WATER AUDIT REPORT

BCS GOVT. PG COLLEGE DHAMTARI, CHHATTISGARH

2022-23

Submitted
To
IQAC
&
Principal
BCS GOVT. PG COLLEGE DHAMTARI, CHHATTISGARH
By
WATER AUDIT COMMITTEE

PRINCIPAL
Dr. Shreedevi Choubey

WATER AUDIT COMMITTEE

1. **Dr. Rakesh Kumar Sahu**
2. **Ms. Aakanksha Markam**

CERTIFICATE

This is to certify that BCS Govt. PG College, Dhamtari has conducted a detailed water audit of their campus and has submitted necessary data and credentials scrutiny. The activities and measures carried out by the college have been verified based on the report submitted and found satisfactory. The efforts taken by the institute and staff towards water conservation and awareness are appreciated and commendable.

30.01.23.
ASSISTANT ENGINEER
Public Health Engg. Sub Div.
DHAMTARI (C.G.)

Place: Dhamtari

Date: 30.01.23

Signature
Distt. Water Testing Laboratory
Public Health Engg. Dept.
Div. Dhamtari (C.G.)

WATER AUDIT REPORT

BCS GOVT. PG COLLEGE DHAMTARI, CHHATTISGARH

YEAR 2022-23

EXECUTIVE SUMMARY

The executive summary of the water 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.

AREAS FOR IMPROVEMENT AND RECOMMENDATION FRESH WATER MONITORING SYSTEM:

Collect RO rejected water from all RO drinking points and use it to utilize for toilet and washroom activity in the college.

Installation of "Cloud based ground water extraction monitoring system" for well to quantify fresh water consumption per day in the college.

Install water flow meters (Mechanical or Electronics) in distribution network, like college building, drinking and Gardening for quantity per day water consumption and waste water generation in the college campus.

DIP WATER IRRIGATION SYSTEM FOR GARDENING.

Use dip water irrigation system for gardening. Waste water can be reuse for gardening purpose. It will reduce the fresh water consumption of college.

WASTE WATER TREATMENT PLANT

Waste water generated from various departments and canteen should be collect in separate waste water collection tank. It should be treated in STP and ETP plants after that treated water reuse activity like gardening, toilet and wash room etc.

OTHER SUGGESTIONS

Some of the very important suggestions are:

- Prepare the water management policy, and work towards creating and implementing a strategy to reduce the water consumption.
- Establish institutional ecology policy and set an example of environmental responsibility and practices of resource conservation, recycling, and waste management.
- Collaborate for interdisciplinary approaches to develop curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- Promote 3R education policy (reduces, reuse, and recycle) in campus.
- Ensure participation of students and teachers in local water issues.

CHAPTER-1

INTRODUCTION

1.1 About College

Vision: The vision of the college is to make the students ideal citizen in the global challenging situations through value added and quality education. Dhamtari District is the gateway to tribal dominated Bastar and mainly agricultural district. Among the students in the college number of students of ST and Other backward class happens to be the largest. Many of the students belong to labour class family and farmer family as well. That's why the motto of the college is to provide quality education mobilizing the available resources so that the students are able to get employment.

Mission:

- The mission of the college is to provide value based education.
- To ensure exposure to the latest developments in various disciplines.
- To enhance employability skills of the students of the region.
- To generate a culture of hands on learning and research.
- To facilitate research in traditional and emerging areas.
- To strive to cater to the tribal and less privileged sections of society.
- To develop healthy & intimate relationship between the students & teacher.
- To develop Gender Equality & sexual Harassment free Environment in the college.

1.2 About College Campus:

Campus Area	27.7 acres
Constructed building	01. Main Building, 02. Library Building, 03. I.T. Building, 04. Science Building (New Building), 05. Canteen, 06. Girls Hostel, 07. Sports Department, 08. Cricket Stadium
Class Rooms	31
Smart Class Room	02
Laboratories	07

Office	01
Department	11
Staff Room	01
Research Centre	02 (Hindi, Economics)
NCC Room	01
NSS Room	01
Rest Rooms (Toilet)	17+01 (For Divyang)
Girls Common Room	01
Store Room	02
Primary Health Centre	01
Garden	02
Botanical Garden	01
Open Play Ground	01
Two wheeler parking	01
Staff Vehicle Parking	01

1.3 Water Audit Team (Internal)

- **Dr. Rakesh Kumar Sahu,** Assistant Professor (Chemistry)
- **Ms. Aakanksha Markam,** Assistant Professor (Chemistry)

1.4 About Water Auditing

Water 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.

1.5 Objectives of Water audit

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

The specific objectives are:

- To monitor the water consumption and water conservation practices.

- To evaluate the quantity of water, usage, quantity of waste water generation and their reduction within the college.

1.6 Target Areas of Water audit

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

1.7 Methodology followed for conducting water audit

Step 1: Walk through survey

- Understanding of existing water sourcing, storage and distribution facility.
- Assessing the water demand and water consumption areas/processes.

Step 2: Secondary Data Collection

- Analyze significant water use and wastewater generation
- Field measurements for estimating current water use
- Metered & unmetered supplies.
- Understanding of "base" flow and usage trend at site
- Wastewater treatment scheme & costs etc.

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

- Wastewater flow measurement and sampling plan

Step 4: Conduction of Detailed Water Audit & Measurements

- Conduction of field measurements to quantify water/wastewater streams
- 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 Water 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 Borewell. The freshwater is mainly used for drinking, housekeeping, gardening, domestic activity and new construction project. Details of the well and pumps are given in table 2.1

Table: 2.1 Details of Fresh water sources and Supply pumps

S. No.	Water Source	Location	Quantity
1	Borewell - 01	Back Site of Home Science Dept.	01
2	Borewell - 02	Near Library	01
3	Borewell - 03	Near Canteen	01
4	Borewell - 04	Near Home Science Dept.	01(Not Working)

2.2. Water Accounting & Metering system:

To measure the consumption of water in the college, water flow meters are required at the water source, which were not observed.

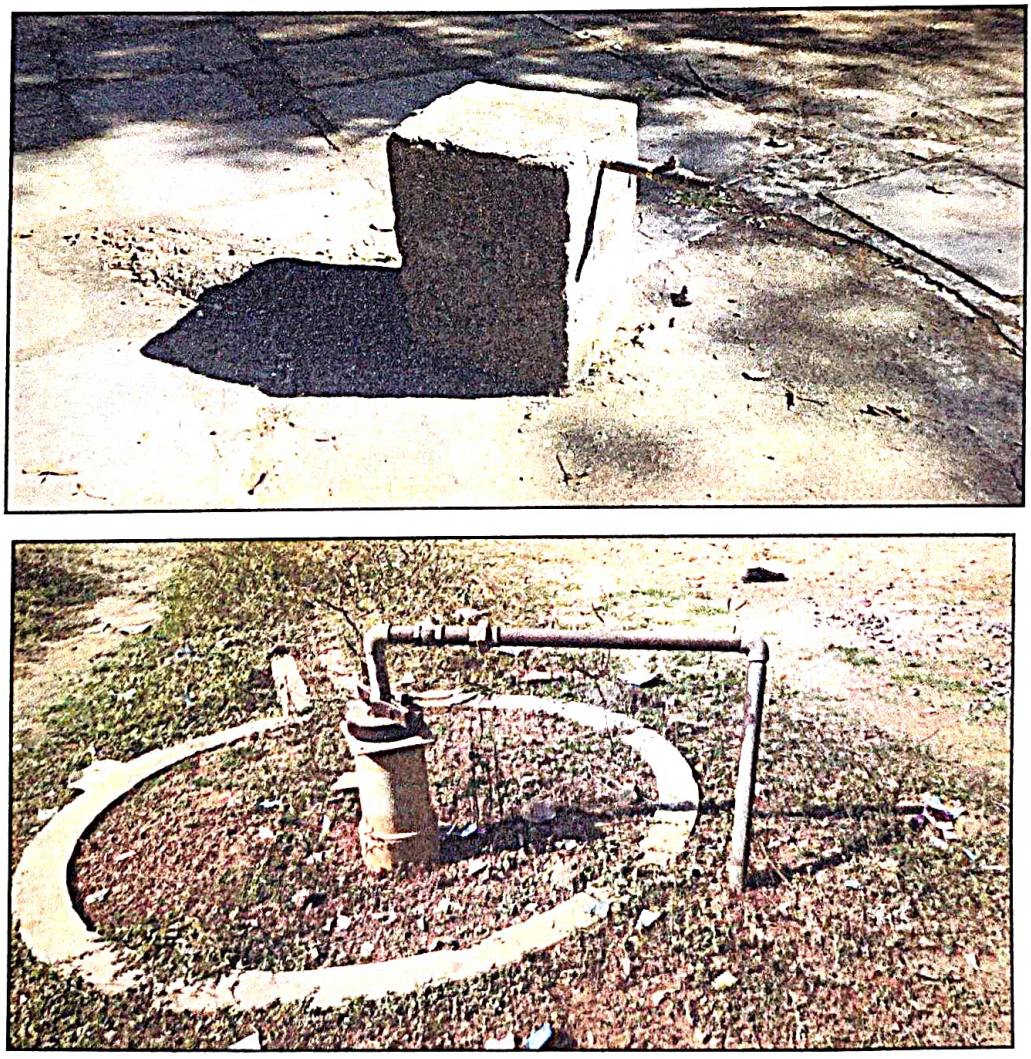


Figure: 2.1 fresh water supply from open well for college campus

2.3. Water Storage Capacity in College Campus:

Table 2.2 Water Storage Capacity in college campus

S. No.	Departments	Capacity	Units	Tank Type
1	Library Building	1000 L	02	Overhead tank
2	IT Department	1000 L	02	Overhead tank
3	New Building	1000 L	03	Overhead tank
4	Main Building	1000 L	01	Overhead tank
5	Main Building	3000 L	01	Concrete water tank
6	Main Building (Near NCC Dept.)	1000 L	02	Overhead tank
7	Main Building (Home Science Dept.)	500 L	01	Overhead tank
8	Girls Hostel	1000 L	01	Overhead tank

2.4. Water use areas and taps in College Campus:

Water is preliminary used for drinking, washing, Toilet, gardening and Domestic activity. Audit team visited various departments and buildings to determine appliances.

The details of washroom, toilet and taps are given in table 2.3

S. No.	Location of taps	Fresh Water taps	RO Water Tap
MB ground floor			
1	Hindi Department	01	0
2	Economics Department	01	0
3	Home Science Department	01	0
4	Commers Department	01	0
5	Geography Department	01	0
6	Office	01	0
7	Staff Toilet	04	0
8	Boys Toilet	03	0
9	Indore ground	07	0
10	First aid room	02	0
11	PWD Toilet	02	0
12	Corridor (Ground floor)	-	01
MB 1st floor			
13	Sociology Department	01	0
14	Botany Department	07	0

15	Zoology Department	07	0
16	Political Science Department	01	0
17	Physics Department	02	0
18	Staff room	03	0
19	Girls washroom	05	0
20	Girls Common room	01	0
21	Corridor (1st floor)	-	01
MB 2nd floor			
20	English Department	01	0
21	Boys Toilet	02	0
22	Corridor (2nd floor)	-	01
Library			
23	Library (Outside)	02	01
24	Boys Toilet	02	0
25	Girls Toilet	02	0
IT Building			01
26	Staff Room	01	
27	Boys Toilet	02	
28	Girls Toilet	03	
New Building			01
29	UG Chemistry lab	18	0
30	PG Chemistry lab	03	0
31	Girls Washroom	08	0
32	Boys Washroom – I	07	0
33	Boys Washroom – I	07	0
Girls Hostel			
34	Girls Hostel (Total)	25	0
35	Canteen	03	0
	Total No of water Taps	137	06

2.5. Fresh Water uses for Gardening:

The one of major contribution from fresh water consumption is watering for plants and garden in college campus.

2.6. Waste Water Generation sources:

At present waste water generated from various departments canteen, Mess, and like washrooms, hand wash and washing and RO rejected etc is discharge into drain line.

Some photographs of waste water generation sources are given in Figure. 2.2

Figure: 2.2 Waste Water Generation sources

2.7. Rainwater Harvesting System of the College

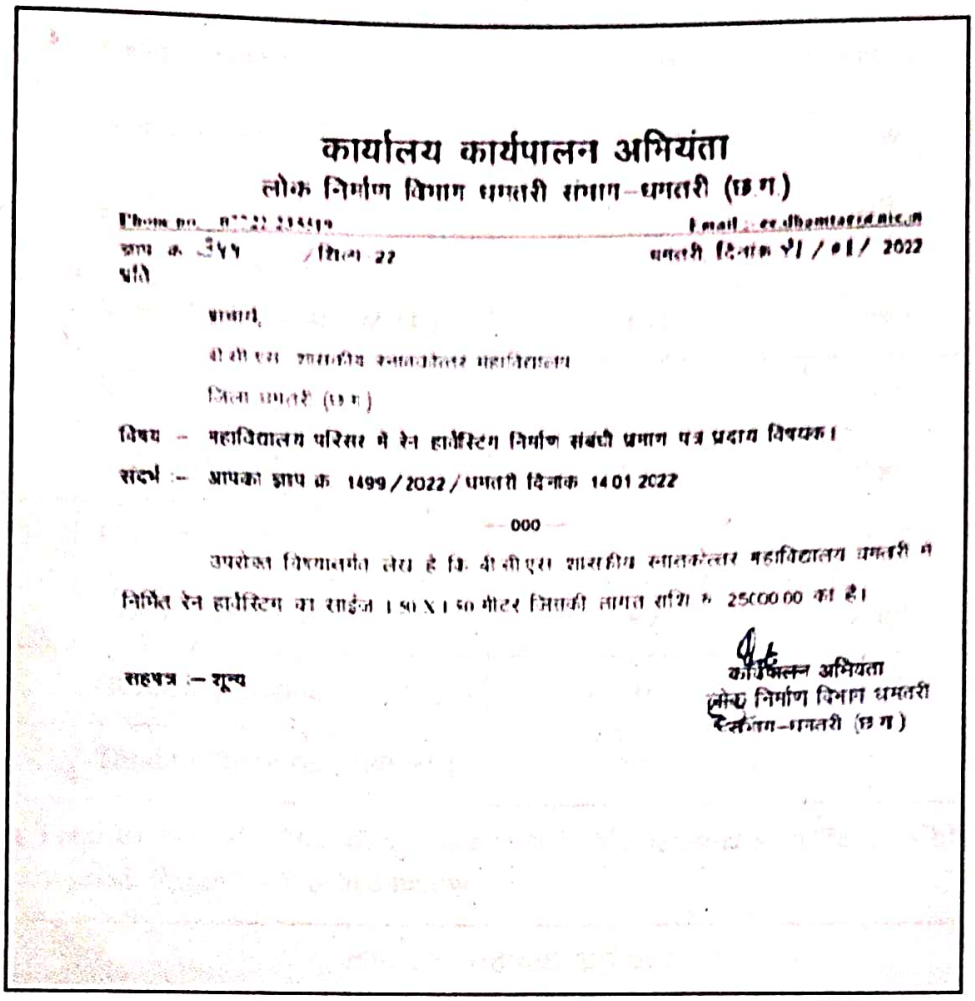
The rainwater harvesting is a technique to capture the rainwater when it precipitates, store that charge the groundwater.

There are typically four components in a rainwater harvesting system:

- Roof Catchment
- Collection
- Transport
- Infiltration

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

Figure: 2.7 Rain water harvesting system in college campus



कार्यालय कार्यपालन अभियंता

लोक निर्माण विभाग धमतरी संभाग–धमतरी (छ.ग.)

Phone no. 07722-235519 E-mail : ee.dhamtari@cgstate.gov.in

ज्ञाप क. 345 /विभा. 22 धमतरी दिनांक 21 / 01 / 2022

प्रति

शासकीय,

बी.बी.एस. शासकीय स्नातकोत्तर महाविद्यालय

जिला धमतरी (छ.ग.)

विषय – महाविद्यालय परिसर में रेन हार्वेस्टिंग निर्माण संबंधी प्रमाण पत्र प्रदाय विषयक।

संदर्भ – आपका ज्ञाप क. 1499/2022/धमतरी दिनांक 14.01.2022

000

उपरोक्त विषयान्तर्गत लेख है कि बी.बी.एस. शासकीय स्नातकोत्तर महाविद्यालय धमतरी में निर्मित रेन हार्वेस्टिंग का साईज 1.50 X 1.50 मीटर जिसकी लागत राशि रु. 25000.00 का है।

सहपत्र – शून्य

कार्यपालन अभियंता
लोक निर्माण विभाग धमतरी
धमतरी–धमतरी (छ.ग.)

2.8. Water test parameter in the college water

Table 2.4 Water test parameter in college water

S. No.	Parameter	Test Sample -01	Unit
1	Source of sample	Deep Bore-well water supply	-
2	Sample Quantity	1 Litter	-
3	Analysis date	17.01.2023	-
4	Colour	4	Hazen
5	Odour	Agreeable	-
6	Taste	Non Objectionable	-
	Turbidity	0.3	NTU
	Chloride (as Cl^-)	42.21	mg/L
	TDS	290	mg/L
	Total Alkalinity (as $CaCO_3$)	120.48	mg/L

7	Calcium (as Ca^{++})	41.6	mg/L
8	Magnesium (as Mg^{++})	14.58	mg/L
9	PH	6.6	pH Scale
10	Total Hardness (as $CaCO_3$)	164	mg/L
11	Iron (as Fe^{++})	-	mg/L
12	Nitrate (as NO_3^-)	NIL	mg/L
13	Fluoride (as F^-)	-	mg/L
14	Sulphate (as SO_4^{2-})	NIL	mg/L
15	Residual Chlorine	0	mg/L
16	Total Coliform (per 100 mL)	NIL	-

Observation: Total 01 No. of water sample are tested. All parameter in Permissible range and water quality are good. Report is attached below.

कार्यालय सहायक अभियंता
लोक स्वास्थ्य यांत्रिकी उपखण्ड धमतरी , जिला–धमतरी (छ0ग0)

पत्र क्रमांक 28 /प्रयो.शा./स.अ./लो स्वा.यां.उपखण्ड/2022–23 धमतरी दिनांक 17-01-2023

प्रति

प्राचार्य
बी सी एस शा स्ना महा.
जिला–धमतरी (छ0ग0)

विषय :– जल गुणवत्ता प्रतिवेदन देने बाबत्।

संदर्भ :– आपका पत्र क्रं.2600/2022 धमतरी, दिनांक 14.01.2023

---000---

उपरोक्त विषयान्तर्गत लेख है कि दिनांक 16/01/2023 को आपके द्वारा भेजे गये जल नमूनो का जल परीक्षण किया गया जिसकी जल परीक्षण प्रतिवेदन आपकी ओर सादर प्रेषित है।

सहपत्र :– 01 सेम्पल का जल परीक्षण प्रतिवेदन।

सहायक अभियंता
लोक स्वास्थ्य यांत्रिकी उपखण्ड
धमतरी (छ0ग0)

Format No [illegible]

District Water Testing Laboratory

Public Health Engineering Department, Division Dhamtari Chhattisgarh

Rudri Road Gokulpur Ward

E-Mail-ee- phe-cgw nic in Phone-07722-232422

TC-[illegible]

Test Report

Kind of Sample- Drinking Water	Report No [illegible]	[illegible]	Sample Collected By	[illegible]
Sender Name and Address :	Sender letter no.	[illegible]	Sender's Letter Date	14 01 2021
B C S Govt Postgraduate College Dhamtari	Date Of Collection	16 01 2021	Sampling plan & Procedure No	Not Done By Lab
	DL Receipt No	35	DL Receipt Date	16 01 2021
	Date Of Analysis Started	16 01 2021	Date of Analysis Completed	17 01 2021

No	DISTRICT	BLOCK	VILLAGE	Location/Source
1	Dhamtari	Dhamtari	Dhamtari	B C S Govt Postgraduate College Dhamtari

Details of parameters , their test methods, unit andspecification as per IS/APHA

No	Characteristics	Test Method IS 3025		Unit of Measurement	As Per IS 10500 2012 for Drinking Water		Results						
					Acceptable Limit	Permissible Limit	1	2	3	4	5	6	7
1	2	3	4	5	6	7	8						
1	Color	IS 3025	Part -04	Hazen	5-15	No Relaxation	4	-					
2	Odour	IS 3025	Part -05	-	Agreeble	Agreeble	Agreeble	-					
3	Taste	IS 3025	Part 48	-	Non Objectionable	Non Objectionable	Non Objectionable	-					
4	Turbidity	IS 30 25	Part-10	NTU	1 0	5 0	0 3	-					
5	Chloride as cl-	IS 30 25	Part-32	mg/L	250	1000	42 21	-					
6	TDS	IS 30 25	Part-16	mg/L	500	2000	290	-					
7	Total Alkalinity as CaCO3	IS 30 25	Part - 23	mg/L	200	600	120 48	-					
8	Calcium as Ca++	IS 30 25	Part - 40	mg/L	75	200	41 6	-	-				
9	Magnesium as mg++	IS 30 25	Part - 46	mg/L	30	100	14 58	-					
10	pH	IS 3025	Part - 11	pH Scale	6 5-8 5	No Relaxation	6 6	-					
11	Total Hardness as CaCO3	IS 30 25	Part - 21	mg/L	200	600	164	- -	-				

1 The report should not be produced partly or full without approval of singatory authority of legal purposes

2 It Is recommended that acceptable limit is to be implemented. Values in excess of those mentioned under "acceptable" render the water not suitable,but still may be tolented in the absance of an alternative source but upto the limits indicated under the "permissible limit Inthe absence of alternate source" In column 7 above which the sources will have to be rejected

3 The results refer only to tested samples and paramater tested

4 samples will be retained for a period of 10 days from date of Issue of report.

5 This lab does not hold any responsibilityfor variation In results for samples kept on hold for want of clarification

6 The Laboratory does not hold any responsibility for variation in results for samples kept on hold for want of clarification

Issued To [illegible]

Place [illegible]

DWTL PHE Deptt. Dhamtari (C.G.) Sl. No 28 Dt 17-01-[illegible]

P S Joshi
Chemist
Authorised Signatory(NABL)

Format Id - DL PHED DWT F 2

District Water Testing Laboratory

Public Health Engineering Department, Division Dhamtari Chhattisgarh

Rudri Road Gokulpur Ward

E-Mail-ce- phe-cg @ nic .in Phone-07722-232422

Test Report

Kind of Sample- Drinking Water	Report No DL PHED DWL	ULR [illegible]	Sample Collected By -	Shradevi Choube
Sender Name and Address :	Sender letter no.	[illegible]	Sender's Letter Date	14 01 2023
B.C.S.Govt Postgraduate College Dhamtari	Date Of Collection	14 01 2023	Sampling plan & Procedure No	Not Done By Lab
	DL Receipt No.	23	DL Receipt Date	14 01 2023
	Date Of Analysis Started	16 01 2023	Date of Analysis Completed	17 01 2023

No.	DISTRICT	BLOCK	VILLAGE	Location Source
1	Dhamtari	Dhamtari	Dhamtari	B.C.S Govt Postgraduate College Dhamtari

Details of parameters , their test methods, unit andspecification as per IS/APHA

No.	Characteristics	Test Method IS 3025		Unit of Measurement	As Per IS-10500:2012 for Drinking Water		Results						
					Acceptable Limit	Permissible Limit	1	2	3	4	5	6	7
1	2	3	4	5	6	7	8						
1	Iron as Fe--	IS 3025	3500-Fe-B	mg/L	0.3	1.0	-	-	-	-	-		
2	Nitrate as NO3--	APHA 23rd ed.	4500-NO3 - B	mg/L	45	45	Nil	-	-	-	-		
3	Fluoride as F	APHA 23rd ed	4500-F-C	mg/L	1.0	1.5	-	-	-	-	-		
4	Sulphate as SO_4^{2-}	IS 3025	Part - 24	mg/l	200	400	Nil	-	-	-	-		
5	Residual Chlorine	APHA 23rd ed	4500-CL	mg/L	0.2	1	0	-	-	-	-		
6	Total Coliform per 100 ml	24 Hrs			Nil	Nil	Nil	-	-	-	-		
		48 Hrs			Nil	Nil		-	-	-	-		

1 The report should not be produced partly or full without approval of singnitory authority of legal purposes.

2 It is recommended that acceptable limit is to be implemented. Values in excess of those mentioned under "acceptable" render the water not suitable,but still may be tolerated in the absance of an alternative source but upto the limits indicated under the "permissible limit Inthe absence of alternate source" in column 7 above which the sources will have to be rejected

3 The results refer only to tested samples and paramater tested.

4 samples will be stored for a period of 10 days from date of Issue of report

5 The laboratory does not hold any responsibilityfor variation in results for samples kept on hold for want of clarification

6 The laboratory does not hold any responsibility for variation in results for samples kept on hold for want of clarification

Issue Date: [illegible]

Page No [illegible]

S.N. 28

Dt 17-01-2023

Dhamtari (C.G.)

F.S.Joshi

Chemist

Authorised Signatory(NABL)

Signature of Water Audit Committee

Dr. Rakesh Kumar Sahu, Assistant Professor (Chemistry)..

Ms. Aakanksha Markam, Assistant Professor (Chemistry)..