



**Environment Audit Report
Chandrakanti Ramawati Devi Arya
Mahila P.G. College, Gorakhpur U.P
Year-2021-22**



**ENVIRONMENT AUDIT REPORT
CONSULTATION REPORT**



**Chandrakanti Ramawati Devi Arya
Mahila PG College,
Diwan Bazar,
Gorakhpur, Uttar Pradesh 273001**

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

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(2021-22)



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ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore (M.P) takes this opportunity to appreciate & thank the management of **Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur** 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.



Rajesh Kumar Singadiya

(Director)

M.Tech (Energy Management), PhD (Research Scholar)
Accredited Energy Auditor [AEA-0284]
Certified Energy Auditor [CEA-7271]
(BEE, Ministry of Power, Govt. of India)
Empanelled Energy Auditor with MPUVN, Bhopal M.P.
Lead Auditor ISO50001:2011 [EnMS) from FICCI, Delhi
Certified Water Auditor (NPC, Govt of India)
Chartered Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]



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BUREAU OF ENERGY EFFICIENCY

Examination Registration No.: **EA-7271**

Accreditation Registration No.: **AEA-284**



Certificate of Accreditation

This is to certify that Mr./Ms. **Shri. Rajesh Kumar Singadiya** having its trade/registered office at has been given accreditation as accredited energy auditor. The certificate shall be effective from **9th** day of **May, 2018**

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

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

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

Your name has been entered at AEA No. **284** in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this **5th** day of **October, 2018**


Secretary,
Bureau of Energy Efficiency
New Delhi



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Green Monitoring Committee.

Estb. Year 1990

Chandrakanti Ramawati Devi Arya Mahila P.G. College
Gorakhpur, U.P.
NAAC ACCREDITED
Website-www.crdpccollege.edu.in
Mob : 7275618230

(Affiliated to D.D.U. Gorakhpur University, Gkp. U.P.)


Ref. 2284/K.R.D/2022 Date 07/07/2022

**Energy, Water, Green & Environmental Audit
Committee**

Energy, Water, Green & Environmental Audit Committee will consist of the following faculty members.

S.No.	Name	Designation	Department
01	Mr. Anant Kumar Pathak	Assistant Professor	B.Ed.
02	Dr. Rekha Srivastava	Assistant Professor	M.Ed.
03	Dr. Aparna Mishra	Assistant Professor	B.Ed.
04	Dr. Virendra Kumar Gupta	Assistant Professor	M.Ed.
05	Dr. Sarika Jaiswal	Assistant Professor	Home Science
06	Miss Ankita Upadhyay	Assistant Professor	Commerce
07	Miss Priya Kumari	Assistant Professor	Sociology
08	Dr. Rekha Rani Sharma	Assistant Professor	Fine Art
09	Mr. Narendra Singh Rawat	Office Superintendent	Administration Office

Time duration of this committee is 03 years up to June 2025, after which the committee will be reconstituted.


Principal

प्रधान्या
चन्द्रकान्ति रामावती देवी आर्य महिला महाविद्यालय
गोरखपुर, उत्तर प्रदेश



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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 & Electrical Expert]
- ✚ **Mr. Sachin Kumawat** [Sr. Project Engineer]
- ✚ **Mr. Charchit Pathak** [Ass. Project Engineer]
- ✚ **Mr. Mohit Malviya** [Fire safety Engineer]
- ✚ **Mr. Aakash Kumawat** [Site Engineer]
- ✚ **Mr. Ajay Nahra,** [Sr. Accountant & admin]



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 conserve water and increase the productivity of the college.

SUSTAINABLE INITIATIVE TAKEN BY COLLEGE: -

✚ WATER SPRINKLER SYSTEM

College has installed Water sprinkler system for Lawn area in college building. IT is reduced water consumption in the college campus. **It's Appreciable**

✚ WATER TANK OVERFLOW SENSOR :-

College has installed water tank overflow buzzer sensor. It is indicate the tank filling **Its Appreciable**

✚ RAIN WATER HARVESTING SYSTEM

College has installed Rain water harvesting system on college building. It will be increased ground water level. **It's Appreciable**

ENVIRONMENT AUDIT RECOMMENDATION

WATER MONITORING SYSTEM:

- ✚ Installation of “**Cloud based (IoT based) ground water extraction monitoring system**” for bore well to quantify fresh water consumption per day in the college.
- ✚ Install water flow meters (Mechanical or Electronics) in distribution network, (At outlet of supply pump of open well and underground RCC tank) it will help to determine water consumption of college main building, and hostels building,

WASTE WATER TREATMENT PLANT (STP PLANT)

- ✚ There is requirement to install Sewerage Treatment Plant (STP) waste water generated from daily activity from college department. All waste water generated from drinking, washing, etc. activity is collected in separate tank and it should be treated in proposed STP plant



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DRIP WATER IRRIGATION SYSTEM FOR GARDENING.

- ✚ Use drip water irrigation system for gardening.

USE EFFICIENT WATER TAPS -

- ✚ Water saving taps either reduce water flow or automatically switch off to help save water. So, it is highly recommended to install efficient water taps in university campus to reduce water consumption.

USE EFFICIENT URINAL TAPS: -

- ✚ Replacing these inefficient fixtures with water sense labelled flushing urinal can save between 0.5 to 04 liters per flush without sacrificing performance. Installing water saving flushing urinal will not only reduce water use in facilities but also save money on water bills.



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**CHAPTER-1
INTRODUCTION**

1.1 About College

Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur in the holy land of Guru Gorakhnath, located in diwan bajar in Gorakhpur city was, established by Smt. Chandrakanti Devi Arya Mahila Sansthan on the day of Kartik Shukla Navami in 1990. The aim of this institution is to promote conserve and encourage the Arya culture, science and literature language, civilization while working for the multi faceted development of the students along with the educational, social and economical revival of women in which the organization is constantly engaged. On graduation level B.A., B.Sc. (Home Science), and B.Com. and on Post-Graduation level Home Science, Visual Art, Education and Political Science under M.A. are being run by this college. B.Ed. and M.Ed. program are also being run for teacher-training by the faculty of Education. A study center has also been approved by the Uttar Pradesh Rajarshi Tandon University Prayagraj which is to be operated from session 2019-20. Since the beginning, this college is continuously working for the all round development of women- students. Co-curricular activities and cultural programs are run in regular form for the spiritual and intellectual development of women-students. The college students have so far received the highest marks in the university examination and have received gold medal at the university level. Various students have been selected for the National Camp and Pre RD Parade by the units of NCC and NSS, run in the college which is a milestone in fulfilling the purpose of the establishment of this college. The college is fully active for the promotion of Arya culture and the goal of women education and multifaceted development which was set at the time of the establishment of this college.



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MISSION :-

- ❖ To provide women a wider access towards education of excellence, Excellence of Education, knowledge, Skill, through our wider access of Exposure. Empowerment of Human Values and Indian Culture by Self Responsibility. Enhancing Potential through the way of Curricular Actions.

VISION :-

- ❖ To Promote the Efficiency of Society by Women Education Creation of Security and Ability on Student. Provision of Positive Energy and Self dependency for the Progress of the Nation



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1.2 About Campus: - Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur total campus area is 7159.85 Sq.m.

Table 1.1 Details are total build up area given in the table:-

College campus Built-up area of Buildings	
Floor	Proposed
Ground floor	918.9708
First floor	918.9736
Second floor	918.9717
Third floor	918.9717
Total Built-up Area	3675.8878

Satellite Image from Google map



Figure 1.1: - Satellite Image of College from Google map

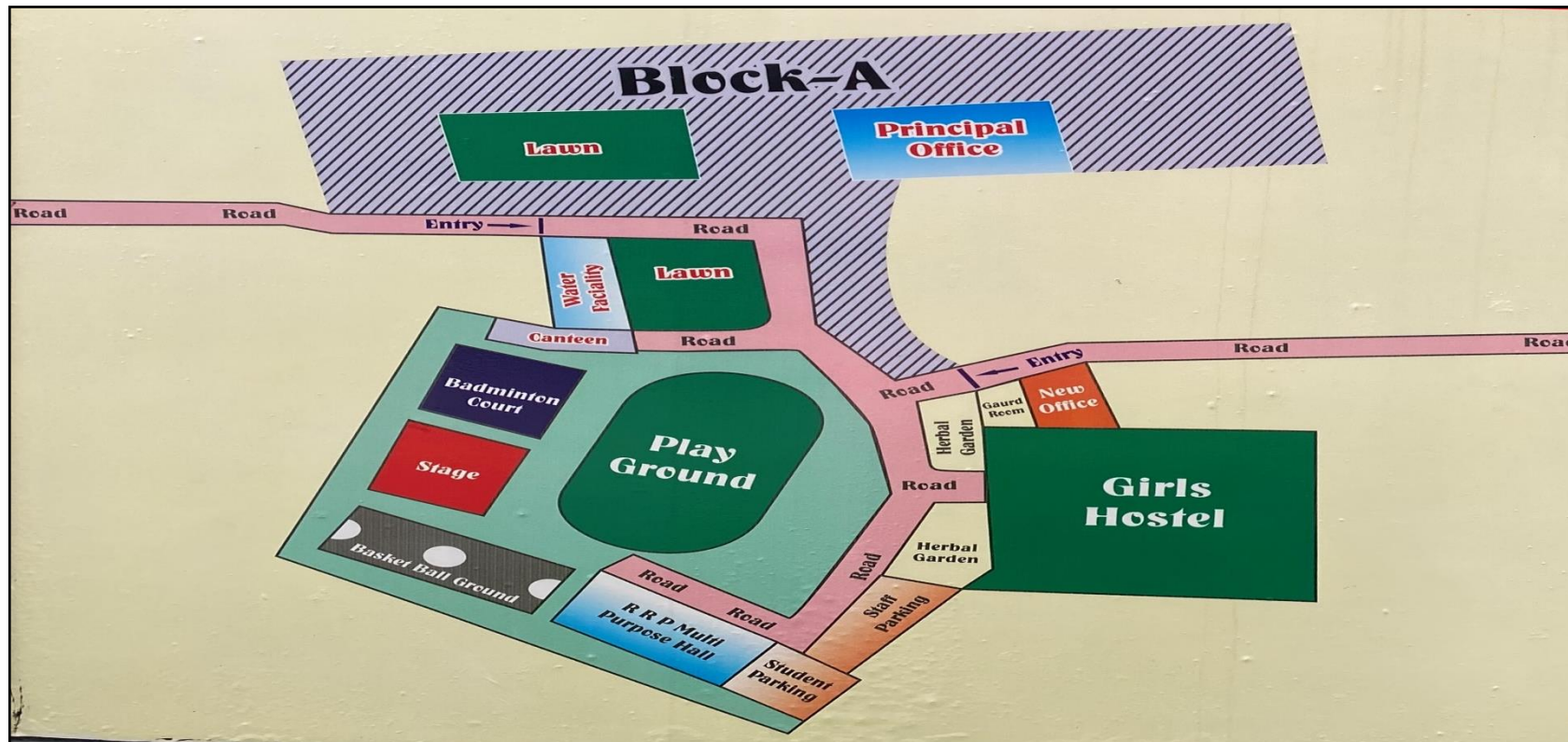


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1.3 LAYOUT OF VARIOUS BUILDINGS

Layout map of College





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1.4 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. Environment 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.

1.5 Objectives of Environment audit

The general objective of environment audit is to conduct water audit and preparation of baseline report on water conservation measures to mitigate consumption, improve quality and sustainable practices.

The specific objectives are:

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

1.6 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.



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1.7 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

- ✚ Analyse 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 Environment 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 & analysed 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



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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 Borewell for the college. The freshwater is mainly used for drinking, housekeeping, gardening, domestic activity and new construction project. Details of the pumps are given in table.

Table:2.1 Details of Fresh water sources.

Sr. No.	Fresh Water Sources	Location	Motor Power (HP)	Remark
1	Borewell-01	Block-A	1.5	For Fresh water Supply
2	Borewell-02	Hostel	1.5	For Fresh water Supply



Power Measurement of Bore wells

Sr. No	Borewell No	Voltage (V)	Current (Amp)	Power Factor	KW	Remark
1	Borewell-01	423	5.9	0.854	3.7	Block-A
2	Borewell-02	430	4	0.876	2.6	Hostel

Observation:-

College has 02 no's bore well system for fresh water supply. But there are requirement a water meter in bore well to quantify per day water consumption



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2.2 Water Storage Capacity in college Campus: -

There is different type of tank available in college campus for water storage like Underground RCC tank, Overhead RCC tank and PVC tanks etc.

Table 2.3: - Water Storage tank in university campus

Sr. No	Location	Type of Tank	Unit Capacity (Litter)	Quantity	Total Capacity (Litter)	Total Capacity (Kilo Litter)
1	Main building,	Under ground (RCC tank)	10,000	1	10000	10
2	Main building,	Overhead tank (Sintex)	1000	2	2000	2
3	Hostel Building	Overhead tank (RCC)	3000	1	3000	3

2.3 Photographs of water storage tanks.



Fig: - 2.2 Water storage tank and capacity of college campus



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2.4 Water use areas in College Campus: -

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

Table: 2.4 Details of washroom and Uses Taps in various areas

Sr. No.	Location of Taps	Fresh water Taps	R.O. + Water Cooler Tape
1.	Garden Area	13	2
2.	Home Science Staff washroom	2	0
3.	Home Science Lab	5	1
4.	Ladies staff washroom (Ground floor)	5	0
5.	B.Ed. Staff washroom (013)	2	1
6.	I.Q.A.C. Office (014)	3	0
7.	Principal office Washroom	2	0
8.	Health Care Centre	2	0
9.	Gents Washroom (1 st Floor)	3	0
10.	Science Lab (Room No.-112)	2	0
11.	Girls Washroom (1 st Floor)	13	1
12.	Second Floor (Stair Case)	1	2
13.	Girls Washroom (2 nd Floor)	13	0
14.	Ladies Staffroom (Library Department 2 nd Floor)	3	0
15.	Washroom (office Area)	4	0
16.	R.R. Memorial Hall (001) (Ground Floor)	1	3
17.	R.R. Memorial Hall (001) 2 Washroom	4	0
18.	R.R. Memorial Hall (001) Washroom (Backside)	4	0
19.	M.Ed. Staffroom Washroom	7	0
20.	Hostel Gust Room	2	0
21.	Teaching staffroom (Ground floor)	2	0
22.	Hostel Washroom (Ground floor)	13	2
23.	Hostel Mess	3	0
24.	Teaching Staff (Room No.-23)	2	0
25.	Teaching Staff (Room No.-24)	2	0
26.	Washroom (1 st Floor)	11	1
	Total No. of Water Taps-	124	13



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Photographs of Water Cooler and taps



Observation: -

College has installed 03 no's RO system. And all RO rejected water in drain into drain line .Estimated rejected waste water from 3 no's RO plants is 1m³/Day. It is highly recommended to collect all rejected water in separate tank and utilize for other activity. It is reduce fresh water consumption of the college



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2.5 Fresh Water uses for Gardening:

College has installed water sprinkler system for lawn area in front of main college building.

It's appreciable.



Figure:-Water Sprinkler system in college campus

Observation: - There is good potential for water saving by adopt “Automatic Watering 360 adjustable misting nozzle irrigation Dripper’s system” for other area of the college.

2.6 Waste Water Generation sources: -

At present waste water generated from various departments canteen, Mess, hostels like washrooms, hand wash and washing and RO rejected water treated in Proposed STP plants. After that treated Water College to be reused in gardening.

Table: - 2.6 Waste water generation area in university campus

Sr. No	Key Water Usage Section	Type of water used (raw, treated etc.)	Water Consuming activities
1	Main Building	Fresh Water	Drinking and other uses
2	Hostels	Fresh Water	Drinking, Food cooking, other Uses
3	Institution Buildings	Fresh Water	Drinking and other uses
4	Canteens /Mess	Fresh Water	Food cooking, drinking
6	Guest House	Fresh Water	Drinking and other uses

Some photographs of waste water generation sources are given



Figure: -2.5 Waste Water Generation sources




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2.7 Water Quality Report:-

College has frequently done water quality test. **It's Appreciable**


Mineral Water For Healthy Living ...

Ref. No. Date... 11 Oct-2022

Respected Sir/Madam
C. R. D. M. P. G. College
Diwan Bazar
Gorakhpur

Subject- T.D.S. of Water Samples.

Sir/Madam .

Our service technician has visited your College and check the T.D.S. of Water.

1) → The ground Water TDS found to be → 700 Approx
2) → Hostel ground floor R.O. Water TDS found to be → 90 Approx
3) → Hostel 1st floor R.O. Water TDS found to be → 90 Approx
4) → College ground floor R.O. Water TDS found to be → 100 Approx
5) → College 2nd floor R.O. Water TDS found to be → 100 Approx

We look forward to provide the fresh and pure water, for any kind of assistance kindly revert us back.

Thank you
=

With Regards
Ratan Aqua Enterprises
111, Gyan Bhawan, Gorakhnath,
GORAKHPUR
Mob - 9919800711, 9935875389

H.No.- 111, Gyan Bhawan, (Near Water Tank)
Gorakhnath Road, Gorakhpur

Mob.: 9935875389
9919800711



CHAPTER- 3 RAIN WATER HARVESTING SYSTEM

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 it 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.

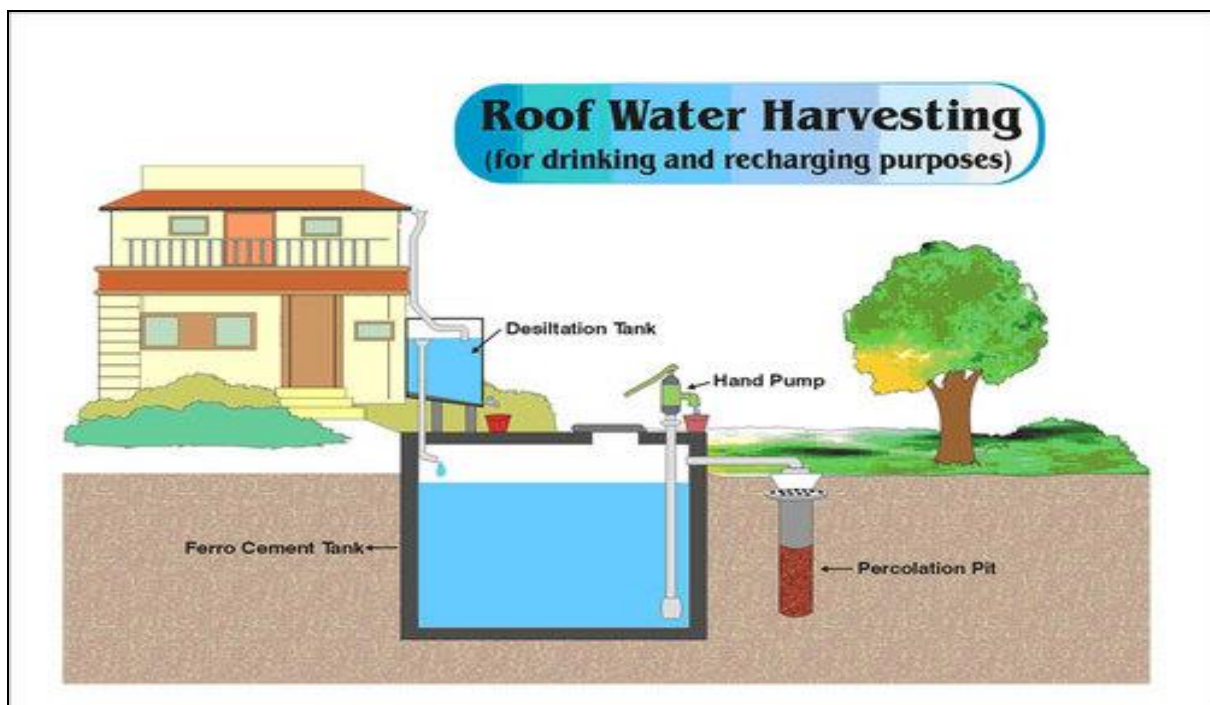


Figure: - 3.1 Components of a rooftop rainwater harvesting system

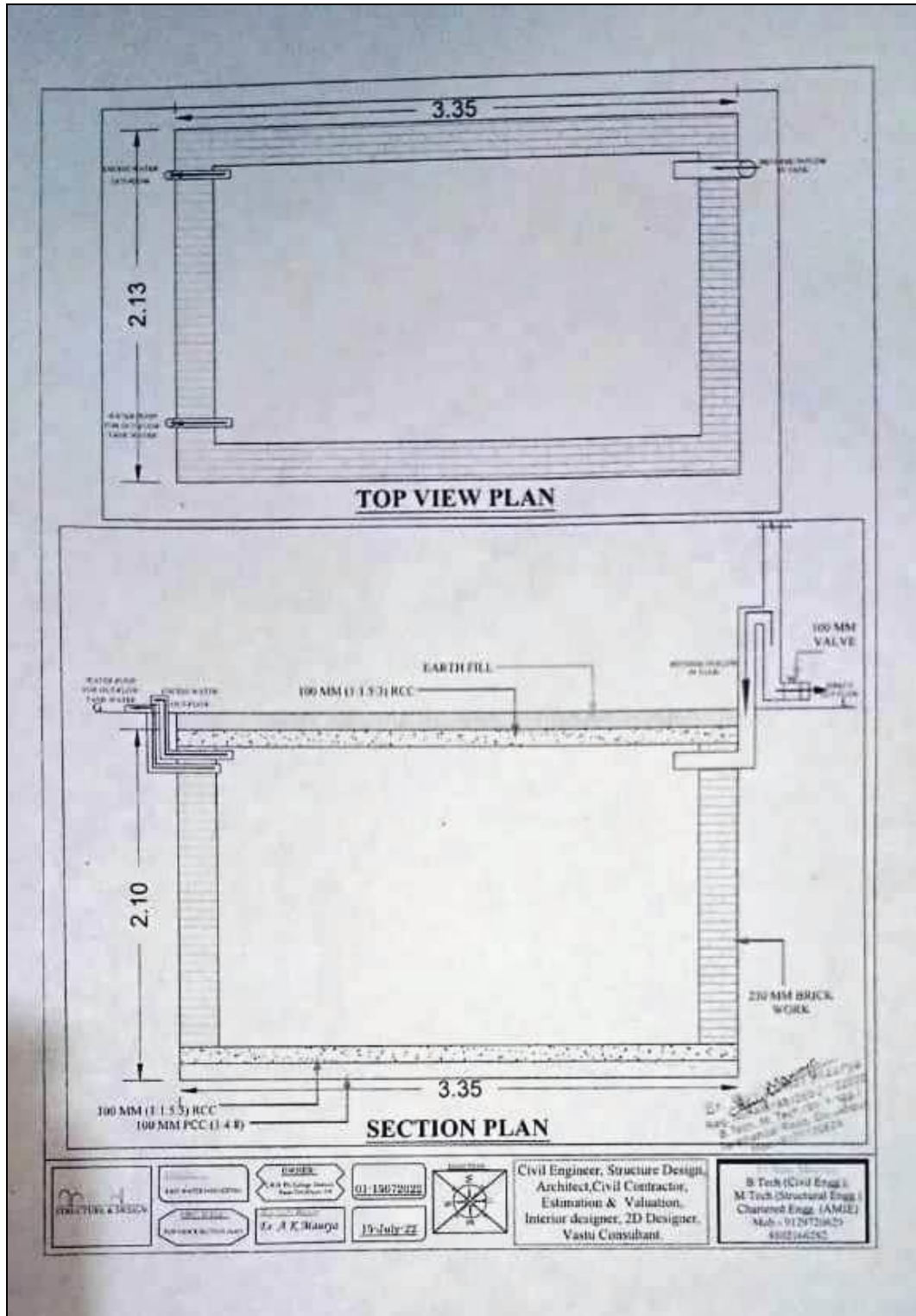


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3.2 Rainwater harvesting system in college campus:-

College has a rain water harvesting system for main building. **It's Appreciable,**
RWH design layout is given below.





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3.3 Rainwater Harvesting Photos





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**END OF THE REPORT
THANKS**