

ENVIRONMENTAL AUDIT REPORT
of
Janata Shikshan Prasarak Mandal's
PHULSING NAIK MAHAVIDYALAYA
PUSAD - 445 216



Year: 2022-23

Prepared by:

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ENVIRONMENTAL AUDIT CERTIFICATE

Certificate No: ES/PNM/22-23/03

Date: 18/05/2023

This is to certify that we have conducted Environmental Audit at Phulsing Naik Mahavidyalaya, Pusad, in the Year 2022-23.

The Institute has adopted following Energy Efficient & Green Practices:

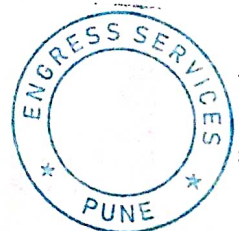
- Usage of Energy Efficient LED Light Fitting
- Segregation of Waste at Source
- Installation of Bio Composting Bed
- Installed Septic Tanks and it Cleans Periodically
- Installation of Sanitary Waste Incinerator
- Installation of Rain Water Management Project
- Tree Plantation in the Campus
- Creation of awareness by Display of Posters on Resource Conservation

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the Eco Friendly.

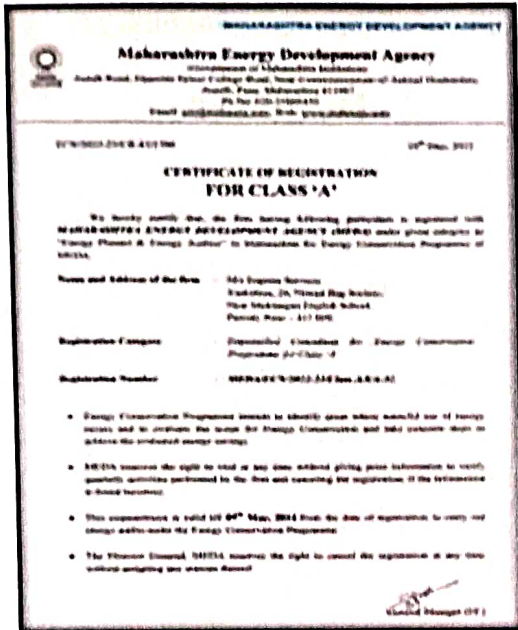
For Engress Services,



A Y Mehendale,
B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192
ASSOCHAM GEM Certified Professional: GEM: 22/788



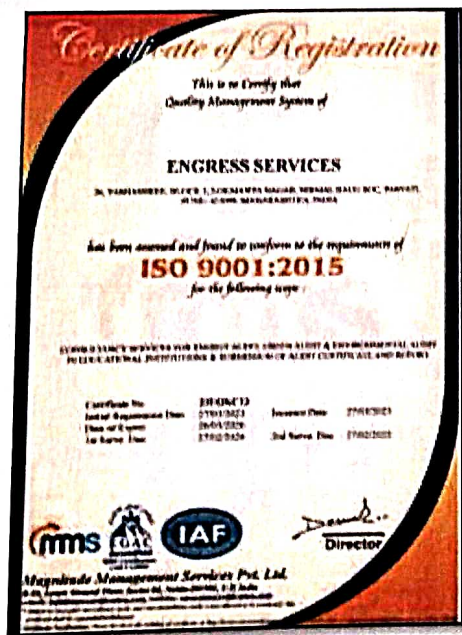
REGISTRATION CERTIFICATES



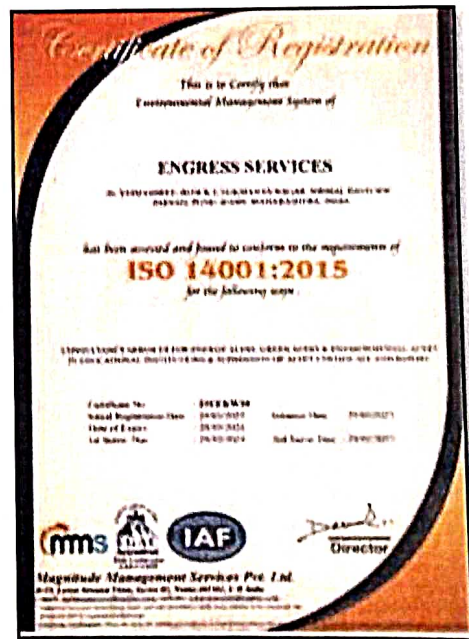
MEDA Registration Certificate



GEM Certified Professional Certificate



ISO: 9001-2015 Certificate



ISO: 14001-2015 Certificate



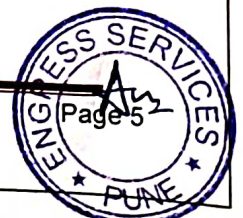
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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Phulsing Naik Mahavidyalaya, Pusad, for awarding us the assignment of Environmental Audit of their Campus for the Year: 2022-23.

We are thankful to all the staff members for helping us during the field study.



EXECUTIVE SUMMARY

1. Phulsing Naik Mahavidyalaya, Pusad consumes Energy in the form of Electrical Energy used for various Electrical Equipment, office & other facilities.

2. Pollution due to Institute Activities:

- Air pollution: Mainly CO₂ on account of Electricity Consumption
- Solid Waste: Bio degradable Garden Waste
- Liquid Waste: Human liquid waste

3. Present Energy Consumption & CO₂ Emission:

No	Particulars	Value	Unit
1	Annual Energy Consumption	26807	kWh
2	Annual CO ₂ Emissions	24.12	MT

4. Various initiatives taken for Environmental Conservation:

- Usage of Energy Efficient LED fittings
- Bio Composting Pit Installation

5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	50	31	42
2	Minimum	33	20	26

6. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	33.1	46	310	43
2	Minimum	31	42	137	39

7. Waste Management:

7.1 Segregation of Waste at Source:

The Waste is segregated at source in separate Waste Bins & is handed over for further action.

7.2 Bio Composting Pit:

The Institute has a Bio Composting Pit, to convert the Leafy Waste into Bio Compost.

7.3 Liquid Waste Management:

The Institute has installed Septic Tank and it cleans periodically.

7.4 Sanitary Waste Management:

The Institute has installed Sanitary Waste Incinerator, for disposal of the Sanitary Waste.

7.5 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.

8. Rain Water Management:

The Institute has installed the Rainwater Management project; the rain water falling on the terrace is collected through pipes and is used for recharging the bore well.

9. Environment Friendly Initiatives:

- Maintenance of Internal Garden: About **500 Plus** Trees in the campus.
- Display of Posters on Resource Conservation

10. Assumption:

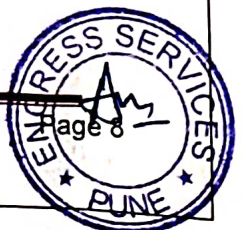
1. 1 kWh of Electrical Energy releases **0.9 Kg** of CO₂ into atmosphere

11. References:

- For CO₂ Emissions: www.tatapower.com
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI & Water Quality Standards: www.cpcb.com

ABBREVIATIONS

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
LPD	:	Liters per Day
LED	:	Light Emitting Diode
AQI	:	Air Quality Index
PM-2.5	:	Particulate Matter of Size 2.5 Micron
PM-10	:	Particulate Matter of Size 10 Micron
CPCB	:	Central Pollution Control Board
ISHRAE	:	The Indian Society of Heating & Refrigerating & Air Conditioning Engineers



CHAPTER-I INTRODUCTION

1. Important Definitions:

1.1. Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

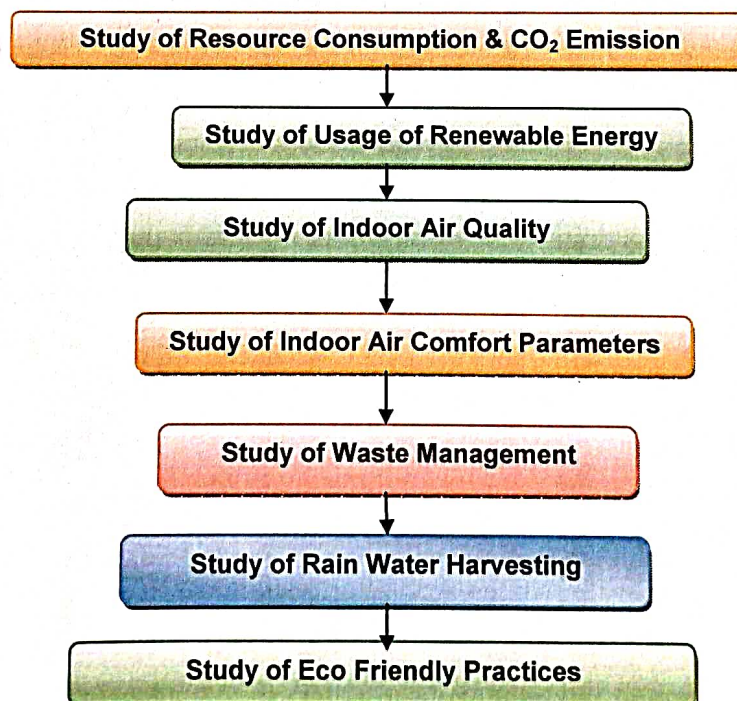
1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

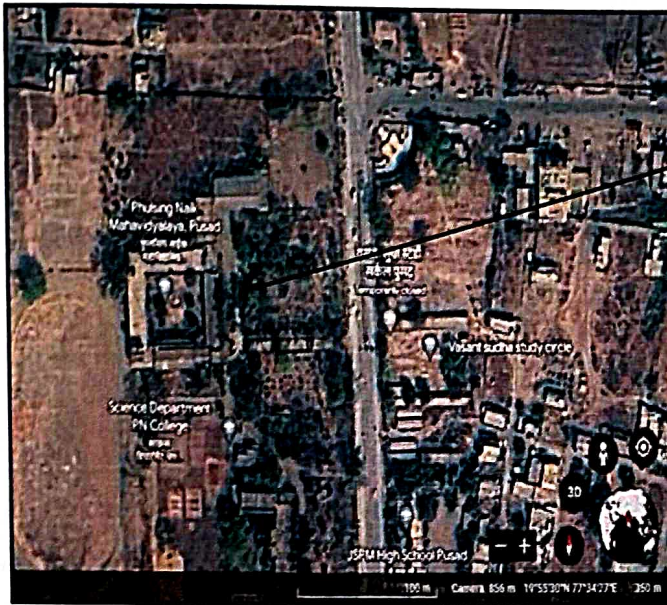
According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment

1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.4 Audit Procedural Steps:



1.5 Institute Location Image:



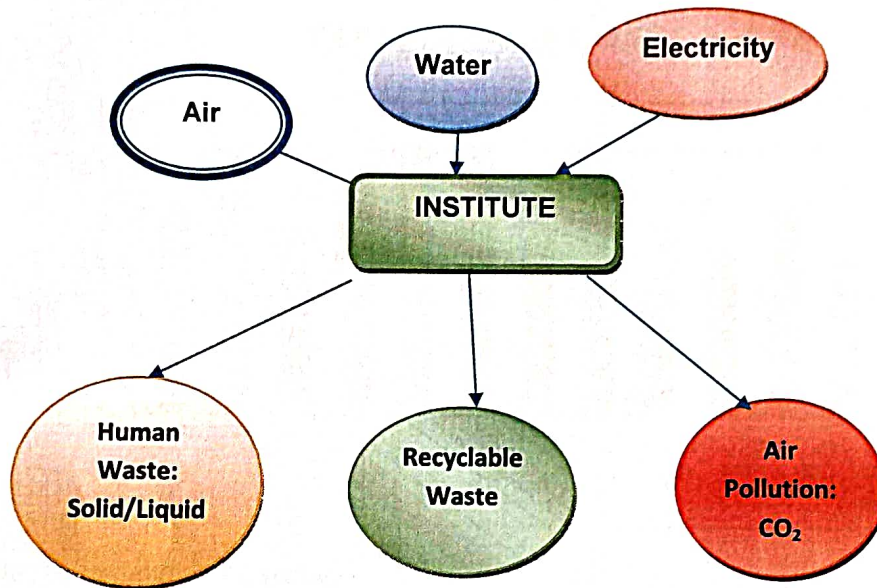
Institute
Campus

CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the Institute System & Environment as under.
Chart No 1: Representation of Institute as System & Study of Resources & Waste



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy. The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

Table No 5: Study of Consumption of Electrical Energy & CO₂ Emissions: 22-23:

No	Month	Energy Consumption	CO ₂ Emissions, MT
1	Apr-22	2201	1.980
2	May-22	2294	2.064
3	Jun-22	1985	1.7865
4	Jul-22	2600	2.34
5	Aug-22	2919	2.627
6	Sep-22	2930	2.637
7	Oct-22	1860	1.674
8	Nov-22	2390	2.151

9	Dec-22	2121	1.908
10	Jan-23	1736	1.562
11	Feb-23	2159	1.943
12	Mar-23	1612	1.450
13	Total	26807	24.126
14	Maximum	2930	2.637
15	Minimum	1612	1.450
16	Average	2233.92	2.010

Chart No 2: Month wise CO₂ Emissions:

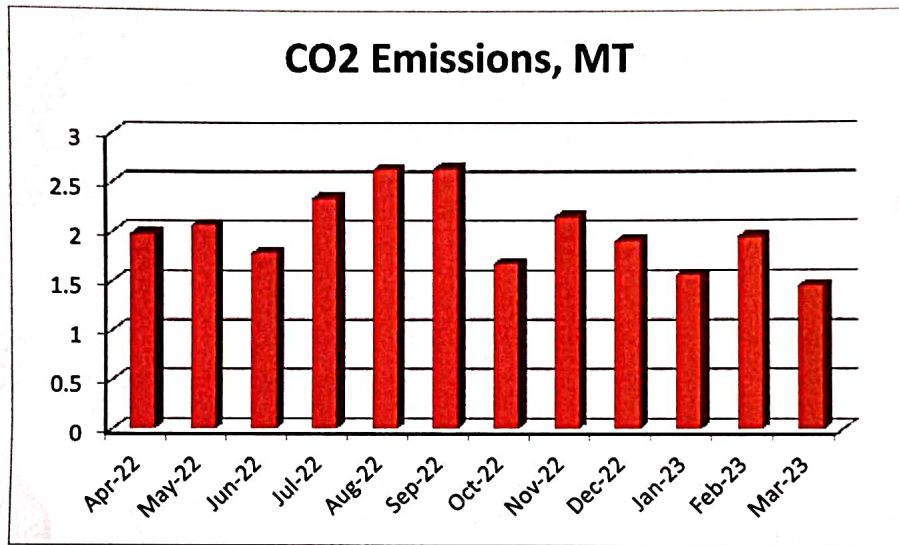


Table No 6: Important Parameters:

No	Parameter/ Value	Net Energy Consumption (kWh)	CO2 Emissions MT
1	Total	26807	24.126
2	Maximum	2930	2.637
3	Minimum	1612	1.450
4	Average	2233.92	2.010

CHAPTER III

STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has not installed Roof Top Solar PV Plant. It is recommended to install Roof Top Solar PV Plant.

CHAPTER IV STUDY OF INDOOR AIR QUALITY

4.1 Importance of Air Quality:

Air: The common name given to the atmospheric gases used in breathing and photosynthesis.

By volume, Dry Air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.039% carbon dioxide, and small amounts of other gases.

On average, a person inhales about **14,000 liters** of air every day. Therefore, poor air quality may affect the quality of life now and for future generations by affecting the health, the environment, the economy and the city's livability.

Air quality is a measure of the suitability of air for breathing by people, plants and animals.

4.2 Air Quality Index:

An **Air Quality Index (AQI)** is a number used by government agencies to measure the **air pollution** levels and communicate it to the population. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects. The measurement of the AQI requires an **air monitor** and an **air pollutant** concentration over a specified **averaging period**.

We present herewith following important Parameters.

1. AQI- Air Quality Index
2. PM-2.5- Particulate Matter of Size 2.5 micron
3. PM-10- Particulate Matter of Size 10 micron

Table No 7: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
Arts & Commerce Building				
1	Principal Office	46	30	32
2	Admin Office	46	27	42
3	NSS Dept	50	30	42
4	Library	46	28	42
5	Girls Common Room	35	21	26
6	IQAC Cell	45	23	37
7	Class Room 113	45	23	37
8	Class Room 114	50	31	42
9	Class Room 115	35	21	27
10	Class Room 116	36	22	26
11	Physcial Education Dept	33	20	30
Science Building				

12	EXTC Lab	48	27	34
13	Physics Lab	33	20	28
14	Computer Science Dept	41	24	31
15	Biology Dept	40	28	32
16	Chemistry Dept	41	29	31
17	Class Room 1	40	25	31
18	Class Room 2	41	27	33
19	Class Room 3	40	28	32
20	Maximum	50	31	42
21	Minimum	33	20	26

CHAPTER V STUDY OF INDOOR COMFORT CONDITION PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit. The Parameters include:

1. Temperature
2. Humidity
3. Lux Level
4. Noise Level.

Table No 8: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
Arts & Commerce Building					
1	Principal Office	32	42	137	41
2	Admin Office	32.2	44	240	41.2
3	NSS Dept	32.3	44	210	41.3
4	Library	32	44	230	40
5	Girls Common Room	33	45	245	41
6	IQAC Cell	32.2	44	244	43
7	Class Room 113	32.4	44	310	43
8	Class Room 114	32.3	45	305	39
9	Class Room 115	33	46	289	42
10	Class Room 116	33.1	46	250	43
11	Physical Education Dept	32	44	220	41
Science Building					
12	EXTC Lab	31.9	44.8	244	41
13	Physics Lab	32	44	240	41
14	Computer Science Dept	32	44	230	40
15	Biology Dept	32	45	225	39
16	Chemistry Dept	31	44	226	39
17	Class Room 1	33	43.9	245	41
18	Class Room 2	32	43.5	250	40
19	Class Room 3	32	44	250	40
20	Maximum	33.1	46	310	43
21	Minimum	31	42	137	39

CHAPTER VI STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The Waste is segregated at source in separate Waste Bins & is handed over for further action.

Photograph of Waste Collection Bins:



6.2 Bio Composting Pit:

The Institute has installed a Bio Composting Pit, to convert the Leafy Waste into Bio Compost.

Photograph of Bio Composting Pit:

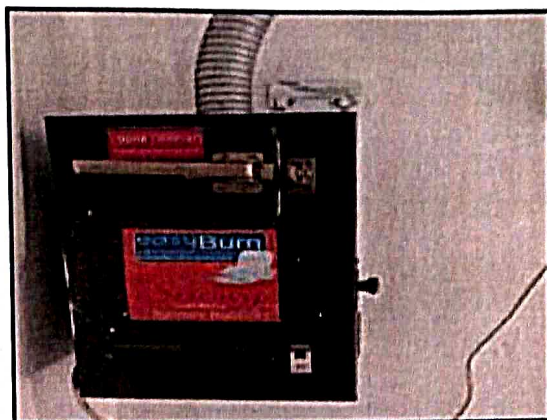


6.3 Liquid Waste Management:

The Institute has installed Septic Tanks it cleans periodically.

6.4 Sanitary Waste Management:

The Institute has installed Sanitary Waste Incinerator, for disposal of the Sanitary Waste.



6.5 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.

CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

The Institute has implemented the Rain Water Management Project. The Institute has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used for recharging the bore-well.

Photograph of Rain Water Management Pipes & Recharge Section:

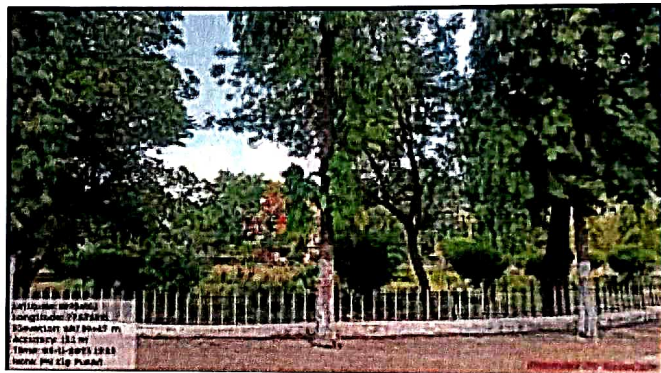
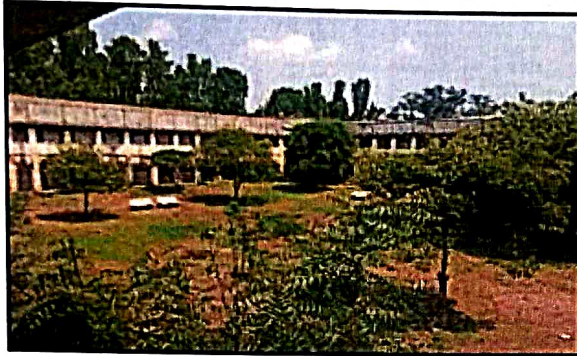


CHAPTER-VIII STUDY OF ECO FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The Institute has well maintained landscaped garden in the campus.

Photograph of Tree plantation:



8.2 Creation of Awareness about Energy Conservation:

The Institute has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:



**ANNEXURE-I:
VARIOUS AIR QUALITY, WATER QUALITY, NOISE & INDOOR
COMFORT STANDARDS:**

1. Category Wise Air Quality Index Values & Concentration of PM 2.5 & PM10:

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

2. Recommended Water Quality Standards:

No	Designated Best Use	Criteria
1	Drinking Water Source without conventional Treatment but after disinfection	pH between 6.5 to 8.5 Dissolved Oxygen 6 mg/l or more
2	Drinking water source after conventional treatment and disinfection	pH between 6 to 9 Dissolved Oxygen 4 mg/l or more
3	Outdoor Bathing (Organized)	pH between 6.5 to 8.5 Dissolved Oxygen 5 mg/l or more
4	Controlled Waste Disposal	pH between 6 to 8.5

3. Recommended Noise Level Standards:

No	Location	Noise Level dB
1	Auditoriums	20-25
2	Outdoor Playground	55
3	Occupied Class Room	40-45
4	Un occupied Class Room	35
5	Apartment, Homes	35-40
6	Offices	45-50
7	Libraries	35-40
8	Restaurants	50-55

4. Thermal Comfort Conditions: For Non-conditioned Buildings:

No	Parameter	Value
1	Temperature	Less Than 33°C
2	Humidity	Less Than 70%