



**Environment Audit Report
Arvindbabu Deshmukh Mahavidyalaya,
Bharsingi, Nagpur, Year 2020-21**



**ENVIRONMENT AUDIT REPORT
CONSULTATION REPORT**



Arvindbabu Deshmukh Mahavidyalaya
Bharsingi, Pin – 441305, Nagpur
India

PREPARED BY

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Year: 2020-21



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ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore takes this opportunity to appreciate & thank the management of **Arvindbabu Deshmukh Mahavidyalaya Bharsingi, Nagpur** for giving us an opportunity to conduct environment audit for the college.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation the course of study.



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Lead Auditor ISO50001:2011 [EnMS) from FICCI, Delhi
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Chartered Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]



EXECUTIVE SUMMARY

The executive summary of the Environment audit report furnished in this section briefly gives the identified water conservation measures that can be implemented in a phased manner to water conservation and increase the productivity of the college.

Environmental Management Initiative Taken by College

- ✚ College conduct the awareness program, activity, competitions on occasion of different environment related days.
- ✚ Chemical waste from laboratories is collected separately to avoid contamination of ecosystem .
- ✚ College has functional rain water harvesting unit through which the water from the terrace collected through the pipe and transport near the bore well and water bodies prepare in college premises. It helps to maintain the level of water due to which problem of water scarcity solve to the some extent, especially in the season of summer.

S. No.	Water Conservation/Saving Measure Undertaken	Annual Monetary Saving (Rs)	Investments (Rs)	Pay Back Period (Year/s)
1	Water Harvesting unit	8,000/-	40,000/-	5
2	Bore-well recharge	5,000/-	15,000/-	3
3	Water Bodies	3,500/-	10,000/-	2.8

AREAS FOR IMPROVEMENT AND RECOMMENDATION

WATER MONITORING SYSTEM:

- ✚ Installation of “**Cloud based (IoT based) ground water extraction monitoring system**” for well to quantify fresh water consumption per day in the College.

SPRINKLER IRRIGATION SYSTEM FOR GARDENING.

- ✚ Use Sprinkler water irrigation system for gardening.

DIP WATER IRRIGATION SYSTEM FOR GARDENING.

- ✚ Use dip water irrigation system for gardening.

WATER QUALITY TEST.

- ✚ Conduct water test for Drinking and Ground Water.



CHAPTER-1 INTRODUCTION

1.1 About the College

Arvindbabu Deshmukh College of Arts, Science and Commerce also well known as AD College, was established in 1986. In its journey during the past 35 years it has grown in strength from 75 students from its inception to a total strength of 2000 students today. Also there are 1300 students studying in YCMOU through this college. Under the affiliation of Rashtrasant Tukadoji Maharaj College of Nagpur. College offers undergraduate and post graduates programs like B.A., B.Com. From 1986 and later in 2008 B.Sc. and M.A. have been started. The college is also identified as community college under scheme of UGC and running a skill oriented diploma course in Welding and Fabrication. Beside that the college also runs as-on courses like Fashion designing and Communicative English. Listed in first top ten for the graduation course in mass media. College having units such as N.S.S. of 250 students, college awarded with best college for N.S.S. by R.T.M.N.U., Nagpur. College having very active sport department. Every year students are performed at National, State, College level and received Gold, Silver and bronze medal. Our college organized International, National, State and College level Conferences, Seminars and Workshops in various subjects. College is popular for its cultural, sports and drama activities and infrastructural facilities.



Fig

Fig.-1.1 – Satellites Image of College from Google map



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VISION

To become a centre of quality education by promoting high academic and social pursuit and competencies of students of rural region for all round development

MISSION

- To impart higher education for all round development of students of rural area and provide them an opportunity to make them competent for development in society
- The priority of the institution is to bring academic excellence along with personality development to compete with the rest of the world.
- The institution is located in the remote area so maximum students belong to backward communities and socio – economically weaker section so provide them opportunity to make themselves competent.

To provide opportunity in future by providing them quality education, skilled base programme, competitive examination guidance, sports facility etc.

Name of Department

Sr. No.	Name of Teaching Departments
1	Department of Marathi
2	Department of English
3	Department of History
4	Department of Political science
5	Department of Economics
6	Department of Music
7	Department of Home-economics
8	Department of Chemistry
9	Department of Botany
10	Department of Zoology
11	Department of Physics
12	Department of Mathematics
13	Department of Commerce



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Sr. No.	Floor	Department
1.	Ground floor	Administration office, Principal cabin, Classrooms
2.	First floor	Examination cell, IQAC room, Classrooms, Computer lab
3.	Second Floor	Science Laboratory, Audio visual hall, classroom, Girls common room
4.	Third floor	Classrooms, Boys common room
5.	Indoor stadium area	Indoor stadium, gymnasium, college canteen,
6.	Girls hostel	Hostel rooms, Canteen, warden room
7.	Playground	Playground, Basketball court, parking

1.2 About College Infrastructure:

The college is spread over 5807.379 M² plenty of open space and sports area interspersed within academic buildings. The details of various department and building are given below:

Table 1.1 :- Name of the various Building in the college

Sr. No.	Building	Department
1.	Main Building	3033.115 Sq. M.
2.	Indoor	1176. 15 Sq. M.
3.	Hostel	1458.114 Sq. M.
4.	Canteen	140 Sq. M.





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1.3 Master Plan of Campus:-

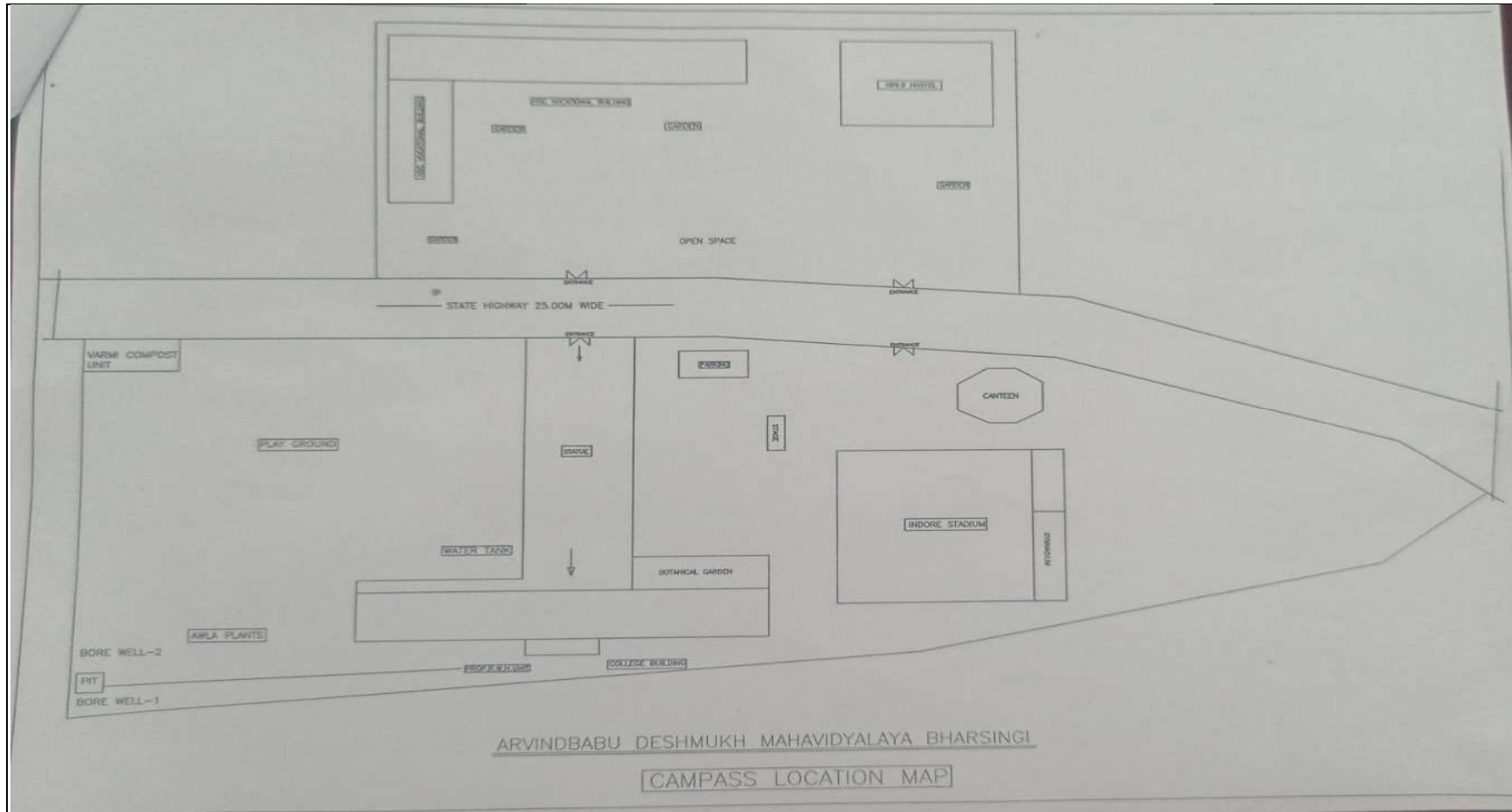


Figure 1.2: - Master Plan of Campus



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1.4 Green Monitoring Committee

STD : 07105
NAAC Re-accredited with 'B' Grade
VSPM Academy of Higher Education
Ph : 2333


Dr. Prakash Pawar
Officiating Principal

ARVINDBABU DESHMUKH MAHAVIDYALAYA
BHARSINGI, Dist. Nagpur - 441305

Ref.No. : AOM/2022/117 Date 12/02

Energy, Environment & Green audit committee

Energy, Environment & Green audit committee consist of following members.

Sr. No.	Name	Designation
1.	Dr. P. D. Pawar	Chairperson
2.	Dr. M.M. Varma	Convener
3.	Dr. S. B. Thakare	Member
4.	Dr. S. P. Gudadhe	Member
5.	Dr. A. R. Gharpure	Member
6.	Dr. A. L. Gadre	Member
7.	Dr. S. R. Bansod	Member
8.	Mr. S. R. Sinkar	Member
9.	Mr. B. B. Madhavi	Member
10.	Mr. C.B. Barapatre	Administrative Member

This committee working period is for 03 year up to June 2024 and after that committee will be reconstructed.


Off. Principal
Arvindbabu Deshmukh Mahavidyalaya,
Bharsingi Dist. Nagpur

e-mail : admv_bharsingi@rediffmail.com website : www.adm.edu.in, Ph : 07105-233533, 233330




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1.5 Integrated Energy, Environment & Green Policy

STD - 07105
NAAC Re-accredited with 'B' Grade
VSPM Academy of Higher Education
Ph : 233329


ARVINDBABU DESHMUKH MAHAVIDYALAYA
BHARSINGI, Dist. Nagpur - 441305

Dr. Prakash Pawar
Officiating Principal

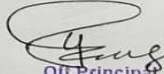
Ref.No. : ADM/2022/117
Date : 12/02/2022

Integrated Energy, Environment & Green Policy

Management of our institution is committed to go green for making our nation to Atma-Nirbhar (Self-Sustainable) in area of energy and environment.

Our emphasis is to:-

- Ensure continuous enhancement in our energy and water conservation and usage.
- Continuous monitoring the energy consumption pattern through periodic reviews and using latest informative system.
- Procure and use energy efficient equipment's and products.
- Create awareness regarding necessity of energy conservation and making environment pollution free to all the stakeholders by arranging awareness activity such as seminar, webinar, rallies and guest lectures etc.
- Carry out regular energy, environment and green audit by certified auditors to identify the areas for improvement.


Off. Principal
Arvindbabu Deshmukh Mahavidyalaya,
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e-mail : admv_bharsingi@rediffmail.com website : www.adm.edu.in, Ph : 07105-233533, 233330

1.6 The Audit Team

The study team constituted of the following senior technical executives from **Empirical Exergy Private Limited**,

- ✚ **Mr. Rajesh Kumar Singadiya**, [Director & Accredited Energy Auditor , AEA-0284]
- ✚ **Mr. Rakesh Pathak**, [Director]
- ✚ **Mrs. Laxmi Raikwar Singadiya**, [Energy Engineer]
- ✚ **Mr. Lokesh Kumar Verma** [Project Engineer]
- ✚ **Mr. Ajay Nahra**, [Site Engineer]



1.7 About Environment Auditing

Environment audits can be a highly valuable tool for institute in a wide range of ways to improve their energy, environment and economic performance. While reducing wastages and operating costs. Water audits provide a basis for calculating the economic benefits of water conservation projects by establishing the current rates of water use and their associated cost.

1.8 Objectives of Environment audit

The general objective of Environment audit is to prepare a baseline report on water conservation measures to mitigate consumption, improve quality and sustainable practices.

The specific objectives are:

- ✚ To monitor the water consumption and water conservation practices.
- ✚ To assess the quantity of water, usage, quantity of waste water generation and their reduction within the college.

1.9 Target Areas of Environment audit

This indicator addresses water sources, water consumption, irrigation, storm water, appliances and fixtures aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.



1.10 Methodology followed for conducting Environment audit

Step 1: Walk through survey

- ✦ Understanding of existing water sourcing, storage and distribution facility.
- ✦ Assessing the water demand and water consumption areas/processes.
- ✦ Preparation of detailed water circuit diagram.

Step 2: Secondary Data Collection

- ✦ Analyses historic water use and wastewater generation
- ✦ Field measurements for estimating current water use
- ✦ Metered & unmetered supplies.
- ✦ Understanding of “base” flow and usage trend at site
- ✦ Past water bills
- ✦ Wastewater treatment scheme & costs etc.

Step 3: Site Water Audit Planning (based on site operations and practices)

- ✦ Preparation of water flow diagram to quantify water use at various locations
- ✦ Wastewater flow measurement and sampling plan

Step 4: Conduction of Detailed Environment Audit & Measurements

- ✦ Conduction of field measurements to quantify water/wastewater streams
- ✦ Power measurement of pumps/motors
- ✦ Preparation of water balance diagram
- ✦ Establishing water consumption pattern
- ✦ Detection of potential leaks & water losses in the system
- ✦ Assessment of productive and unproductive usage of water
- ✦ Determine key opportunities for water consumption reduction, reuse & recycle.

Step 5: Preparation of Environment Audit Report

- ✦ Documentation of collected & analyzed water balancing and measurement details
- ✦ Projects and procedures to maximize water savings and minimize water losses.
- ✦ Opportunities for water conservation based on reduce/recycle/reuse and recharge options



CHAPTER- 2 WATER CONSUMPTION AND WASTE WATER SOURCES

2.1 Details of Source of Fresh Water and Use Areas:

The main source of freshwater is Bore-well & opens well for the college. The freshwater is mainly used for drinking, housekeeping, gardening, domestic activity, clinical activity and new construction project. Details of the Bore-Well are given in table.

Table: 2.1:- Details of Fresh water sources

Sr. No	Source of Water (Bore well/ Open well/ Municipality)	Location	Depth (ft/m)	Type of Pumps	Rated (HP)	Rated Flow (m ³ /hr)	Running Hr per day
1	Bore well	College Campus	480 ft.	Submersible	7.5	20	2
2	Open well	Near Jam River	50 ft.	Submersible	7.5	20	1
3	Hand Pump	College Campus	60 ft.	-	-	-	-



Fresh water sources (Bore-Well & Open well)

Fig.-2.1 Details of Source of Fresh Water and Use Areas



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2.2 Water Accounting & Metering system:

It was observed that there is requirement of water flow meters on Bore-well to quantify per day ground water extraction from different sources.

Table2.2: Water accounting & metering system

Sr. No	Source of Water (Bore-well)	Location	Type of meter (Mechanical /Electronic)	Regularly recorded (Yes/No)	Remark
1	7.5 HP 3phase	College Campus	NA	No	Required
2	7.5HP 3 Phase	Near Jam River	NA	No	Required

2.3 Water Storage Capacity in College Campus: -

There is different type of tank available in college for water storage like, Overhead RCC tank and PVC type (Sintex) etc.

Table 2.3: Water Storage tank in college campus

Sr. No.	Type of Storage System (Over Head Tank, Underground Tanks, Reservoir etc.)	Location	Storage Capacity (m ³)	Dimensions (Meter)
1	Tank	Admin Building	3.0	1.465 (D) x 1.830(H)
2	Tank	Admin Building	3.0	1.465 (D) x 1.830(H)
3	Tank	Admin Building	1.0	1.1 (D) x 1.1 (H)
4	Tank	Canteen	1.5	1.25 (D) x 1.426 (H)
5	Tank	Indoor stadium	2.0	1.37 (D) x 1.465 (H)
6	Tank	Hostel	3.0	1.465 (D) x 1.830(H)
7	Tank	Hostel	1.5	1.25 (D) x 1.426 (H)
8	Underground Tank	Hostel	5.0	1.80 (D) x 1.90 (H)



Fig.-2.2 Water Storage Capacity in College Campus

2.4 Water use areas in College Campus: -

Water is preliminary used for drinking, domestic, gardening and clinical activity. Audit team visited various departments and buildings to determine appliances. The details of washroom, toilet and taps are given in table 2.4.

Table 2.4 details of washroom, toilet and taps

Sr. No	Name of Building	No. of taps Drinking Water	No. of taps Service Water
1	Main Building	10	46
2	Indoor stadium	02	22
3	Hostel Building	04	34

Table 2.5 Details of Hand Wash and Urinals/Toilets

Details of Hand Wash and Urinals/Toilets				
Sr. No	Name of building	Hand wash	Urinal	Toilet
1	Main Building	11	15	12
2	Indoor stadium	06	2	12
3	Hostel Building	08	16	16



2.5 Efficient water taps and urinal: -

College has installed high water consumption basin and urinal. Average water consumption on per flash is 04 to 06 Litters. So, it is recommended installed automatic sensor-based urinal and basin it is reduced water consumption on per flash.



Figure 2.3:-Recommended Efficient water taps use on existing system

CHAPTER- 3 RECOMMENDATION

3.1. Rain water harvesting systems

The rainwater harvesting is a technique to capture the rainwater when it precipitates, store that water for direct use or charge the groundwater and use it later.

There are typically four components in a rainwater harvesting system:

- ✚ Roof Catchment.
- ✚ Collection.
- ✚ Transport.
- ✚ Infiltration or storage tank and use.

If rainwater is not harvested and channelized its runoffs quickly and flow out through storm-water drains. For storm-water management the recharge pits, percolation pits and porous trenches are constructed to allow storm water to infiltrate inside the soil.



Figure: - 3.1 Components of a rooftop rainwater harvesting system



3.2 Rainwater Harvesting Potential of the College: -

The college has total build-up area is about 3033.15 m^2 . The average annual rainfall 2.07 m and runoff coefficient 0.88 are considered for commercial building. Accordingly, above figures and consideration, estimated rainwater harvesting potential for the College is about $5,524 \text{ m}^3/\text{year}$. The following Mathematical Equation is used for the calculation.

RWH Potential = Rainfall (m) x Area of catchment (m^2) x Runoff coefficient

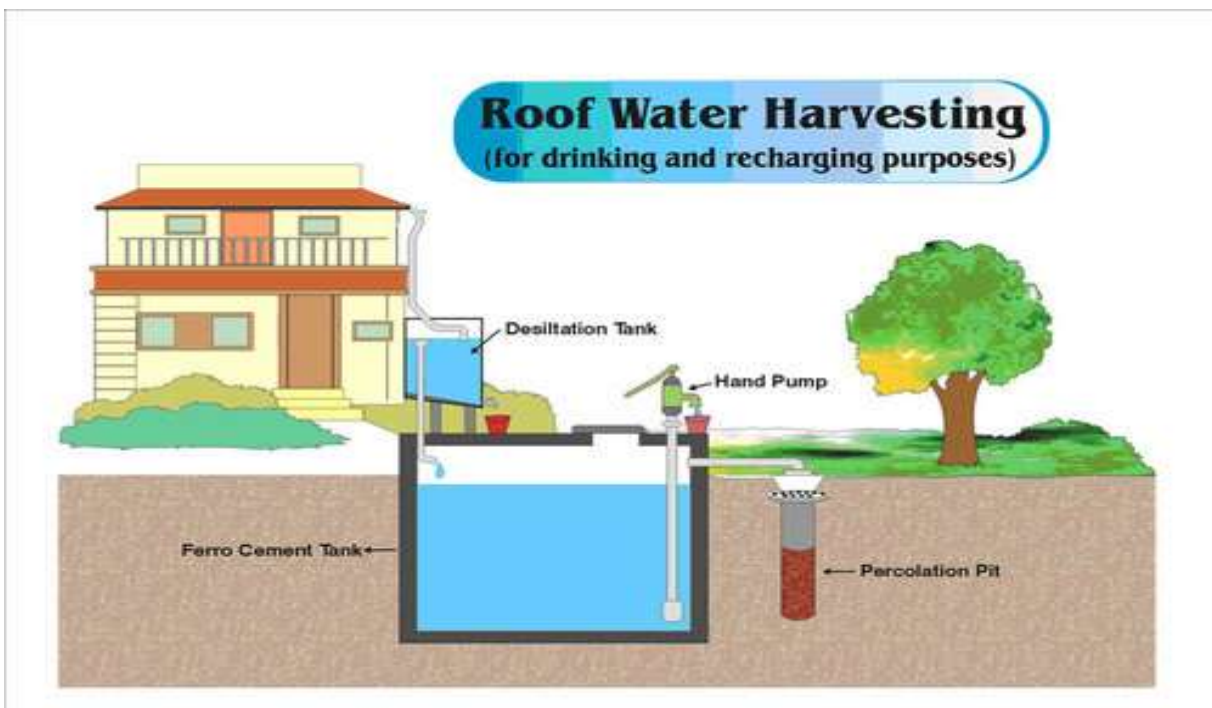


Fig.-3.2 Rainwater Harvesting Potential of the College