Green Audit

Report of

Jawahar Medical Foundation's

Annasaheb Chudaman Patil Memorial

Medical College & Hospital, Dhule.

Submitted by

M/s. Shree Consultants, Nashik.

24th June 2021

CERTIFICATE

This is to certify that, M/s Shree Consultants Nashik has carried out the Green Audit of JMF's Annasaheb Chudaman Patil Memorial Medical College & Hospital Dhule during academic year 2020 – 21. The green audit was conducted in accordance with the guidelines given by NAAC Criteria.

The Green Audit involves observations about Use of Alternative Energy Sources, Management of biodegradable and non-biodegradable wastes, water conservation facilities and green campus initiatives.

Present Green Audit report has been prepared by the team of auditors based on their knowledge and the data given by the institute. In an opinion and to our best knowledge as well as based on available information, present green audit gives a true and fair view in conformity with the principles of Green Auditing.

Green Audit Team Members

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Sumant D. Parkhi 

Dr. Hitesh R. Thakare 

Date: 24/06/2021

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1. Introduction

The ever increase in population as well as demand for higher economic growth has led to rapid urbanization along with increase in per capita fuel consumption. This has resulted in several environment and ecological concerns at local, regional, national and global level. In such conditions, adoption of Green Campus system and methodology for sustainable development has become more important than ever.

Jawahar Medical Foundation (JMF) was established in the year 1984 with its vision and mission to create leading medical education & tertiary health care to serve the community at large in and around North Maharashtra region. The trust has begun its humble journey with foundation of 150 bedded charitable general hospital to cater health needs of the rural & tribal population of Dhule district in the year 1989. In the year 1990, the trust established its medical college in the memory of its founder Late Shri Annasaheb Chudaman Patil with permission of Government of Maharashtra. The medical college campus has now grown as a tertiary health care, spreads over 36.5 acres to lush green eco-friendly environment, housing teaching block, 530 bedded hospital block, hostel block for boys and girls, residents, faculty, nursing and non-teaching staff.

Briefly, Green Audit can be defined as systematic identification, recording, quantification, verification, analysis and reporting the components contributing to sustainable environment and development. Such audit helps the organization to systematically introspect its strengths and weakness relevant to sustainable development, thereby enabling the organization to identify and implement the opportunities for improvement. Green Audit was conducted at JMF's Annasaheb Chudaman Patil Memorial Medical College & Hospital, Dhule, in the month of May 2021. It was observed that the organization is very keen to promote green initiatives wherever possible, as a commitment towards better environment and sustainable development. The organization has already put in a lot of efforts to help the environment. To further increase its green performance and identify energy saving opportunities, M/s. Shree Consultants, Nashik, was assigned the responsibility to carry out Green Audit of the premises.

This Green Audit Report presents various aspects of Environmental Consciousness and Sustainability practices being followed at the organization such as, Use of Alternative Energy Sources, Waste Management, Water Conservation Facilities

and Green Campus Initiatives. The data presented in this green audit report has been collected and verified through frequent on-site visits to the campus as well discussion through online platform Google Meet. Analysis of the data collected, Geo tagged photos, necessary documentation and recommendations are discussed in the following chapters.

2. Green Audit Team

Essential details of team members including Designation, Professional qualification & experience, who contributed for this Green audit, are as follows:

Table – Essential Details of Team members of Green Audit Team

S. No.	Name	Qualification	Designation	Experience
1.	Er. Mohan Kulkarni 	B. E. Mechanical, M.M.S., C. Eng. (I). M.I.E.F.I.V Lead Auditor: Environment Management System - ISO 14001, Energy Management Systems ISO 50001, Occupational Health and Safety Management System ISO 45001.	Environment Consultant Chartered Engineer Valuer & Arbitrator	45 Years
2.	Sumant D. Parkhi 	DME, DBM, MMS Lead Auditor: Environment Management System - ISO 14001, Energy Management Systems ISO 50001, Occupational Health and Safety Management System ISO 45001.	Founder, Principal Consultant, Trainer & Auditor IRCA approved Principal Auditor for ISO 14001:2015	38 Years
3.	Dr. Hitesh R. Thakare 	B. E. (Mechanical), M. Tech. Ph.D. (Mechanical)	BEE Certified Energy Auditor (EA – 27707) & Team Member	12 Years

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3. Aim, objectives and scope

The management of the institute recognizes its vital role & responsibility in creating the awareness about importance of sustainable development. This innate motivation has been actualized through implementation of various green initiatives throughout the campus. Main ***aim*** of this green audit is to verify and ensure that the green practices and various sustainability initiatives followed in the institute are in accordance with the intent of the management as well as guidelines prescribed by accreditation bodies, if any.

Following are salient ***objectives*** of green audit undertaken:

1. To identify current green practices and various sustainability initiatives undertaken by the institute.
2. To review and verify the physical existence as well as documentation relevant to green practices and various sustainability initiatives.
3. To substantiate the compliance of green practices and various sustainability initiatives being followed at the institute in accordance with guidelines of accreditation bodies, if any.
4. To identify the scope for further improvement of green practices and various sustainability initiatives, both in qualitative and quantitative terms.

Following areas/avenues are covered under the ***scope*** of present study:

1. Use of Alternative Energy Sources such as solar energy, implementation of energy efficient technologies for energy conservation.
2. Management of different kinds of degradable and non – degradable wastes such as Bio Medical Waste (BMW), other solid wastes, liquid waste, e – waste etc.
3. Facilities for Water Conservation and water management initiatives.
4. Green Campus Initiatives

4. Methodology

Green Audit was conducted systematically by using following procedure:

1. The members of green audit team visited the campus of the institute.
2. Green audit team members held an initial discussion with key staff members of the institute such as NAAC Criteria In-charge, maintenance manager as well as external service providers such as building architect, who have been assigned the responsibility of sustainable practices implemented throughout the campus.
3. Further, it was discussed and decided to follow Guidelines of NAAC Criteria for assessment of green initiatives.
4. Green audit team members created awareness among the staff members of the institute about importance of Green Audit and its contribution in improving the overall environmental performance of the institute.

Geo tagged photo - Initial discussion between green audit team & key staff members of institute

5. Then, team members physically checked the presence of various green initiatives undertaken and facilities created through campus tour.
6. Then green audit team members identified the avenues for improvement in the existing green systems of the institute as well as continual improvement necessary for sustainable development of the institute.
7. Thereafter, green audit team discussed the technical and economic feasibility of implementation of new systems with institute's staff members and management.

8. A draft report of all these findings and suggestions was prepared and a presentation was given to management to identify any corrections/improvements.
9. The report was finalized after incorporating the suggestions by management/staff members as well as green audit team members and final report submitted to the institute.

5. Site details

JMF's Annasaheb Chudaman Patil Memorial Medical College & Hospital Dhule was established in 1990 and is located on Dhule – Surat highway at Morane Village, about 5 kms away from Dhule City. The institute is surrounded by abundant greenery.

College has developed various educational facilities such as state of the art lecture halls, laboratories, museums, seminar halls, research labs and library. The institute has also taken care of recreational facilities such as playground and gymnasium. Hospital provides all related facilities such as OPD, specialty clinics, wards, operation theatre, central clinical laboratory, blood bank, physiotherapy, radiology etc. Keeping in mind the current COVID – 19 pandemic situations, institute has also created significant medical facilities for testing and treatment of COVID – 19 patients with oxygen beds, ventilators with ICU.

Total land area covered by the institute is 52,600 sq. m. Institute has an average electrical energy consumption of 54,617 kWh per month. Institute has created facilities for Bio Medical Waste (BMW) management along with Sewage Treatment Plant (STP). Tree plantation has been carried out on a large scale to reduce environmental pollution, taking into account the importance of native species of trees.

Carrying out the green audit of such a huge campus presented a colossal challenge for the green audit team. Hence, guidelines provided by NAAC Criteria 7 were adhered to in order to execute the present green audit. A brief sequence of observations and assessments during green audit is as follows:

1. Use of alternative energy sources as well as application of energy efficient technologies.
2. Facilities for management of different kinds of wastes.
3. Facilities for water conservation.
4. Various green initiatives undertaken by the institute.

All essential details about all these observations are presented in the following chapters.

6. Use of Alternative Energy Sources & Energy Conservation Devices

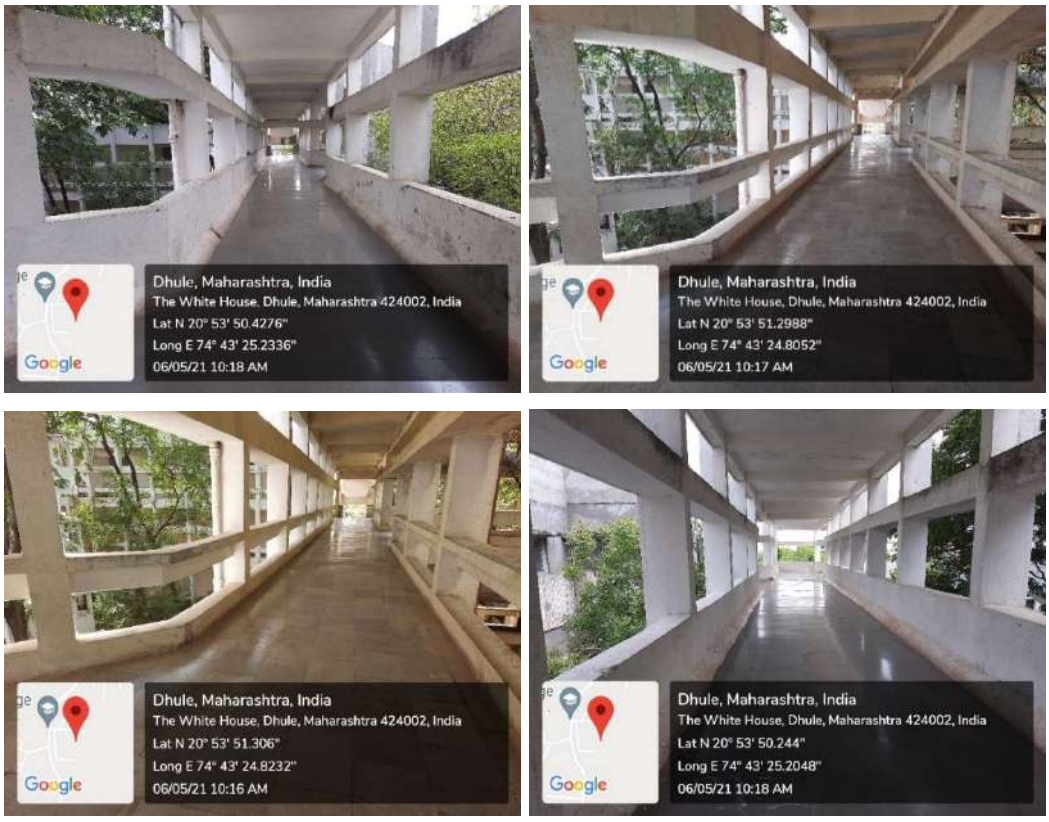
6.1 Use of Solar energy as alternative source of energy (NAAC Criteria 7.1.3.1)

Part A – Natural Light & Ventilation

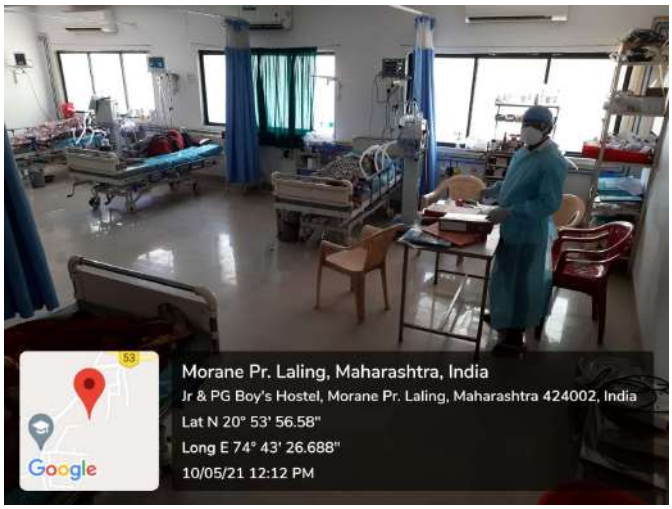
Current Status

Natural light entering into the building is giving cool lighting effect without using the electricity, thereby helping to reduce carbon emission. This also reduces burden on artificial lighting to be used in the institute. Hence, use of as much as natural light as possible is always encouraged for educational institute.

Natural light and ventilation are provided in campus buildings. Architectural design is made in such a way that utilization of natural light & ventilation is ensured. Following photos are captured to indicate the utilization of natural light in the building.



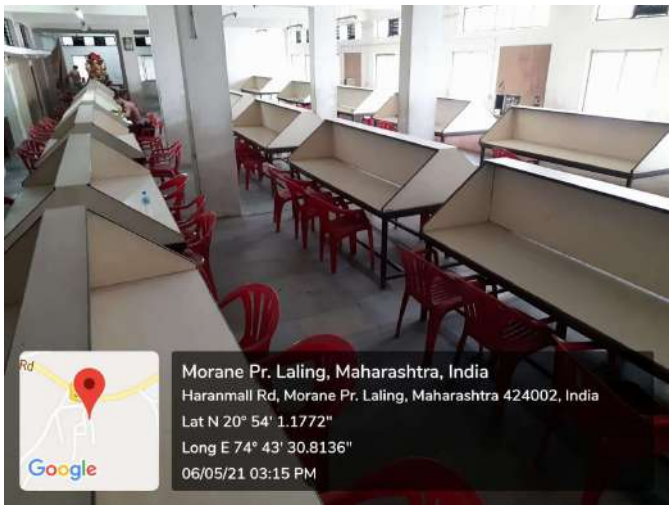
Geo Tagged Photo – Use of Natural light for lighting in passages of college building on various floors



Geo tagged photo – use of natural lighting in ICCU

Geo tagged photo – use of natural lighting in Ward

Geo tagged photo – use of natural lighting in Lecture Hall



Geo tagged photo – use of natural lighting in Library reading hall

Geo tagged photo – Natural lighting in Microbiology practical laboratory

Geo tagged photo – use of natural lighting in Mess

Conclusion

It was observed that building design is effectively making full use of solar energy for lighting and natural ventilation.

Part B - Solar Thermal Energy

Current Status

Institute has already taken proactive initiative to install Solar Water Heater (SWH) systems on the rooftop of boy's hostel and girl's hostel to cater the need of hot water. This measure reduces the consumption of electricity or any other fossil fuel required for water heating. Following Table presents the details of SWHs installed at various locations.

Table – Details of SWHs Installed at Various Locations

Sr. No.	Location	No. of Occupants	Status Of Building	Wing/Section (Liters/day)				Wing Total (Liters/day)
				A	B	C	D	
1.	Boy's Hostel	150	Existing	1200	1200	1200	1200	4800
2.	PG Boy's Hostel	100	Existing	1200	1200	1200	-	3600
3.	Ladies Hostel	150	Existing	1200	1200	1200	-	3600
Grand Total Existing (Liters/day)								12,000

Following geo tagged photo shows the SWH system installed on the rooftop of girl's hostel.

Geo Tagged Photo – Solar Water heater installed on the rooftop of Boys hostel

Presently, solar water heaters are installed at 3 locations having total capacity of 12,000 liters per day. Total 400 students stay in the hostel and the average requirement of hot water is 30 liters per day per student i.e., 12,000 liters per day.

Thus, 100% of the requirement is satisfied by use of SWH system. This also helps to save the electricity or fossil fuels needed for the water heating purpose.

Presently electrical geyser is being utilized in the staff quarters to fulfill the hot water requirement. Now, electricity required to generate hot water in staff quarters needs to be calculated to estimate the possible savings, as follows:

No. of occupants in staff quarters – 25

Hot water required - 30 litres/day/person

Total Mass of water to be heated = 25 x 30 = 750 kg/day

Specific heat of water = 1 kCal/kg^{o}C

Initial temperature of water at entry to solar water heater = 30^{o}C

Final temperature of water at exit of solar water heater = 70^{o}C

1 Unit of electricity = 1 kWh electricity = 860 kCal

Annual energy saving expected due to installation of solar water heater for different seasons is given as explained in following Table.

Table – Calculation Electricity saving potential due to solar water heaters

Season	**Initial Temp (^{o}C) (A)**	**Final Temperature (^{o}C) (B)**	**Energy saved using solar water heater instead of electric geyser (kWh/day) (C) = 750 x 1 x (B – A)/860**	**Total electricity saving possible (kWh/season) (C) x 90 i.e., no. of days/season**
Monsoon	30	60	26.16	2,354.65
Post Monsoon	28	65	32.27	2,904.07
Winter	25	70	39.24	3,531.98
Summer	35	55	17.44	1,569.77
			Total / annum	**10,360.47 kWh**

Electricity bill analysis shows that presently, average electricity rate for the institute is Rs. 13.94/kWh. Thus, in monetary terms, installation of additional SWH can save Rs. 13.94/kWh x 10360 kWh = Rs. 1,44,418 per year for the institute. Payback period for investment required for this installation can be calculated once quotation is available from supplier/vendor.

Conclusion

Presently, institute has installed 12,000 litres of SWH capacity out of total requirement of 12,750 litres / day i.e., **94.12% of hot water requirement is met with using solar energy.**

Recommendation

1. It is clearly observed in quantitative terms that substantial quantity of electrical energy can be saved through capacity addition to existing solar water heating systems. Hence, planning should be done to install balance capacity of SWH requirement from the above calculations and also considering future requirement.

Part C – Use of Solar Photovoltaic (PV) System for Electricity generation

Presently, Solar Photovoltaic (PV) systems are not installed in the campus to generate electricity. However, it is suggested that institute should consult with respective vendor/supplier about techno-economic feasibility of Solar PV system installation. Such a system will enable the institute to reduce its dependence on the grid of State Electricity Board (SEB). Excess electricity from such a Solar PV plant can also be exported/wheeled to the SEB grid to earn the monetary incentives for the institute. During discussion with institute team, we were informed that proposal installation of solar PV street lamps is in process.

Recommendations

1. Installation of Solar PV system connected to grid is recommended, since significant space is available.
2. Location of the hospital/college is such that abundant sunlight is available for electricity generation using the Solar PV system.
3. As a thumb rule, approximately 10 sq. m. space is required for installation of 1 kW capacity of solar PV system. So, the institute should evaluate the space available for such installation.

6.2 Wheeling to the grid (NAAC Criteria 7.1.3.2)

Presently, Solar Photovoltaic (PV) systems are not installed in the campus to generate electricity. However, it is suggested that institute should consult with respective vendor/supplier about techno-economic feasibility of Solar PV system installation.

The core purpose of wheeling the on-site generated electricity to the grid is to reduce the load on the SEB grid. Hence, institute has taken other measures in an effort to reduce the stress on SEB grid. Following Table presents the essential details observed from electrical bills of the institute for the last 12 months.

Table indicates that institute is consistently maintaining high value of Power Factor (PF). Presence of higher power factor in the electrical network reduces the magnitude of reactive power to be drawn from the SEB grid. This in turn reduces the total current flowing through the system from the source end. Thus, I^2R losses are reduced in the system. Also, transformers get a capacity relief due to reduced kVA loading. Thus, higher value of Power Factor contributes to reduction of energy losses and thus, to energy conservation.

One important observation that can be made from Table is that institute is consuming a significant component of its electrical energy consumption in the non – peak hours i.e., in the zone A, C and D. Due to this practice, loading of SEB grid during the peak hours is reduced, thereby reducing the maximum demand charges. Also, utilization of SEB grid is improved during non – peak hours.

Recommendation

1. Installation of Solar PV plant should be taken into consideration, considering its long-term benefits and availability of abundant sunlight.
2. Capacitor bank installation should be checked for addition of capacitors so that resultant power factor becomes unity.

Table - Essential details of electrical bills of the campus

Sr. No.	Month	kWh Consumption	Billed Demand (kVA)	TOD Zone wise consumption				Power Factor (PF)
				A 0000 Hrs- 0600 Hrs & 2200 Hrs- 2400 Hrs	B 0600 Hrs- 0900 Hrs & 1200 Hrs- 1800 Hrs.	C 0900 Hrs - 1200 Hrs	D 1800 Hrs- 2200 Hrs	
1	April – 2020	47,774	193	14,324	18,720	6,726	8,004	0.974
2	May – 2020	61,020	193	17,862	24,032	9,448	9,678	0.972
3	June – 2020	60,632	193	17,176	23,784	10,168	9,504	0.962
4	July – 2020	64,564	193	19,268	25,060	9,838	10,398	0.949
5	August – 2020	54,882	193	16,102	21,792	7,650	9,338	0.966
6	September – 2020	58,228	226	16,454	23,662	8,742	9,370	0.964
7	October – 2020	63,978	193	17,810	25,398	9,340	11,430	0.965
8	November – 2020	47,658	193	12,708	19,242	6,810	8,898	0.892
9	December – 2020	46,428	193	12,620	18482	6,540	8,786	0.866
10	January – 2021	45,612	157	12,460	18,076	6,504	8,572	0.924
11	February – 2021	40,066	157	10,764	16,116	5,656	7,530	0.941
12	March – 2021	64,564	160	18,410	25,158	9,312	11,684	0.952

6.3 Application of Sensors for energy conservation (NAAC Criteria 7.1.3.3)

A significant amount of electrical energy savings can be achieved in the long run through

a. Application of Motion-based sensors for lighting systems in corridors, washrooms, classrooms, laboratories, offices and cabins.
b. Timer-based sensors for street light.
c. Temperature based sensors for cooling centers and air conditioners.
d. Level sensors for automatic ON - OFF of water pumping systems.
e. Pressure based sensors for large capacity overhead water tanks.

Current status

1. Presently no motions-based sensors and Time-based sensors are available for regulated use of lighting systems. However, purchase of motion-based sensors is under evaluation.
2. Air conditioners are already equipped with temperature sensors. Air conditioners are operated through Remote, which helps to easily control their temperature ranges.
3. Automatic liquid level controller of Maxxcon make has been installed for monitoring the liquid level water tanks of RO plant installed in girl's hostel.
4. Presently no timer-based sensors are installed for street light systems.

Conclusion

It is observed that institute has taken some initiatives for sensor-based energy conservation in the form of temperature sensors in air conditioners and automatic liquid level controller for RO plant. This becomes particularly important due to large no. of air conditioners being used in the campus.

Recommendations

1. Motion-sensors are recommended in following areas:
    a. Lecture Hall – 04 Nos.
    b. Mess Hall – 01 No.
    c. Management office – 05 Nos.
    d. Washroom blocks – College and Hospital total – 20 Nos.
    e. Laboratories – 15 Nos.
2. Timer-based sensors are recommended in following areas:

a) Street lights in campus – 12 nos.

3. Temperature range for air conditioners should not be less than 24^{o}C in college buildings. An indicative sticker can be attached next to air conditioner mentioning this temperature range to create awareness among people.
4. Float control valves to be installed for overhead water tanks of hostels, college and hospital.
5. Pressure based sensors for water pumping systems should be installed for all overhead tanks.

Geo Tagged Photo – Air conditioner installed in Molecular Laboratory

Geo Tagged Photo – Automatic Liquid Level Controller installed in RO Plant of Girl's Hostel

6.4 Biogas Plant (NAAC Criteria 7.1.3.4)

Presently, no biogas plant is installed in the premises of the institution. However, there is significant scope for installation and operation of biogas unit using food waste from canteen and student mess as well as foliage available in the form of dried leaves. Such a plant will help to partly offset the LPG consumption.

Recommendation

It is recommended that institute should evaluate techno – economic feasibility of biogas plant construction and operation.

6.5 Use of LED bulbs/power efficient equipment (NAAC Criteria 7.1.3.5)

LED lighting systems help to save energy by consuming less electricity for the same lighting output as compared to conventional incandescent bulbs or CFL lamps. Initial cost of LED lamps is higher as compared to CFL lamps. However, it can be recovered through energy savings realized due to their installation. One more benefit with LED lamps is their longer service life as compared to incandescent bulbs and CFL lamps.

Presently, institute has installed 822 no. of LED lamps in its premises. Details of these LED Lamps are given in the following Table. Replacement of old lighting with LED shall be undertaken as and when old lighting goes out of service.

Table – Details of LED bulbs installed in the institute

Sr. No.	Name of Building/location	No. of LED Bulbs installed	Capacity of LED bulb/Fixture (W)
1.	FORUND FLOOR BOYS HOSTEL	5 19	12W 9W
2.	FIRST FLOOR BOYS HOSTEL	5 10 9	20W 12W 9W
3.	SECOND FLOOR BOYS HOSTEL	25	9W
4.	THIRD FLOOR BOYS HOSTEL	12 4 13	20W 12W 9W
5.	BOYS HOSTEL	18	9W
6.	GIRLS HOSTEL	5 1	12W 9W
7.	FIRST FLOOR BOYS HOSTEL	5 8	12W 9W
8	SECOND FLOOR BOYS HOSTEL	22	9W
9	THIRD FLOOR BOYS HOSTET	4 23	12W 9W
10	GIRLS HOSTEL	18	9W
11	BOYS HOSTEL P. G	1 29	20W 9W
12	SECOND FLOOR GIRLS HOSTEL	18	9W
13	THIRD FLOOR GIRLS HOSTEL	8	9W
14	OLD STAFF QUARTER	8	9W
15	NEW STAFF QUARTER	2	9W
16	OUTDOOR STREET LIGHT	14	50W
17	COLLEGE COMPUS STREET LIGHT	22	25W
18	WHITE HOUSE LED	6	22W
19	MESS DEPARTMENT	2	20W
20	PHARMACOLOGY DEPARTMENT	-	-
21	NURSING HOSTEL P. G.	2	12W
22	FIRST FLOOR NURSING HOSTEL	7	9W
23	SECOND FLOOR NURSING HOSTEL	6	9W
24	THIRD FLOOR NURSING HOSTEL	9	9W
25	SECRETARY OFFICE	-	-

26	VICE CHAIRMAN OFFICE	12	15W
27	VICE SECRETARY OFFICE	2	9W
28	COUNCIL HALL OFFICE	-	-
29	COMPUTER SECTION	1	9W
30	H. R OFFICE	1	9W
31	O. S OFFICE	1	9W
32	VICE DEAN ROOM	1	9W
33	DEAN	9	12W
34	PASSAGE	1 1	20W 9W
35	XEROX DEPARTMENT	1	22W
36	SALARY SLIP DEPARTMENT	1	22W
37	OFFICE	2	20W
38	PAEDIATRIC DEPARTMENT	2 13	20W 9W
39	ORTHO DEPARTMENT	9	22W
40	MAIN OT	8	22W
41	PHYSIOTHERAPY DEPARTMENT	-	-
42	SKILL LAB DEPARTMENT	5	20W
43	ANATOMY DEPARTMENT	18	22W
44	BIOCHEMISTRY DEPARTMENT	2	12W
45	PASSAGE	3	22W
46	CAP PAPER CHECKING DEPARTMENT	2	22W
47	PROFESSOR ROOM	1	22W
48	DEPARTMENT OFFICE	-	-
49	TOILET & BATHROOM	1	22W
50	PRACTICAL	1	22W
51	PATHOLOGY DEPARTMENT	54	12W
52	PHYSIOLOGY DEPARTMENT	5	20W
53	SKIN, VD & CHEST TB DEPARTMENT	-	-
54	MEDICAL SUPERINTENDENT	1	20W
55	MEDIA NEWS ROOM	1	20W
56	DEMO ROOM	1	20W
57	MEDICAL BILLING ROOM	1	20W
58	MEDICAL ADMINISTRATION ROOM	1	9W
59	INSURANCE SCHEMES ROOM	1	9W
60	NTEP LAB	3	9W
61	CCL LAB ROOM	4	20W
62	BIOCHEMISTRY LABORATORY	4	9W
63	PATHOLOGY LABORATORY	12	9W
64	MICROBIOLOGY LABORATORY	4	20W
65	REPORTING ROOM	1	20W
66	DOCTOR ROOM	6	20W
67	RT PCR LAB COLLECTION COUNTER	2	20W
68	DOCTOR ROOM	1	20W
69	DONNING ROOM	1	20W
70	SAMPLE COLLECTION ROOM	1	9W
71	DEEP FREEZ & MASTER MIX ROOM	1	20W
72	DAN /RNA EXTRACTION LAB	1	20W
73	RT PCR LAB	1	20W
74	QUALITY CONTROL ROOM	5	20W
75	STORE ROOM	1	20W
76	PASSAGE	1	20W
77	DOFFING ROOM	1	20W

78	REPORTING ROOM	4	20W
79	CAP DEPARTMENT	9	22W
80	PROPOSED BLOOD BANK	7	20W
81	OPD COMPLEX DEPERTMENT	5 18	20W 12W
82	COMMUNITY DEPERTMENT	7	20W
83	MEDICAL STORE	4	20W
84	CASUALTY DEPERTMENT	3	100W
85	PASSAGE	1	20W
86	BLOOD BAG STORAGE	-	-
87	REFRESH ROOM	-	-
88	TROLLEY ROOM	2	20W
89	ELISA ROOM		
90	BLOOD BANK INCHARGE ROOM		
91	MEDICAL EXAMINATION ROOM		
92	QUALITY CONTROL ROOM		
93	COMPONENT ROOM		
94	COMPONENT STORE ROOM		
95	ICU DEPERTMENT	11 9	18W 9W
96	ICCU	4 9	12W 9W
97	DIALYSIS ROOM	4	12W
99	SICU I		
100	SICU II		
101	DOCTOR ROOM		
102	MEDICINE DEPERTMENT	1 1	20W 9W
103	CORONA WARD DEPERTMENT	45	20W
104	NURSES CHANGING ROOM	1	20W
105	TOILET & BATHROOM	6	20W
106	SURGERY DEPERTMENT	62	20W
107	GYNAEC WARD I & II	56	20W
108	MICROBIOLOGY DEPARTMENT	-	-

Geo Tagged Photo – Main Name plate of hospital/college illuminated in night with LED lamps

Geo Tagged Photo – LED bulbs installed for street lighting in the campus

Geo Tagged Photo – LED bulbs installed for street lighting in the campus

Geo tagged photo – LED Lighting in Molecular laboratory

Geo tagged photo – LED Lighting in Library reading hall

Conclusion

It is observed that institute is taking active initiative of replacing the old lighting system with LED lamps in a phased manner. As a result of this, 822 LED lamps have been installed so far in the campus and further replacement is in progress.

Recommendations

1. Replacement of existing lightings with LED requires certain modifications in terms of fixtures/connections as well as level of illuminance created by conventional lighting. Hence, a systematic plan should be made by identifying the area for complete replacement of old lighting by LED lamps/tube lights.
2. Henceforth, record of replacement of old lighting by LED lamps should be maintained in the suggested format.

3. Study can also be initiated to check the deviation between recommended and actual illumination levels in various areas of the campus and take corrective action thereafter.
4. Turbo ventilators should be installed on rooftops to promote passive circulation of air without any electrical energy consumption.

Energy efficient equipment

The Star Labeling program undertaken by the Bureau of Energy Efficiency (BEE) enables the user to make informed decisions about purchase of energy efficient equipment such as Air Conditioners and Transformers.

Current status

The following Table shows various important details of energy efficient equipments being used in the campus.

Table – Details of energy efficient/Energy Star Rated equipments installed

Sr. No.	Name of Building/ Location	Name of equipment & Star Rating	Quantity	Capacity
1	New Staff Quarter	3-star rated air conditioner	07	1.5 Ton
2	New Staff Quarter	5-star rated air conditioner	13	1.5 Ton
3	Kitchen/pantry	3-star rated Refrigerator	01	220 L
4	Water pumping station	4-star rated Energy efficient motor for pump	01	10 hp
5	Management offices	3-star rated air conditioner	11	2 Ton
6	OPD/Reception	5 star rated ceiling fan	10	35 W
7	OPD/Reception	5 star rated ceiling fan	05	45 W
8	Dean Cabin and Secretary cabin	1 Star and 2 Star rated, respectively	02	55 W
9	Laboratory complex	3-star rated air conditioner	05	0.8 Ton
10	Laboratory complex	3-star rated air conditioner	03	1.5 Ton
11	Council Hall	3-star rated air conditioner	04	1.5 Ton
12	Main OT complex	3-star rated air conditioner	15	1.5 Ton
13	Auditorium	3-star rated air conditioner	10	1 Ton
14	ICU and ICCU	3-star rated air conditioner	10	1.5 Ton
15	Office	3-star rated Refrigerator	01	165 L
16	Paediatrics Dept.	3-star rated Refrigerator	04	165 L
17	Biochemistry Dept.	3-star rated Refrigerator	01	220 L
18	Laboratory Complex	3-star rated Refrigerator	03	215 L
19	Blood Bank	3-star rated Refrigerator	04	220 L
20	ICU	3-star rated Refrigerator	01	215 L

1. Capacitor Bank of 55 kVAr capacity has been installed to improve the Power Factor of electrical network.
2. Capacitors from this bank are inspected at periodic intervals by electrical team and replaced whenever necessary.
3. Observation of electricity bills for the last 12 months indicates value of Power Factor in the range of 0.866 – 0.974. except for the month of November and December 2020, PF was observed to be above 0.90.
4. Total 78 energy efficient air conditioners are installed at the institute. These air conditioners are either of 3-star rating or 5-star rating. Institute is also using 15 energy efficient ceiling fans of 5-star rating.
5. There is total 15 nos. of 3 star rated energy efficient refrigerators currently in use in the institute.

Conclusion

As an energy efficiency improvement initiative, procurement and installation of 111 no. of star rated energy efficient equipments has been done by the institute.

Recommendation:

1. Regular inspection, maintenance and upgradation (if required) of Control Panel of capacitor bank installation should be undertaken.
2. Illumination survey and ventilation survey for college and hospital can be conducted to verify the adequacy of installation of lighting systems and turbo ventilators.
3. Study should be undertaken for power factor analysis and its subsequent improvement up to the value of unity.
4. Annual Maintenance Contracts (AMC) for air conditioners should be taken and implemented.
5. Hospital being a life saving facility, consistency in good quality power should be ensured through periodic power quality monitoring.

Geotagged photo – Capacitor bank installed in the campus

Geo tagged photo - Control panel installed for power factor indication

7. Management of Biodegradable & non–biodegradable waste

In medical college and hospital, waste is divided in two categories –

1. Biodegradable waste
2. Non-Biodegradable waste

The wastes are further categorized as Solid waste, Liquid waste, Bio Medical Waste (BMW), e – waste etc.

7.1 Solid waste management (NAAC Criteria 7.1.4.1)

7.1.1 Bio-degradable waste

This kind of waste includes garden waste, food waste, paper waste, wood based waste and corrugated boxes used during purchase of materials.

Current Status

Following Table shows various details of bio-degradable solid waste generated in the campus.

Table – Details of Bio degradable solid waste generated in the campus

Sr. No.	Type of Solid Waste Generated	Source of solid waste	Quantity	Treatment/ Processing	Utilization/ Disposal area
1.	Foliage (Garden waste)	Garden	15 kg/day	Composting	As manure for gardens
2.	Food waste	Canteen and Mess	30 kg/day	Composting	As manure for gardens
3.	Paper waste	Exam work & lab work	100 Kg/year	At the year end	Sold for recycling
4.	Wood based waste	Broken furniture	250 Kg/year	As and when available	Sold for recycling
5.	Corrugated boxes	Material/chemical procurement	50 Kg/year	As and when available	Sold for recycling

Garden waste and food waste is composted in using Composter machine installed in the institute. Composter machine was installed on 24th February 2020. Total capacity of composter machine is 75 kg per day for processing the waste. This machine uses Micro-organism based natural composting and achieves volume reduction of waste by 85 – 90%. The machine does not discharge any harmful gases. Presently, approximately 30 kg food waste per day from canteen and mess is recycled in the composter machine and manure is prepared. Manure is then used as a

supplement in gardens. The data about manure preparation and its distribution to individual gardens is maintained properly.

The bio-degradable solid waste which cannot be composted with the in-house composting facility, such as paper waste, wood based waste and corrugated boxes are sold for recycling periodically.

Geo tagged photo – Composter machine installed in the campus

Geo tagged photo – Storage facility for composting manure

Conclusion

Composting machine has been installed which converts about 45 kg/day of food waste and foliage into manure, which is then utilized in various gardens of the institute.

Recommendation

Presently, the composting machine is installed next to the kitchen window, which creates possibility of harmful bacteria being present in the vicinity. Hence, shifting of this machine to some suitable place should be undertaken.

7.1.2 Non-biodegradable waste

This kind of waste includes plastic, empty containers, lead acid batteries, metal waste, construction and demolition waste etc.

Current Status

Following Table presents the details of steps taken for disposal of non-bio-degradable solid wastes.

Table – Details of steps taken for disposal of non-bio-degradable solid wastes

Sr. No.	Type of Solid Waste Generated	Source of solid waste	Quantity	Disposal method
1.	Plastic (E.g., polybags, pipes, plumbing accessories, acid carboy)	Plumbing installations and maintenance, Garbage.	25 Kg/ year	Sold as scrap / recycled
2.	Empty containers (E.g., metal barrels, cans)	Chemicals or Medicines from labs and hospital	50 kg/year	Sold as scrap for recycling
3.	Lead acid batteries	UPS	05/year	Replace with buyback offer
4.	Metal waste other than container	Construction work	50 kg/ year	Sold as scrap for recycling
5.	Construction and demolition waste	Construction waste	500 kg/year	Disposed to designated landfill site

All the waste is submitted to stores in-charge, who in turn sells it to the vendor for recycling.

An awareness session about Plastic Ban was conducted for the students and faculty members under the guidance of Mr. M. M. Kulkarni, Lead Auditor, ISO 14001 – Environmental Management System. Relevant photos are given in the subsequent section.

Lead Acid batteries -

Current status

Buy back arrangement has been done for UPS batteries with authorized dealers. Total 05 batteries get replaced with buy back every year.

Geo Tagged Photo – Waste collection facility provided by local municipal corporation

Conclusion

Institute has made careful arrangements for recycling of non-bio degradable solid wastes through various agencies.

7.2 Liquid Waste Management (NAAC Criteria 7.1.4.2)

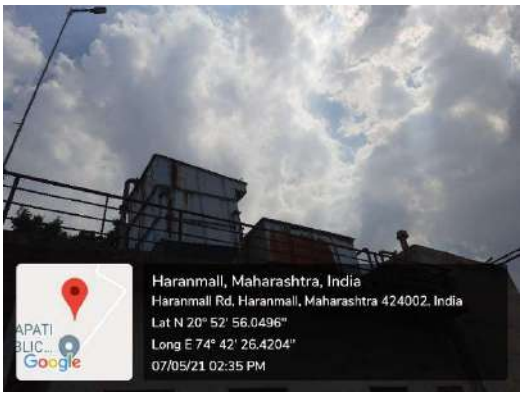
Following table provides essential details about Occupant's data for water calculation. The recommended water quantity required per person per day has been considered as mentioned in **National Building Codes**.

Table – Occupant's data for water calculation

Sr. No.	Building/location	No. of occupants	Water quantity required per person per day	Water quantity required per section
1.	Students in College	500	45	22,500
2.	Boy's Hostel	150	135	20,250
3.	Girl's Hostel	150	135	20,250
4.	Staff quarters	50	165	8,250
5.	Guest house	10	135	1,350
6.	Hospital (No. of beds =)	500	450	225000
7.	Covid Centre (no. of beds =)	200	450	90000
8.	College staff (Teaching + non-teaching)	350	45	15750
9.	Hospital staff (Nursing + Paramedical + Support)	150	45	6750
10.	Hostel for resident doctors/interns	100	135	13500
11.	Nursing hostel	100	135	13500
	Total	**2,260**		**4,37,100**

As per agreement between the institute and Irrigation Department, Government of Maharashtra, campus is allocated 493.397 m^3 of water per day i.e., 4,93,397 liters of water per day. As per National Building Codes, requirement of water per day in campus is 4,37,100 liters of water per day. Difference between water utilized is due to water purification installed at source Haranmaal lake. Only purified water is sent to institute and back wash water is sent back to lake. Hence the difference.

Geotagged photo – Water meter Haranmaal lake to indicate water disbursed to institute

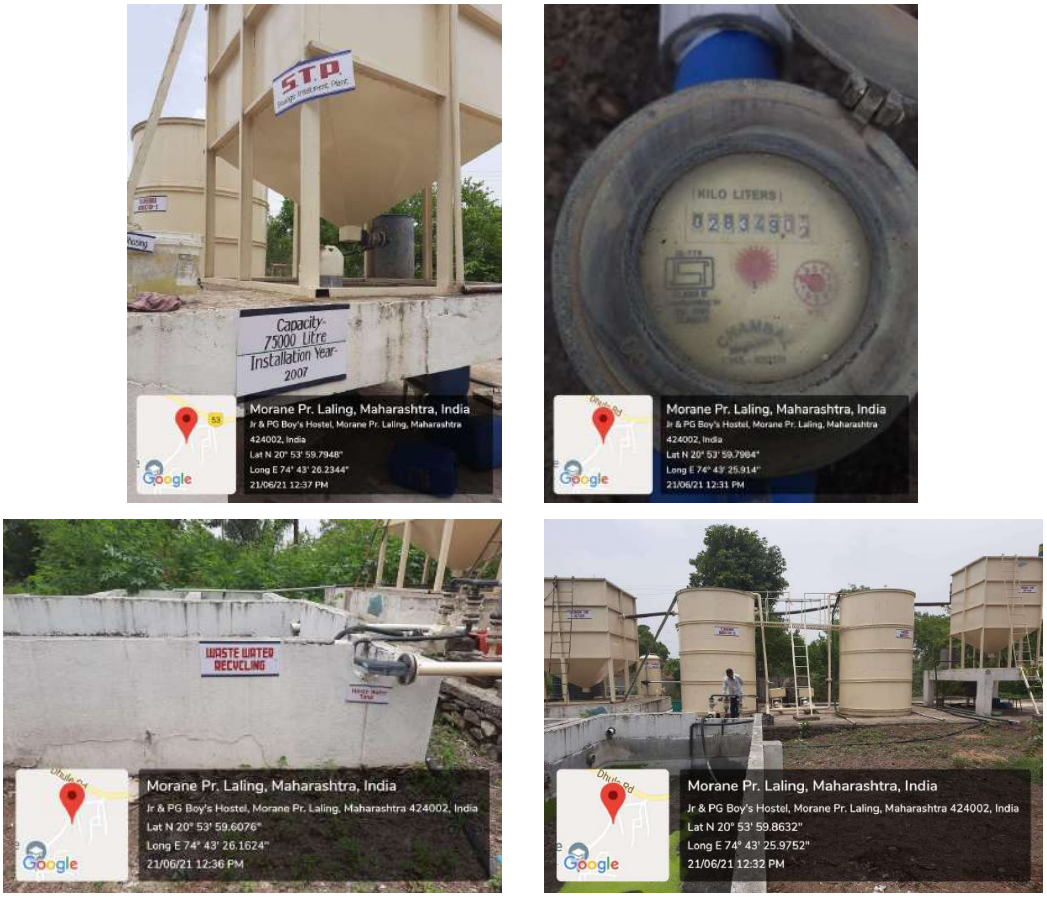


Geo tagged photo – Water purification system at Haranmaal lake

Geo tagged photo – Wells created in campus to store the water received from Haranmaal Lake.

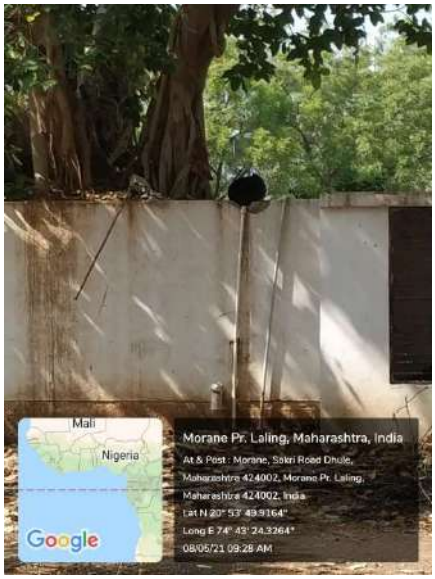
7.2.1 Domestic Wastewater (Sewage)

All the domestic wastewater from college and hospital is collected and treated in a Sewage Treatment Plant (STP), installed in the campus itself. This STP has an installed capacity of 75,000 liters per day. On an average, 50,000 liters of raw water is treated in STP per day to generate 20,000 liters of treated water. Approximately, 30,000 liters of water rare used for backwash and 20,000 liters is recycled in gardening.



Geo tagged photos – STP installed in campus

Photo – record maintained for STP Operation



Geo tagged photo – pipeline for treated water supplied from STP to gardening

Conclusion

Institute has installed a fully functional STP which treats about 50,000 litres of water per day out of which 20,000 litres of water is utilized for gardening. This ultimately helps to conserve the fresh water required for gardening purposes.

Recommendations

i. Institute should monitor the building wise consumption of water by installing water flow meters for respective buildings.

ii. The loss of water at various locations should be identified and addressed.

7.3 Biomedical waste management (BMW) (NAAC Criteria 7.1.4.3)

It covers the waste generated by healthcare activities. It includes a broad range of materials from *used needles* and syringes to soiled dressings, body parts, diagnostic samples, blood, chemicals, dead expired medicines etc. Following table provides details about different types of BMW collected in the institute.

Table – Details of collection and segregation of BMW with quantity

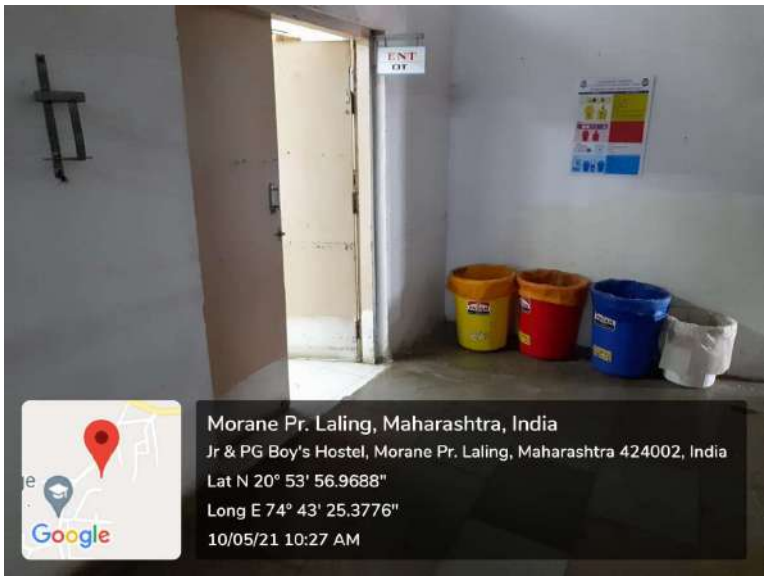
Category	Sources (Examples)	Quantity	Disposal Method
Yellow	Anatomical waste, soiled waste, discarded/expired medicines, discarded linen, laboratory waste, liquid chemical waste, infectious and contaminated material.	100 Kg/ day	Pre-treatment with Autoclave and then given for incineration to agency
Red	Recyclable plastic waste like tubes, bottles, gloves	25 Kg/ day	Pre-treatment with Autoclave and then given for recycling to agency
White	Waste sharps like needles, scalpel etc.	15Kg/ month	Pre-treatment with Autoclave and then given for sanitary landfill to agency
Blue	Glassware, body implants	25 Kg/ month	Pre-treatment with Autoclave and then given for recycling to agency

Current status

1. ***Combined consent has been obtained from Maharashtra Pollution Control Board (MPCB) for BMW authorization under red category.***
2. BMW segregation chart, indicating the colour coding, have been displayed at salient locations.
3. Colour coded bins are kept at important locations to collect the BMW as per respective category.
4. ***All BMW is collected and segregated at the central collection center. Collection area creation in progress. Then it is handed over to Shree Swami***

Samarth Enterprises Pvt. Ltd. Dhule. (A common BMW facility available in Dhule, authorized by Maharashtra Pollution Control Board).

Geo tagged photo – Clearly Visible BMW handling instruction board



Geo tagged photo – collection bins at source (ENT OT)

Geo tagged photo – BMW collection bins near Covid Ward

Geo tagged photo – BMW collection bins near Surgery Ward

Geo tagged photo – BMW collection van

Conclusion

BMW is collected in colour coded bins kept at various locations. Further, institute has made arrangement for disposal of BMW to common facility at Dhule which is authorized by MPCB.

Recommendation

Construction of BMW collection and segregation area should be completed soon. Incinerator plant installed in the campus should be electrically disconnected and dismantled.

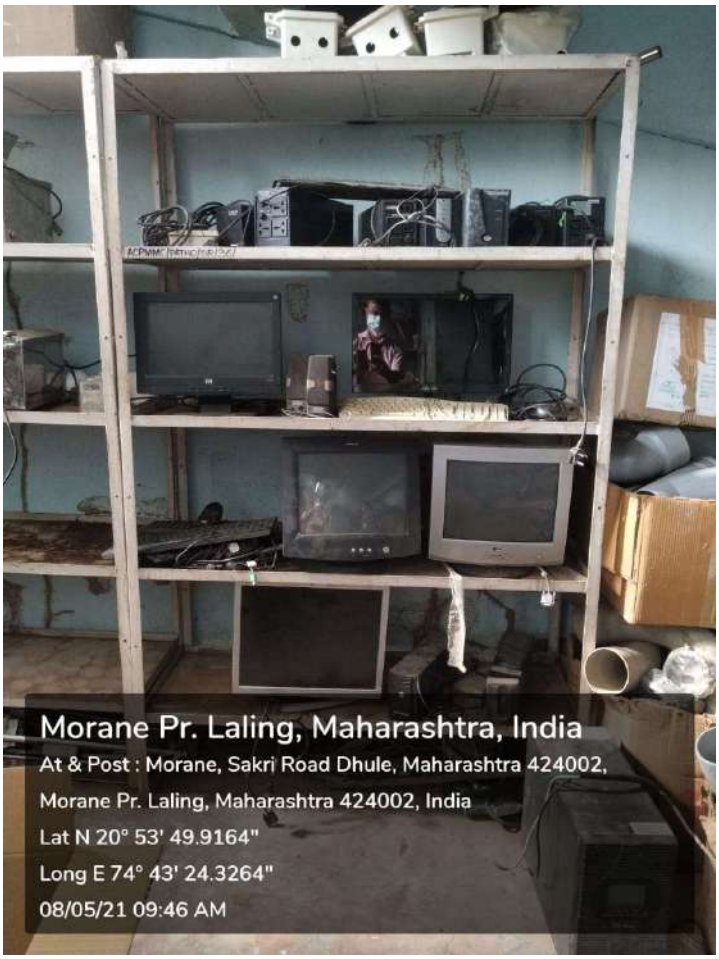
7.4 E-Waste management (NAAC Criteria 7.1.4.4)

Current status

It covers electronic waste or e – waste described as discarded electrical or electronic devices. Used electronics which are destined for refurbishment, reuse, resale, and salvage and recycling through material recovery or disposal are considered as e – waste.

Items included in this type of waste are - Desktop PC including CPU, monitor and accessories, Laptops, Main frames, Servers and storage devices, Network equipments like modems and cables, Printers, copiers, Telephone and cellular equipments, UPS, ACs, Kitchen appliances like microwave, Medical equipments, etc.

Presently contract is done for E – waste disposal with Unique Health Care, Dhule with effective from 11th May 2021 upto 31st March 2022. E – waste disposal is in process.



Geo tagged photo - Storage room of segregated e -waste

Conclusion

E-waste is collected and stored properly in the campus. Further disposal to the authorized agency is in progress.

Recommendation

1. Regular monitoring of E-waste generated should be done and record should be maintained.
2. **Present agency with which MOU has been created for e-waste recycling is not MPCB authorized. E waste to be recycled through authorized agency only.**
3. ***Copy of Annual return (Form 3) indicating the quantity of E-waste handled should be maintained.***

7.5 Waste Recycling System (NAAC Criteria 7.1.4.5)

1. Biodegradable waste such as food waste is recycled and composted as manure for gardens.
2. Sewage water is treated in STP and recycled in gardening.
3. Lead acid batteries are handed over to authorized dealer for recycling.
4. Other wastes like paper and plastics are given to recyclers.

Geo tagged photo – STP installed in the campus

Geo tagged photo – vegetable plantation using treated water from STP

Conclusion

Institute has created an overall waste recycling system to address different categories of wastes generated in the campus.

7.6 Hazardous Chemicals and Radioactive Waste Management (NAAC Criteria 7.1.4.6)

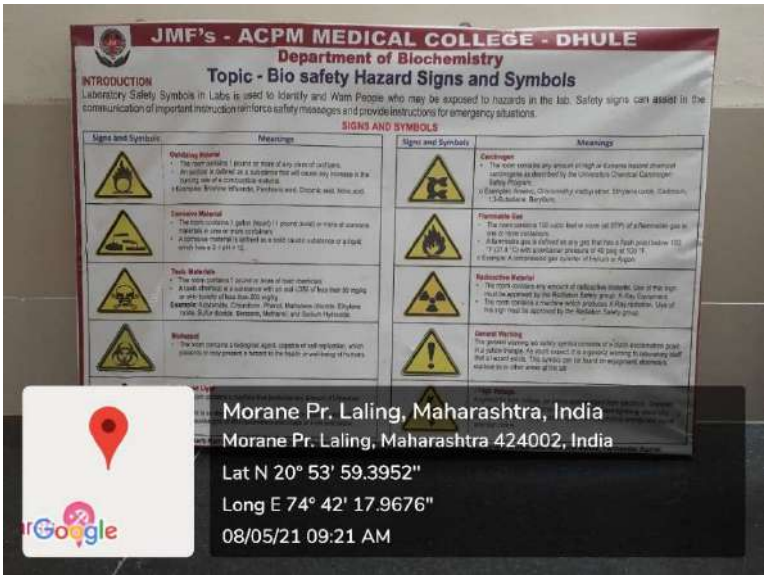
Current status

Presently various departments in the college and hospital use various types of chemicals, as presented in the following table.

Table – Details of consumption of various chemicals and radioactive materials

Sr. No.	Area of use	Type of chemical/radioactive material used	Consumption/year
1.	College	Reagents and chemicals used in Laboratories, Pharmacology & Forensic Medicine,	100 Litres / year
2.	College	Preservatives used in anatomy	500 Litres/ Year
3.	Hospitals	Disinfectants and cleaning solutions for Operation Theatres, sterilization chemicals etc.	200 Litres / Year
4.	Housekeeping	Detergents & Other chemicals	200 Litres / year
5.	Gardens	Chemical fertilizers, Pesticides, insecticides, weedicides, Rodent killing chemicals (if any)	100 Litres / year
6.	Hospital	Radioactive material used in X-ray, CT scan, Cath lab, radiation therapy	Radioactive material not used. X ray and CT scan are digital and given to patients.

General awareness is created about hazards associated with mishandling of chemicals through precautionary posters displayed in the laboratories.



Geo tagged photo – Precautionary/Instructional Posters of chemical handling, displayed in central clinical laboratory

Geo tagged photo – dedicated cupboard for storage of hazardous chemicals

Geo tagged photo – Storage facility for hazardous chemicals

Conclusion

Institute has well defined storage and handling system for hazardous chemicals, further improvisation is in progress.

Recommendations

1. Records of training given to concerned team members about proper storage, handling and spill control of such chemicals, if any, should be maintained.
2. Disposal method of spilled chemicals and expired/discarded chemicals should be documented.
3. Records of first aid training for exposure of chemicals after spillage should be maintained.
4. Material Safety Data Sheet (MSDS) of chemicals for handling and disposal of chemicals and Record of training given to related people about MSDS should be maintained.

8. Water Conservation Facilities

8.1 Rain Water Harvesting (NAAC Criteria 7.1.5.1)

Current Status

Presently, rainwater harvesting is done by collecting the rainwater from staff quarters and hostel into the well which is constructed near the staff quarters. Thus, presently institute is utilizing rooftop area of those buildings x rainfall/annum x runoff coefficient = (635.42 + 249.57) x 674 x 0.75 = 4,47,362.45 liters of rainwater harvesting potential out of total rainwater harvesting potential of campus of 20,046.27 cu. m. Hence, remaining rainwater harvesting potential of 19,598.92 cu. m. can be exploited.

Conclusion

Institute has initiated the rainwater harvesting practice to a certain extent. Increasing the utilization of RWH is being planned.

Recommendation

For rainwater collection, it was observed that campus is having total area of 52,600 sq. m. Following are different areas in the campus.

Total area – 52600 Sq. m. Area under road – 3534 Sq. m.
Garden Area – 1927 Sq. m Total plot area – 41701 Sq. m.
Total built up area – 43241 Sq. m

Hence, there is good potential for systematic rainwater harvesting.

Open area = Plot area – (Plinth area + area under roads/pavements + area under gardens/plantation)

Rainwater available (Litre) = rooftop area x avg. rainfall per annum x runoff coefficient.

Following Table indicates the rainwater harvesting potential at campus.

Table – Evaluation of rainwater harvesting potential at campus

Sr. No.	Parameter	Value	Unit	Runoff Coefficient	Rainwater available (Liters)
1	Plot area	52600	sq. m.	-	-
2	rooftop area	12098	sq. m.	0.75	6115539
3	area under roads/pavements	3534	sq. m.	0.7	1667341.2
4	area under gardens/plantation	1927	sq. m.	0.35	454579.3
5	Open area	35041	sq. m.	0.5	11808817
6	Average rainfall per annum	674	mm	-	-
7.	**RWH Potential utilized (Well near staff quarter)**	**884.99**	**sq. m.**	**0.75**	**447362.45**
8.	**Total RWH Potential**		**cu. m.**	**Total**	**20046.277**
9.	Balance RWH Potential				19598914
10.	Proposed RWH in near future (from building next to second well of water storage)	980.89	sq. m.	0.75	495839.9

Geo tagged photo - Rain water harvesting well near staff residential quarters

(collects rainwater from staff quarters and hostels.)

Geo tagged photo – insides of rainwater harvesting storage well

Geo tagged photo - open well recharge

8.2 Borewell/Open Well Recharge (NAAC Criteria 7.1.5.2)

There are only 2 open wells constructed in the campus. No bore wells have been created. Following are the photos of open wells created in the campus. The open well near the staff quarters collects the rainwater from staff quarters and hostels. Whereas, the open well near the college building is used to collect and store the purchased water received from Haranmaal Lake.

Geo tagged photo – Wells constructed in the campus.

8.3 Construction of tanks and bunds (NAAC Criteria 7.1.5.3)

Current Status

Presently, one water bund is under construction. The purpose is to arrest the overflowing water from Nakane lake and increase groundwater level. Its dimensions are 200 m (length) x 100 m (width) x 3.75 m (ht.).

Approximate storage capacity of this bund is given as

= area bund x height of bund = 200 x 100 x 3.75

= 75,000 cu. m.

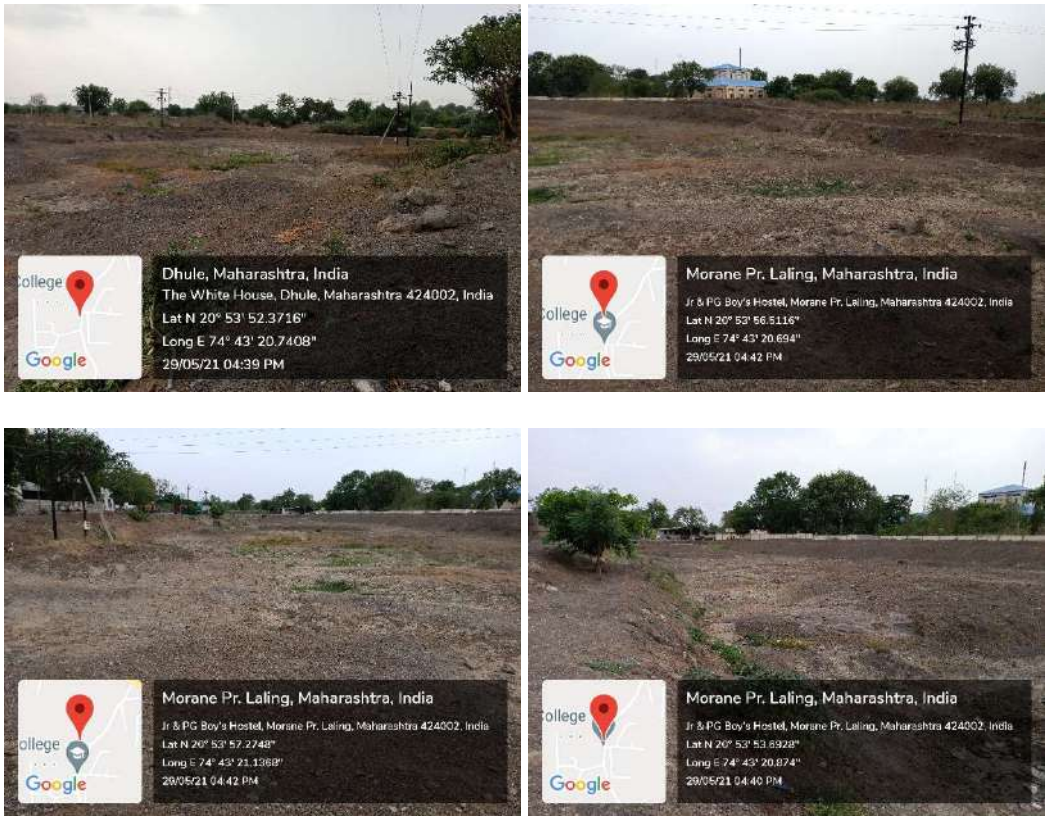
Presently, there are 16 overhead water tanks installed in the campus having total capacity of 64,000 litres.

Conclusion

Institute has taken an active initiative to increase groundwater reserve by constructing the water bund near the campus, which is having significantly high storage capacity.

Recommendations

1. Trenches/underground tanks should be constructed to collect the rainwater by taking advantage of slope of land.
2. The water bund constructed in the campus still needs to be developed further systematically to utilize its full storage potential.



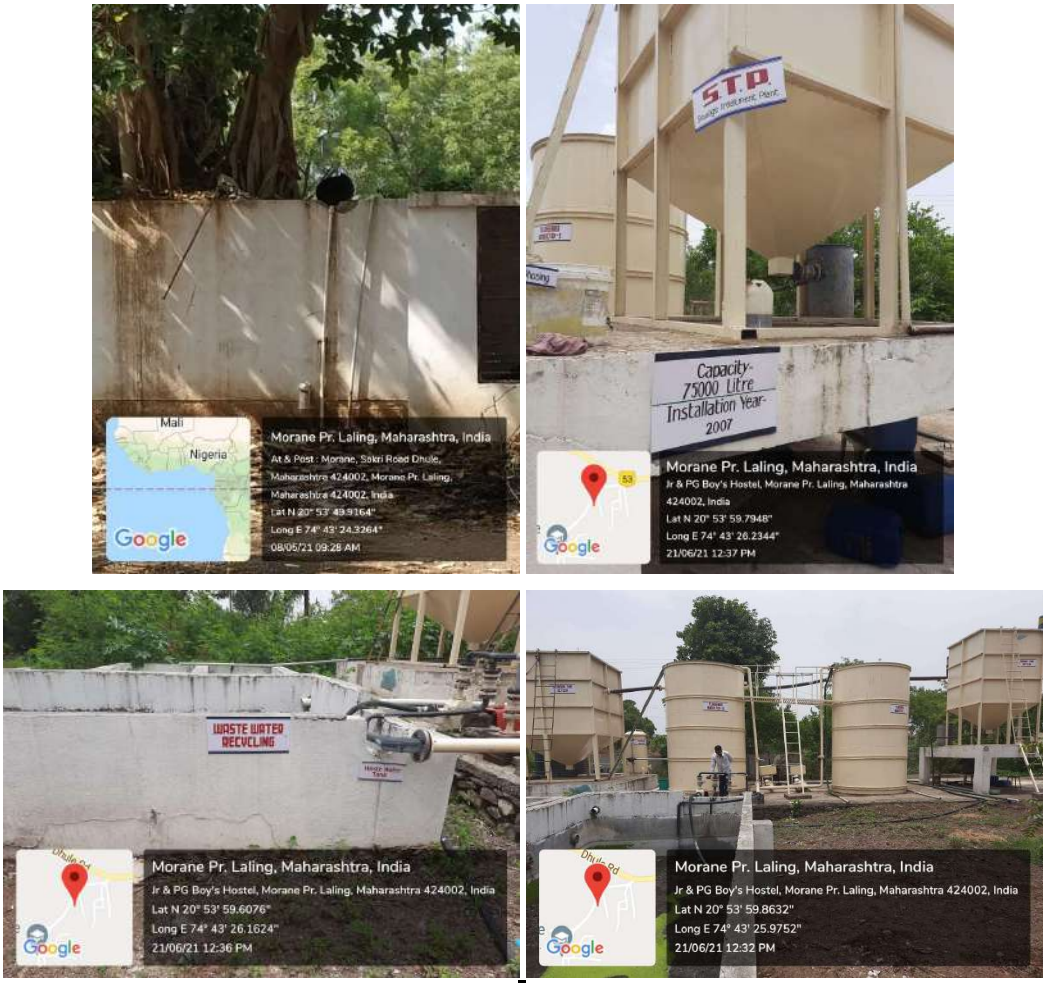
Geo tagged photos – Water bund near campus, being constructed by institute

Geo Tagged Photo – Overhead tank installed on rooftop of institute

8.4 Waste Water Recycling (NAAC Criteria 7.1.5.4)

Current Status

Presently, one Sewage Treatment Plant (STP) is in operation. All the domestic wastewater from college and hospital is collected and treated in the Sewage Treatment Plant (STP), installed in the campus itself. This STP has an installed capacity of 75,000 liter per day. On an average, 50,000 of sewage is treated in STP per day. Out of this, 30,000 liters is used for backwash and 20,000 liters is recycled in gardening.



Geo tagged photos – STP installed in the campus

Conclusion

Because of waste water recycling through STP, institute is conserving 20,000 litres per day of freshwater.

Recommendations

1. Quality of output of STP should be maintained and ensured through regular maintenance.
2. Treated water analysis should be carried out regularly and results must be monitored.
3. Treated water quality should be maintained for intended use.
4. Target should be 100% utilization of treated water for intended use.
5. Record of water consumed, quantity treated at STP and quantity recycled and utilized should be maintained and monitored on daily and monthly basis.
6. Maintenance record and chemical consumption record of STP should be preserved in the form of daily reports.

8.5 Maintenance of water bodies and distribution system in the campus (NAAC Criteria 7.1.5.5)

Part A – Maintenance of Water Bodies

Current Status

Presently, there are no water bodies in the campus.

Recommendation

1. Water bodies can be further enhanced through comprehensive rainwater harvesting program.
2. Water bund can be developed in a systematic way to utilize aesthetically, recreationally and from rainwater conservation perspective.

Part B – Maintenance of Distribution System

Current Status

1. Drip irrigation system is being used at landscape gardens. This helps to conserve the water by eliminating evaporation losses from soil.
2. Water is potable. Report is available for the same (dated 26th April 2021).
3. Sprinkler system is also used for watering the gardens.

Conclusion

Water distribution systems in campus are well maintained and help to conserve precious natural resource base of water by reducing the losses.

Recommendation

1. Water Level sensor / pressure sensor switch should be provided for all overhead tanks, after checking their technical feasibility.
2. Leakages of water in the water distribution system should be regularly monitored and arrested to ensure no loss of water. Record of such leak arresting should be preserved.
3. Periodic checking and maintenance of seals and packaging should be undertaken to minimize water loss by dripping. The record of such checking and maintenance/repairs should be preserved.
4. Install water flow meter for all the wells as well as major consumption areas, wings of hostel, different buildings etc. to enable the water accounting.
5. All taps and bathroom showers should be provided with Pressure Reducers and low flow faucets.

6. Pipeline diagram should to be prepared for the campus.
7. Properly close the redundant piping connections, if any.

Geo tagged photo – drip irrigation system near entry to the campus

Geo tagged photo – drip irrigation system near administrative office

Geo tagged photo – drip irrigation system in garden near college building

Geo tagged photos – Sprinkler system installed and used in gardens

9. Green Campus Initiatives

9.1 Restricted Entry of Automobiles (NAAC Criteria 7.1.6.1)

Current Status

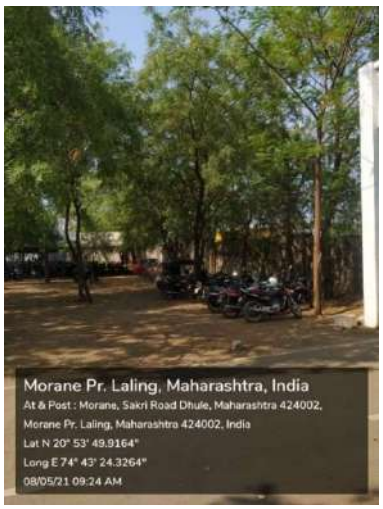
Implementation of "vehicle parking at main gate" has been done so as to restrict the movement of vehicles inside the campus. Daily commutation bus facility is not available. Only available for health camps or patients. *Zebra crossing strip is proposed to be created near the entry gate of campus.* PUC Camp has been organized by the institute for inspection of staff vehicles entering the campus on 22nd April 2021. Institute has issued a circular about restricted entry of 2-wheeler and 4-wheeler automobiles which do not possess a valid PUC Certificate.

Conclusion

Institute has created awareness among people about environmental impact of automobiles and taken concrete action about PUC of vehicles entering the campus.

Recommendations

1. Parking discipline should be maintained in the campus.
2. Use of bicycle for internal transport should be encouraged.
    a) Incentivized /preferred parking can be implemented throughout the campus for Transport using bicycles and Transport using carpooling.
3. Solar parking can be installed in the parking area of the campus.



Geo tagged photo – parking near entry gate of campus. ***People walk to individual buildings hereafter***

9.2 Battery Operated Vehicles (NAAC Criteria 7.1.6.2)

Current Status

Presently, no battery-operated vehicle is being used in the campus for internal transport of people.

Recommendations

Use of battery-operated vehicles is recommended due to their environment friendly nature of operation.

9.3 Pedestrian friendly pathways (NAAC Criteria 7.1.6.3)

Current Status

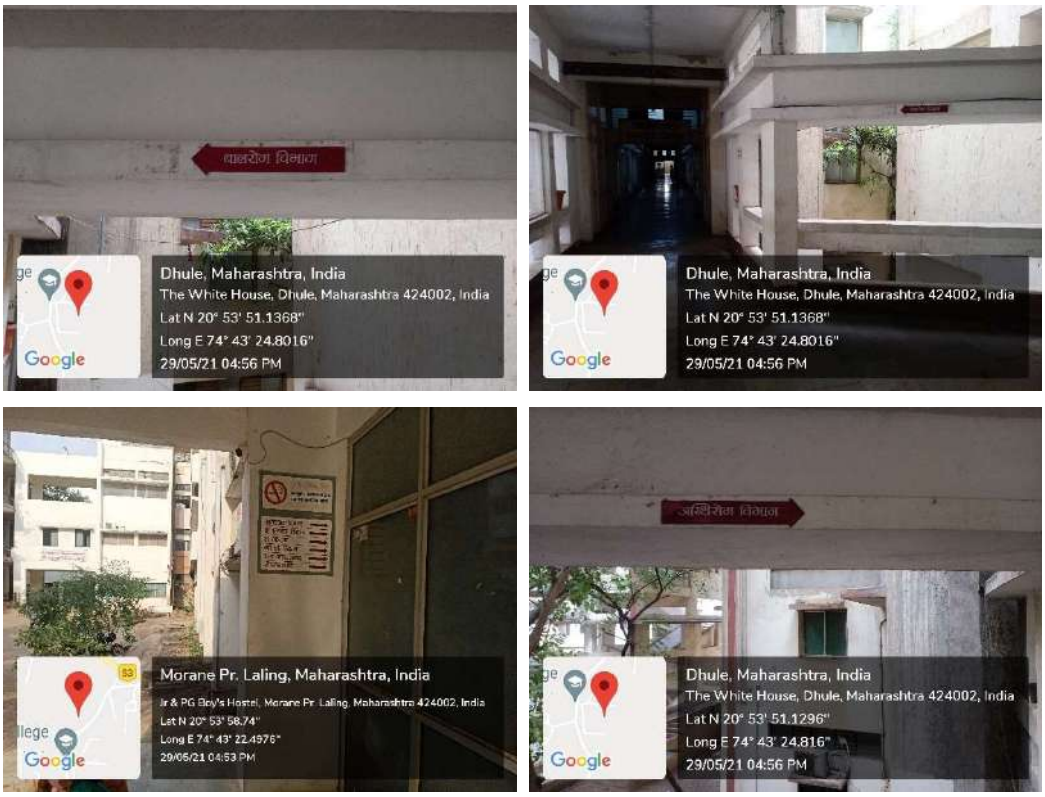
1. Pedestrian friendly pathways are provided in campus.
2. Covered pathways are provided interconnecting the buildings.
3. Hospital buildings clearly indicate the direction for different areas.
4. Ramps are present on every floor in the building. (Photo near Physiology department provided herewith.)
5. Lift is accessible. It is having sufficient depth to accommodate the patient on stretcher and wheelchair.

Conclusion

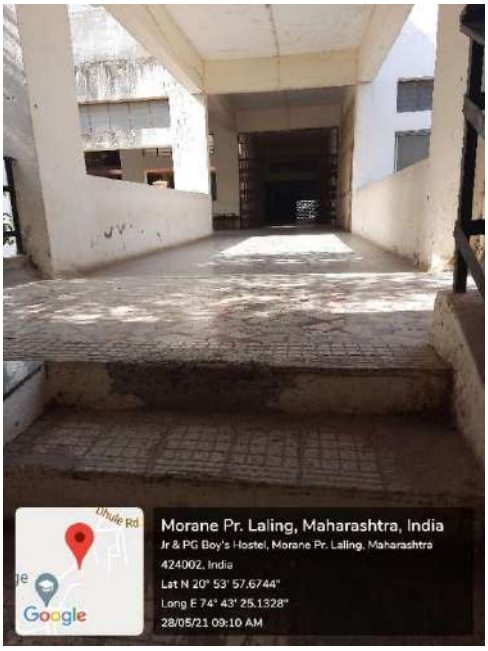
Institute has taken care to reduce the efforts of pedestrians for commutation within the campus by constructing ramps, lifts, covered pathways connecting the two buildings etc. Properly visible directional signboards are further helpful for the pedestrians.

Recommendations

1. Provide sufficient light throughout the pathways in the night time.
2. Preferably, there should not be any road crossing associated with such pathways.
3. Instructional boards like “pedestrians first” should be displayed and followed in the campus.
4. Hospitals are legally considered as silence zones within a radius of 100 meters. Hence, it is suggested that prominent board should be displayed near the entrance of campus to instruct the vehicles to reduce noise pollution.



Geo tagged photo – signs created to indicate direction of different areas in the institute.



Geo tagged photo - Walkway connecting college building to hospital

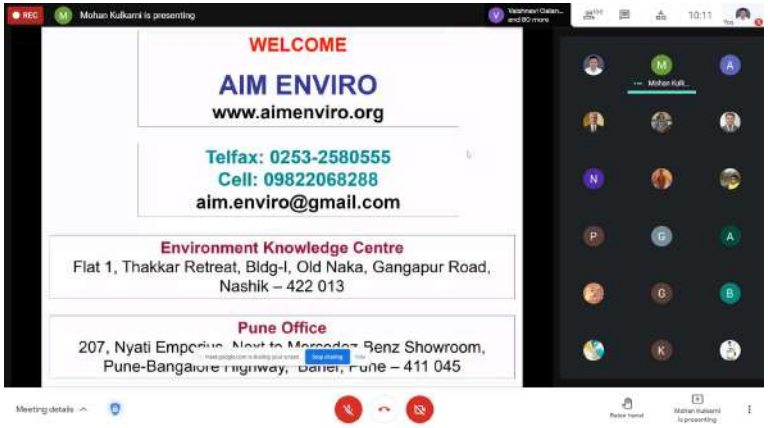
Geo tagged photo – ramp constructed in the institute for ease of movement of wheelchair

Geo tagged photo – Lift installed in the institute

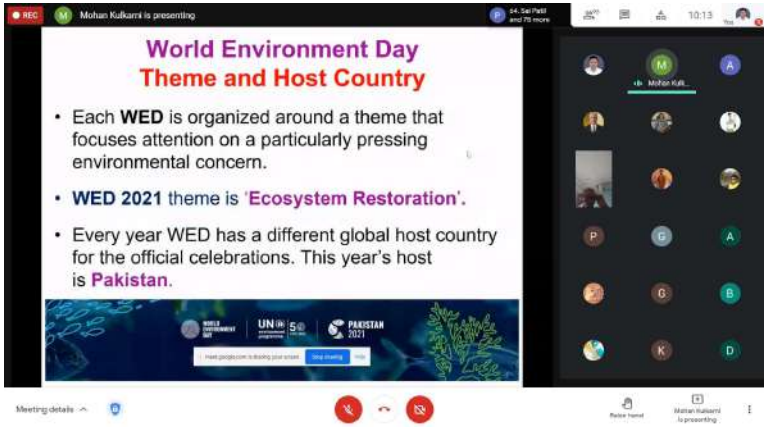
9.4 Ban on use of plastics (NAAC Criteria 7.1.6.4)

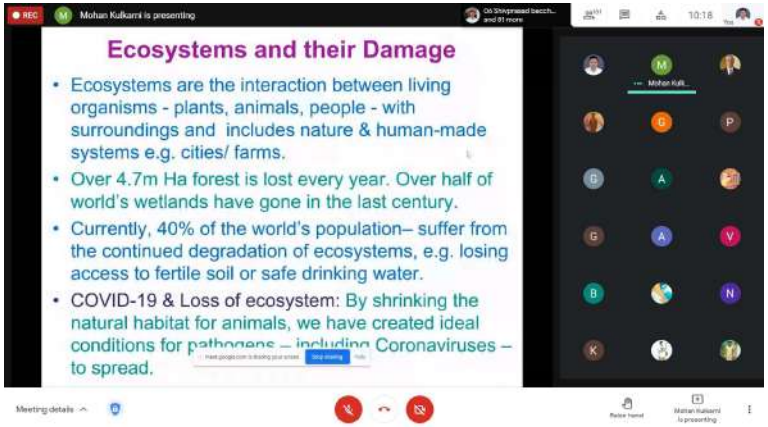
Current Status

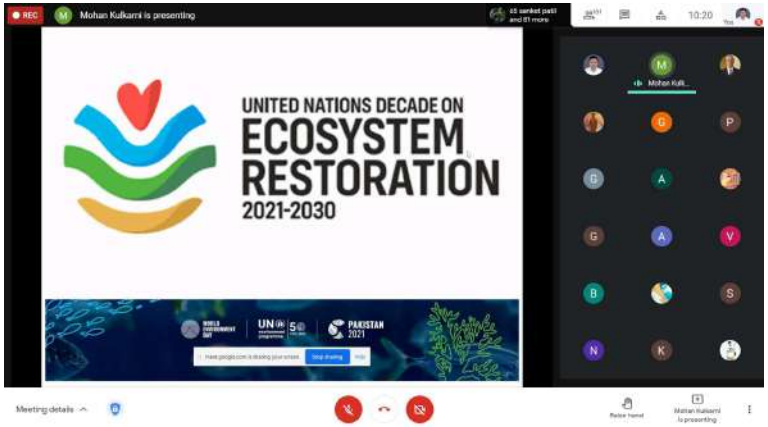
1. Institute has initiated replacement of plastics by paper.
2. Institute also encourages its suppliers to use paper bags and wrappers and not to use plastics.
3. Institute has issued a circular on Ban of single use Plastic.
4. Institute has organized an online session entitled ***Awareness program on Ban on Plastics*** which was addressed by Mr. M. M. Kulkarni, Lead Auditor of ISO 14001 – Environment Management System, Nashik, on 5th June 2021 for students and faculty of the institute.
5. 5th June being the **World Environment Day,** was selected for organizing this session.
6. This lecture was conducted using Google Meet platform considering the pandemic situation of COVID-19. In total, 183 participants enrolled using Google Form.
7. Screenshots and flyer of this online session are provided herewith. The recording of this session is also available.

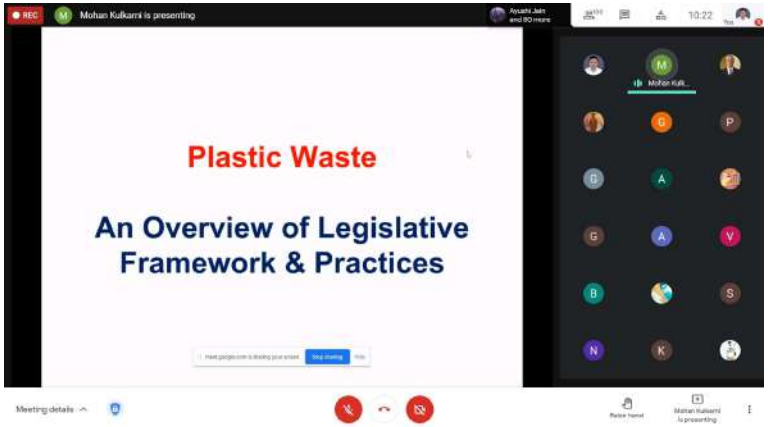

Mohan Kulkarni is presenting
WELCOME
AIM ENVIRO
www.aimenviro.org
Telfax: 0253-2580555
Cell: 09822068288
aim.enviro@gmail.com
Environment Knowledge Centre
Flat 1, Thakkar Retreat, Bldg-I, Old Naka, Gangapur Road, Nashik – 422 013
Pune Office
207, Nyati Emporius, Next to Mercedez Benz Showroom, Pune-Bangalore Highway, Baner, Pune – 411 045

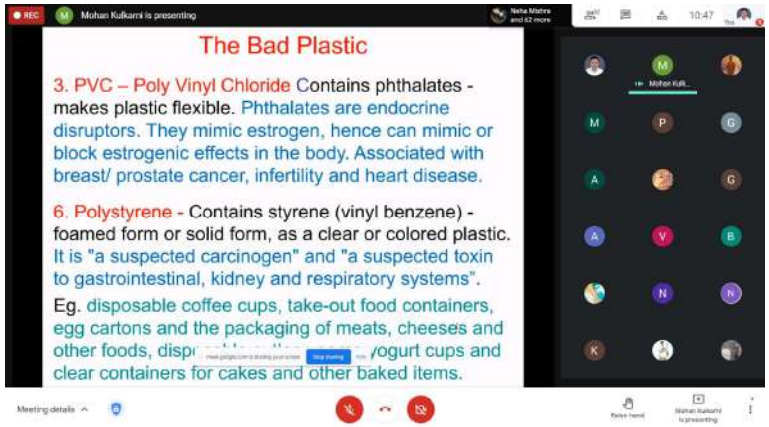

Mohan Kulkarni is presenting
5 June, World Environment Day
WORLD ENVIRONMENT DAY
WED
5th June, Every Year
UNEP
United Nations Environment Programme
UN's Decade on Ecosystem Restoration
2021 - 2030
WORLD ENVIRONMENT
UN

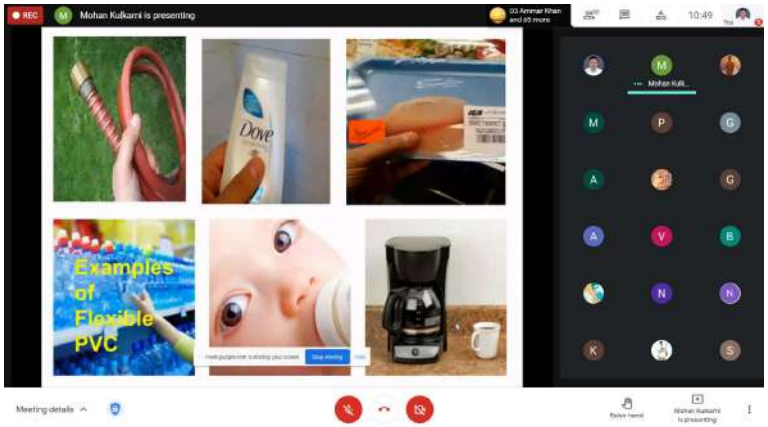

Mohan Kulkarni is presenting
World Environment Day
Theme and Host Country
Each WED is organized around a theme that focuses attention on a particularly pressing environmental concern.
WED 2021 theme is 'Ecosystem Restoration'.
Every year WED has a different global host country for the official celebrations. This year's host is Pakistan.
PAKISTAN 2021


Mohan Kulkarni is presenting
Ecosystems and their Damage
Ecosystems are the interaction between living organisms - plants, animals, people - with surroundings and includes nature & human-made systems e.g. cities/ farms.
Over 4.7m Ha forest is lost every year. Over half of world's wetlands have gone in the last century.
Currently, 40% of the world's population– suffer from the continued degradation of ecosystems, e.g. losing access to fertile soil or safe drinking water.
COVID-19 & Loss of ecosystem: By shrinking the natural habitat for animals, we have created ideal conditions for pathogens – including Coronaviruses – to spread.


Mohan Kulkarni is presenting
UNITED NATIONS DECADE ON
ECOSYSTEM
RESTORATION
2021-2030
PAKISTAN
2021


Mohan Kulkarni is presenting
Plastic Waste
An Overview of Legislative
Framework & Practices


Mohan Kulkarni is presenting
The Bad Plastic
3. PVC – Poly Vinyl Chloride Contains phthalates - makes plastic flexible. Phthalates are endocrine disruptors. They mimic estrogen, hence can mimic or block estrogenic effects in the body. Associated with breast/ prostate cancer, infertility and heart disease.
6. Polystyrene - Contains styrene (vinyl benzene) - foamed form or solid form, as a clear or colored plastic. It is "a suspected carcinogen" and "a suspected toxin to gastrointestinal, kidney and respiratory systems".
Eg. disposable coffee cups, take-out food containers, egg cartons and the packaging of meats, cheeses and other foods, disp /ogurt cups and clear containers for cakes and other baked items.


Mohan Kulkarni is presenting
Dove
Examples of Flexible PVC

Conclusion

Institute has issued a circular to ban the use of single use plastic, thereby the process of reducing dependency on plastic at various levels has begun. Also, awareness has been created about ban on plastic among the faculty members and students.

Recommendations

1. Increase the awareness about plastic ban through continued campaigns.
2. Collected plastic waste should be properly segregated and given for recycling.
3. Eco friendly food packaging should be implemented for delivery of foods from mess and canteen.

9.5 Landscaping with trees and plants (NAAC Criteria 7.1.6.5)

Current Status

1. Presently, two landscape gardens have been developed in the campus.
2. Following are details about various areas in the campus

Total area – 52600 Sq. m. Area under road – 3534 Sq. m.

Garden Area – 1927 + 594.6 + 624.6 + 2400 + 963.82 = 6510.02 Sq.m.

Total plot area – 41701 Sq. m. Total built up area – 43241 Sq. m.

3. Presently, total 164 big trees are present in the campus.
4. Out of the planted trees, 2 are of foreign species and remaining are native species.
5. Bio Diversity mapping is done as presented in following table.

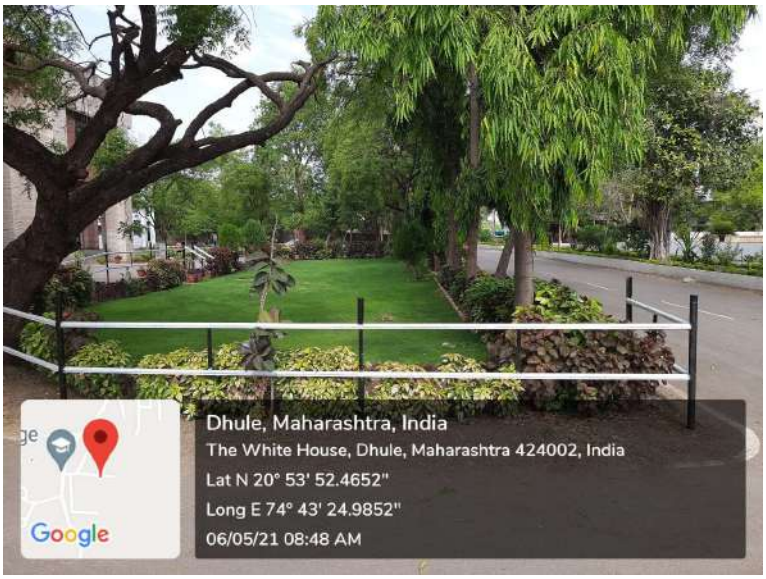
Table – Details of Big trees in the campus

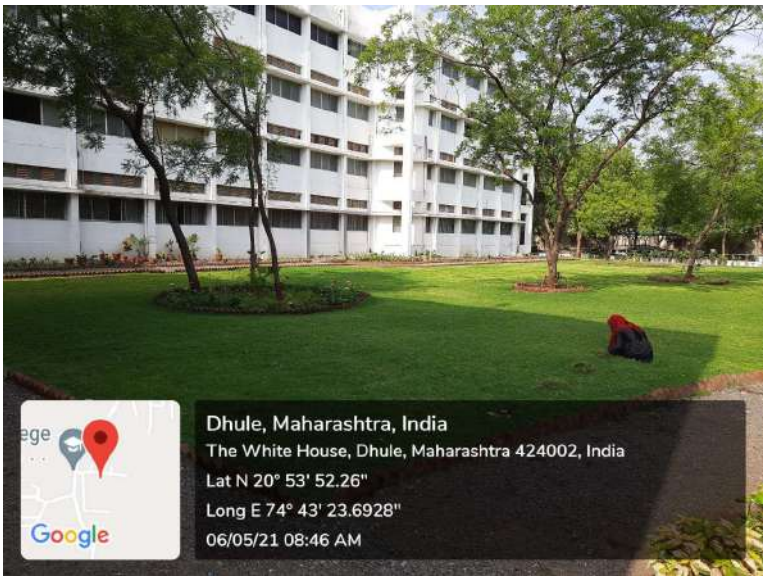
Sr. No.	Common Name	Botanical Name	Total no. of trees
1.	Mango Tree	Mangifera indica	6
2.	Copperpod Tree	Peltophorum pterocarpum	5
3.	Royal Poinciana Tree	Delonix regia	5
4.	Manila Tamarind Tree	Pithecellobium dulce	3
5.	Neem Tree	Azadirachta indica	58
6.	Drumstick Tree	Moringa oleifera	3
7.	Eucalyptus Tree	Eucalyptus globulus	1
8.	Indian Cork Tree	Millingtonia hortensis	3
9.	Indian Gooseberry Tree (Amla)	Emblica officinalis	3
10.	Indian Rosewood Tree	Dalbergia sissoo	8
11.	Tamarind Tree	Tamarindus indica	7
12.	Teakwood Tree	Tectona grandis	21
13.	Cluster Fig Tree	Ficus recemosa	1
14.	Peepal Tree	Ficus religiosa	10
15.	Banyan Tree	Ficus benghalensis	3
16.	Rain Tree	Samanea saman	2
17.	Ashoka Tree	Saraca asoca	5
18.	Orchid Tree	Bauhinia variegata	1
19.	Frangipani Tree	Plumera spp.	1
20.	Rubber Fig Tree	Ficus elastica	2
21.	River Tamarind Tree	Leucaena leucocephala	8
22.	Thusa Tree	Thusa occidentalis	6
23.	Burflower Tree	Leonamarckia cadamba	1
24.	Areca Palm Tree	Areca Catechu	1

Table – Bio diversity mapping of campus

	Sr. No.	Common Name	Species
Birds	1.	House Sparrow	*Passer domesticus*
	2.	Great Egret	*Ardea alba*
	3.	Rosy Starling	*Paster roseus*
	4.	Large Grey Babbler	*Turtoides malcolmi*
	5.	Alpine swift	*Apus melba*
	6.	Common Cuckoo	
	7.	Common Myna	
	8.	Pigeon	*Columbidae*
Reptiles	1.	Indian cobra	*Naja naja*
	2.	Graceful racer	*Platyceps gracilis*
	3.	Indian saw scaled viper	*Echis carinatus*
	4.	Indian python	*Python molurus*
	5.	Indian Green Keelback	*Rhabdophis plumbicolor*
	6.	Common Bronzebeck tristis	*Dendrelaphis tristis*
	7.	Indian Chamaleon	*Chamaelaeo zeylanicus*
	8.	Oriental rat snake	*Ptyas mucosa*
	9.	Common cat snake	*Boiga trigonata*
	10.	Indian Palm Squirrel	
Arachnids	1.	Scorpion	*Heterometrus fulvipes*
	2.		*Hottentota tamulus*
Insects	1.	Sphinx moths	
	2.	Common Gull	*Cepora nerissa*
	3.	Common grass yellow	*Eurema hecabe*
	4.	Lemon migrant	*Catopsilia Pomona*
	5.	White orange tip	*Ixias Marianne*
	6.	Common Jay	*Grapium doson*
	7.	Peacock pancy	*Junonia almanac*
	8.	Common crow butterfly	*Euploea core*
	9.	Lesser grass blue	*Zizina otis*
	10.	Forget Me Not	*Catochrysops Strabo*
	11.	Common Mormon Swallowtail	*Papilio polytes*
	12.	Lime Swallowtail	*Papilio demoleus*
	13.	Lime blue	*Chilades lajus*
	14.	Grasshopper	*Poekilocerus pictus*
	15.	Blue Tiger	*Tirumala limniace*
	16.	Common evening brown	*Melanitis leda*
	17.	Ants, Bees and Wasps, Sawflies etc	

Geo tagged photo – Old Trees planted in campus





Geo tagged photo – landscape garden developed in the institute

% Green coverage area has been calculated as follows:

Particulars	Area under green cover (Sq. m.)	Total Open Area (Sq. m.)	% Of total open area
Garden area	1927.00	20899	9.22
Plantation near wall throughout the campus	2400.00	20899	11.48
Lawn between admin and hospital	624.60	20899	2.99
Lawn near admin office	594.60	20899	2.85
Lawn near Samadhi area	963.82	20899	4.61
Total	**6510.02**	**20899**	**31.15%**

Conclusion

Institute has carefully preserved a large no. of big old trees. The garden area improvement is in progress.

Mapping study done indicates a significant bio diversity in the eco system of campus.

Recommendations

1. Additional garden opposite to college gate can be developed.
2. Tree ownership can be given to employees.
3. Target to be decided for number of trees to be planted in a year.

10. Acknowledgement

Green audit team of M/s. Shree Consultant, Nashik wishes to express sincere gratitude towards the wholehearted cooperation and support extended by

- Hon. Chief Executive Officer Dr. Mrs. Mamtatai R. Patil madam,
- Dean Dr. Vijay Patil sir,
- NAAC Coordinator Dr. R. C. Sharma sir,
- IQAC Coordinator Dr. Prashant Solanke sir,
- NAAC Criteria 7 Coordinator Dr. Rahul Wadile Sir

and other team members of various support departments of JMF's Annasaheb Chudaman Patil Memorial Medical College & Hospital, Dhule, during the entire course of the green audit. Without their untiring enthusiasm and involvement, this green audit study would have been left incomplete.