INTERNAL WATER AUDIT REPORT

CONDUCTED BY
OFFICE OF INFRASTRUCTURE DEVELOPMENT
CHITKARA UNIVERSITY, PUNJAB

Water Audit Committee

Dr. Sudarshan Pal Singh- Vice President
Mr. Sanjeev Bhardwaj- Project Manager
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Mr. Umesh Salgotra- Asst Project Manager
Mr. Vinay Rishiraj, Asst Project Manager

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EXECUTIVE SUMMARY

The rapid environmental degradation at local, regional and global level is leading us to global “Environmental poverty”. Stabilization of human population, adoption of environmentally sound and sustainable technologies, reforestation and ecological restoration are crucial elements in creating an equitable and sustainable future for all humans in harmony with nature and natural resources.

Thus, academic leaders must initiate and support mobilization of internal and external resources and knowledge so that their institutions respond to environmental challenges. As an Institution of higher learning and research, Chitkara University is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends of environment degradation.

We deeply subscribe to the fact that humans should be stewards of Mother Nature and that we all have a profound responsibility to protect the earth’s resources in perpetuity. Being a premier institution of higher learning, Chitkara University is aware of its responsibilities towards environmental issues and therefore has resolved to play a major role in the education, research, policy formation and information exchange necessary for a sustained environmental campaign.

This report is based on the approaches and interventions done on part of the University to address the Water Preservation concerns of the Chitkara University campus. The current environmental audit represents the first stage in our efforts to build environmental sustainability on the campus.

The audit was conducted by Infrastructure Department of Chitkara University. It is indeed the reflection of Chitkara University’s endeavour to exercise leadership in promoting sustainability and an institutional obligation to instill among all students and each of us, and those in the broader community a sense of environmental stewardship.

This commitment of Chitkara University has led to actions whose reflection is visible remarkably on ground. This Internal Water Audit conducted is not only significant for the institution, but also for the other institutions to emulate and adopt as a model and therefore contribute regionally as well as nationally in this endeavor of sustainable environment for all.

INTRODUCTION

Introduction to water audit

A water audit is an on-site survey and assessment of water-using hardware, fixtures, equipment, landscaping, and management practices to determine the efficiency of water use and to develop recommendations for improving water-use efficiency (Newcomb P. J 20084). In simple words, a water audit is a systematic review of a site that identifies the quantities and characteristics of all the water uses. The site may vary from a public water utility, facility (institutional or commercial properties like malls, office, schools etc.) or a household. The overall objective of conducting a water audit is to identify opportunities to make system or building water use more efficient. Since water uses vary greatly from one type of business or institution to another and from site to site, therefore water audit is crucial to determine quantity, nature and quality of water consumption. Water audit for a water utility refers to tracking, assessing and validating all components of flow from the site of withdrawal or treatment through the water distribution system and into the consumer's properties. On the other hand, water audit of an office building would review direction and quantity of water used for domestic, cooling/heating, sanitary and landscaping processes. Whereas, a domestic water use audit examines the major areas in which a facility uses water, including human consumption, personal hygiene & sanitation, washing, cleaning, laundry, gardening etc. Thus, even though the nature and scale of water use varies and differs according to the sites and systems, the underline principle is common, that is, water use audit determines where the water ends up and in what amount. The audit exercise provides decision making tools to the concerned people in the utility, institutions or households by identifying inefficient uses, problem areas wherein water conservation and remedial measures can be undertaken. Water auditing is an ongoing process and rarely stays consistent in a site or system over time. Therefore in order to gauge progress from adopted water conservation and cutbacks, water audit should be performed on a regular basis. In addition it provides convincing overview of the water use trends, effectiveness of conservation measures and potential cost and water savings.

IMPORTANCE OF WATER AUDIT

A portion of the total water use is leakage, some of it is due to inaccurate metering, some of it may be unauthorized use, and some of it is water delivered to customers. A water audit determines where the water ends up and how much of it got there. The level of detail in the water audit will vary based on the information on system has available. All water systems lose some amount of water for a variety of reasons. There are no accurate statistics for how much water is lost. Water loss costs money, paid by the system and customers. Utilities cannot reduce their water loss to zero. Some water loss is unavoidable, and it is not worth the expense to try to eliminate every drop escaping your system. However, most of the loss that occurs in water systems can be better managed by using a water audit. Managing a water utility is similar to managing any other business. In India, the land, water resources and population are 2.4 percent, 4 percent and 16 percent respectively of those of the globe. On an average the 50 percent of rain fall is within 15 days and in less than 100 hr, and this water is used for 365 days. The present water availability of India is 1820 m3 per capita per annum reduces from 6000 m 3 per capita in 1947. In the context of prevailing scenario, the water audit becomes an inevitable activity in India and in World. Thus it is a tool to identify public money wastage due to the water loss, un- authorized connections as an advantage over the optimized use of water resources with environmental protection.

NEED FOR WATER AUDIT

A water audit is a study of the water use of an entity. It starts at the point where water enters the premises and goes up to the point where the waste water is discharged, critically examining all aspects of use. The audit establishes the quantity/volume of water being used, wastage if any, leakages existing, excess use etc., and identifies areas where consumption can be reduced. It critically examines existing treatment systems and practices and recommends changes to improve efficiency and reduce usage. Based on this detailed study and observations, an audit gives recommendations on how to reduce wastage as well as consumption of water, improvements in treatment practices and methods along with cost benefit analyses. It also recommends the setting up of a system to maintain a record of the amount of water entering a system and to keep track of how this water is distributed and used.

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OBJECTIVES OF WATER AUDIT

Objectives of Water Audit: Objectives of water audit is to find out physical losses due to pipe leakage and over flow, losses due to metering errors, un-authorized connections and free water supply given by Municipal authority for public stand post and park in the distribution system.

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 theirreduction within the college.

Advantages of water audit

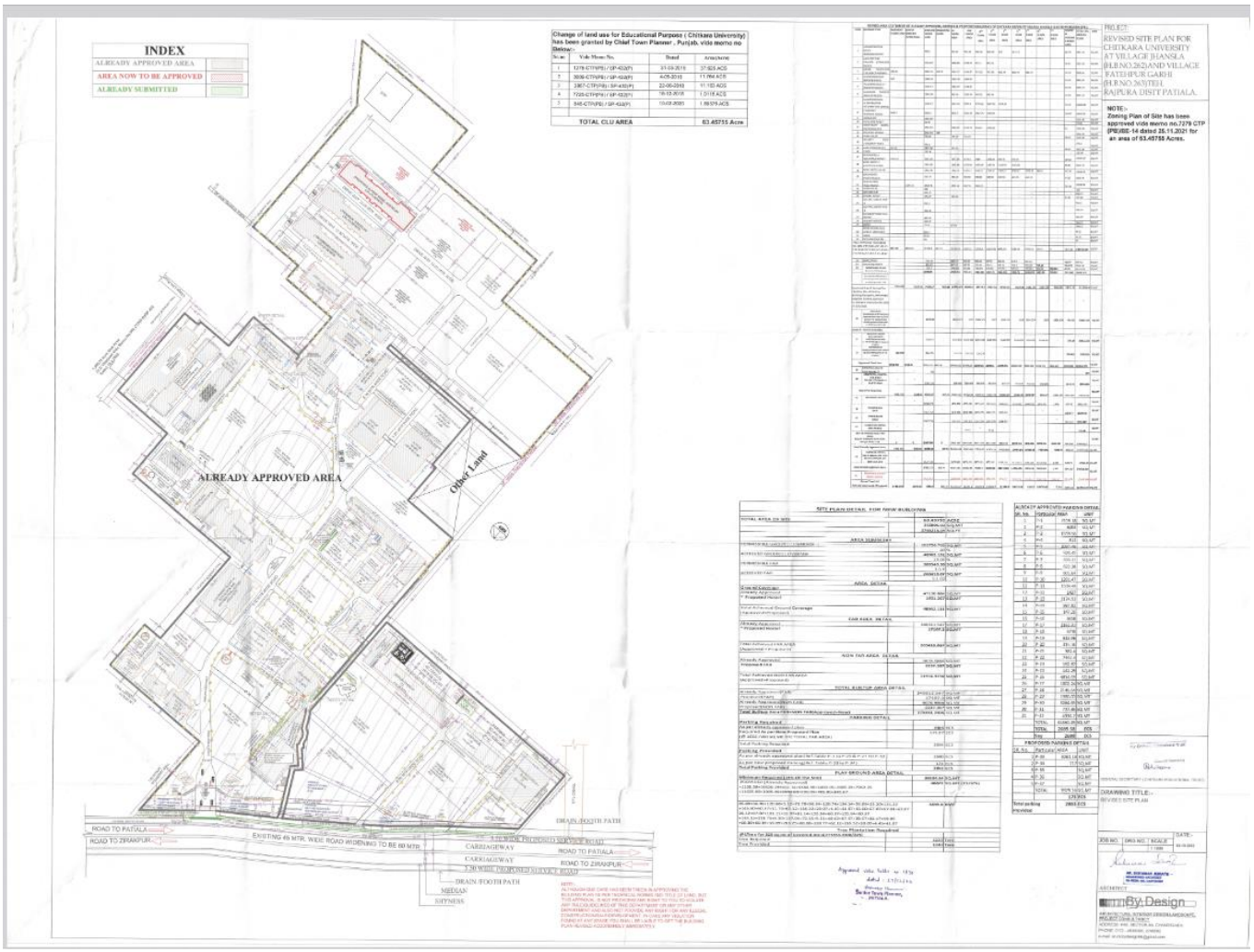
- Water audits provide decision making tools to utility managers, directors, and operators. i.e., knowing where water is being used in your system allows you to make informed decisions about investing resources such as time, labor and money.
- Water audits allow managers to efficiently reduce water losses in the system.
- Reducing water used at the source may even result in delaying or avoiding capital investments such as a new well, more treatment technology or additional water rights.
- Water audits also identify which water uses are earning revenue for the utility and which water uses are not. Thus, System personnel can increase revenue by ensuring all appropriate uses are being accurately measured and billed. This leads to more financial capacity in the water system, reduced cost per customer and better management of the water resource.
- Creating awareness among water users i.e., customers can see and understand that the utility is taking proactive steps to manage wasted water and save for the future.
- It is an effective educational and public relations tool for the water system

Target Areas of Water 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.

ABOUT THE UNIVERSITY

Chitkara University, the best university in Punjab is a government-recognized university with the right to confer degrees as per the Sections 2(f) and 22(1) of the UGC Act, 1956. In the year 2002, Chitkara Educational Trust established its Punjab campus 30 kilometres from Chandigarh, on the Chandigarh–Patiala National Highway. In the year 2010 Chitkara University was established by the Punjab State Legislature under "The Chitkara University Act". The University offers multi-disciplinary programs, all of which are designed to be industry-relevant. As a result of this student-centric approach, Chitkara University is renowned as one of the best private universities in the North India region. The Campus area of the University during the financial year under report was 63.4548 Acres. From business management programs to programs in nursing and medical laboratory technologies; and from computer science, electronics and mechanical engineering programs, to hotel management and architecture— Chitkara University, Punjab is a veritable cornucopia of educational service



Site plan of Chitkara University, Punjab (Financial Year 2021-2022)

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CHITKARA UNIVERSITY PUNJAB

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.
- Preparation of detailed water circuit diagram.

Step 2: Secondary Data Collection

- Analyze 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 Water 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
- 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

SOURCE OF FRESH WATER

The source of the fresh water of University is groundwater. Two tubewells has been installed in the university. The details of the tubewells are given below:

Sl.	Location	Depth (meters)	Diameter (mm)	Discharge m^3/hr	Operational hours/day	H.P. of Pump	Whether electromagnetic flow meter with Telemetric module installed
1.	Tubewell / 2014	350.00	200	42.00	7/365	33.00	Yes
2.	Tubewell/ 2022	492	200	45.00	7/365	33.00	Yes
3.	Tubewell/ 2023	492	200	45.00	7/365	33.00	Yes

Tubewells installed with electromagnetic flow meter with telemetric module

- The maximum per day water abstraction of the University during the financial year 2023-2024 was 432 KL/day.
- The University has maintained record of ground water abstraction. Electromagnetic flow water meters have been installed. Water meter readings are recorded on daily basis.

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- Record of energy consumption for abstraction of ground water has also been maintained by the University.
- The University has also maintained record of consumption of water for every section.

The Permission to extract 847 KL water per day has been given to University by PWRDA.

Permission letter from PWRDA to extract the ground water

- The university is paying water bills of water Extraction to the PWRDA on the self-assessment basis (INR22/ KL) every Month.
- The University has obtained and renewed the Consent to Operate (Water) NOC from PWRDA. Attached Below:-

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PUNJAB WATER REGULATION AND DEVELOPMENT AUTHORITY
sco 149-152, Sector 17 c, Chandigarh – 160017

PERMISSION FOR EXTRACTION OF GROUNDWATER

(Under The Punjab Groundwater Extraction And Conservation Directions, 2023)

Unit ID:	Permission Number:	Date of Grant of Permission	Valid up to
1260301154	PWRDA/I/09/2023/L3/122	28.09.2023	27.09.2026

1	Name of Unit:	Chitkara University	
2	Activity of Unit:	Institutional	
3	Address/Location of Unit:	Chitkara University, Village Jhansla & Fatehpur Garhi, Tehsil Rajpura, District Patiala, Punjab	
		District Patiala	PIN: 140401
4	Assessment Area (Block):	Rajpura	Status: Orange
5	District	Patiala	
6	Head Office Address:	Chitkara University, Village Jhansla & Fatehpur Garhi, Tehsil Rajpura, District Patiala, Punjab	
			PIN: 140401
	Email	sanjeev.bhardwaj@chitkara.edu.in	
	Phone/Mobile No.	9463438910	
7	Project Status:	Existing : 27-05-2002	
8	No. of Existing Tube-Wells	No. of Proposed Tube-Wells	Total Number of Tube-Wells Permitted
	03	01	04
9	Volume of Ground Water Permitted to be Extracted(m^3/month)	Fresh	Brackish/Saline
		25410	-

Note: This permission is granted in terms of the Punjab Groundwater Extraction and Conservation Directions, 2023 notified on 27th January, 2023 under section 15 of the Punjab Water Resources (Management and Regulation) Act, 2020 and is subject to the conditions given overleaf.

Dated: 28.09.2023
Place: Chandigarh

28.9.2023
A.O.L-3
Senior Manager (Admin & Coord.)
Punjab Water Regulation and Development Authority
Simranjeet Kaur
28/09/2023

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CHITKARA UNIVERSITY PUNJAB

PUNJAB POLLUTION CONTROL BOARD

Zonal Office-I, Vatavaran Bhawan, Nabha Road, Patiala - 147001.

Website:- www.ppcb.gov.in

Office Dispatch No : **Registered/Speed Post** **Date:**

Industry Registration ID: *O16PTA4451817* **Application No :** *15086170*

To,

Dr S C Sharma
Chitkara University, Village Jhansla & Fatehpur Garhi, Chandigarh-patiala Highway, Tehsil-rajpura Rajpura,Patiala-140401

Subject: **Renewal of 'Consent to Operate'an outlet u/s 25/26 of Water (Prevention & Control of Pollution) Act, 1974 for discharge of effluent.**

With reference to your application for obtaining Renewal of ï¿½Consent to Operateï¿½an outlet for discharge of the effluent u/s 25/26 of Water (Prevention & Control of Pollution) Act, 1974, you are, hereby, authorized to operate an industrial unit fordischarge of the effluent(s) arising out of your premises subject to the Terms and Conditions as mentioned in this Certificate.

1. Particulars of Consent to Operate under Water Act, 1974 granted to the industry

Consent to Operate Certificate No.	*CTOW/Renewal/PTA/2021/15086170*
Date of issue :	*28/04/2021*
Date of expiry :	*31/03/2026*
Certificate Type :	*Renewal*
Previous CTO No. & Validity :	*CTOW/Renewal/PTA/2017/6545145 From:03/11/2017 To:31/03/2021*

2. Particulars of the Industry

Name & Designation of the Applicant	*Dr. S.c. Sharma, (Registrar)*
Address of Industrial premises	*Chitkara University, H.b. Nos. 262 & 263, Village Jhansla & Fatehpur Garhi, Nh07 (chd.-pta. Nh), Tehsil- Rajpura, Distt. Patiala-140401, Punjab, Rajpura,Patiala-140401*
Capital Investment of the Industry	*29672.0 lakhs*
Category of Industry	*Red*
Type of Industry	*Building, Const. projects, Township & Area development ..... covered under EIA notification dated 14/9/06*
Scale of the Industry	*Large*
Office District	*Patiala*
Consent Fee Details	Rs. 1,41,2000 /- vide R.No. 497405932 dated 15.03.2021.
Raw Materials(Name with quantity per day)	*Fixed Population Students & Staff @ 4100 Number/Year and Floating Population Students & Staff @ 9900 Number/Year.*
Products (Name with quantity per day)	*Educational Institution/University.*

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Water pollution Generation and its mitigation:

- Following is the details of Fresh Water extraction and Treated water in last 3 Years.

Year	Discription	January	February	March	April	May	June	July	August	September	October	November	December	Yearly Total	Treated Water generated	Used in Dual Plumbing	Used in Horticulture	Used in Karnal Technology
2021	Borewell-1	5189.00	6254.23	6776.50	6731.04	4158.34	3366.83	5086.81	5626.99	6515.83	10339.63	9374.18	10835.75	80255.13	64204.10	25681.64	24397.56	14124.90
	Borewell-2	5337.00	9174.79	8938.40	5615.64	6272.39	4906.29	5817.95	7012.39	7429.08	8498.61	7067.22	10068.41	86138.17	68910.54	27564.21	26186.00	15160.32
	Monthly Total	10526.00	15429.02	15714.90	12346.68	10430.73	8273.12	10904.76	12639.38	13944.91	18838.24	16441.40	20904.16	166393.30	133114.64	53245.86	50583.56	29285.22
2022	Borewell-1	7655.83	5704.07	11740.83	14796.08	13306.18	7340.71	9217.86	7714.55	7089.56	8239.58	7177.75	6774.45	106757.45	85405.96	34162.38	32454.26	18789.31
	Borewell-2	3810.41	3360.93	5552.57	2105.68	7165.08	6647.38	4531.02	4621.13	6820.79	6795.89	5281.31	4115.89	60808.08	48646.46	19458.59	18485.66	10702.22
	Monthly Total	11466.24	9065.00	17293.40	16901.76	20471.26	13988.09	13748.88	12335.68	13910.35	15035.47	12459.06	10890.34	167565.53	134052.42	53620.97	50939.92	29491.53
2023	Borewell-1	6595.67	7244.64	6457.58	7074.42	7352.13	6824.11	6554.74	8303.78	0.00	0.00	0.00	0.00	56407.07	45125.66	18050.26	17147.75	9927.64
	Borewell-2	4733.40	8377.07	10462.31	6076.47	2512.52	4024.92	949.24	4072.63	13279.48	13978.00	14639.30	9609.20	92714.54	74171.63	29668.65	28185.22	16317.76
	Borewell-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	711.88	5741.80	6453.68	5162.94	2065.18	1961.92	1135.85
	Monthly Total	11329.07	15621.71	16919.89	13150.89	9864.65	10849.03	7503.98	12376.41	13279.48	13978.00	15351.18	15351.00	155575.29	124460.23	49783.09	47294.89	27381.25

- The university has two Sewage Treatment plants based on the MBBR technology to treat the wastewater of capacity 250 KLD and 1 MLD. A new STP of 2 MLD is going to be commissioned in June 2024.

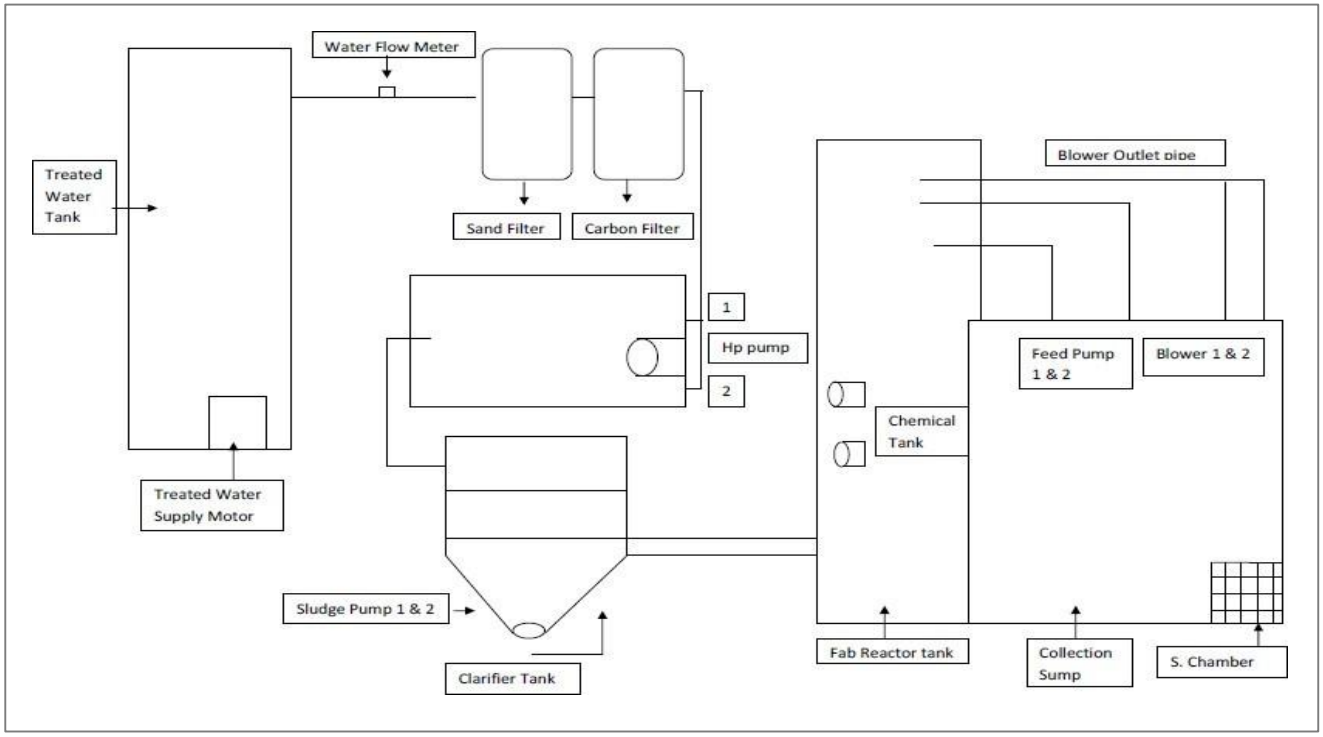
DETAILS OF SEWAGE TREATMENT PLANT

General Process Description for 250 KLD STP with FAB Technology

The Treatment Plant is based on FAB Technology having 250 capacity with following treatment scheme.

- **Stage 1: Primary Treatment**
  Bar Screen Chamber, Sewage Collection tank, Oil & Grease Trap
- **Stage 2: Secondary or biological treatment**
  FAB Reactor, Coagulation tank, Clarifier
- **Stage 3: Tertiary treatment**
  Chlorine Contact tank, Pressure Sand Filter, Activated Carbon Filter, Hypo Dosing System, Treated Water Tank
- **Stage 4: Sludge Treatment**
  Sludge Drying Beds

Layout plan of STP 250 KLD



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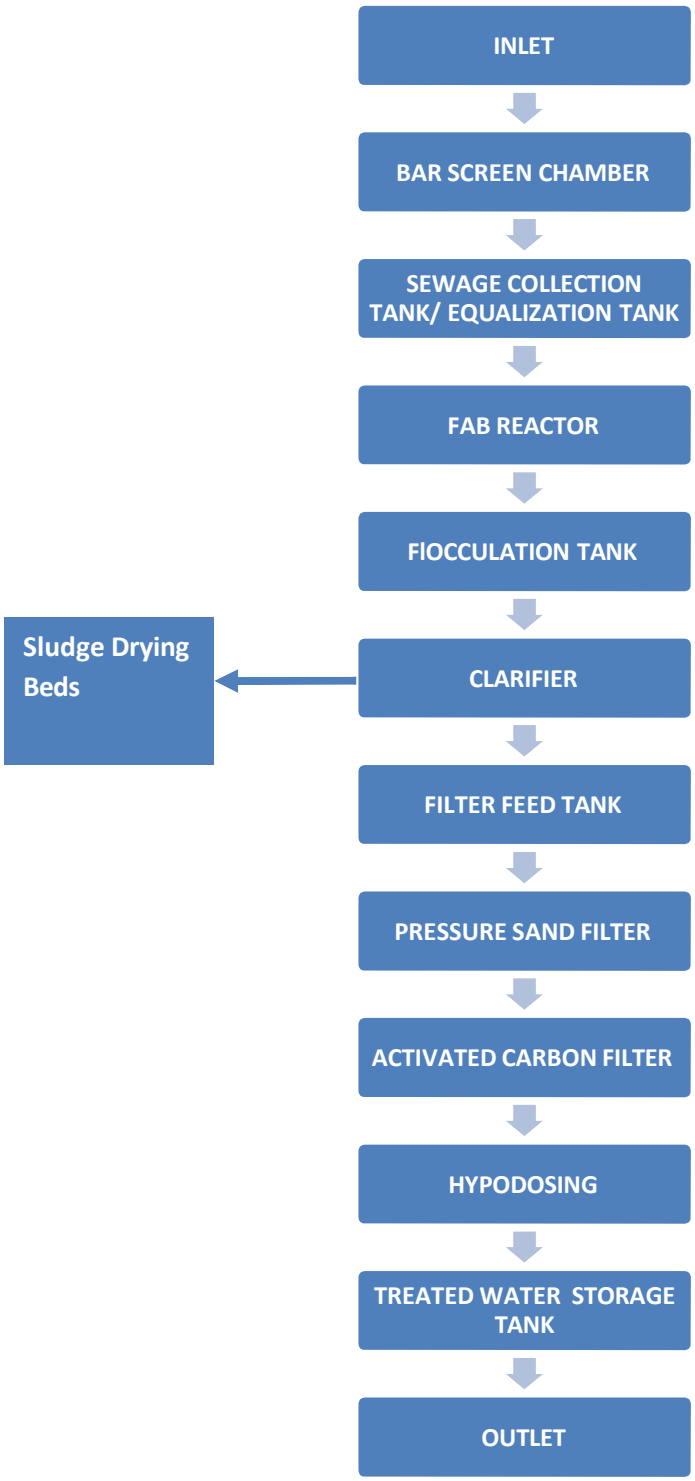
FLOW CHART OF TREATMENT SCHEME OF STP 250 KLD



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GPS	
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Longitude	76; 39; 42.9720000000089...
Altitude	252.6

Sewage Treatment Plant of Capacity 250 KLD

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General Process Description for 1 MLD STP with MBBR Technology

The Treatment Plant is based on MBBR Technology having 1 MLD capacity with following treatment scheme.

- **Stage 1: Primary Treatment**

  Bar Screen Chamber, Sewage Collection tank, Oil & Grease Trap

- **Stage 2: Secondary or biological treatment**

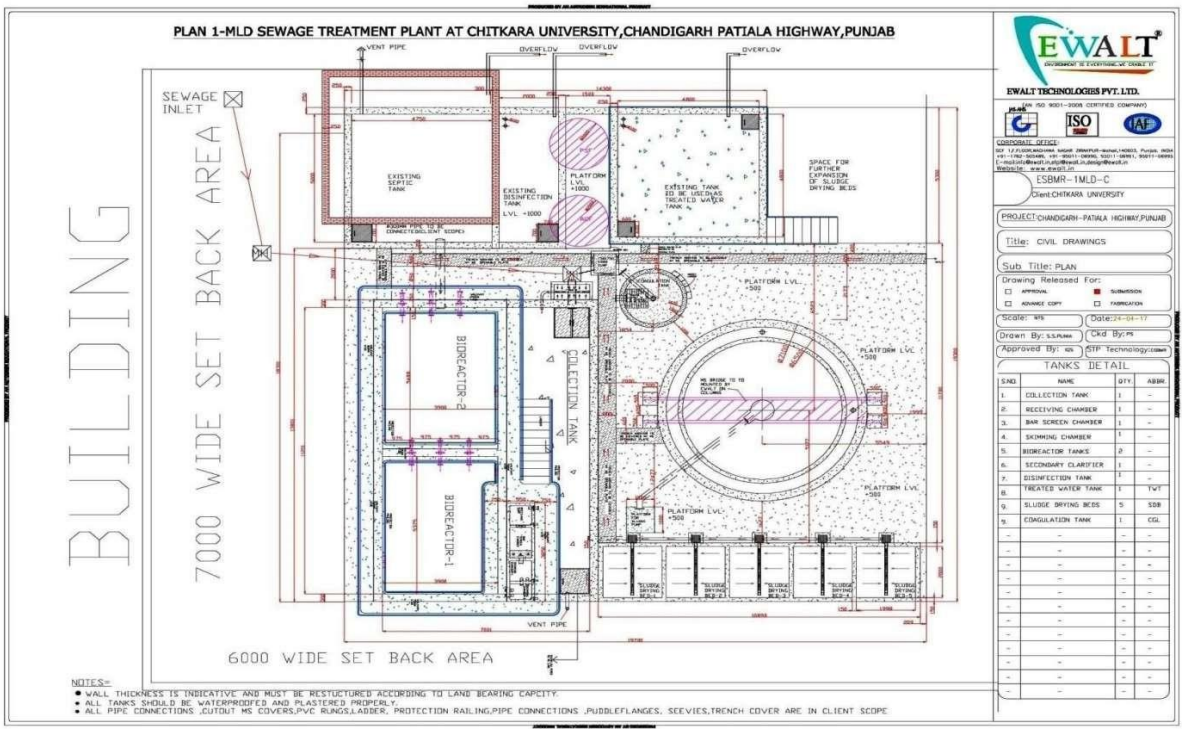
  MBBR Reactor I & II, Coagulation tank, Clarifier

- **Stage 3: Tertiary treatment**

  Chlorine Contact tank, Pressure Sand Filter, Activated Carbon Filter, Hypo Dosing System, Treated Water Tank-I, Treated Water Tank-II

- **Stage 4: Sludge Treatment**

  Sludge Drying Beds



Layout plan of STP 1MLD

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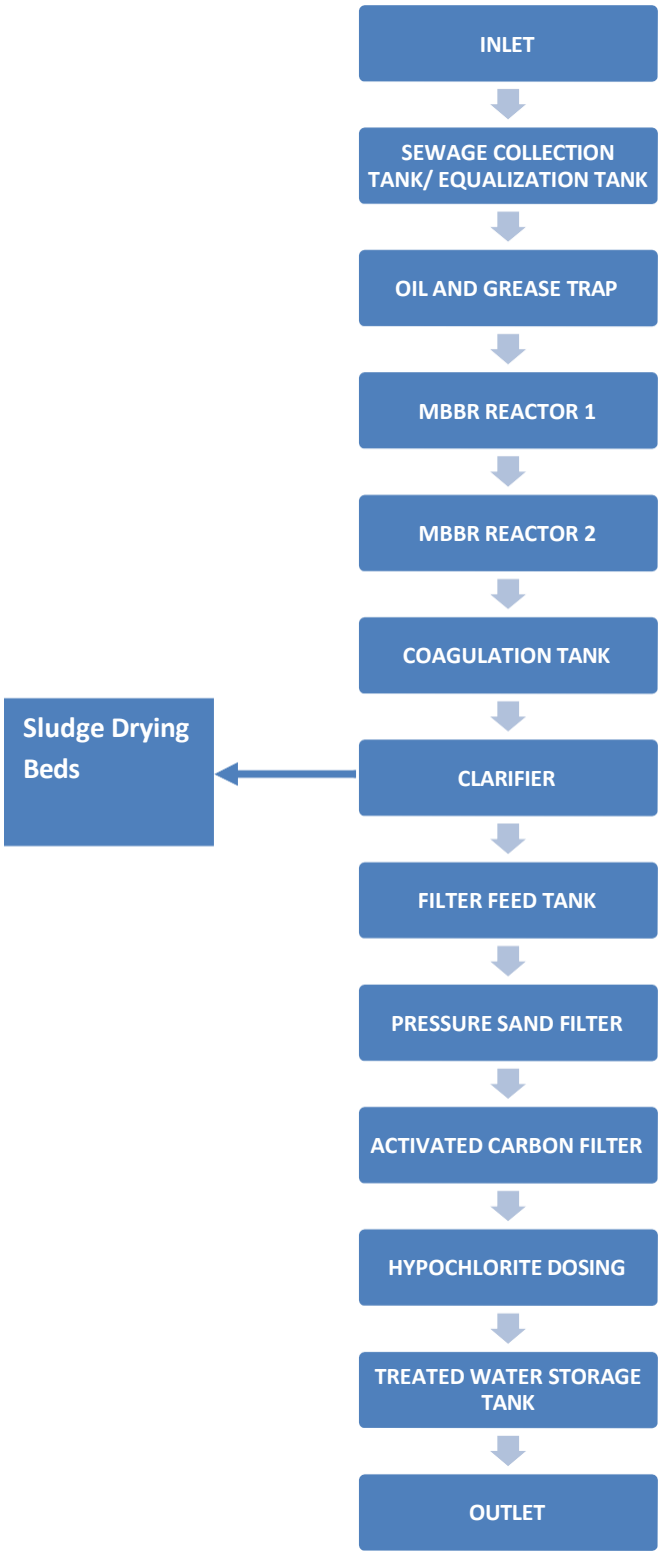
FLOW CHART OF TREATMENT SCHEME OF STP 2



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GPS

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Altitude	274.8

GPS

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Longitude	76; 39; 29.7660000000033...
Altitude	261.9

Treated waste water being used in the campus and Sewage Treatment Plant of capacity 1 MLD

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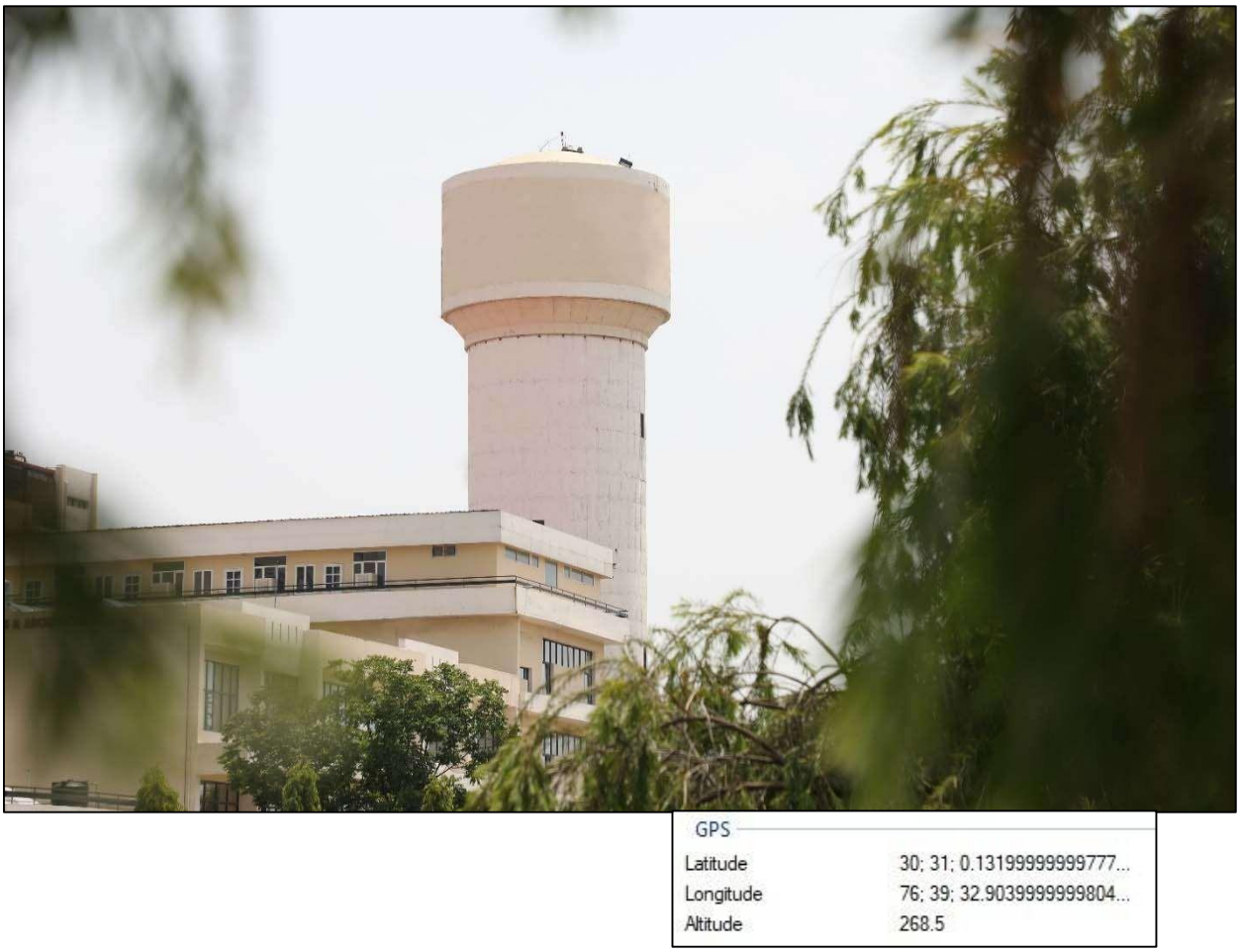
WATER STORAGE FACILITIES WITHIN THE CAMPUS

1. One Overhead Tank of Capacity 400 KL
2. One Underground Storage Tank of capacity 400 KL
3. One Underground storage Tank of capacity 100KL



Overhead Tank of Capacity 400KL

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WATER USE AREAS AND TAPS IN COLLEGE CAMPUS

Chitkara University Campus, Punjab 2021-22				
Academic Blocks				
Sl.	**Academics Building**	Tap	Urinal	WC
1	Babbage	105	18	30
2	Architecture Block	52	13	18
3	Turing Block, D'Morgan Block	336	53	72
4	Fleming Block	160	30	38
5	IHM Block	100	15	30
6	Galilio Block	165	50	55
7	Newton Block	76	15	30
8	Edision Block	84	14	18
9	Tesla Block	130	25	40
10	Picasso	216	80	66
11	Workshop	30	5	7
12	Exploretorium	60	11	9
13	Food Court	32	7	9
14	Sub Station -1	6	0	0
15	Sub Station -2	6	1	1
16	Indoor Stadium	41	8	10
17	Admission Cell	7	0	2
18	Animal House	4	0	1
19	Swimming Pool	56	6	8
20	Circle One	16	2	4
21	Ramanujan Block	84	14	18
	Hostels			
1	Nightingale Hostel	158	-	35
2	Hostel-Pie A,B,C	450	-	141
3	Vascodagama Hostel	364	96	113
4	Columbus Hostel	259	84	60
5	Marco Polo Hostel	473	64	133
6	Armstrong Hostel	475	96	128
7	Magellan Hostel	480	108	130
8	Ibn Battuta Hostel	1272	Attached	318
9	Archemedes Hostel	1299	Attached	342

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FRESH WATER TESTING

The university test the Fresh water samples regularly from the NABL Accredited lab. The test reports has been attached below:

Centre for Environment and Food Technology Pvt. Ltd.

An ISO 9001: 2015, ISO 45001: 2018 (OHSAS); ISO/IEC 17025: 2017
NABL Accredited, FSSAI and MoEF Recognised Testing Laboratory

TC-6145

TEST REPORT

ULR No. : TC-614524000001029

Party Name	: M/s Chitkara University Chandigarh – Patiala National Highway, Village Jhansla, Rajpura, District Patiala, Punjab	**Report No.**	: CEFT/155
		Format No.	: 7.8 F-01G
		Reporting Date	: 31.01.2024
		Analysis Completion date	: 27.01.2024 to 31.01.2024
		Receipt Date	: 27.01.2024
		Sampling Date	: 25.01.2024
		Sampling Method	: As per APHA Method
Sample Description	: Drinking Water	**Sample Quantity**	: 2 Ltr.
Sampling Location	: Marco Polo Hostel	**LSRF/Sample ID**	: CEFT/GEN/2401270155
Source	: -		
Sample Collected by	: Sampler		

TEST RESULT

S. No.	Parameter	Result	Unit	Limit of IS: 10500-2012 (Reaffirmed 2018)		Test-Method
				Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source (Max.)	
	Physical Parameters					
1	pH (at 25 °C)	7.58	-	6.5 to 8.5	No Relaxation	IS 3025 (Part-11)
2	Total Dissolved Solids, (Max.)	360	mg/l	500	2000	IS 3025 (Part-16)
	General Parameters					
3	Total Hardness as $CaCO_3$, (Max.)	78.0	mg/l	200	600	IS 3025 (Part-21)
4	Calcium as Ca, (Max.)	23.2	mg/l	75	200	IS 3025 (Part-40)
5	Alkalinity as $CaCO_3$, (Max.)	62	mg/l	200	600	IS 3025 (Part-23)
6	Chloride as Cl, (Max.)	64.9	mg/l	250	1000	IS 3025 (Part-32)
7	Nitrate as NO_3, (Max.)	3.45	mg/l	45	No Relaxation	IS 3025 (Part-34)
8	Fluoride as F, (Max.)	ND	mg/l	1	1.5	IS 3025 (Part-60)
9	Magnesium as Mg, (Max.)	4.88	mg/l	30	100	APHA 3500-Mg (B) 2017
10	Sulphate as SO_4,(Max.)	7.6	mg/l	200	400	IS 3025 (Part-24)
11	Nickel as Ni (Max.)	ND	mg/l	0.0	No Relaxation	IS 3025 (Part-54)
12	Sodium as Na, (Max.)	15.0	mg/l	No Relaxation	No Relaxation	IS 3025 (Part-45)
13	Potassium as K, (Max.)	3.0	mg/l	No Relaxation	No Relaxation	IS 3025 (Part-45)
14	Cobalt as Co (Max)	ND	mg/l	-	-	APHA 24th Edit. 2023
15	Chromium as Cr, (Max.)	ND	mg/l	0.05	No Relaxation	IS 3025 (Part-52)
	Microbiological Parameters					
16	Total coliform	Absent	per 100 ml	Absent per 100 ml		IS 15185:2016
17	E.coli	Absent	per 100 ml	Absent per 100 ml		IS 15185:2016

Note: 1. ND = Not Detectable

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End of Report

Checked by
Ms. Swati

Authorized Signatory
Mr. Nadeem

Authorized Signatory
Mrs. Puja

Note : 1. The test results are related to the sample/ tested as identified.
2. The sample will be discarded after retention time of 7 days unless otherwise specified.
3. Any Discrepancy found in the test report may be communicated within seven days.
4. This report shall not be reproduced, cannot be used as evidence in the court of law and should be used in any advertising media without written permission of CEO, CEFT Pvt. Ltd.
5. The Court Jurisdiction will be Delhi.
6. Customer complaint register is available at the laboratory.

Regd. Address - Bldg. No. 17, 1st Floor, DLF Industrial Area, Moti Nagar, New Delhi - 110015 Ph.: - 011-45012722
Email: info@cefflab.com, Website : www.cefflab.com

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CHITKARA UNIVERSITY PUNJAB

TREATED WATER TESTING

The Treated Water From both the sewage Treatment plants are tested regularly and Test Reports has been attached below:

Centre for Environment and Food Technology Pvt. Ltd.

An ISO 9001: 2015, ISO 45001: 2018 (OHSAS); ISO/IEC 17025: 2017
NABL Accredited, FSSAI and MoEF Recognised Testing Laboratory

TC-6145

TEST REPORT

Party Name	: M/s Chitkara University Chandigarh – Patiala National Highway, Village Jhansla, Rajpura, District Patiala, Punjab	Report No.	: CEFT|150
		Format No.	: 7.8 F-01G
		Reporting date	: 31.01.2024
		Analysis completion date	: 27.01.2024 to 31.01.2024
Sample Description	: STP Inlet	Receipt Date	: 27.01.2024
Sampling Location	: STP Plant-1	Sampling Date	: 25.01.2024
Sample Code	: -	Sampling Method	: Grab
Source	: -	Sample Quantity	: 1 Ltr
Sample Collected by	: Sampler	LSRF/Sample ID	: CEFT|GEN|2401270150

TEST RESULT

S. No.	Parameter	Result	Unit	Test-Protocol
1	pH (at 25 °C)	7.32	-	IS 3025 (Part-11)
2	TSS	108.0	mg/l	IS 3025 (Part-17)
3	BOD (at 27°C for 3 days)	115.0	mg/l	IS 3025 (Part-44)
4	COD	306.0	mg/l	IS 3025 (Part-58)
5	Oil & Grease	40.0	mg/l	IS 3025 (Part-39)
6	TDS	711.0	mg/l	IS 3025 (Part-16)
7	Ammonical Nitrogen	31.5	mg/l	IS 3025 (Part-34)
8	Total Kjeldahl Nitrogen	56.7	mg/l	IS 3025 (Part-34)
9	Phosphorous	34.00	mg/l	IS 3025 (Part-31)

Page No. 1/1

**End of Report **

Swati
Checked By
Ms. Swati

Authorized Signatory
Mrs. Puja

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RAINWATER HARVESTING SYSTEM

The rainwater harvesting is a technique to capture the rainwater when it precipitates, storethat 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.

Chitkara University is located at village Jhansla, Sub Division Rajpura District Patiala, PunjabPatiala district of Punjab state lies between 29o 49' 30o 40' north latitudes and 75o 58' 76o 48' east longitudes. Total geographical area of the district is 3218 sq.km. The Patiala district is divided into five sub-divisions (tehsils) namely Patiala, Nabha, Ghanaur, Rajpura and Samana comprising eight-community development blocks viz. Patiala, nabha, Sanaur, Bhunerheri, rajpura, ghanaur, samana and Patran for the purpose of administration

Rainfall and Climatic Condition

The climate of Patiala district can be classified as tropical steppe, Semi-arid and hot which is mainly dry with very hot summer and cold winter except during monsoon. There are four seasons in a year. The hot weather season starts from mid-March to last week of the June followed by the south west monsoon which lasts upto September. The transition period from September to October forms the post monsoon season. The winter season starts late in November and remains upto first week of March. The normal monsoon and annual rainfall of the district is 547 mm and 677 mm, respectively which is unevenly distributed over the area 29 days. The south west monsoon sets in from last week of June and withdraws in end of

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September, contributing about 81% of annual rainfall. July and August are the wettest months. Rest 19% rainfall is received during non-monsoon period in the wake of western disturbances and thunderstorms. Generally rainfall in the district increases from southwest to northeast. The mean minimum and maximum temperature in the area ranges from 7.1° C to 40.4° C during January and May or June respectively.

GROUND WATER LEVELS IN PATIALA

The depth to water level ranges from 4.43 to 20.62 m bgl during pre-monsoon period and 6.99 to 24.28 m bgl during post monsoon period. The seasonal fluctuation varies from 0.03 to (-) 3.66 m in the area. The long-term water levels trend indicates average fall of 0.50 m/year

RAINWATER CONSERVATION POLICY AT CHITKARA UNIVERSITY

The clayey soil is found to be dominant in the soil of campus, so the campus has been provided with deep well borewell harvesting system. The rain water collected in the catchment areas (Roofs, Roads and Ground) is conserved by recharging the ground water. The water falling at the

roof of the building and roads is made to fall in to ground and a steep slope is provided at the ground and the water from ground will flow to the recharging pit. The runoff water may contain silts and Grits so to prevent the entry of the silts entering the water has to pass through the filtration Media (layer of sand and gravels). The filtered water will then pass through the perforated pipes which are connected to borewell pipe and the rainwater will joins the aquifer Chitkara University has 8 Rain Water Harvesting points at different locations. The capacity and type of system is as given below:-

RAIN WATER HARVESTING DETAIL				
SR. NO.	LOCATION	DEPTH OF BOREWELL	TYPE	RECHARGING RATE PER DAY
1	OMEGA ZONE	70 MTR.	BOREWELL RECHARGE	50000 ltr
2	OMEGA ZONE	70MTR.	BOREWELL RECHARGE	50000 ltr
3	OMEGA ZONE	103MTR.	BOREWELL RECHARGE	30000 ltr
4	BETA ZONE	70MTR.	BOREWELL RECHARGE	50000 ltr
5	ALPHA ZONE	45MTR.	BOREWELL RECHARGE	30000 ltr
6	NIGHTINGALE HOSTEL	184MTR.	BOREWELL RECHARGE	40000 ltr
7	SPORT ARENA	70MTR.	BOREWELL RECHARGE	50000 ltr
8	COLUMBUS	45MTR.	BOREWELL RECHARGE	30000 ltr
TOTAL				330000 ltr

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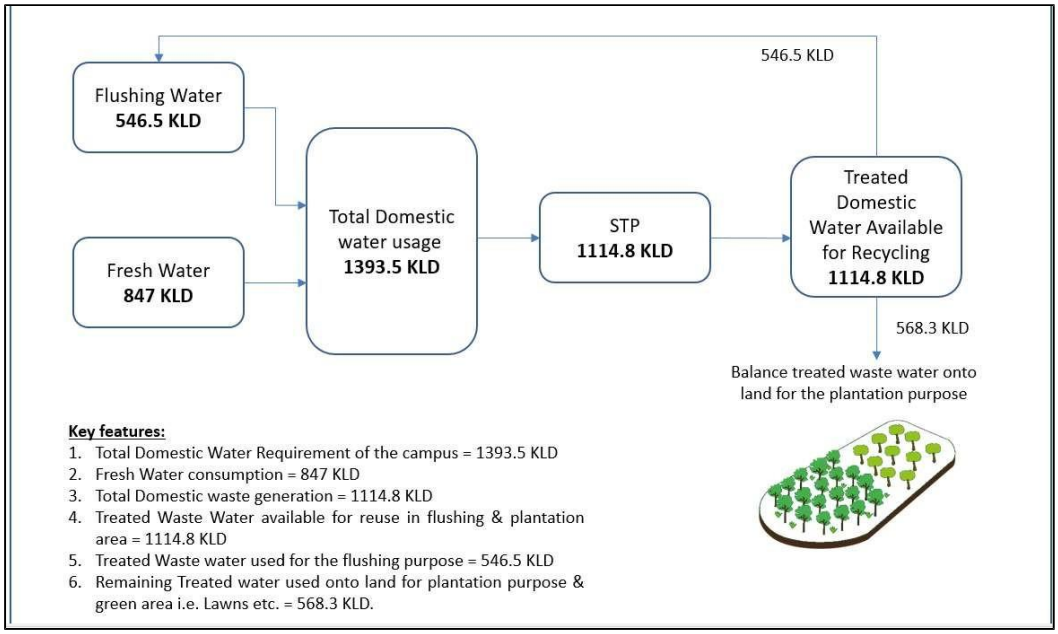
SEPARATE RECHARGING PITS FOR SEPARTE ROOF TOP AREAS

Chitkara University is now constructing the separate Recharging pits for the Separate Roof top catchment areas of the building (Hostels, auditorium, Academic blocks) in order to recharge more run off. As of now, three new Recharging Pits has been recently constructed and 25 more recharging pits are proposed.

NEW RAIN WATER HARVESTING DETAIL				
SR. NO.	**LOCATION**	**DIMENSIONS (LxBxH Meter) Including Filter Media**	**TYPE**	**RECHARGING RATE PER DAY**
1	MARCO POLO HOSTEL	**(3x2x2.5)**	BOREWELL RECHARGE	727200ltr
2	MAGELLAN HOSTEL	**(3x2x2.5)**	BOREWELL RECHARGE	727200ltr
3	IBN BATTUTA	**(3x2x2.5)**	BOREWELL RECHARGE	727200ltr

The Total Rainfall Recharging Capacity of pits is approx. 2500KL/day

WATER BALANCE DIAGRAM



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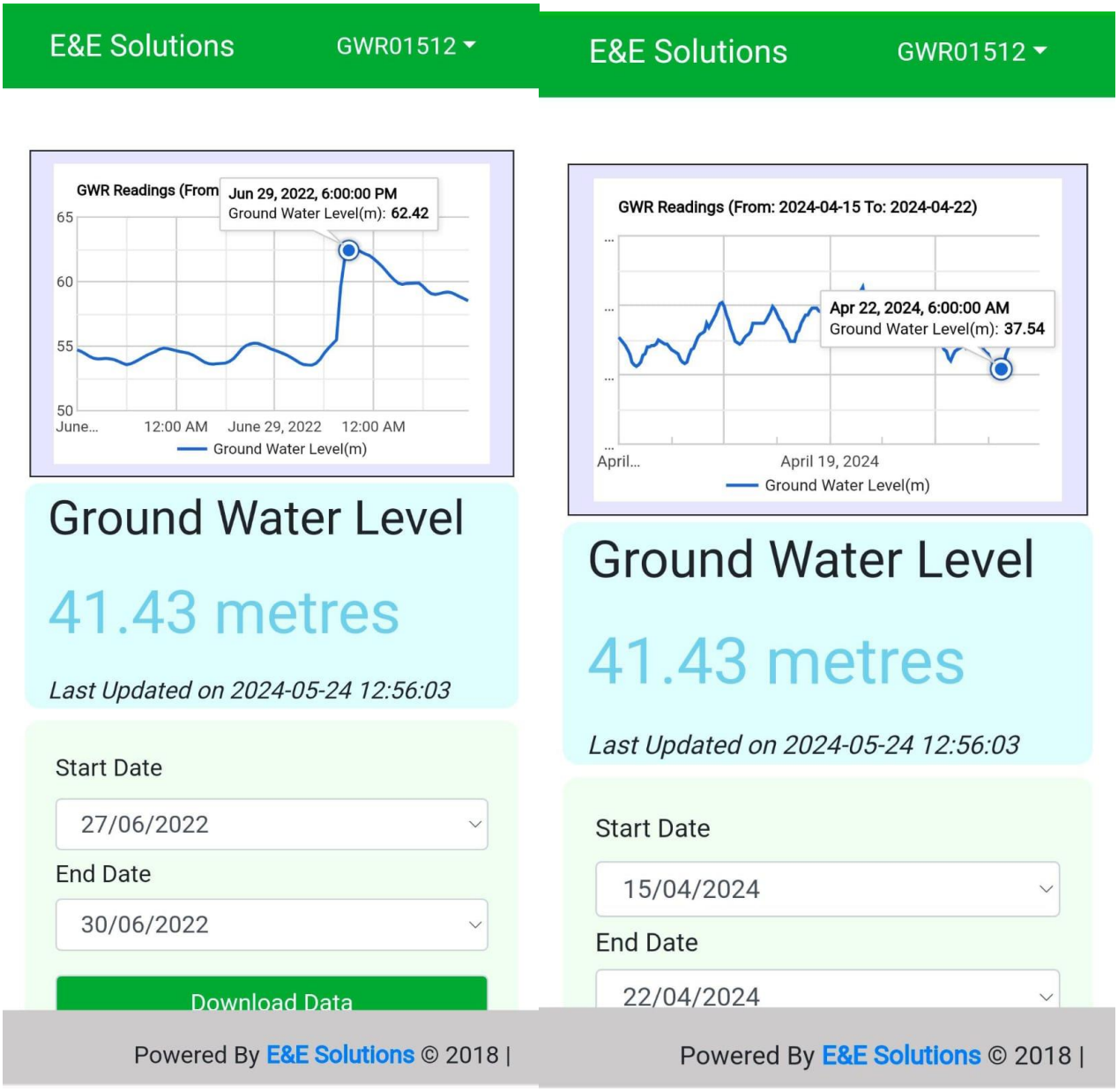
Ground Water Level improvements –



Improving groundwater levels is crucial for sustaining ecosystems, agriculture, and ensuring a stable water supply for communities. Here are several strategies that can help improve groundwater levels:

1. **Rainwater Harvesting**: Collecting rainwater and storing it in tanks or allowing it to percolate into the ground can replenish groundwater levels.
2. **Reducing Runoff**: Implementing practices like permeable paving, green roofs, and rain gardens can reduce surface runoff and allow more water to infiltrate into the ground.
3. **Water Conservation**: Encouraging water-saving practices in households, industries, and agriculture can reduce water demand and alleviate pressure on groundwater resources

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4. **Recharge Wells**: Constructing recharge wells or infiltration basins can directly inject surface water into the groundwater aquifers, replenishing depleted levels.

5. **Wetland Restoration**: Restoring wetlands can help recharge groundwater by providing a natural filtration system and allowing water to slowly percolate into the ground.

6. **Land Use Management**: Implementing land use practices that minimize soil erosion and promote natural vegetation can help maintain healthy groundwater recharge zones.

7. **Artificial Recharge**: Utilizing techniques like injection wells, recharge pits, or spreading basins to artificially replenish groundwater.

8. **Monitoring and Regulation**: Implementing effective monitoring systems and regulations to manage groundwater extraction, ensuring sustainable usage and preventing overexploitation.

9. **Education and Awareness**: Increasing public awareness about the importance of groundwater conservation and the role individuals can play in preserving this vital resource.

10. **Policy Interventions**: Developing and enforcing policies that promote sustainable groundwater management, including allocation quotas, recharge requirements, and pollution prevention measures.

By adopting a combination of these strategies tailored to specific regional conditions and challenges, communities can work towards improving and maintaining healthy groundwater levels for future generations.

The ground water table has considerably increased to 37.54 Meter from all time low of above 60 Meters

AWARDS AND RECOGNITIONS

CII-TRIVENI WATER INSTITUTE

CII
Confederation of Indian Industry

CII National Award for Excellence in Water Management 2022

This is to certify that

Chitkara University
Chandigarh, Punjab

has been rated as "The Winner" in "Within the Fence" Category. This has been based on evaluation by the Jury at the National Competition for Excellence in Water Management 2022.

Nikhil Sawhney
Chairman
CII-Triveni Water Institute

Dr. Anil Kakodkar
Chairman of the Jury
CII National Award for Excellence in Water Management

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RECCOMENDATIONS/CONCLUSIONS

- The Testing of the fresh water and Treated Water from STP must be periodically done from NABL Accredited Laboratory to ensure the standards prescribed by the NGT.
- The Plumbing pipeline and fixtures must be inspected regularly to ensure Zero leakage.
- The level switches in the overhead tank should be inspected regularly to ensure no overflowing of water.
- Only Treated water From STP should be used for Irrigation.
- More area should be covered under plantation of native and draught tolerant Species.
- The Drip Irrigation method for plants and Sprinkler irrigation for turf should be encouraged more.
- The old and faulty plumbing fixtures must be replaced by water efficient plumbing fixtures.
- Establish institutional ecology policy and set an example of environmental responsibility and practices of resource conservation, recycling, and waste management.
- Involve all stakeholders and encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in water conservation and sustainable development.
- Collaborate for interdisciplinary approaches to develop curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- Promote 4R education policy (reduces, reuse, and recycle) in campus.
- Arrange training programmes on water management system and nature conservation.
- Ensure participation of students and teachers in local water issues.

*******Data Source- Office of Infrastructure Development.

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