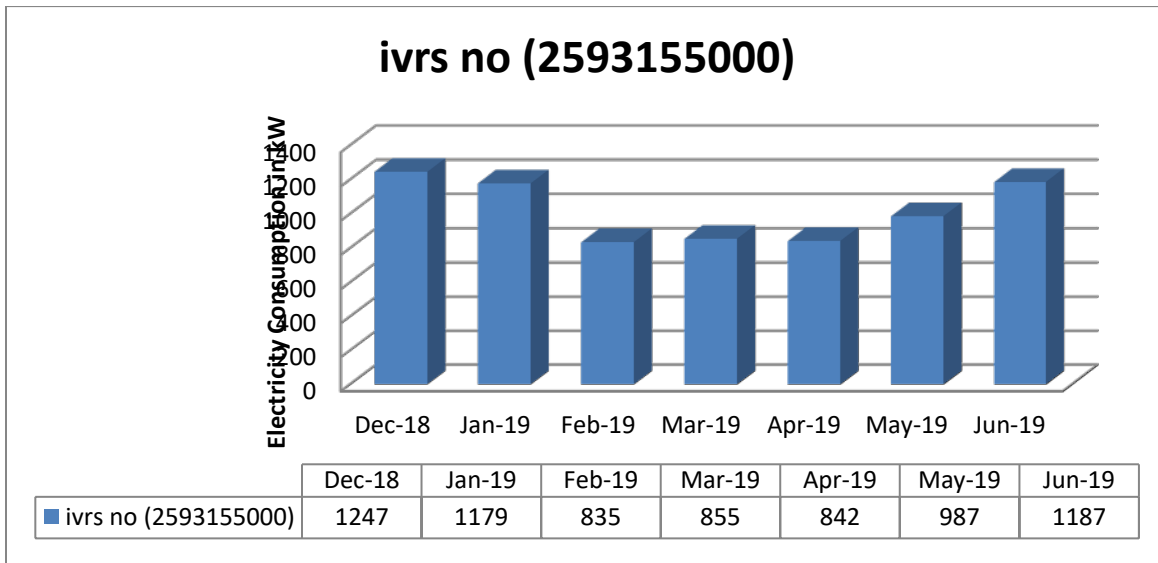
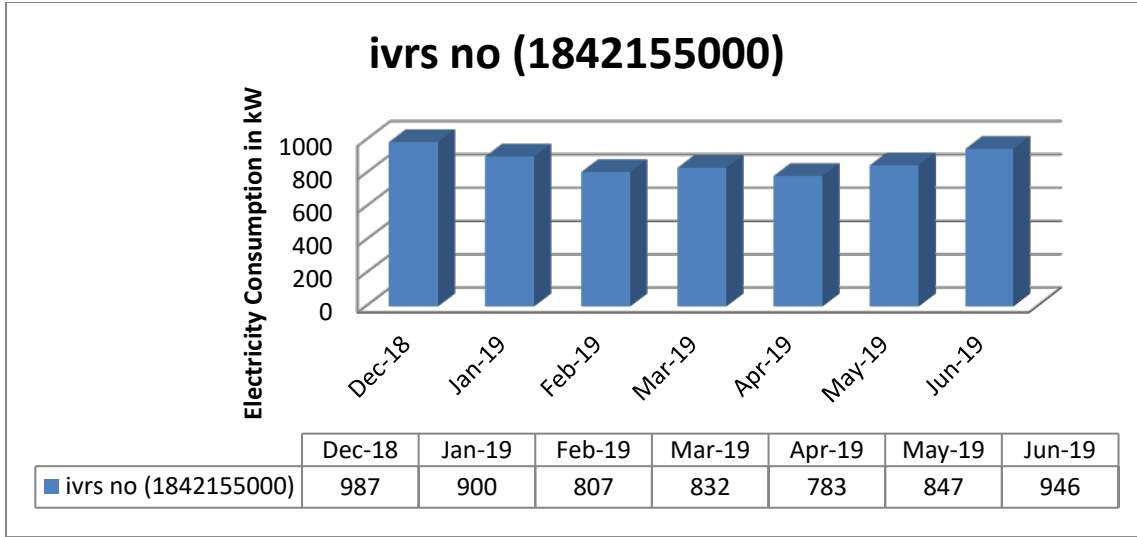
Electricity is supplied by Madhya Pradesh Madhya Kshetra VidyutVitaran Company Limited (MPMKVVCL). Tapping point is at the enterence of the institute.

SOLAR POWER PLANT

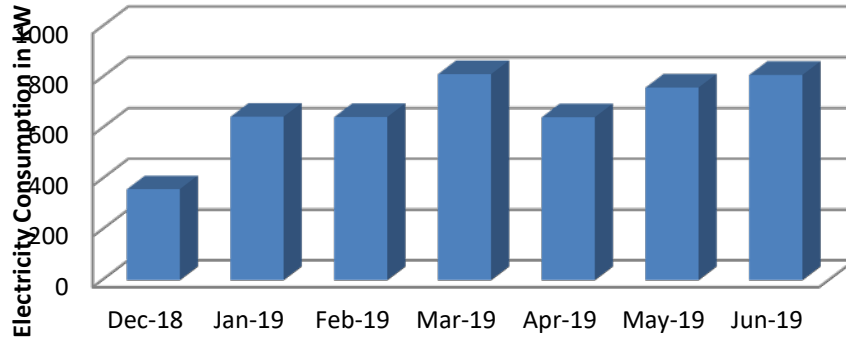
As policy matter of MP government roof top solar power plant is planned to cater 20% of the total electrical requirement of the campus. Installation is awaited.

ELECTRICITY CONSUMPTION PATTERN

There are ten electrical meters are installed in campus .Total energy consumption recorded in period December 18 to June 19 was 43785 kWh. Excluding energy consumption of NCC building energy analysis of all the other meters were done. The energy consumption pattern is as follows:

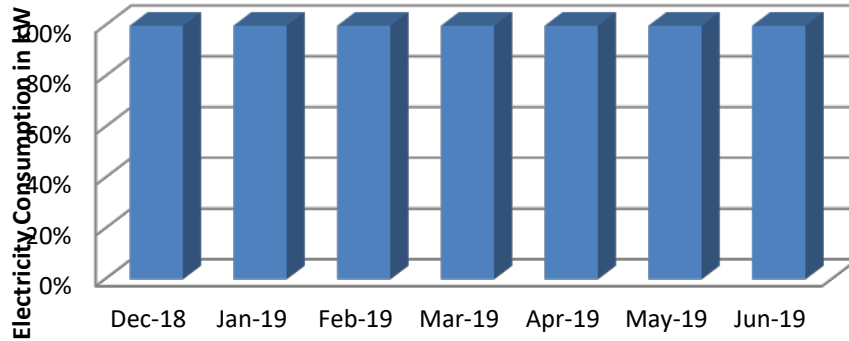


ivrs no (3245155000)



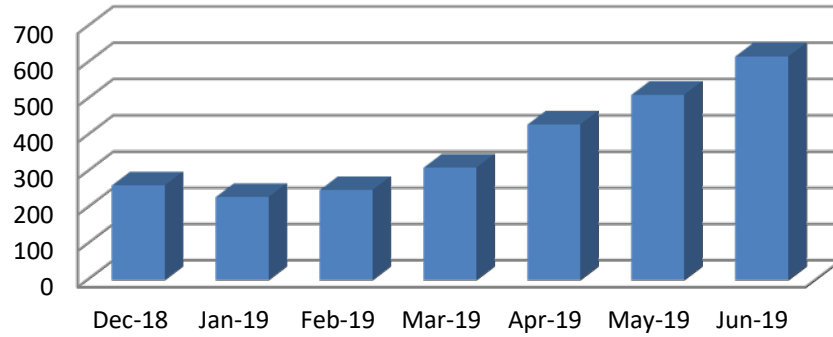
	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
■ ivrs no (3245155000)	359	645	644	813	643	760	810

ivrs no (4986155000)



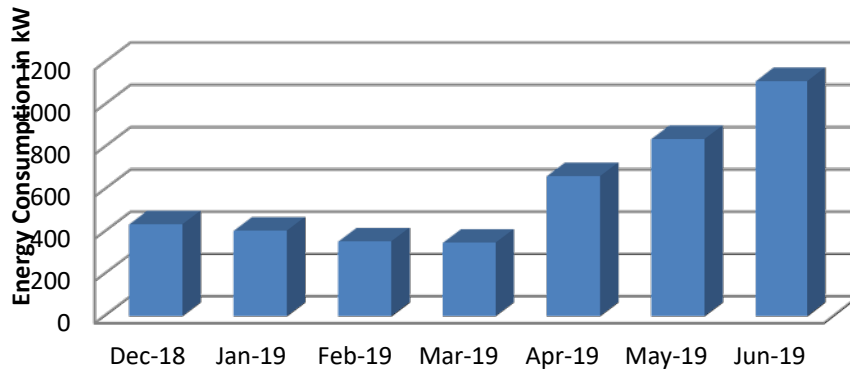
	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
■ ivrs no (4986155000)	575	535	465	615	420	677	892

ivrs no (4986155000)

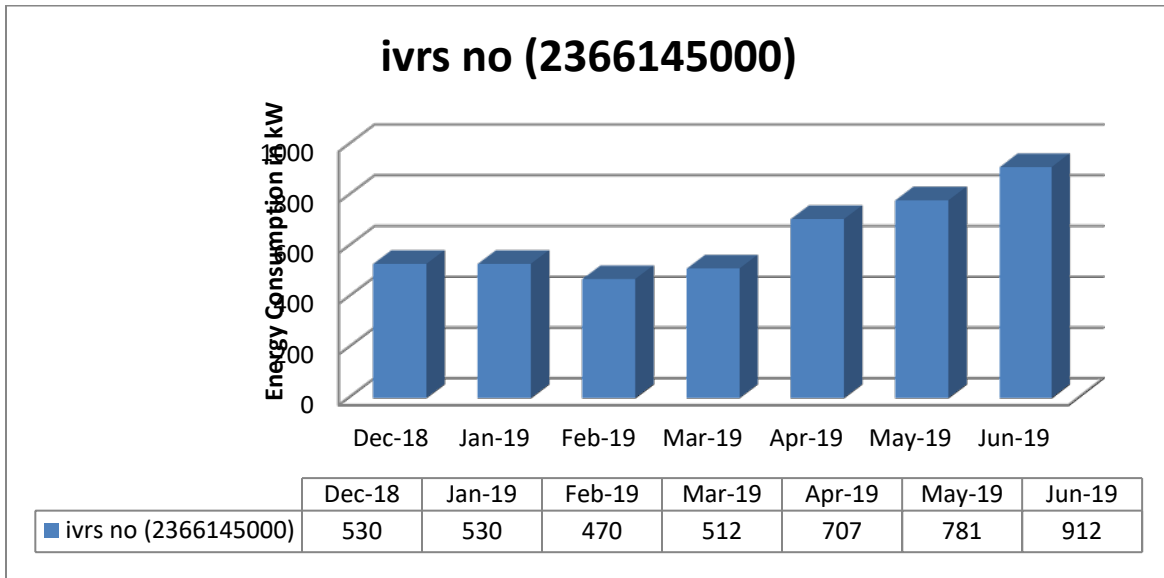
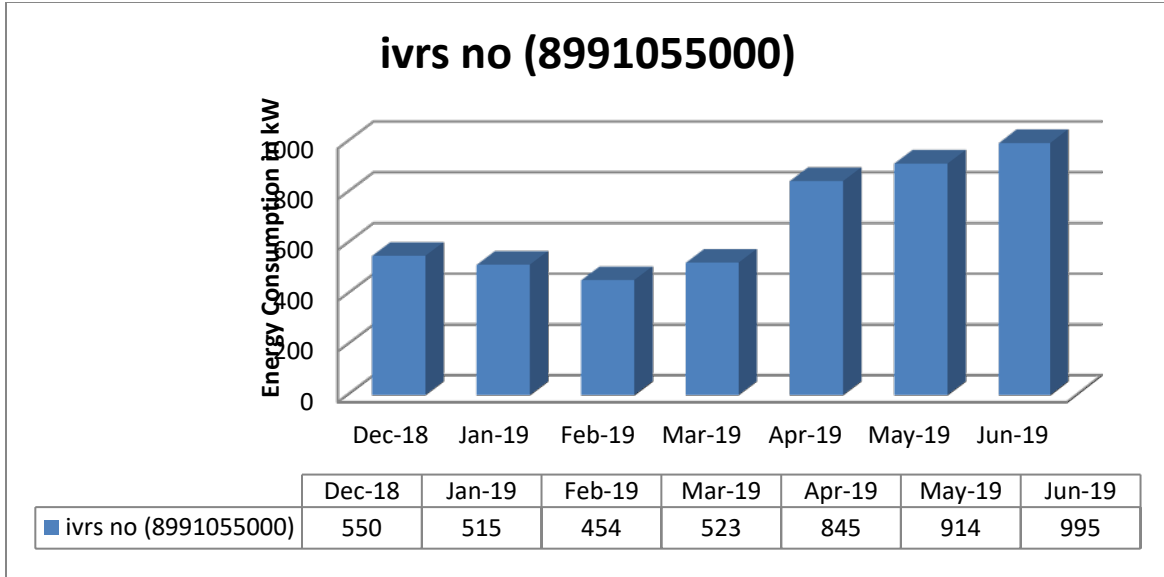


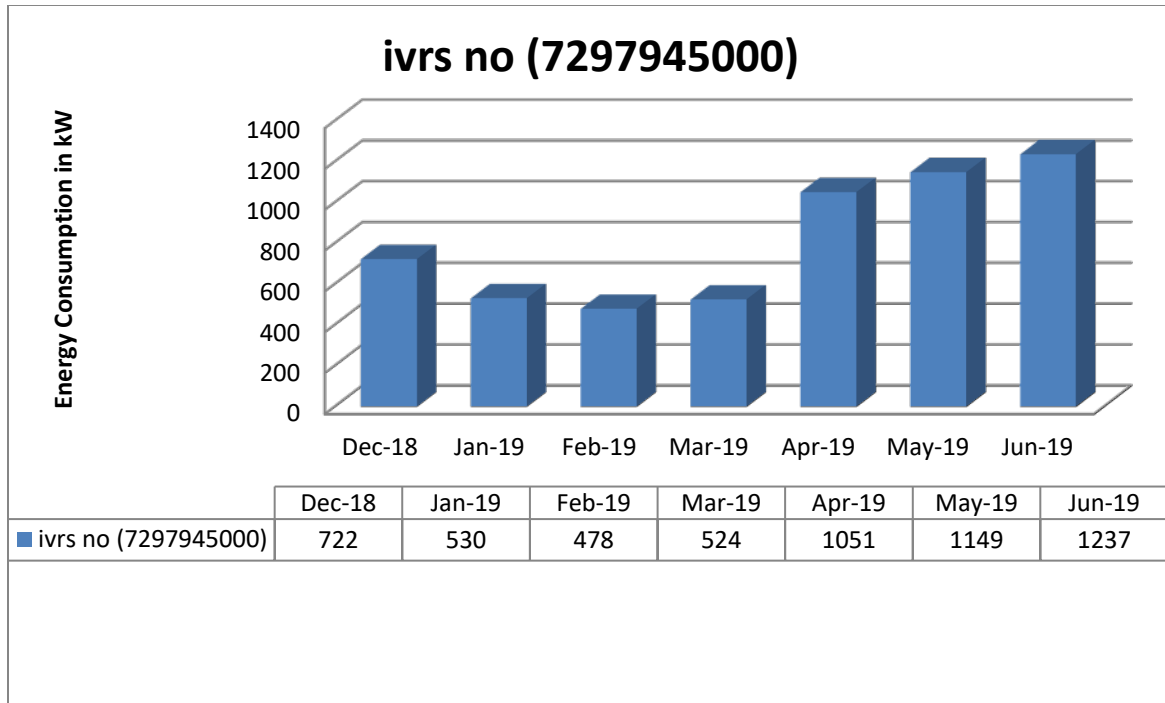
	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
■ ivrs no (4986155000)	262	230	249	311	430	512	618

ivrs no (6031255000)



	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
■ ivrs no (6031255000)	435	405	354	348	663	839	1113





From the study of bills it is clear that the maximum energy consumption is in summer specially in the month of May and June when summer is in peak otherwise consumption is less in winters.

CONDITION OF EXISTING ELECTRICAL INSTALLATION

WIRING

The major part of the buildings are old with electrical system. With time and the system was upgraded and modified. This results in different wiring system with electrical protection starting with batten to open steel/ PVC conduit to concealed wiring as well casing capping. Wide range of switches and fan regulators are in use.







ELECTRICAL EARTHING

The process of transferring the immediate discharge of the electrical energy directly to the earth by the help of the low resistance wire is known as the electrical earthing. This system provide shifty to human being and electrical equipment and installation.

No electrical earthing has been observed for individual building. There is a conventional earthing at substation.

LUMINARY AND FANS

It is observed that there is no uniformity in luminary. Maximum places T 8/T12tube fitting with conventional choke are provided with CFL and LED bulb fitted in holders. Although Institute is in the process of phasing out system of CFL and bulb with LED bulbs.

Similarly ceiling fans were installed in the initial phases were replaced with new fans. This makes system inefficient and system require more electricity.



NATURAL VENTILATION CONDITION

The building is naturally ventilated there are adequate amount of windows (with ventilators) are provided on outer side of the rooms opening outside the building. There is no obstruction in front of windows. Doors and ventilators are provided on the opposite wall opening in the

corridor to provide proper cross ventilation. There is about 10°C temperature difference is observed in ambient air outside and inside the building with average airflow of 0.4m/s.

It is observed that windows and ventilators are permanently closed obstructing cross ventilation.

DAY LIGHT CONDITION

Each and every room are having adequate windows. The observation of day light taken in between 12 noon to 3 pm on bright sunny day of April is more than 150 lux on lux meter.

It is observed that the window pans are painted opaque or light is obstructed by putting curtains





Day light and ventilation Condition

WATER AUDIT AND MANAGEMENT

FRESH WATER

WATER REQUIREMENT

Water is required for drinking, flushing of toilets, Lab works and watering of plants of Botanical garden. The anticipated water requirement is as follows:

S.No.	Description	Consumption in liters
1	Drinking @2 l/day (considering 50% of 2400 person)	1200 l
2	Flushing of toilets @30 l/day (considering 50% of 2400 person)	36000 l
3	Watering of plants	Not required plants are too old
	Total anticipated water requirement	37000 l

SOURCE AND DISTRIBUTION

There are tube wells and a municipal water connection. The water is collected in a PVC tanks. The water is then transferred to individual tank placed on terrace. The water is distributed through pipe network to individual point of use. The control valve are not in function. The terrace tank are un approachable.

There is no meter in supply line or distribution line.





DRINKING WATER FACILITY

There are adequate drinking water point having a set of water cooler with purifier and a PVC water storage tank.



Drinking water facility

IRRIGATION OF GARDEN

The average life of plants in garden are 15 to 20 year of the plant need almost no water. Water level in this area is very high hence there is very less water requirement.

WASTE WATER MANAGEMENT

Waste water is generated from Drinking water point, Basin and WC of toilets. The sewage so generated is conveyed to the septic tank near individual building. Hence institute is having many septic tanks. The overflow of these septic tank flow to lower lake.

RAIN WATER MANAGEMENT

Water from roof and other area follow natural path of contour and flow merges in lower lake. Water table is very high hence there is almost no opportunity for rain water harvesting.

STATUS OF MUNICIPAL / SOLID WASTE HANDLING

Here it is observed that all the Municipal waste is collected in common bin. The collected waste is then shifted to the nearest pickup point from which the waste is transported to Municipal Land fill.





Municipal Solid waste handling system

SOLID CHIMICAL WASTE

There is no chemical waste generated in the campus.

ORGANIC WASTE

The organic waste generated in the form of leafs and tree waste all over the canpus. There is no facility of vermicomposting .

ELECTRONIC WASTE

The non functioning computers are stored in a room with the intent to dispose it off to authorised vendor on later date.

RECYCLABLE WASTE

time to time old newspapers, magazine and used papers from office are handed over to authorised vendor.

CARBON FOOT PRINT

Carbon foot print is the amount of carbon dioxide released into the atmosphere as a result of the activities of a particular individual, organization, or community. In the institute like this Carbon Dioxide is generated by burning of petroleum product like petrol, Diesel and LPG or use of electricity.

Total energy consumption between December 2018 to June 2019 is 43785 kWh.

The carbon foot print of above is 50 metric ton per year considering electrical consumption 43785 kWh for seven months @ 0.813 kgCO₂e/kWh

There are about 100 two wheeler and 15 cars used for transport till institute, rest about 2000 person come to institute daily by public conveyance. Assuming average distance covered by these vehicles are 10 km for attending the institute for 200 hundred days

The carbon foot print of above is 0.15 metric ton for cars , 15 metric ton for two wheeler and 20.20metric ton for public conveyance.

Hence the total foot print of campus for last year is 85.35 metric ton/year .

Note the above calculation is based on calculator provided by <https://www.carbonfootprint.com/calculator.aspx>

HEAT ISLAND IMPACT

The heat island effect implies to cities or metropolitan areas are transformed into islands of heat. Temperatures in these regions can get as much as 3 to 5°C higher compared to the adjacent rural areas.

The hard paved surface, Black roof top and 50 vechale standing outside in direct sun enhance heat island impact.

RECOMMENDATIONS

GENERAL

Based on the baseline study or the observation made earlier section, this portion outlines measures to be adopted to make campus Green.

BUILDING MAINTENANCE

Although maintenance of Building infrastructure is in owners scope even then work can be priorities for follow up. The classification of priorities and its contains are as follows

HIGH PRIORITY WORK

Definition: Work that does not qualify as an emergency, but cannot wait to be scheduled as routine maintenance and repair. Generally, these are NOT issues related to health, safety, or security but have impact on the function of the building. The Chief Custodian must put in a work order for these issues and be sure to be specific in the description of the assistance needed.

Following are typical examples of high priority work orders:

- Broken fence or gates
- Leaking or broken sprinkler heads, valves
- Broken tree limbs or fallen trees
- Leaking plumbing
- Cracked glass windows
- Street lights not working.

MEDIUM PRIORITY WORK

Definition: Medium priority work order falls into the routine maintenance work request. These work orders are the everyday repairs required to keep the building in proper working order.

Most work orders will fall into this priority for completion. The Chief Custodian must put in a work order for these issues.

Some examples can be:

- Repair electrical switch or outlet
- Replace light ballast
- Urinal stopped up
- Door closer leaking hydraulic fluid
- Black Board Painting
- Drinking water facility either cooler or filter or both are not working

LOW PRIORITY WORK

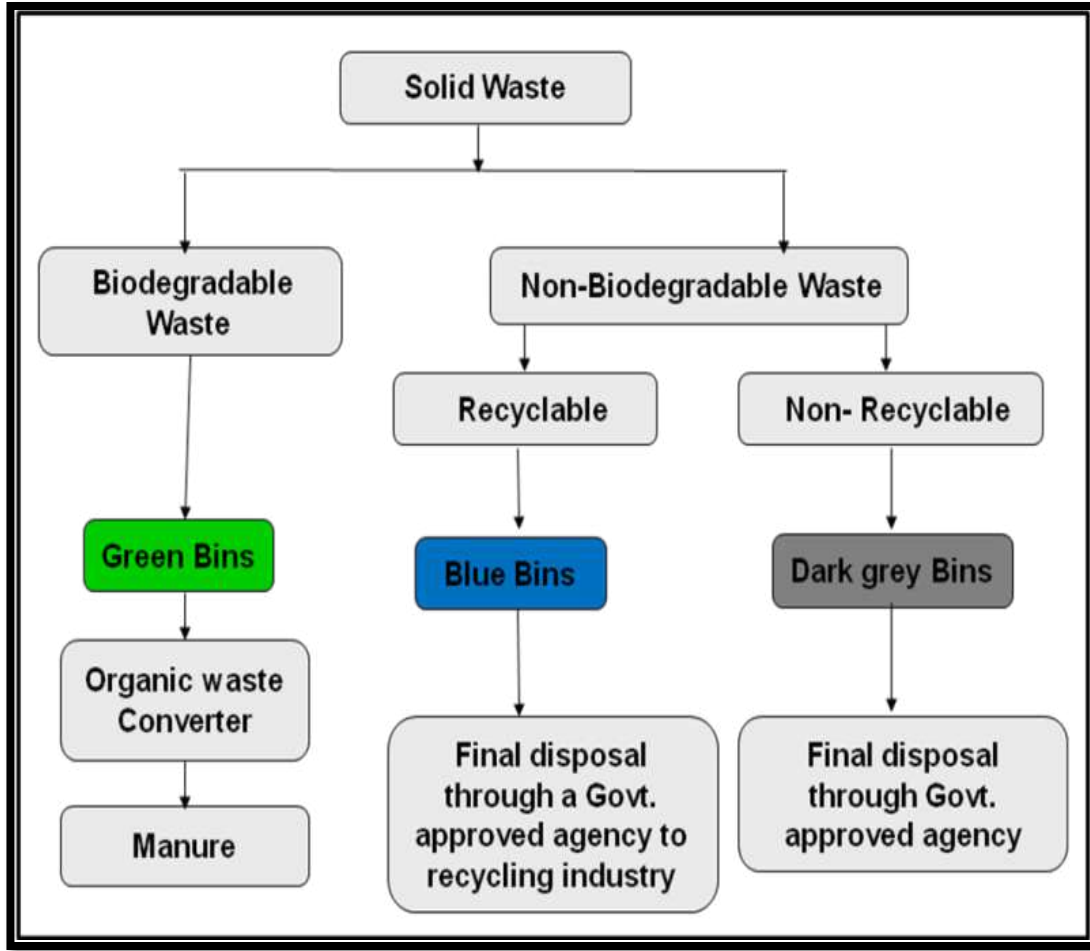
Definition: Low priority work orders are issues needed to be completed within the scheduled period of time. These items, although routine, can be scheduled and completed as a craft person becomes available.

Some examples might be:

- Playground equipment painted
- Keys (replacement keys)
- Paint parking lot stripes
- Pick up bags of leaves for disposal

SOLID WASTE MANAGEMENT SYSTEM

It is proposed to have provision for segregation and collection of biodegradable & non-biodegradable waste within the premises. Biodegradable waste will be treated in Organic Waste Converter and the biodegradable waste within the premises. Biodegradable waste will be treated in Organic Waste Converter and the from non-biodegradable waste recyclable waste shall be handed over to recyclers and non-recyclable waste shall be shifted to nearest pick up point from which it is transported to land fill ground.



Solid waste management plan

AUTOMATIC COMPOSTING MACHINE

Composting machine is a fully automatic and highly compact machine which uses special technique to break down and decompose all kinds of organic waste into compost with in 3 to 10 hours when used with solar dehydrator and 10 to 24 hours without solar dehydrator with a volume reduction of 80-90%. The entire process is natural and biological. This has a inbuilt shredder, composting tank with a humidity sensor, heater (in electric verison), mixing blades, moisture control system and air ventilation system. When organic waste is added to it, shredder shreds organic food waste into small pieces and transfers all shredded material to composting tank. After being processed in the machine the

raw organic compost is then placed in the Solar dehydrator for extracting the humidity from the compost.



With MSDS (Modular Solar Dehydration System)



With Electrical Heating

FEATURES & BENEFITS:

- Machine can process 50 Kgs waste and convert it into 5 to 10 Kgs of organic manure in 24 hours with the support of electrical heating without MSDS (Modular Solar Dehydration System). Fully automatic.
- Machine if used along with MSDS (Modular Solar Dehydration System) can process upto 500 Kgs of waste on 10 hours basis and give 50 to 100 Kgs of organic manure depending of the presence of moisture content in the green waste.
- MSDS is supplied as an accessory at an extra cost which multiplies the machine output by more than 10 times and reduces operation and maintenance cost by 5 times.
- Compact in Size and Long life
- Noiseless, Odourless with No harmful gases
- PLC (Programmable Logic Controller) with sound & HMI (Human Machine Interface) Touch Screen
- Converts any kind of Food Waste like veg., non-veg, egg, Fish, crab, small bones, Fruit & Vegetable peels, Meals Leftover into High Quality of Compost
- 90% volume reduction of food waste & 10% Compost of High quality for your plants / garden and farming
- Composting is totally Natural and Biological Process
- Organic farming will improve soil fertility

DISPOSAL OF ELECTRONIC WASTE

Electronic waste or **e-waste** describes discarded electrical or electronic devices. Informal processing of e-waste in developing countries can lead to adverse human health effects and environmental pollution. If electronic equipment is in operational condition then donate it. This will helps reduce pollution that would be generated while manufacturing a new product and

therefore the pressure on natural resources. It also reduces the energy used in new product manufacturing.

Put unusable electronic equipment in a tamper proof plastic bag. Store it in leak proof containers till it is disposed off. Hand over all the e-waste to authorised recycler.

If electronic equipment are replaced by new one then hand over old one to the supplier itself.

HOUSE KEEPING

The purpose effective housekeeping is to protect faculty, staff and students from injuries and illness by making all the area clean. Following shall be done for effective housekeeping:

- Dispose of all items in the proper labelled containers
- Anything flammable should be in a metal container and labelled
- Clean up spills immediately
- Stack Item properly make sure they cannot fall or block passages
- Avoid food and beverages in work area
- Never put liquids in an unlabelled container
- Do not remove any safe guards on equipment

ENERGY MANAGEMENT

Energy conservation is the need of the hour the first step toward energy consumption is to record the energy use. Following steps can reduce energy consumption:

- Energy record shall be maintained as per Performa enclosed
- Provide Power Factor correction method to claim incentives for maintaining better power factor.
- High efficiency electronic ballasts shall be used on all Tube lights.
- Change incandescent lamp with either CFL or LED bulbs.
- Change existing T12/T 8 Tube light with T5 Tube light.
- Change existing fans with energy efficient fans

- Open window for day light or replace at least top two window panes with transparent glass.
- Switch off all the electrical equipment when it is not in use.
- Provide solar powered LED street light.
- Provide occupancy sensor and day light sensors to switch off lights and fan when operation of this is not required.
- Maximum demand meter shall be provided.
- Electricity supply company shall be approached to revise contract demand hence accordingly fixed charges will be reduced.
- Provide proper earthing for electrical equipments and building wiring system.
- Replace present conventional earthing system with no maintenance chemical earthing.

Similarly record of LPG shall be maintained and following steps will optimise use of LPG

- Clean the burner of stove periodically
- Use small burner in place of big one
- Make all the preparation before turning on LPG stove
- Please check the flame of burner. Blue flame means gas stove is operating efficiently. Yellowish flame is an indicator that the burner needs cleaning
- Use pressure cookers as much as possible
- Use lids to cover the pans while cooking & Bring items taken out of refrigerators (like vegetables, milk etc.) to room temperature before placing on the gas stove for heating.
- Turn off the stove when it is not in use.

WATER MANAGEMENT

Material which is not measured cannot be saved hence it is advisable to put a meter and check the consumption on regular basis. A record shall be maintained for tank cleaning, water cooler cleaning and purifier maintenance with water consumption. Following provision shall be implemented for water conservation:

- Providing self closing (push cock) type pillar cock and bib cock to avoid wastage of water due to not closing the pillar tap.
- Providing automatic auto sensor based flushing to urinal in place of normal flushing cistern which operates 24 hours.
- Providing dual flushing cistern for water closet 3 -6 litres in place of 10 liters cistern.
- All WC ablution taps to be self closing taps.
- Consumption requirement of fresh water will be reduced by 70 % by using.
- Provide drip irrigation and high efficient sprinkler irrigation system
- Rain water harvesting shall be adopted to enhance ground water table.
- Repair leakage in water distribution system on priority.
- Develop a regular maintenance protocol.
- Plant drought resistance trees (list enclosed).

WASTE WATER MANAGEMENT

Septic tank is provided with buildings to cater individual building. The over flow from these septic tank is flow towards lower lake. This flow can be channelized to a Sewage Treatment Plant based on anaerobic treatment process preferably DEWATS.

Provide neutralization tanks for chemical waste.

FIRE AND SAFETY

Following steps will make campus safe from Fire

- Evacuation plan is to be prepared and adopted.
- Provision of more fire extinguisher shall be made.
- Additional spiral stair case will make evacuation effective.
- Provide 20 kg fire extinguisher with moveable trolley to fight heavy fire and forest fire.

UNIVERSAL ACCESSIBILITY

Following steps will make property friendly for all:

- Provide more ramp at suitable location.
- Provide Tactile floor for Blind.
- Provide signage in Braille Language.
- Provision for handicap toilet can be made.

CARBON FOOT PRINT

Carbon foot print can be reduced by adopting following steps:

- Discourage driving by charging heavy parking charges and providing preferred parking for by-cyclers.
- Implement effective energy use system.
- Switch off lights, fan and equipments not in use.
- Preferred parking or charging point can be provided for electronic vehicle.
- Encourage vehicle users for pollution check and periodical check-up of air pressure of their vehicles.
- Use only energy efficient office and lab equipments.
- Maximum use of natural light and ventilation.
- Encourage users to walk by providing safe and covered pathways.

HEAT ISLAND IMPACT

Heat Island impact can be reduced by adopting following steps:

- Plant more and more trees.
- Provide light colour on hard surface.
- Shade roof using solar panel.
- Use grass pavers in place of regular pavers.
- Watering of road and other hard surface using recycle water.
- Use energy-efficient appliances and equipment

POLICIES

GREEN AUDIT POLICY

Green Audit Policy is an act of determining whether operations and practices regarding General maintenance, Energy use, Water management and Waste management are in compliance with recommendations made in Green Audit Report and industries best practices. The policy is framed to review the actions in specified period of time. A committee can be formed to monitor status of item in Green Audit compliance.

- Verify compliance with environmental regulations, internal policies, and accepted practices.
- Evaluate the effectiveness of Green "management systems" in place.
- Periodic review of records
- Identify and assess any reasonably foreseeable risks associated with hazardous conditions attributable to operations and prevent or mitigate such risks.

An effective Green auditing program increases overall management effectiveness and comfort with the knowledge that the risks of potential exposure to adverse environmental issues are being addressed.

TOBACCO FREE POLICY

The college is committed to maintaining a safe and healthy work and academic environment, improving indoor and outdoor air quality, and promoting the comfort of students, faculty, staff, and guests. Intent of this policy is to prohibit consumption of all type of tobacco/ product contains traces of tobacco in the campus. This policy not only prohibit teaching, non-teaching staff and students but also applicable on visitors too.

The statement says that chewing, smoking or inhaling any is prohibited in all the nick and corner of the college. This is a punishable offence and the culprit will be fined Rs.500/- against this act.

POLY-BAG PROHIBITION POLICY

Through this policy management wants to enforce States policy to ban use of Poly bags. This policy will encourage staff and students to use alternative of poly bag.

NO VEHICLE POLICY

The college is committed to reduce carbon foot print and enhance academic environment, improving indoor and outdoor air quality, and promoting the comfort of students, faculty, staff, and guests. Intent of this policy is to prohibit use of private vehicle and to promote use of public conveyance, vehicle pooling etc. This policy is not only applicable to teaching, non-teaching staff and students but also applicable on visitors too.

The statement encouraging use of public conveyance and vehicle pooling will be displayed in all the nick and corner of the college. High parking fee can be levied on person using private vehicle.

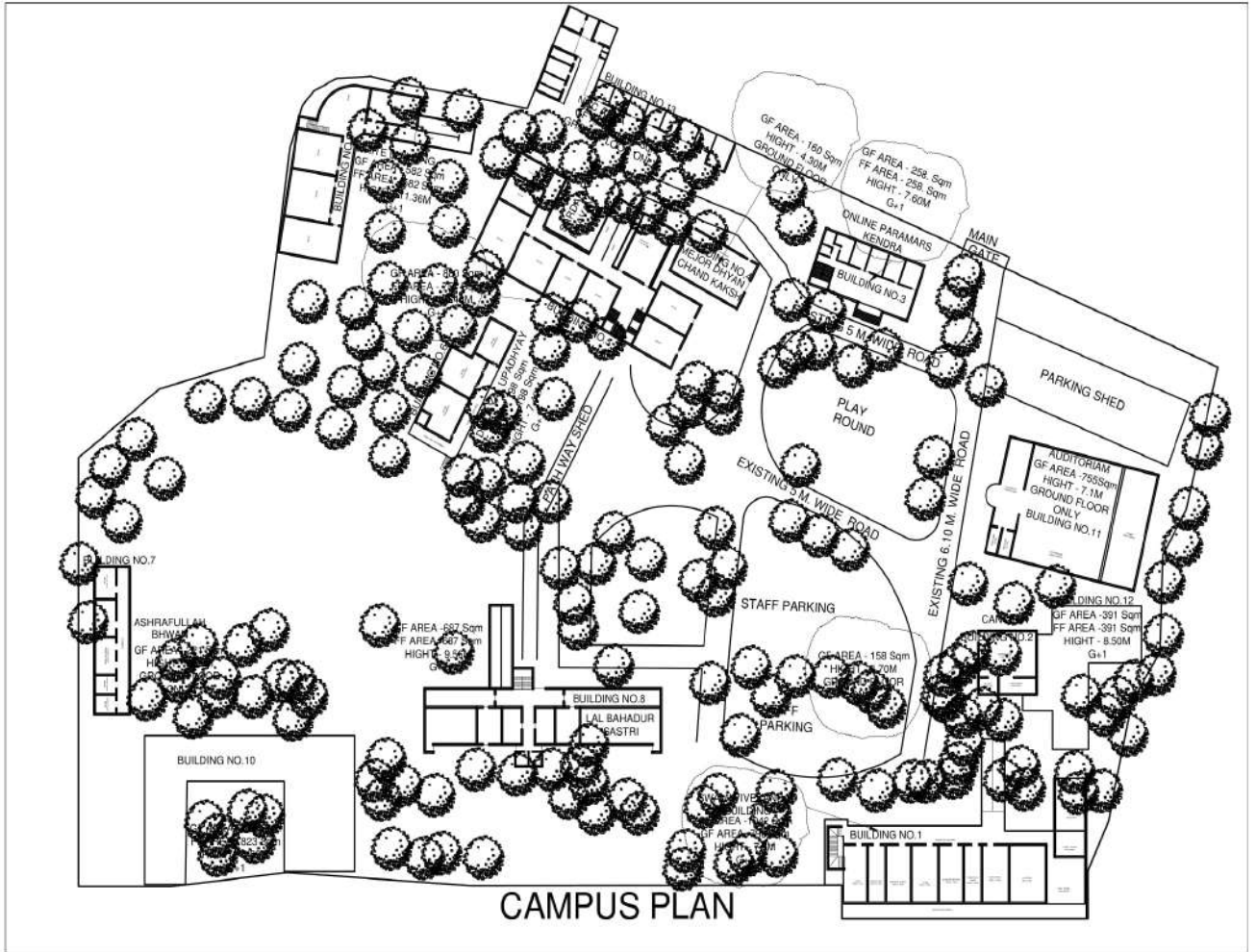
BY-CYCLE POLICY

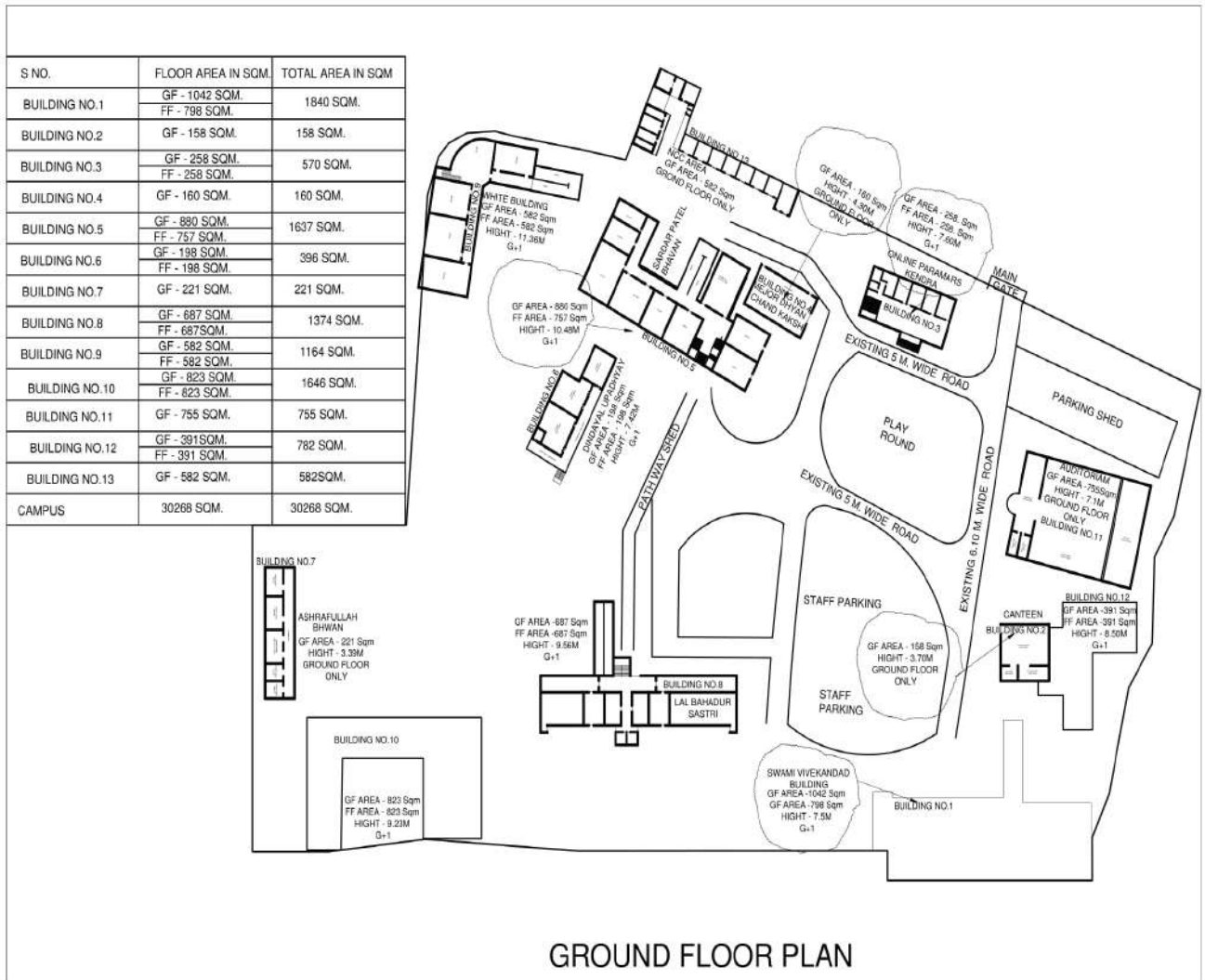
The college is committed not only to reduce carbon foot print and enhance overall health of students, faculty, staff, and guests. Intent of this policy is to encourage physical activity. This policy is not only applicable to teaching, non-teaching staff and students but also applicable on visitors too.

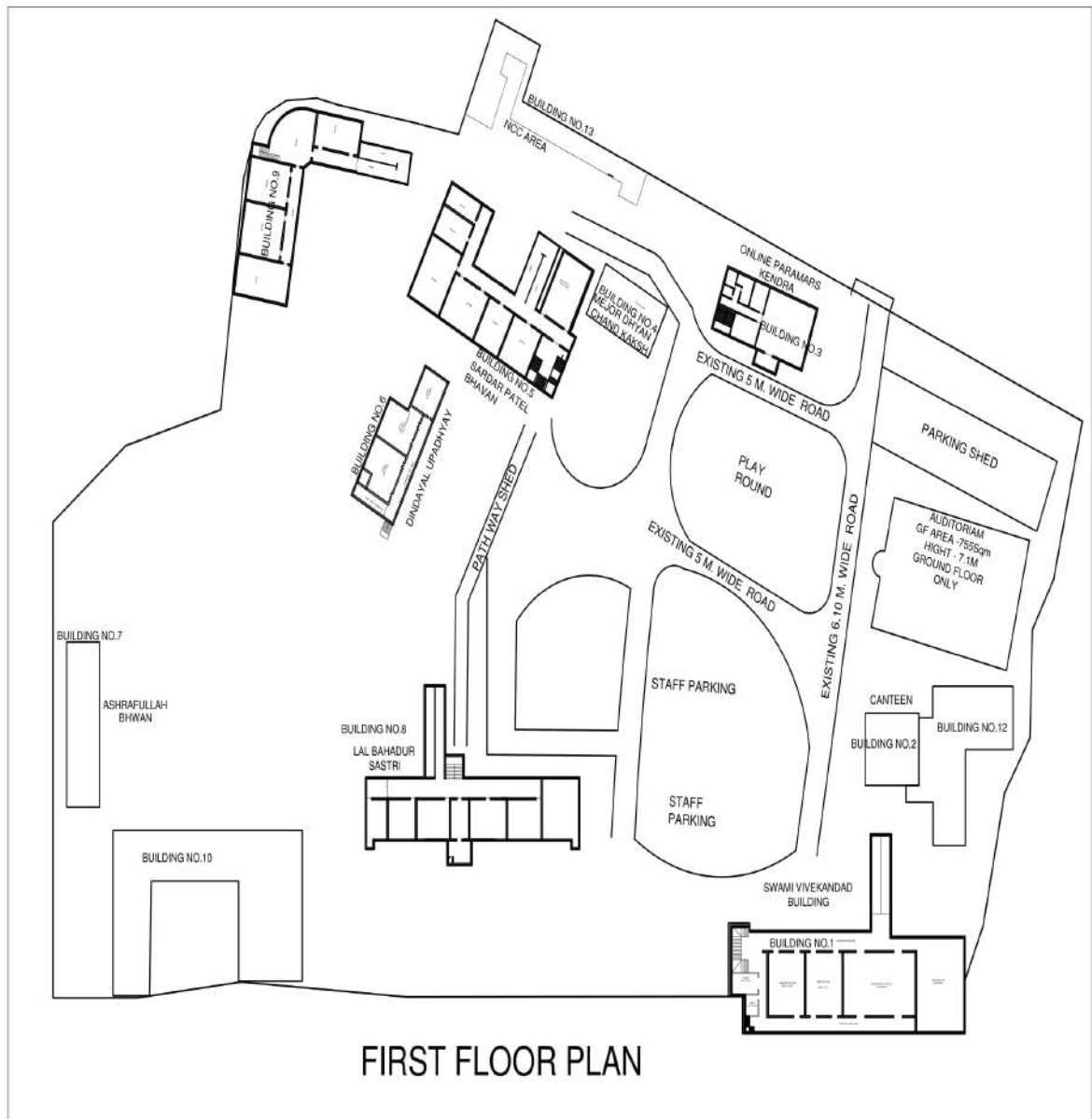
The statement encouraging use of cycle will be displayed in all the nick and corner of the college. Preferred parking will be provided near academic building for cyclists.

ANNEXURE A

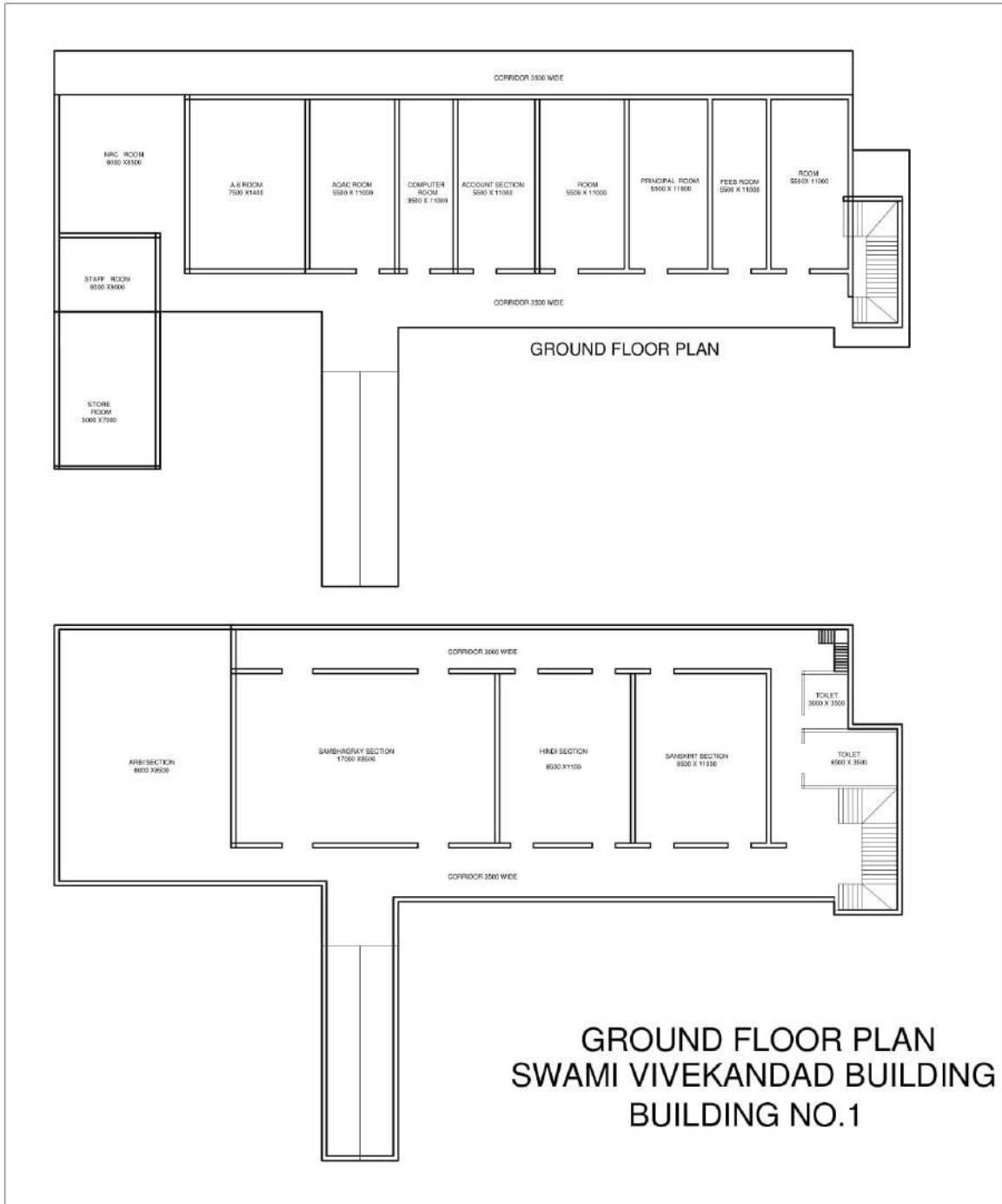
SITE PLAN

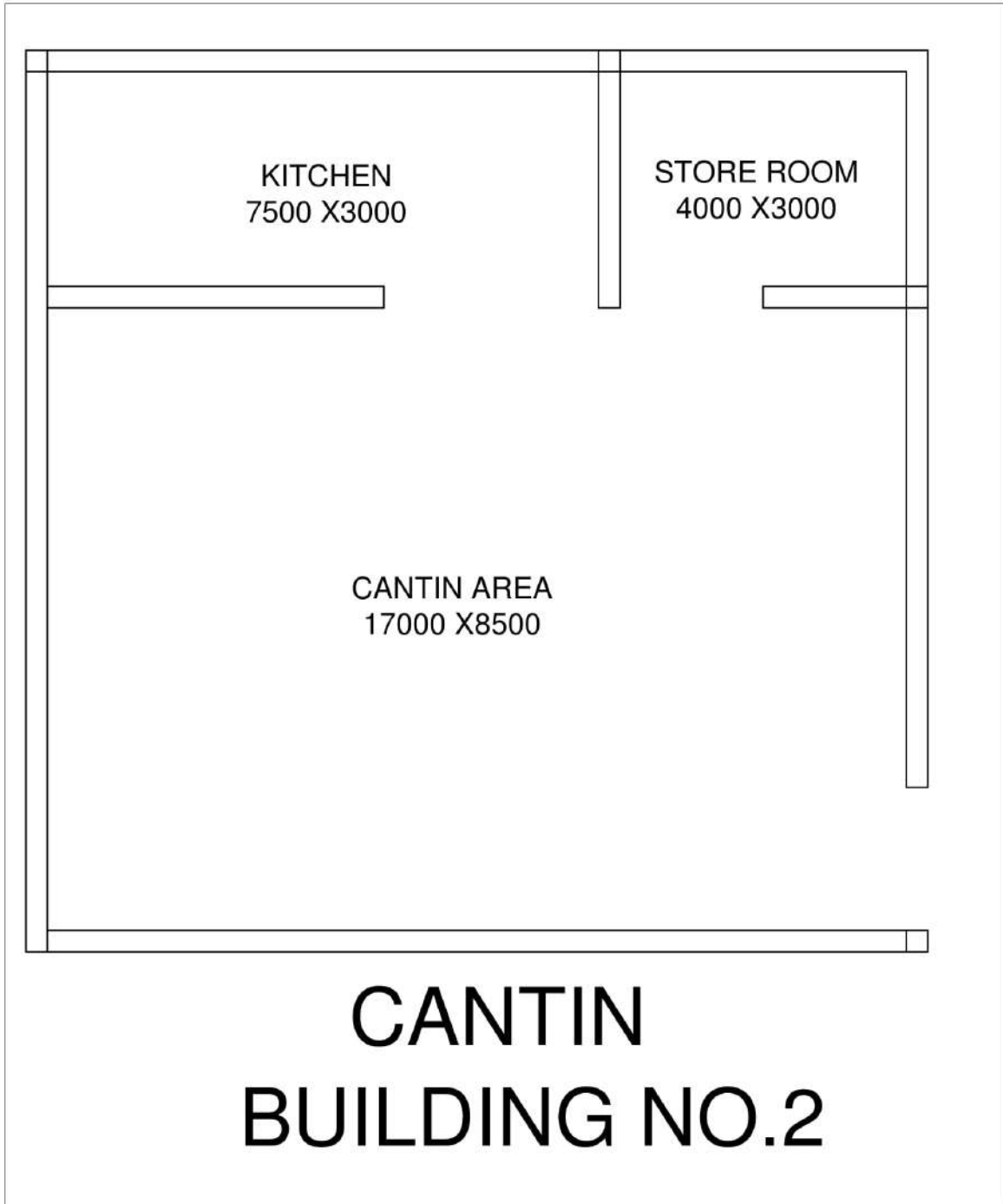


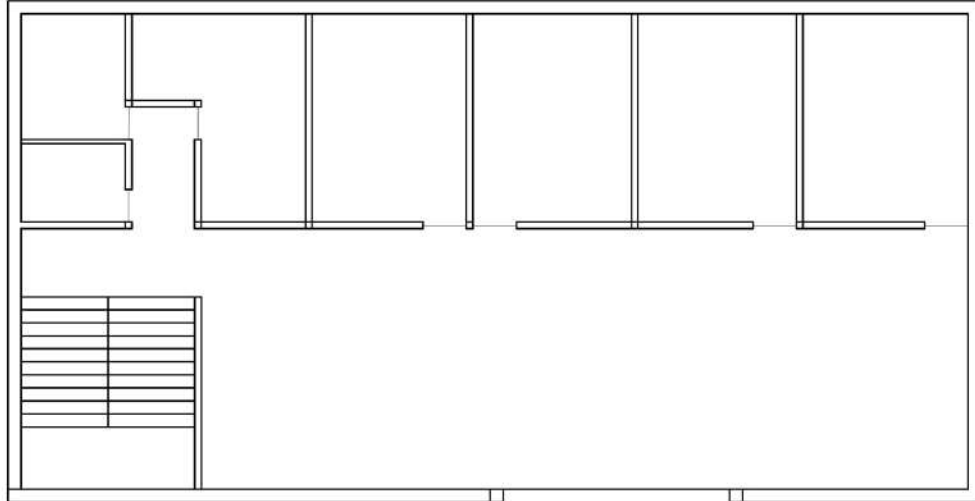




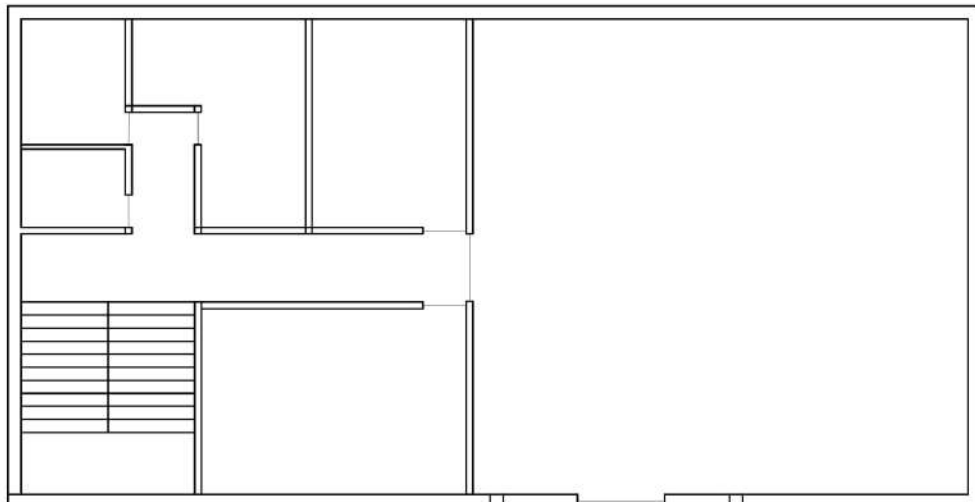
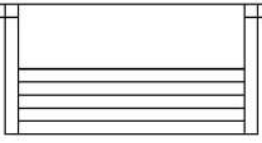
FIRST FLOOR PLAN





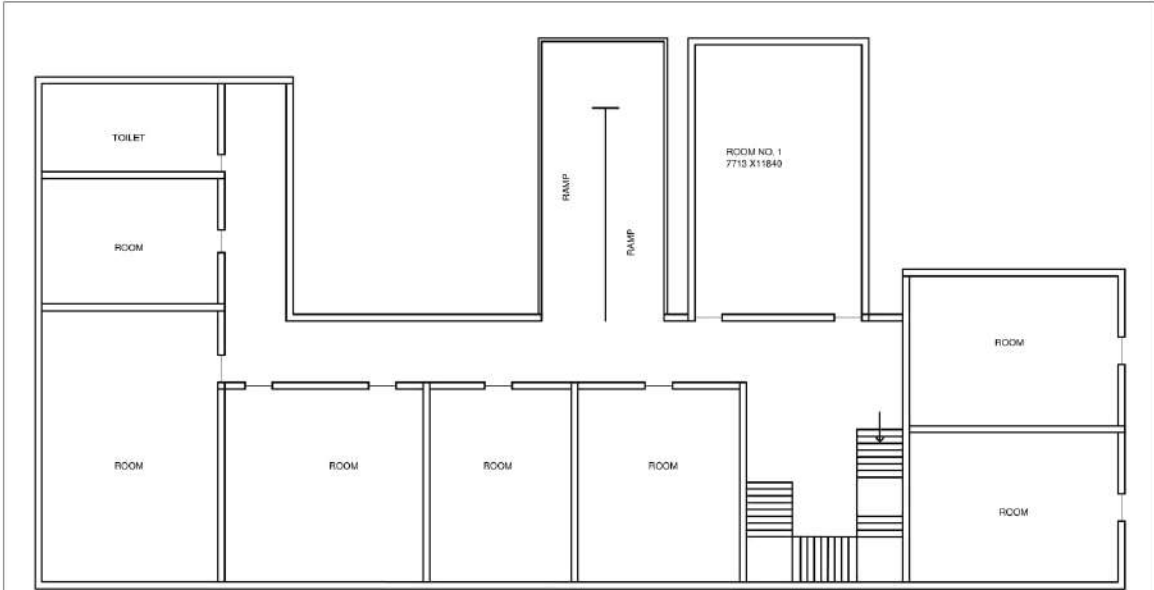


GROUND FLOOR PLAN

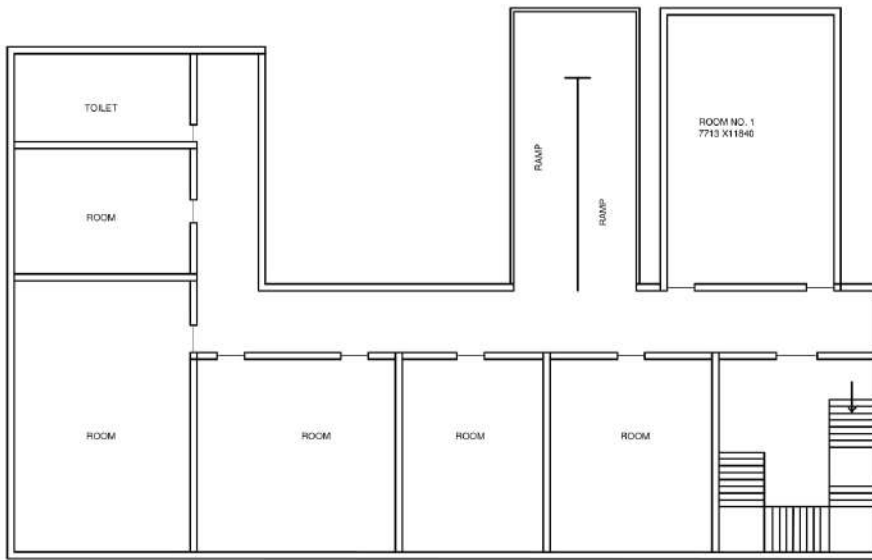


**FIRST FLOOR PLAN
BUILDING NO.3
ONLINE PARAMARS KENDRA**

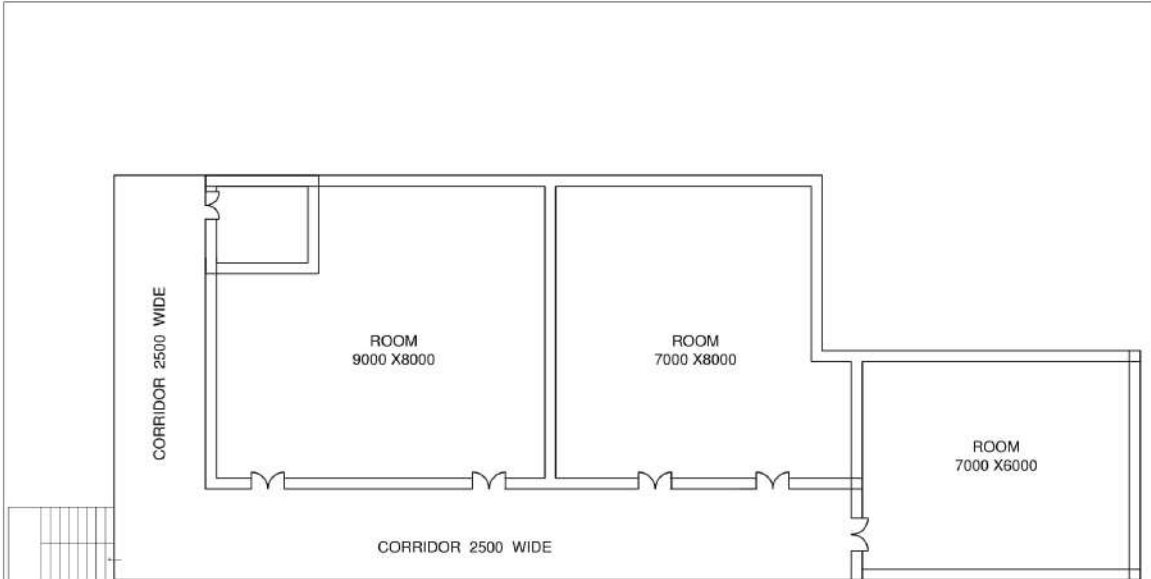




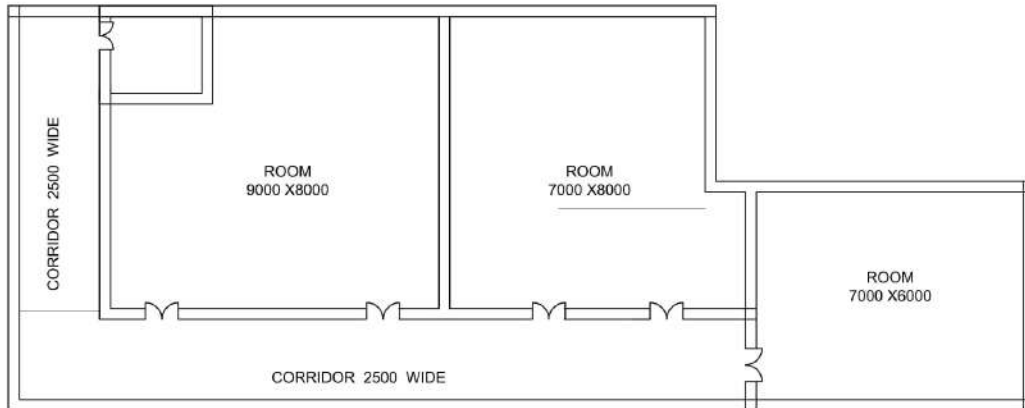
GROUND FLOOR PLAN



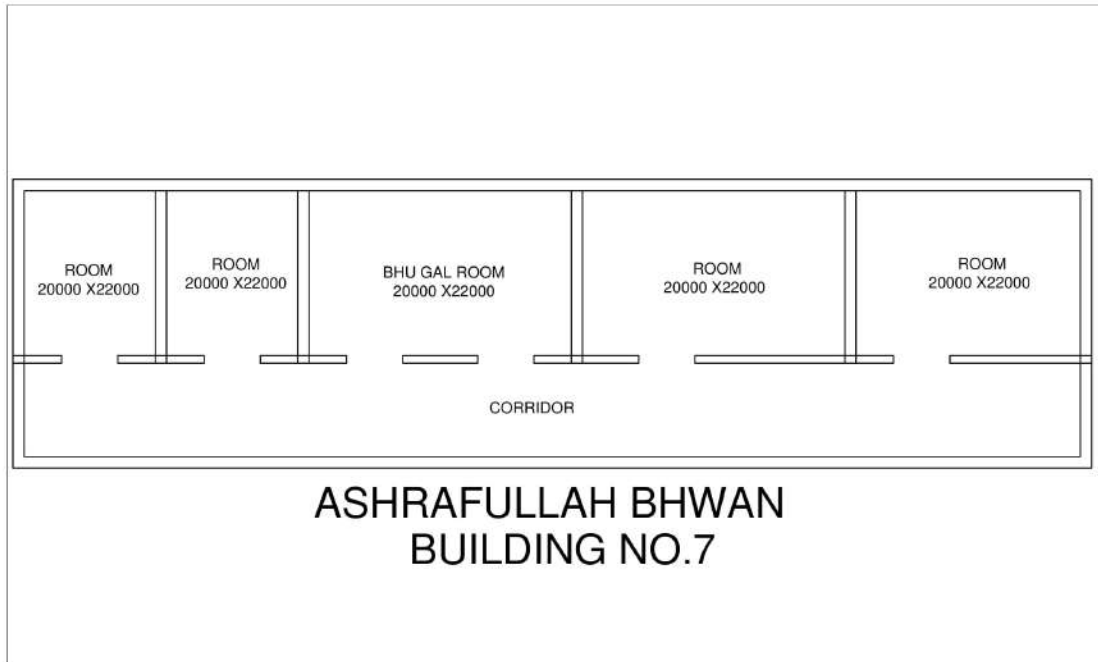
FIRST FLOOR PLAN
SARDAR PATEL BHAVAN
BUILDING NO.5

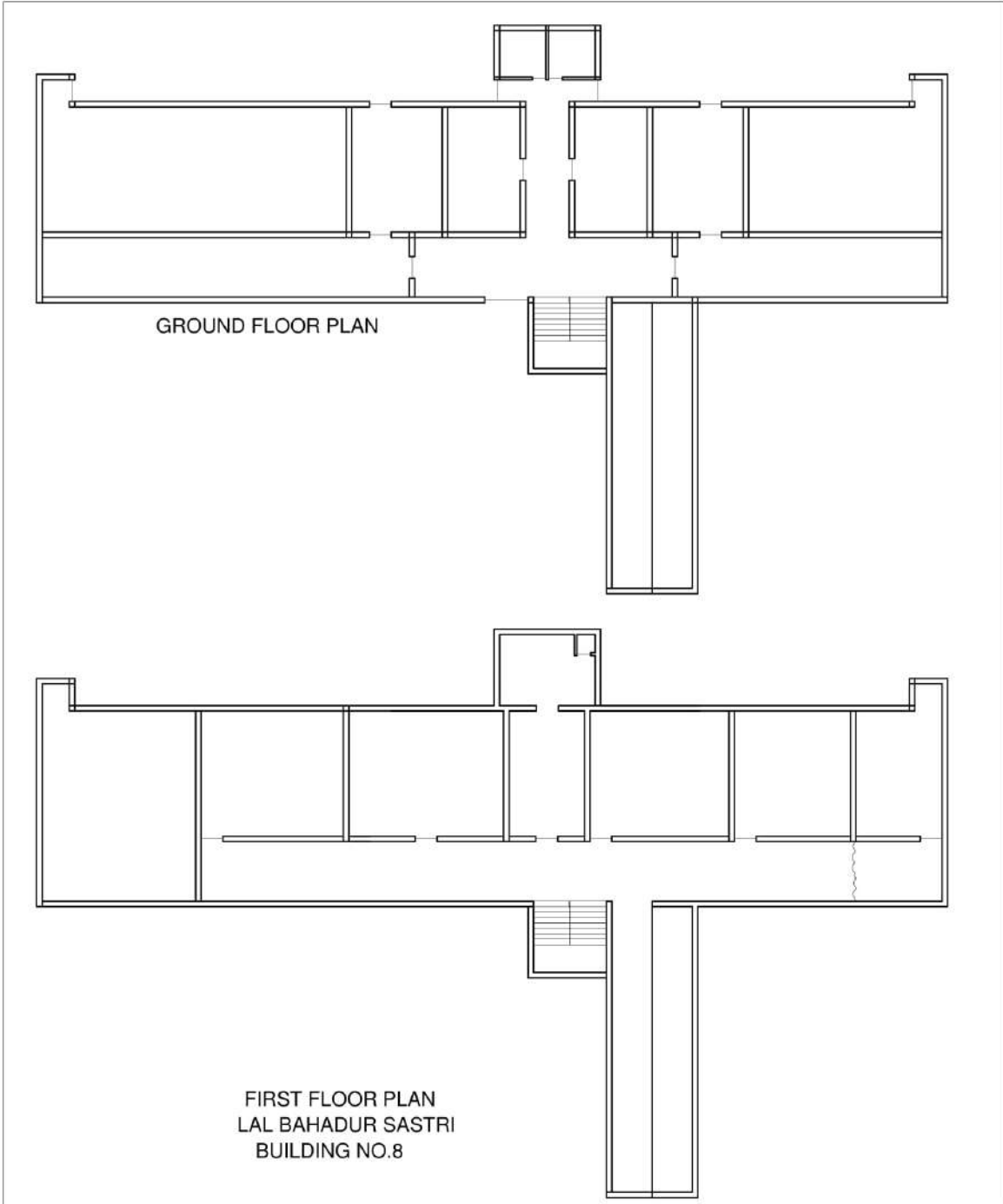


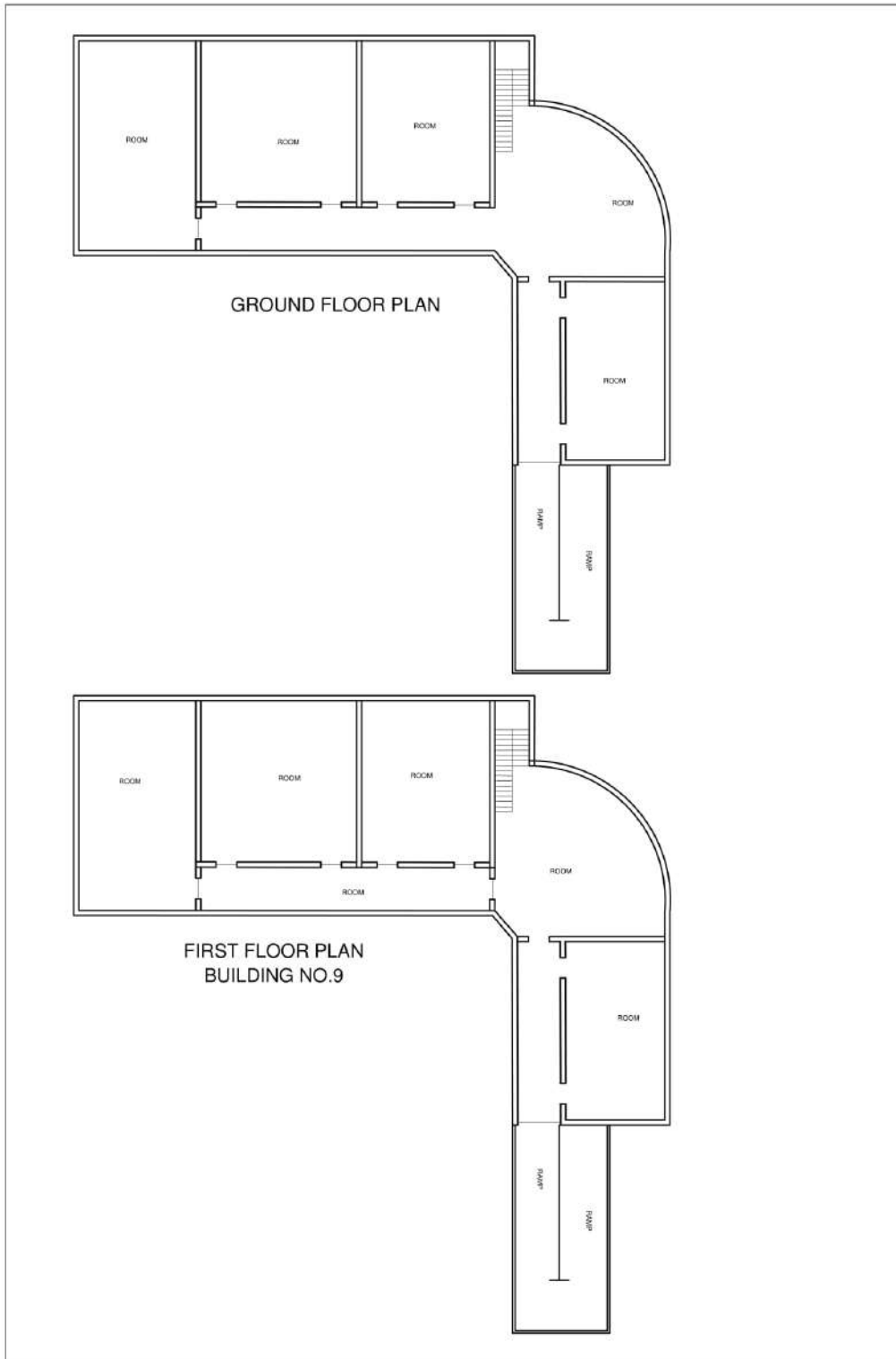
GROUND FLOOR PLAN

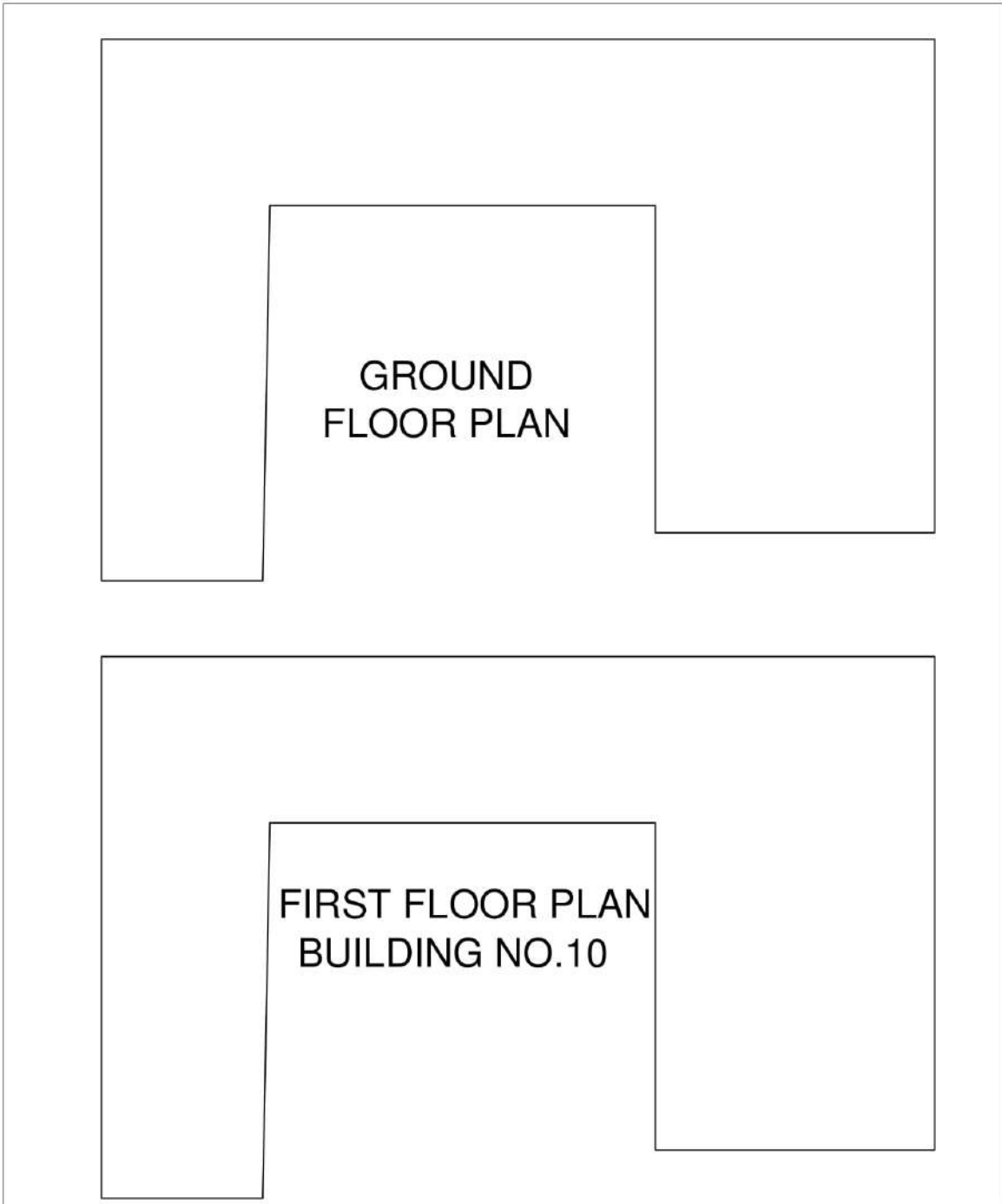


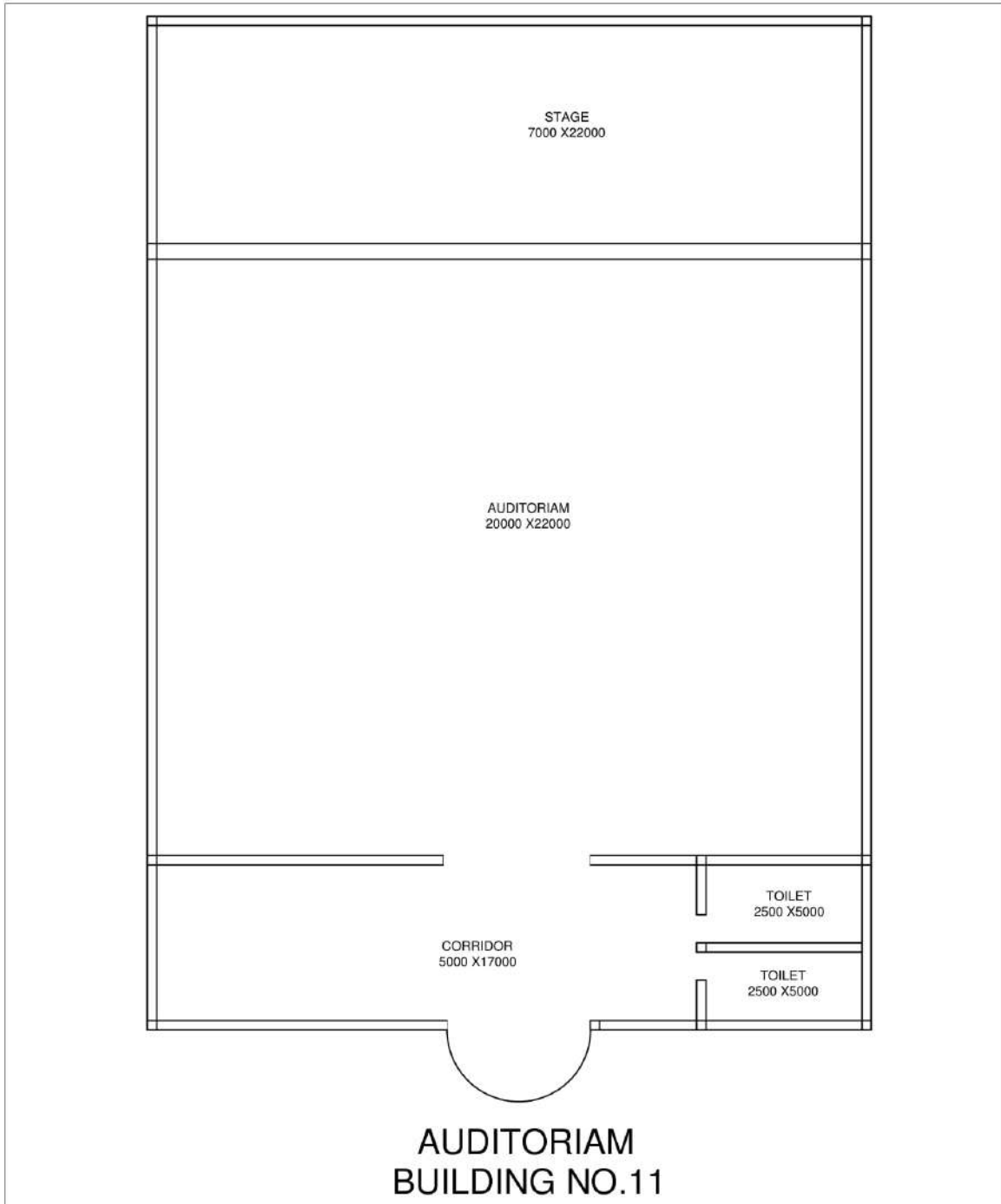
FIRST FLOOR PLAN DINDAYAL UPADHYAY BUILDING NO.6

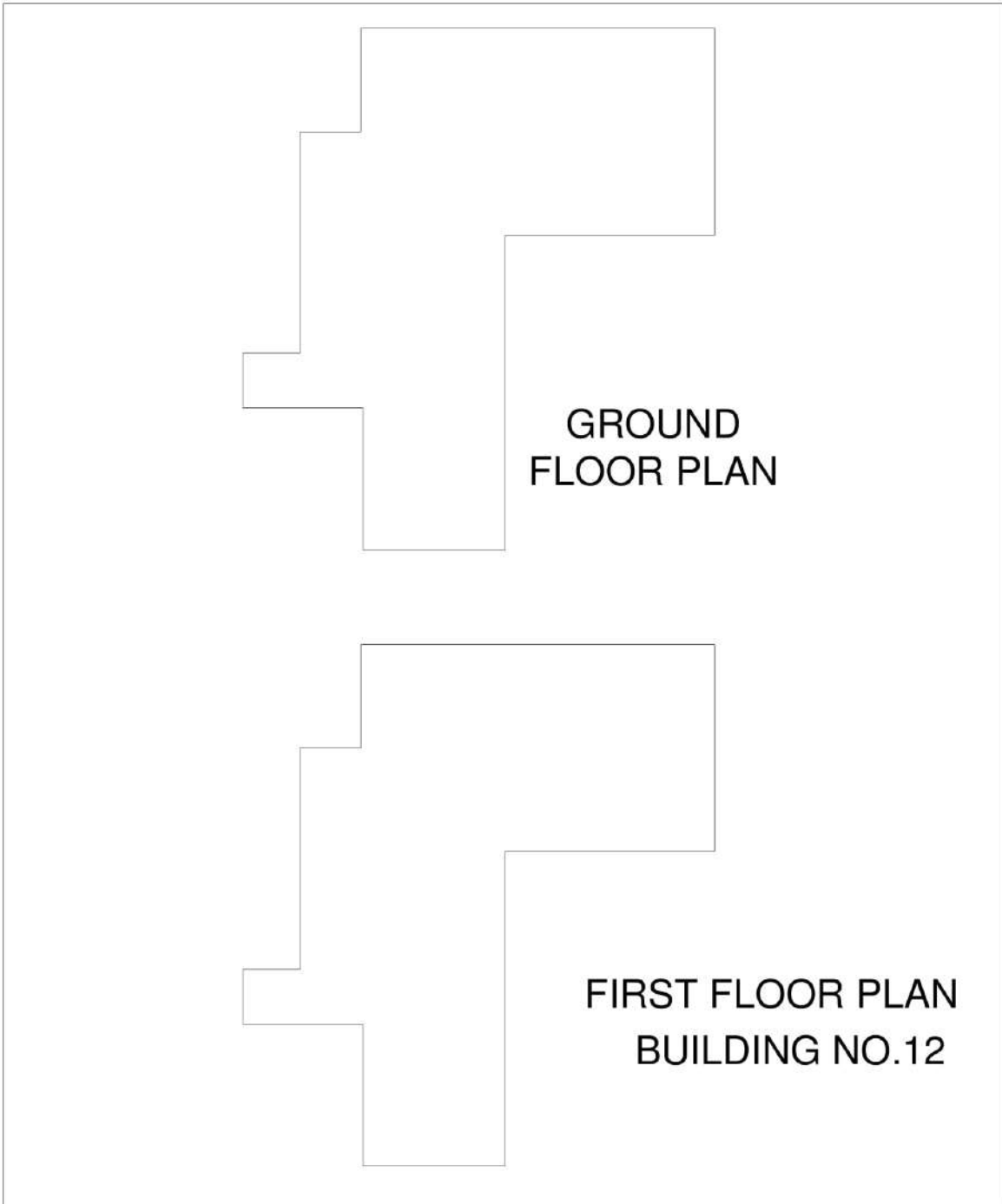


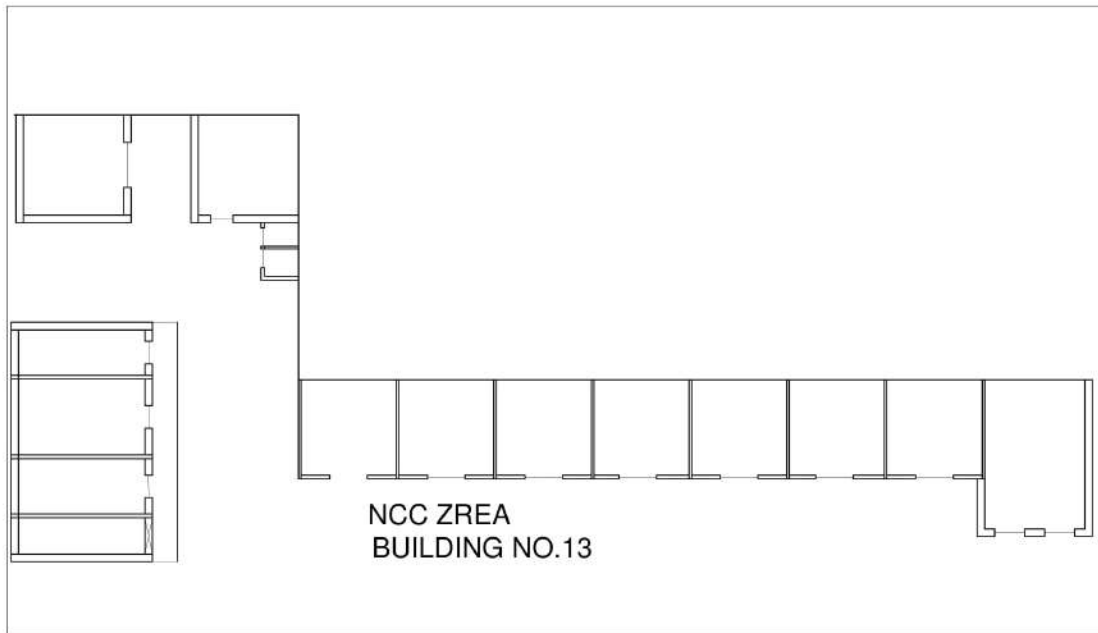












ANNEXURE B

DROUGHT RESISTANT SPECIES

Tree species	Common Name	Tree species	Common Name
<i>Prosopis cineraria</i>	Khejri	<i>Azadirachta indica</i>	Neem
<i>Capparis deciduas</i>	Kiari , Caperbrush	<i>Diospyros melanoxylon</i>	Tendu
<i>Tamarix aphylla</i>		<i>Ougeinia oojeinensis</i>	
<i>Acacia tortillas</i>		<i>Commiphora caudata</i>	
<i>Zizyphus nummularia</i>	Jungli Ber	<i>Bauhinia variegata</i>	Kachnar
<i>Prosopis juliflora</i>	Kikar	<i>Eucalyptus tereticornis</i>	
<i>Tecomella undulata</i>	Rugtora/Wavy leafed Tufmella	<i>Pongamia Pinnata</i>	Karanj
<i>Colophospermum mopane</i>		<i>Casia siamea</i>	
<i>Salvadora oleoides</i>		<i>Anacardium occidentale</i>	Cashew
<i>Acacia aneura</i>		<i>Holoptelia integrifolia</i>	
<i>Parkinsonia aculeate</i>		<i>Acacia catechu</i>	Katha
<i>Dichrostachys cineraria</i>		<i>Boswellia serrata</i>	Lobaw
<i>Acacia holosericea</i>		<i>Butea monosperma</i>	Palash
<i>Borassus flabellifera</i>	Tar	<i>Casaea fistula</i>	Amaltas

Tree species	Common Name	Tree species	Common Name
Grewia tenax	Falsa	Albizia amara	
Commiphora wightii	Guggal	Dalbergia latifolia	Eastern Rose wood
Acacia seyal		Erythrina Indica	Coral Tree
Eucalyptus camaldulensis	Eucalyptus	Ficus bengalensis	Banyan
Hardwickia binnata		Ficus religiosa	Peepal
Pithecelobium dulce	Jungle Jalebi	Santalum album	Sandal
Celtis australis		Syzygium cuminii	Clove
Acacia albida		Terminalia alata	
Albizia lebbek	Shirish	Madhuca latifolia	Mahua
Acacia nilotica	Babul	Acacia auriculiformis	
Acacia ferruginea		Terminalia bellirica	Harad
Casuarina equisetifolia	Jhar	Dendrocalamus strictus	Lathi Baans
Leucaena leucocephala	Subabul	Moringa oleifera	Drumstick
Melea azedirach		Terminalia arjuna	Arjun
Sesbania grandiflora			
Tamarindus indica	Imli		
Wrightia Tinctoria			
Morus indica/alba	Mulberry		

Tree species	Common Name	Tree species	Common Name
Ailanthus excelsa			

Source : Manual on norms and standards for EC of large construction projects-MoEF

ANNEXURE C**EXPENDITURE ON GREEN INITIATIVES AND WASTE MANAGEMENT****Year wise Expenditure**

Year	Expenditure on green initiatives and waste management excluding salary component (INR in Lakhs)
2013-14	1,59,638
2014-15	10,12,486
2015-16	4,56,194
2016-17	1,91,594
2017-18	3,36,430

Detail breakup of expenditure

S.NO	YEAR	LIGHT	WATER	PLANTS
1	2013-14	99,638	60000	159638
2	2014-15	427,486	585000	1012486
3	2015-16	366194	90000	456194
4	2016-17	515945	60000	191594
5	2017-18	202930	120000	363430

ANNEXURE D

STANDARD FORMAT FOR ENERGY RECORD

1. Standard format for electricity record

Meter No/ IBRS No

Location

S.No.	Duration of bill	Reading in Last bill	Reading in this bill	Unit Consumed	Electricity use charges	Fixed charges	Other Charges	Power (P.F.) Factor	Payment details

2. Standard format for LPG record

Connection No.

Location of Use

S.No.	Date of Refill	Supply agency	Amount Payable in this bill	Weight of Cylinder	Date of use	Duration of use	Date and time of empty

ANNEXURE E

**CALCULATION FOR PERCENTAGE OF ELECTRICITY CONSUMED FOR LIGHTING
BY LED**

Total lighting load

S.No.	Description	Numbers	Power requirement in W	Total Power Consumption in W
1	Tube light	374	52	19448
2	CFL	100	18	1800
4	24 watt LED fitting (A)	12	24	288
5	Led Bulb (B)	80	10	800
Total energy consumption (C)				22336
Total energy consumption by LED (A+B)-(D)				1088
Percentage of energy consumption by LED (C/D)x100				4.87%

ANNEXURE F

Electricity consumption from December 2018 to June 2019

mon ths	ivrs no (1)	ivrs no (2)	ivrs no (3)	ivrs no (4)	ivrs no (5)	ivrs no (6)	ivrs no (7)	ivrs no (8)	ivrs no (9)	ivrs no (10)
	941254 5000	184215 5000	259315 5000	324515 5000	498615 5000	563815 5000	603125 5000	899105 5000	236614 5000	729794 5000
Dec- 18	0	987	1247	359	575	262	435	550	530	722
Jan- 19	0	900	1179	645	535	230	405	515	530	530
Feb- 19	0	807	835	644	465	249	354	454	470	478
Mar- 19	0	832	855	813	615	311	348	523	512	524
Apr- 19	0	783	842	643	420	430	663	845	707	1051
May -19	0	847	987	760	677	512	839	914	781	1149
Jun- 19	0	946	1187	810	892	618	1113	995	912	1237
	0	6102	7132	4674	4179	2612	4157	4796	4442	5691