UNIVERSAL WATER REGISTRY

UWR Rainwater Offset Unit Standard

(UWR RoU Standard)

Concept & Design: Universal Water Registry

www.uwaterregistry.io

Project Concept Note & Monitoring Report

(PCNMR)

Project Name: ETP wastewater Treatment by Gangamai Industries & Constructions Ltd,

UWR RoU Scope: 5
Monitoring Period: 01/01/2014-31/12/2023
Crediting Period:01/01/2014-31/12/2023
UNDP Human Development Indicator: 0.644 (India)
RoUs Generated During 1st Monitoring Period: 569,135

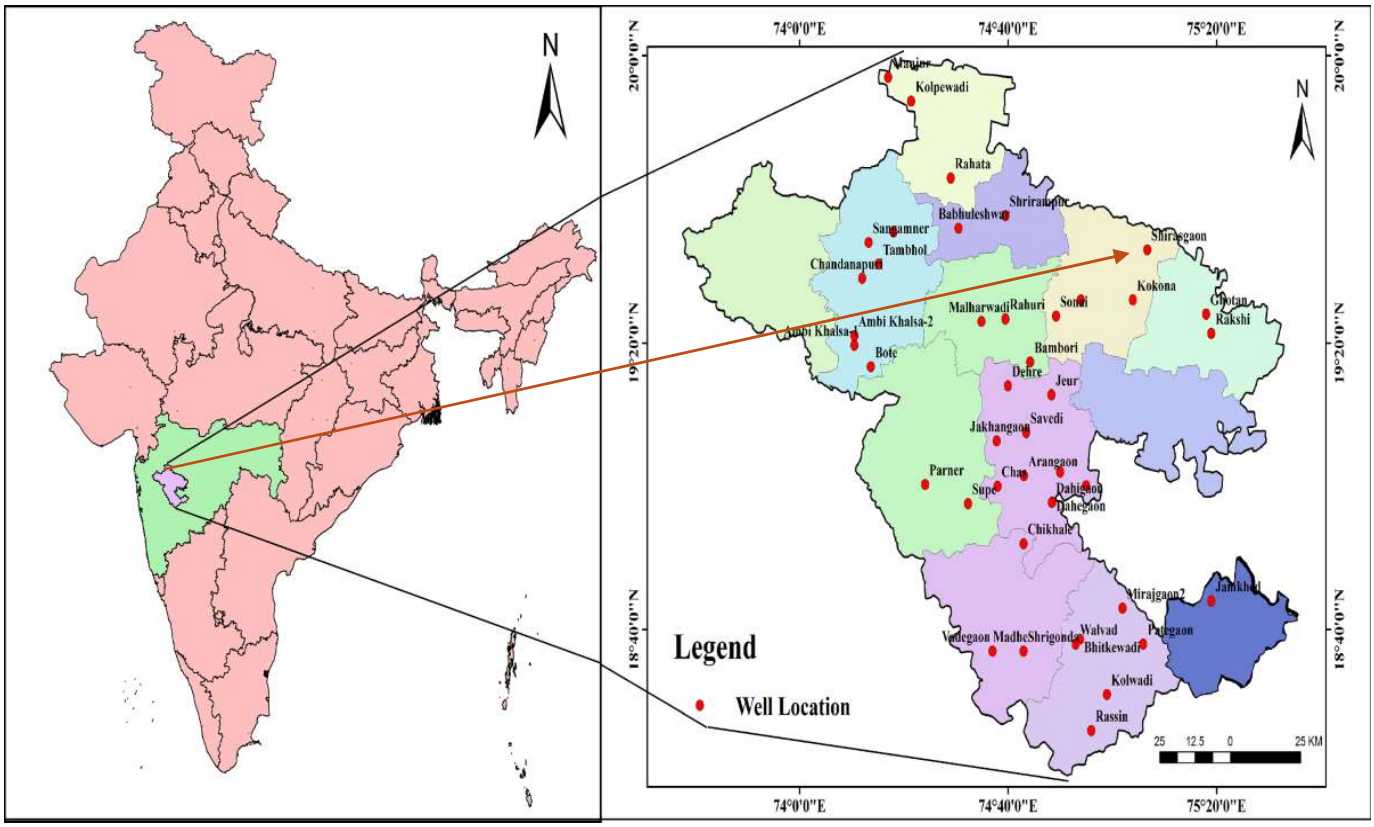
A.1 Location of Project Activity

Title	**ETP wastewater Treatment by Gangamai Industries & Constructions Ltd**
Address of Project Activity	Najik Babhulgaon, Post: Rakshi, Tal-Shevgaon, Dist: Ahmednagar, Gujarat.
Lat. & Longitude	**19°22' 47.28" N** **75°17'00.72" E**
Type and Scope of RoU Project Activity	Type Scope 5: Conservation measures taken to recycle and/or reuse water, spent wash, wastewater etc. across or within specific industrial processes and systems, including wastewater recycled/ reused in a different process, but within the same site or location of the project activity. Recycled wastewater used in off-site landscaping, gardening or tree plantations/forests activity are also eligible under this Scope. The project activity recycles wastewater from the Sugar Factory within the defined project boundary and reuses the treated water for Gardening, and Irrigation. The project activity showcases efficient reuse of industrial wastewater as a key corporate environmental intervention towards achieving more water security in that region.
No. of ETPs	1
Project Commissioning Date	10/12/2013
State	Maharashtra
District	Ahmednagar
Country	India
Block basin/sub basin/watershed	The district lies partly in Godavari basin and partly in Bhima basin. Dhora River that is 11 km distance from the industry.
SDG Impacts	**SDG 3:** Good Health and Well-being **SDG 6:** Clean Water and Sanitation **SDG 8:** Decent Work and Economic Growth **SDG 13:** Climate Action

Climatic Conditions	Annual Mean Maximum Temperature: 31.53 °C Annual Mean Minimum Temperature: 22.31 °C https://weatherandclimate.com/india/maharashtra/ahmadnagar Annual Mean Maximum Rainfall: 584.6 https://ahmednagar.nic.in/en/about-district/rainfall/
Calculated RoUs per year	

Year	Total ROUs (1000 liters)/yr UCR Cap(1 million RoUs/yr
2014	44770
2015	62240
2016	59623
2017	39514
2018	81673
2019	41807
2020	38332
2021	68295
2022	72329
2023	60552
Total RoUs	**569,135**

Fig: Satellite view of the Gangamai Industries-ETP and its surroundings



Location of the Project Activity

Purpose of the project activity:

Gangamai Industries and Constructions Limited (GIACL), Harinagar, Najik babhulgaon, Taluka Shevgaon, District Ahmednagar (M.S.) is one of the companies of Padmakar Mulay Group Of Companies, Aurangabad and is into the manufacturing of sugar & production and marketing of Distillery & Ethanol.

Considering the sugarcane availability in the factory area, the company had established a 2500 TCD Sugar Plant and started crushing operations from January 2001 onwards at Harinagar, Post. Ghatnandra, Ta. Sillod, Dist. Aurangabad, Maharashtra, Pin code- 431 113. Thereafter, Ethanol Plant and Distillery Plant both 30 KLPD were established and put in operations in June 2004 and April 2007 respectively.

PP has installed 1MLD Effluent Treatment Plant (ETP) on 10 Dec'2013 to treat and recycle the wastewater generated from the production process. By treating and reusing wastewater, the company can contribute to environmental conservation and reduce soil contamination.

The sugar industry generates a significant amount of wastewater from various stages of production process, which contains high levels of pollutants such as organic matter, suspended solids, and various chemicals. The process includes water used for cane washing, which cleans the sugarcane before processing, and juice extraction, where water is utilized in the milling process to extract juice from the cane. During boiling and crystallization, water is employed to concentrate the juice and form sugar crystals. Additionally, water is used in cooling and condensing to cool and condense vapours during the boiling process. Finally, cleaning and maintenance activities within the factory premises also contribute to wastewater generation, as water is used to clean equipment and maintain hygiene standards.

If the wastewater is released into the environment without proper treatment, it can cause severe pollution, affecting aquatic life, soil quality, and human health.

Therefore, this project activity helps reduce the environmental impact by treating wastewater and utilizing it for Gardening and agricultural purposes such as Irrigation, further promoting sustainability.

Some Photos of the Project:

Aeration Tank

Clarifier tank

GIACL
GANGAMAI
INDUSTRIES & CONSTRUCTIONS LTD.

Ref. No.: GIACL/2024-25/31 **Date: 26/04/2024.**

To,
The Integrated Regional Office
MoEFCC; Regional Office (WCZ),
Ground Floor, East Wing,
New Secretariat Building,
Civil Lines, Nagpur – 440001

Sub. : Submission of Six Monthly Environment Compliance report for period October 2023 – March 2024 w.r.t Sugar Unit 5500 TCD and Co-generation Power Plant of 32MW by - **M/s.Gangamai Industries And Constructions Ltd.**, located at NajikBabhulgaon, Post: Rakshi, Tal.: Shevgaon, Dist.: Ahmednagar Maharashtra State.

Ref. : Environmental Clearance granted by SEAC; Department of Environment (DoE) Government of Maharashtra was granted vide Letter No.SEAC – 2014 / CR – 276/ TC-2 dated 11 March 2015.

Dear Sir,

This has reference to Environmental Clearance (EC) granted to our Sugar Unit 5500 TCD andCo-generation Power Plant of 32 MW – **M/s. Gangamai Industries and Constructions Ltd.**, At:NajikBabhulgaon, Post: Rakshi, Tal.: Shevgaon, Dist.: Ahmednagar Maharashtra State.

As per General Conditions No. 26 and 29 in the EC letter, we are submitting a six-monthly compliance report for the period of October 2023 – March 2024.

We hope the details furnished by us are in accordance with your requirements.

Thanking you,

Yours faithfully,

M/s. Gangamai Industries And Constructions Ltd.

V.S. Khedekar
Vice President

EIA Clearance certificate dated 11th March,2015

Sr No	Description	Permitted in CMD	Standards to	Disposal
2.	Domestic effluent	14	As per Schedule - I	onland for gardening / irrigation

5. **Conditions under the Air (P& CP) Act, 1981 for air emissions:**

Stack No.	Description of stack / source	Number of Stack	Standards to be achieved
1	Boiler	1	As per Schedule -II

(As per previous consent of existing unit)

6. **Conditions about Non Hazardous Wastes:**

Sr No	Type of Waste	Quantity	UoM	Treatment	Disposal
1	E.T.P.	700	Kg/Day	Used as a Manure	Used as a Manure
2	Ash	101	MT/Day	Sale to Bricks Manufacture /Used in Composting	Sale to Bricks Manufacture /Used in Compostiong

7. **Conditions under Hazardous & Other Wastes (M & T M) Rules 2008 for treatment and disposal of hazardous waste:**

Sr No	Type of Waste	HW Category.	Quantity & UoM	Treatment	Disposal
1	5.1 Used or spent oil	5.1	65 MT/A	Sprayed on Bagasse & Burn in Boiler	Sprayed on Bagasse & Burn in Boiler

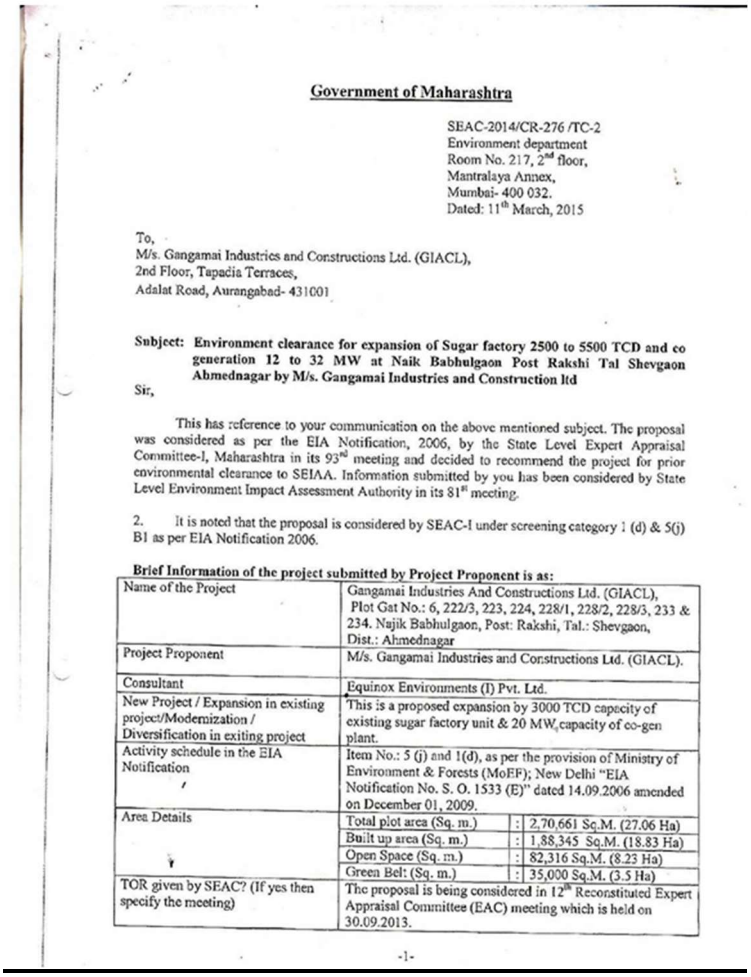
The applicant shall ensure disposal to the Actual user having permissions under Rule 9 of Hazardous and other Waste (M & TM) Rules, 2016.

a. The applicant shall properly collect, transport & regularly dispose of the hazardous waste to CHWTSDF, in compliance of the Hazardous & Other Wastes (Management & Transboundry Movement) Rules, 2016 and keep proper manifest thereof.

8. The Board reserves the right to review, amend, suspend, revoke etc. this consent and the same shall be binding on the industry.
9. This consent should not be construed as exemption from obtaining necessary NOC/permission from any other Government authorities.
10. Industry shall connect online CMS data as per CPCB guidelines to CPCB & MPCB Servers.
11. Industry shall stop production activity voluntarily in case of failure of operation and maintenance of the ETP system as preventive measures.
12. Industry shall extend all existing BGs towards O&M of pollution control systems and towards compliance of the Consent conditions.
13. This consent is issued as per the Consent Appraisal Committee meeting dated 19.06.2020 & 26.06.2020.
14. The 1st consent to operate for expansion shall be consider only after submission of NOC from CGWA/Irrigation department for use of ground water/surface water.
15. The applicant shall make an application for renewal of the consent at least 60 days before the date of the expiry of the consent.

Gangamai Industries And Constructions Ltd. (GIACL)/CR/UAN No.MPCB-CONSENT-0000092423 Page 2 of 11

Consent From MAHARASHTRA pollution control board



Government of Maharashtra

SEAC-2014/CR-276 /TC-2
Environment department
Room No. 217, 2nd floor,
Mantralaya Annex,
Mumbai- 400 032.
Dated: 11th March, 2015

To,
M/s. Gangamai Industries and Constructions Ltd. (GIACL),
2nd Floor, Tapadia Terraces,
Adalat Road, Aurangabad- 431001

Subject: Environment clearance for expansion of Sugar factory 2500 to 5500 TCD and co generation 12 to 32 MW at Naik Babhulgaon Post Rakshi Tal Shevgaon Ahmednagar by M/s. Gangamai Industries and Construction ltd

Sir,

This has reference to your communication on the above mentioned subject. The proposal was considered as per the EIA Notification, 2006, by the State Level Expert Appraisal Committee-I, Maharashtra in its 93rd meeting and decided to recommend the project for prior environmental clearance to SEIAA. Information submitted by you has been considered by State Level Environment Impact Assessment Authority in its 81st meeting.

2. It is noted that the proposal is considered by SEAC-I under screening category 1 (d) & 5(j) B1 as per EIA Notification 2006.

Brief Information of the project submitted by Project Proponent is as:

Name of the Project	Gangamai Industries And Constructions Ltd. (GIACL), Plot Gat No.: 6, 222/3, 223, 224, 228/1, 228/2, 228/3, 233 & 234. Najik Babhulgaon, Post: Rakshi, Tal.: Shevgaon, Dist.: Ahmednagar		
Project Proponent	M/s. Gangamai Industries and Constructions Ltd. (GIACL).		
Consultant	Equinox Environments (I) Pvt. Ltd.		
New Project / Expansion in existing project/Modernization / Diversification in exiting project	This is a proposed expansion by 3000 TCD capacity of existing sugar factory unit & 20 MW capacity of co-gen plant.		
Activity schedule in the EIA Notification	Item No.: 5 (j) and 1(d), as per the provision of Ministry of Environment & Forests (MoEF); New Delhi "EIA Notification No. S. O. 1533 (E)" dated 14.09.2006 amended on December 01, 2009.		
Area Details	Total plot area (Sq. m.)	:	2,70,661 Sq.M. (27.06 Ha)
	Built up area (Sq. m.)	:	1,88,345 Sq.M. (18.83 Ha)
	Open Space (Sq. m.)	:	82,316 Sq.M. (8.23 Ha)
	Green Bel: (Sq. m.)	:	35,000 Sq.M. (3.5 Ha)
TOR given by SEAC? (If yes then specify the meeting)	The proposal is being considered in 12th Reconstituted Expert Appraisal Committee (EAC) meeting which is held on 30.09.2013.		

-1-

Environmental Clearnce Report For all the unit

A.2. Project owner information, key roles and responsibilities

Project Proponent (PP):	Gangamai Industries & Constructions Ltd
UCR Project Aggregator	Viviid Emissions Reductions Universal Private Limited
Contact Information:	lokesh.jain@viviidgreen.com
Date PCNMR Prepared	25-10-2024

A.3. Land use and Drainage Pattern

Not Applicable.

This project activity involves treating and reusing wastewater. It doesn't include any land-use practices. Also, this is an industrial process designed with technical requirements and following the specified norms of local pollution control board. Hence, the project activity does not harm any land and Drainage system**.**

A.4. Climate

The project activity does not rely on the climatic conditions of the area as it treats and reuses only the wastewater from the sugar factory without letting the water be exposed to any climatic condition.

A.5. Rainfall

The project activity is not dependent on the rainfall pattern of the area as it treats and reuses the wastewater from the sugar factory.

A.6. Ground Water

The project activity does not draw water from the ground water reservoirs as it treats and reuses wastewater.

A.7. Alternate methods

[1]India is the topper sugar production from cane in the world. When Indian sugar industry has produced 100 lakh tones of press mud and 333 lakh tone of bagasse's with 16 to 76 m3 wastewater. It discharged 234699.59 lakh m3 of wastewater in the flow of river as well as in open duct. Due to concern wastewater flow in the river 20% of the water have polluted within one km. length of river. And when the wastewater is stored in open big duct when air pollution has been created around 1.5 to 2 km catchment area of concerned sugar factory.

TDS in effluent is treated in developed countries and in some other developing countries by adopting either of the two options:

(1) to combine it with domestic sewerage where it gets diluted for further treatment, or
(2) to discharge the high TDS treated effluent into the sea (marine discharge)

Unfortunately, neither of these options is readily available for the Ahmednagar sugar factories. In the first instance, the domestic sewerage from the areas where factories are concentrated (Ahmednagar) is not at all treated.

Secondly, marine discharge (of the treated effluent) option is impractical as the nearest seacoast is at least 600 km from the Ahmednagar district. Accordingly, the treated effluent is discharged as such into the irrigation and factory premises. Though Dhora River is situated within the limits of Ahmednagar, somehow, the PP has not been offered the choice of either diluting its effluent with city sewerage or marine discharge; so, here surface discharge of treated effluent is resorted to.

The RoU program promotes wastewater treatment and reuse initiatives, thereby offering an alternative to the release of wastewater through surface Discharge which could have an adverse impact on soil Health.

A.8. Design Specifications

The consumption of large volumes of water and the generation of organic compounds as liquid effluents are major environmental problems in the sugarcane processing industry. The inadequate and indiscriminate disposal of this effluent in soils and water bodies has received much attention for decades ago, due to environmental problems associated with this practice. The sugar cane

[1] https://shodhgangotri.inflibnet.ac.in/bitstream/20.500.14146/340/2/02_introduction.pdf

industry is among those industries with the largest water demands and, in addition, is an important source of nontoxic organic pollution combined with the fact that India it is second largest producer and largest consumer makes it more important.

The operation of the ETP is such that it will give an effluent of such standard, prescribed by the Maharashtra Pollution Control Board (MPCB).

A. Screen chamber cum oil & grease tank

The screen chamber (Bar Screen) is used to remove large floating objects. The untreated effluent may contain large floating solids, paper etc. The screening chamber prevents these materials from choking pipe system and clogging the pumps, impellers and aberration to equipments.in this chamber, all these materials are removes by bar screen which are 10 mm wide and 50 mm deep, arranged with spacing of 20 mm between 2 adjacent bars. For removal of trapped matter frequent cleaning activities is carried out. Oil & grease chamber works for the removal of oil & grease from the in[2]fluent which may cause damage to pumping unit, hazard to biological treatments. The combination of the bar screen and oil and grease chamber is provided in the ETP as shown in the Process flow diagram below.

B. Equalization Tank

Equalization basins may be used for temporary storage of diurnal or wet-weather flow peaks. Basins provide a place to temporarily hold incoming sewage during plant maintenance and a means of diluting and distributing batch discharges of toxic or high-strength waste which might otherwise inhibit biological secondary treatment (including portable toilet waste, vehicle holding tanks, and septic tank pumpers). Flow equalization basins require variable discharge control, typically include provisions for bypass and cleaning, and may also include aerators. Cleaning may be easier if the basin is downstream of screening and grit removal.

C. Neutralization Tank

Neutralization tanks are generally provided for through mixing of the influent which if held in the equalization tank. The mixing is carried out with the help of mechanical stirrers.

D. Aeration Tank

with aerators Aeration is the process by which air is circulated through, mixed with or dissolved in a liquid or substance. Hence aeration tanks are provided to aerate the wastewater by the biological treatment of the waste can be carried with greater efficiency.

E. Clarifier Clarifiers are settling tanks built with mechanical means for continuous removal of solids being deposited by sedimentation. A clarifier is generally used to remove solid particulates

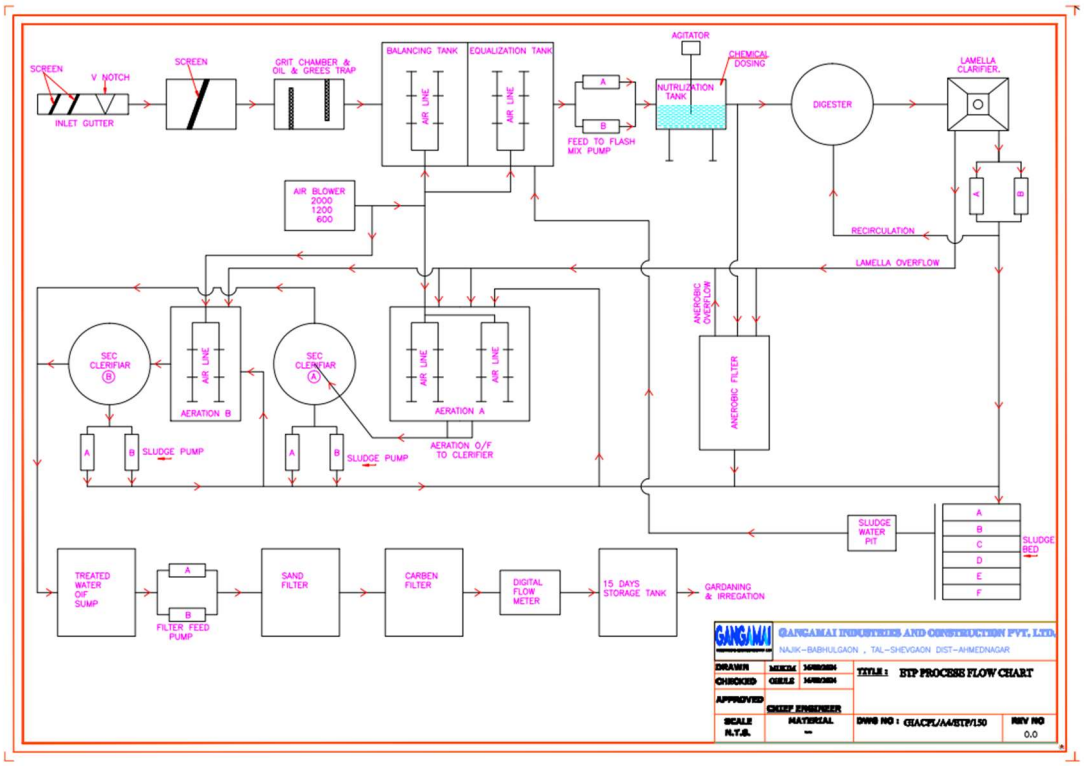
[2] https://ijsrst.com/paper/164.pdf

or suspended solids from liquid for clarification and (or) thickening. Concentrated impurities, discharged from the bottom of the tank are known as sludge, while the particles that float to the surface of the liquid are called scum.

Treatment Process

Before entering the balancing tank, the effluent flow is measured using a V-notch. Lime and alum are initially used to neutralize the effluent in the neutralization tank, adjusting its pH to a neutral level. After this pretreatment, the water passes through primary and secondary clarifiers to remove suspended solids. Polyelectrolyte is added to the clarifiers to facilitate sludge settling. In the tertiary treatment stage, sand and carbon filters are employed to further purify the water by removing impurities and contaminants. The treated water is then safely disposed of through gardening and irrigation in the nearby village. This treatment process ensures that the wastewater is rendered harmless before being returned to the environment.

There are three flow meters, which are electromagnetic flow meters, monitored by the project activity through maintaining a logbook. Forbes Marshall's KROHNE is the suppliers of the flow meters. Gangamai Industries is responsible for the operation and maintenance of the ETP plant. They check the water quality on a regular basis, in accordance with the Maharashtra Pollution Control Board.



Process flow diagram of Gangamai ETP plant

Effluent water Characteristics of Gangamai ETP

Sr. No.	Effluent Characteristics	Sugar Factory	Co-generation	Distillery	Resultant Characteristics
1	pH	5-6	6-7	4-5	5-6
2	BOD (mg/l)	1000-1200	80-100	1200-1500	1000-1200
3	COD (mg/l)	2000-2500	200-250	2500-3000	2500-2800
4	TDS (mg/l)	1800-2000	3000-4000	1500-2000	1800-2200
5	SS (mg/l)	200-300	100-150	300-400	250-300

Design Calculations for ETP units and their specification

Design basis			
Unit	Volume of tank M3 /Hr	Effluent flow **M^3/Day**	Detention Time **Hr**
Balancing Tank	41.66	1000	3
Equalisation Tank	41.66	1000	4.5
Reaction Tanks	10.5	1000	15

Table : Gangamai ETP performance MPCB standards

Sl. No.	Parameter	Effluent Value in mg/l(expect pH)	Treated water value mg/l(expect pH)	Limits acceptable By MPCB
1	Ph	3.49	7.5	7 to 8
2	Suspended Solids	165.2	63.91	100mg/lit
3	Total dissolved Solids	2982.14	1120.58	2100mg/lit

4	COD	2741.77	86.95	250mg/lit
5	B.O.D, 5-day 20 C	1305.69	27.01	100mg/lit
6	Chlorides as Cl-	695.24	196.35	<150
7	Sulphates as SO4-	541.87	148.02	<150
8	Oil & Grease	<5	<5	--

Design basis of ETP

Primary Treatment

Time	Inlet				Neutralization Tank				Settling Tank /Primary Clarifier Outlet				Sludge Geneartion per day in Kg
	Flow m3/Hr	pH	COD mg/l	SS mg/l	pH	Blower in Opeartion	Acid Dosing kg	Alkali Dosing Kg	HRT (in Hrs)	SS mg/l	COD mg/l	Polyelectrolytes/Coagulant addition in Kg	
10:00 am	17	4.9	1780	327	7.5	Yes	-	400	16	270	1246	02	2m3

Activated Sludge Process

Inlet						AERATION TANK								Secondary Clarifier Outlet					COD Reduction in %	BOD Reduction in %	Sludge Geneartion per day in Kg	Chemical Consumption		
Flow m3/Hr	pH	COD mg/l	BOD mg/l	SS mg/l	TDS mg/l	pH	DO mg/l	MLSS mg/l	MLVSS mg/l	COD mg/l	BOD mg/l	F/M Ratio	SVI	HRT Hrs	SS mg/l	COD mg/l	Sludge Recirculation rate (%)	Solids Concentartion in return sludge mg/l				A (kg)	B (kg)	C (kg)
17	7.5	1246	623	270	1450	7.5	3.7	3900	-	207	103	0.3	94	06	39	138	10	700	92	92	400	-	02	400

Sand & Carbon Filter

Inlet				Sand/Carbon Filter Outlet			Sand Filter Backwash Time	Carbon Filter Backwash Time	Filer Media Change if any
Flow m3/Hr	COD mg/l	SS mg/l	Color	COD mg/l	SS mg/l	Color			
17	138	39	clear water	129	27	crystalline water	20 minuts	20 minuts	-

A.9. Implementation Benefits to Water Security

The sugar factory contains chloride and sulphates (and to smaller extent others such as phosphates, nitrates etc.) of metals such as sodium, calcium etc.

The implementation of ETPs has been crucial in safeguarding soil contamination by effectively treating this harmful effluent.

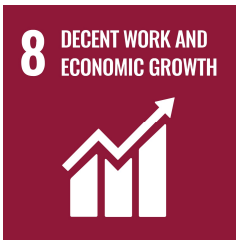
Recycling wastewater from the sugar factory and reusing it to the irrigation after treatment is a pivotal step toward sustainability. This circular approach significantly reduces the reliance on groundwater, a precious natural resource. By minimizing the demand for fresh water, factories can contribute to water conservation efforts and alleviate pressure on depleting aquifers.

This project aims to inspire sugar factories, particularly large multinational corporations, to implement sustainable water management practices. By demonstrating effective strategies for reducing captive water consumption and responsibly managing groundwater, the project hopes to foster a broader adoption of environmentally responsible approaches within the industry.

The sustainable development attributes attached to the project activity are demonstrated below:

Sustainable Development Goals Targeted	Most relevant SDG Target/Impact	Indicator (SDG Indicator)
	13.2: Integrate climate change measures into national policies, strategies and planning	Recycling and reusing wastewater is an effective solution for climate change adaptation because it helps mitigate the impacts of droughts, floods, and other extreme weather events that are becoming increasingly common due to climate change due to water scarcity. The quantity of wastewater recycled and reused by the PP is the SDG indicator.
	3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	The PP showcases how recycling and reusing wastewater can prevent depletion of natural water reserves and prevent water scarcity during droughts. The hazardous impact of industrial wastewater is now avoided due to this project. The PP ensures water availability in water-scarce zones that help promotes healthy lives and well-being in the region.

	4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	PP has provided School bus to the staff and children for better transportation. PP has installed smart tv in the nearest village school and constructed Classroom in nearest village. PP has conducted Educational & Health Awareness for the employees and villagers.
	6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally 6.6: By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.	The PP has showcased recycling and safe reuse of 1000 million liters within the industry during this monitored period, which directly correlates to this indicator 6.3 To overcome the cyclic rotation of drought, PP has implemented water conservation resources. PP has provided recourses to the working area and every year they are completing KT Weirs (Bandharas) through 'Gangamai Pattern' resulting into increased rain water conservation at least 08 to 10 villages under the scheme and have a program of complete eradication of drought from of the working area within next 05 years. PP has provided RO water plant to the local area for safe drinking water.

	8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	PP has created Number of jobs and the Number of people trained as part of this project activity.

A9.1 Objectives vs Outcomes

The impact assessment or objectives of this project activity can generally be enumerated as follows:

- The project activity highlights the catalytic role that corporate India must play vital role in reducing industrial water consumption as well as water pollution per unit of industrial output.
- The PP has showcased technology that creates safe industrial grade water from an effluent source and has overcome the challenges faced by the alternate methods implemented and/or being proposed for the same.
- The PP has showcased the successful wastewater treatment of industrial effluent, thus saving millions of liters of wastewater.
- The project activity showcases best-in-class wastewater treatment technology that can replace the equivalent freshwater and industrial demand in different sectors for nonportable purposes while reducing the proportion of untreated wastewater and substantially increasing recycling and safe reuse in the project activity area.

A9.2 Interventions by Project Owner / Proponent / Seller

The project activity hence achieves the sustainable management and efficient use of India's natural resources since the PP had the option to install bore wells that would have depleted the local groundwater resources and/or continued to use existing drinking water resources in the surrounding area. The PP has instead intervened and chosen to treat and reuse ETP effluent voluntarily at significant costs, thus saving millions of liters of safe drinking water for the city.

Increase in population density and improvement in quality of life has resulted in an increase in demand of natural resources like water. Groundwater being the major source of water supply catering to about 85% of rural water supply, the stress on groundwater is ever increasing. It has resulted in over-exploitation of the resources at places. The situation demands a reorientation of the strategy for its development and management.

The intervention of the PP has had a direct impact on the water security of the area. Over-development of the ground water resources results in declining ground water levels, shortage in water supply, intrusion of saline water in coastal areas and increased pumping lifts necessitating deepening of ground water structures and increase in power costs.

A.10. Feasibility Evaluation

The installed ETP by the PP are robust and smoothly adapts to variations in wastewater effluent. Before establishing the project, PP has done the feasibility test as per MPCB Standard.

A.11. Ecological Aspects:

This project demonstrably achieves sustainable management and efficient utilization of India's natural resources. The project proponent (PP) had the option to install borewells, potentially depleting local groundwater reserves. Alternatively, they could have continued relying on existing, potentially potable, water resources registered with the Universal Water Registry.

Recognizing the environmental impact, the PP commendably opted for a more sustainable approach. They chose to treat and reuse the effluent generated by the Effluent Treatment Plant (ETP), resulting in significant water savings for the sugar industry operations, measured in millions of liters.

This project encourages the industrial sector, particularly large-scale sugar factories processing facilities, to adopt similar sustainable practices regarding their captive water needs and overall groundwater management.

The ETP effectively treats the wastewater comes from Sugar making process, and the use in irrigation & gardening within the area further safeguards against potential leakage and contamination of surrounding soil.

PP has conducted the Environment Impact assessment for the project activity and implemented the safe disposal of Manure and solid waste.

Ecological Issues addressed by the project activity in terms of	
Inundation of habitated land	The project does not lead to inundation of residential land.
Creation of water logging and vector disease prevention mitigation	The ETP effluent is being treated season wise. Impervious flooring is done in ETP area to avoid any type of leakage that can be percolated into the surrounding soil.
Deterioration of quality of groundwater	By avoiding the use of borewells the project activity does not deplete aquifers and hence prevents the depletion of groundwater resources.

A.12. Recharge Aspects:

NA

A.12.1 Solving for Recharge

Water Budget Component	Typical Estimated Uncertainty (%)	Description
Surface Inflow	1%	In accordance with the RoU Standard version 7, and considering that the flow meters are calibrated, PP has accounted for a 1% uncertainty factor in both inflow and outflow volumes to maintain a conservative approach. Consequently, an uncertainty factor of 0.98 is applied to all ROUs.
Precipitation	NA	Not available
Surface Outflow	1%	In accordance with the RoU Standard version 7, and considering that the flow meters are calibrated, PP has accounted for a 1% uncertainty factor in both inflow and outflow volumes to maintain a conservative approach. Consequently, an uncertainty factor of 0.98 is applied to all ROUs.

Evapotranspiration	NA	Not available
Deep Percolation	NA	Not available

A.13. Quantification Tools

Baseline scenario:

The baseline scenario is the situation where, in the absence of the project activity, the PP would have **one or all** of the below options:

- (a) installed multiple bore wells within the project boundary which would have depleted the local groundwater resources (aquifers); **and/or**
- (b) diverted existing safe drinking water resources from the surrounding residential area; **and/or**
- (c) discharged the ETP effluent without further recycling and reuse.

Hence the following baseline scenario is applicable for this project activity:

"The net quantity of treated ETP effluent / wastewater that would be discharged directly into the local drain/sewer without further being recycled and/or reused daily post treatment per year"

The net quantity of treated water used is measured via flow meters installed at the site. The primary set of data records are kept at plant level, managed by Gangamai team. Also, for conservative purposes, the working days or operational days have been assumed at 180 days in a year during the 1st monitoring period. However, the number of days is not an influential parameter on RoUs calculation as RoUs are calculated based on total quantity of treated water being recycled & reused.

Season	Month	ETP Inlet m3	ETP outlet m3	Recycled & Reused water m3	RoUs	Year wise RoUs
Nov 2013- Apr 2014	Jan-14	7628	7854	7854	7697	44770
	Feb-14	7146	7279	7279	7133	
	Mar-14	7875	7765	7765	7610	
	Apr-14	7455	7455	7455	7306	
Nov 2014- June 2015	Nov-14	7646	7396	7396	7248	
	Dec-14	7812	7935	7935	7776	

	Jan-15	7763	7844	7844	7687	
	Feb-15	7345	7079	7079	6937	
	Mar-15	7816.8	7821	7821	7665	
	Apr-15	7627.2	7540	7540	7389	62240
	May-15	7864.8	7833	7833	7676	
	Jun-15	7536	7569	7569	7418	
	Nov-15	7537	7396	7396	7248	
	Dec-15	10632	10428	10428	10219	
Nov2015-Apr 2016	Jan-16	10308	10440	10440	10231	
	Feb-16	9600	9708	9708	9514	
	Mar-16	10356	10404	10404	10196	59623
	Apr-16	10332	10032	10032	9831	
	Nov-16	9948	10020	10020	9820	
Nov 2016-Feb2017	Dec-16	10236	10236	10236	10031	
	Jan-17	10296	10176	10176	9972	
	Feb-17	9576	9600	9600	9408	39514
	Nov-17	9924	10020	10020	9820	
	Dec-17	10596	10524	10524	10314	
	Jan-18	10248	10260	10260	10055	
Nov2017-Jun2018	Feb-18	9660	9624	9624	9432	
	Mar-18	10260	10236	10236	10031	
	Apr-18	9936	9912	9912	9714	
	May-18	10128	10380	10380	10172	81673
	Jun-18	9984	10044	10044	9843	
	Oct-18	2268	2340	2340	2293	
	Nov-18	9924	10020	10020	9820	
	Dec-18	10596	10524	10524	10314	
Oct2018-Apr2019	Jan-19	7993.8	7101	7101	6959	
	Feb-19	7568.6	6695	6695	6561	
	Mar-19	8259.8	6995	6995	6855	41807
	Apr-19	11220	10080	10080	9878	
	Nov-19	2687	2637	2637	2584	
	Dec-19	9276	9152	9152	8969	
Nov2019-Apr2020	Jan-20	9233	9109	9109	8927	
	Feb-20	6724	6556	6556	6425	38332
	Mar-20	5855	5731	5731	5616	

	Oct-20	1665	1623	1623	1591	
	Nov-20	8011	7801	7801	7645	
	Dec-20	8480	8294	8294	8128	
	Jan-21	7254	7006	7006	6866	
Oct2020-June2021	Feb-21	8050	7854	7854	7697	
	Mar-21	9811	9532	9532	9341	
	Apr-21	9425	9155	9155	8972	68295
	May-21	8852	8604	8604	8432	
	Jun-21	8846	8546	8546	8375	
	Nov-21	8920	8860	8860	8683	
	Dec-21	10246	10132	10132	9929	
	Jan-22	10527	10686	10686	10472	
	Feb-22	9673	9552	9552	9361	
Nov2021-July2022	Mar-22	11064	9664	9664	9471	
	Apr-22	10538	10355	10355	10148	
	May-22	11253	10969	10969	10750	72329
	Jun-22	7128	6829	6829	6692	
	Jul-22	3016	2765	2765	2710	
	Nov-22	2695	2669	2669	2616	
Nov2022-May2023	Dec-22	11316	10316	10316	10110	
	Jan-23	12507	11485	11485	11255	
	Feb-23	10419	10279	10279	10073	
	Mar-23	11552	11366	11366	11139	
	Apr-23	6353	6233	6233	6108	60552
	May-23	1728	1702	1702	1668	
Nov-23	Nov-23	10262	10082	10082	9880	
	Dec-23	10796	10641	10641	10428	
						569,135

Quantification of RoUs based on annualized data:

Year	Total ROUs (1000 liters)/yr UCR Cap(1 million RoUs/yr
2014	44770
2015	62240
2016	59623

2017	39514
2018	81673
2019	41807
2020	38332
2021	68295
2022	72329
2023	60552
Total RoUs	**569,135**

A.14. UWR Rainwater Offset Do No Net Harm Principles

According to the UCR RoU Standard principles, the project activity accomplishes the following:

- Increases the sustainable water yield in areas where over development has depleted the aquifer

According to the data released by the Central Groundwater Board in 2021, the total amount of groundwater that can be utilised in India in a year is 398 billion cubic meters (BCM), of which, approximately 245 BCM is currently being utilised, which is about 62 per cent of the total. But the level of exploitation of groundwater is very high in States like Punjab, Rajasthan, Haryana, Delhi and Tamil Nadu. This project activity was commissioned in 1995, and the PP has reduced the proportion of untreated wastewater that future generations would need to recycle and has showcased recycling and safe reuse within the industry from unutilized water resources. Revenue from the sale of UCR RoUs will enable scaling up of such project activities.

- Collect unutilized water or rainwater and preserve it for future use

In India, at the district level, in 24 states/UTs, as many as 267 districts had stages of groundwater extraction more than 63 per cent, ranging from 64 per cent to 385 per cent (source: https://www.business-standard.com/article/current-affairs/from-58-to-63-india-pumpedmore-groundwater-between-2004-and-2017-121122101377_1.htm l). This project activity serves as an example to recycle and reuse wastewater and encourages companies, especially large and transnational companies in the biotechnology and biopharmaceuticals sector, to adopt similar sustainable practices in regard to captive water requirements and groundwater management.

- Conserve and store excess water for future use

The project activity decreases the dependence on groundwater, thereby preventing excessive depletion. Between 2013 to 2024, the project activity has reused 1000 million litres of ETP effluent successfully post treatment with gainful end use of the same.

A.15. Scaling Projects-Lessons Learned-Restarting Projects

With rapid and unplanned urbanization and economic growth, the demand for fresh water for various purposes is on the rise in India. However, spatio-temporal variations in freshwater availability, vagaries of the monsoon and variability in climate, as well as human, development and management challenges pose great threats to water supplies in the country. While excessive withdrawal from surface and underground sources and inefficient use of water were recognized as reasons for reduced availability of fresh water with respect to space and time, the role of pollution of water sources, both surface and ground water, in reducing the quantum of available fresh water for various uses, has not received due importance. It is estimated that 75-80 per cent of water pollution in terms of volume of water polluted is from domestic sewage. The data on water quality in rivers upstream and downstream of selected cities over a period of time was analyzed to understand the changes in crucial water quality parameters over time. The status of sewage treatment across Indian states was also studied, to understand the gaps in waste water treatment. The existing institutional and legal measures available for the control of water pollution were also analyzed.

Health and economic prosperity being very much dependent on clean water supply and good sanitation, an integrated approach balancing infrastructure and socio-economic measures for water quality management is proposed. The paper further argues for construction of new wastewater treatment infrastructure, improvement of the existing wastewater treatment systems, upgrading of wastewater treatment technologies and renovation of the sewer system, all with an accent on economic viability and environmental sustainability. It is also necessary to create awareness on sanitation and pollution issues among users to ensure their cooperation in maintaining their own environments.

Water Crisis

Maharashtra's water storage Down to 23% in 2,499 dams

Water storage in 2,994 dams across Maharashtra has dropped to 23.01 per cent at the end of May, as against 32.36 per cent last year for the same corresponding period, states data from the state Water Resources Department.
While the total live water storage capacity for 2,994 dams is 40485.04 MLD (megalitres per day), at present, this is down to 9,316.80 MLD.[3]

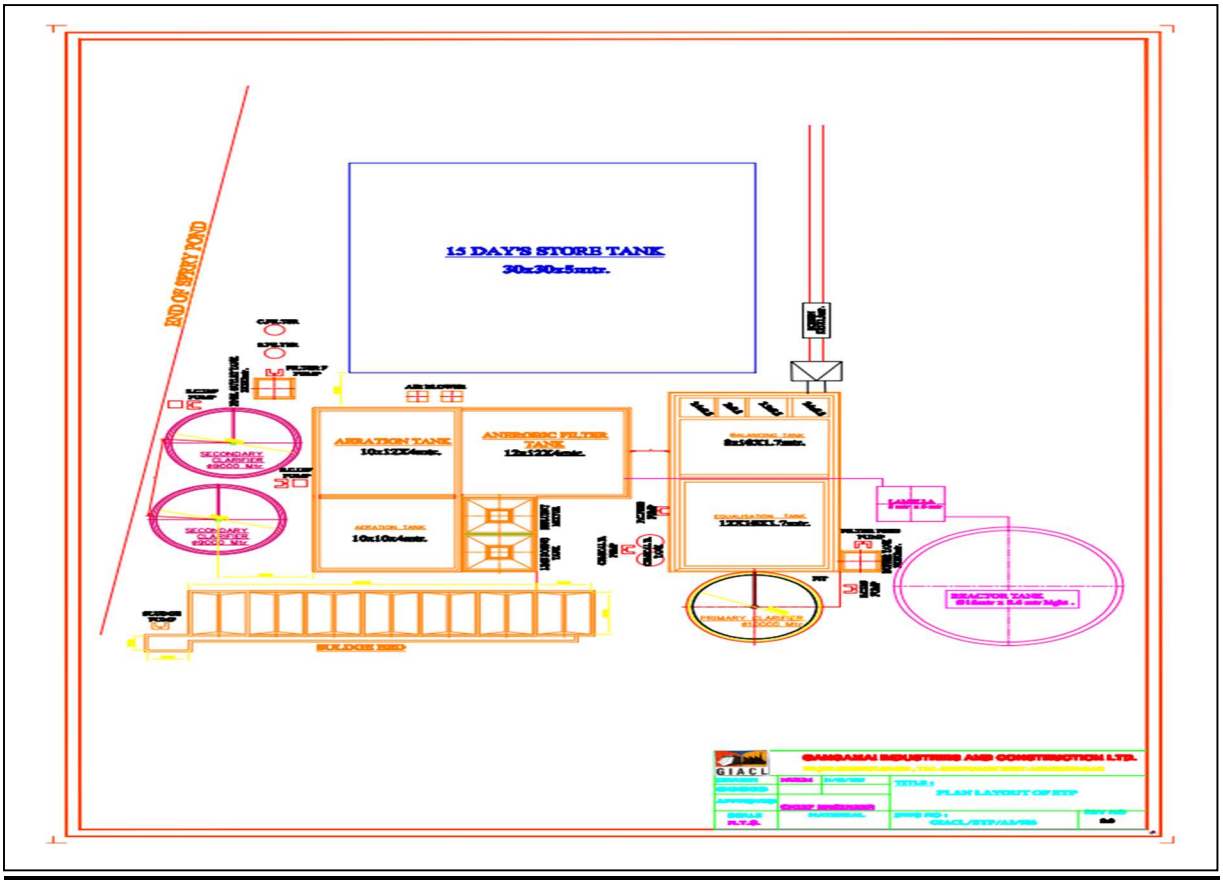
Almost 24 districts of 36 in Maharashtra are reeling under a water crisis. To bridge the demand and supply of water, more than 10,000 tankers have been deployed to provide water in remote hamlets and villages in drought prone talukas across these districts.

The worst affected are seven districts of Marathwada region — Beed, Jalna, Latur, Parbhani, Dharashiv, Nanded and Chattrapati Sambhajinagar. The crisis is reflected in water stored in 920 dams in Marathwada region, which is at its lowest at the end of this May at 9.18 per cent. it was 36.61 per cent for the corresponding time in 2023.

Revenue from water credits (RoUs) provides a much needed incentive to encourage voluntary treatment and reuse of similar ETP effluents across industries, enabling them to be built at the scale and speed demanded by the present climate and global heating crisis.

[3] https://indianexpress.com/article/cities/mumbai/water-storage-down-dams-maharashtra-9357590/

Appendix-Plant Layout of Gangamai ETP Plant



EnviroConnect
Environmental Monitoring

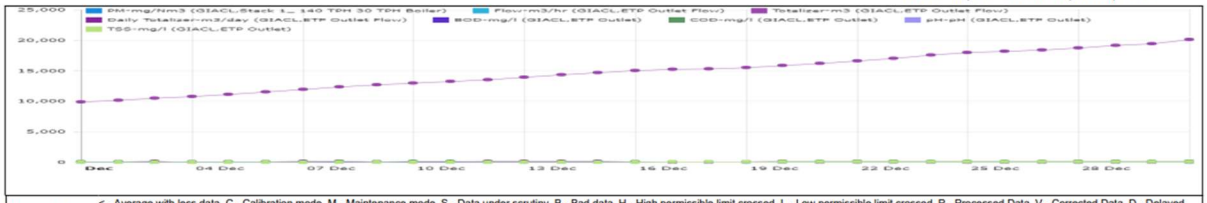
LOGO

FORBES MARSHALL

Forbes Marshall
Multi Station Report

From : 01-01-2024 00:00:00 **To :** 31-01-2024 23:59:59
Interval : Daily **Function :** Average

Maximum 10 parameters can be exported in pdf format.



Flag legends: < - Average with less data, C - Calibration mode, M - Maintenance mode, S - Data under scrutiny, B - Bad data, H - High permissible limit crossed, L - Low permissible limit crossed, P - Processed Data, V - Corrected Data, D - Delayed Data.

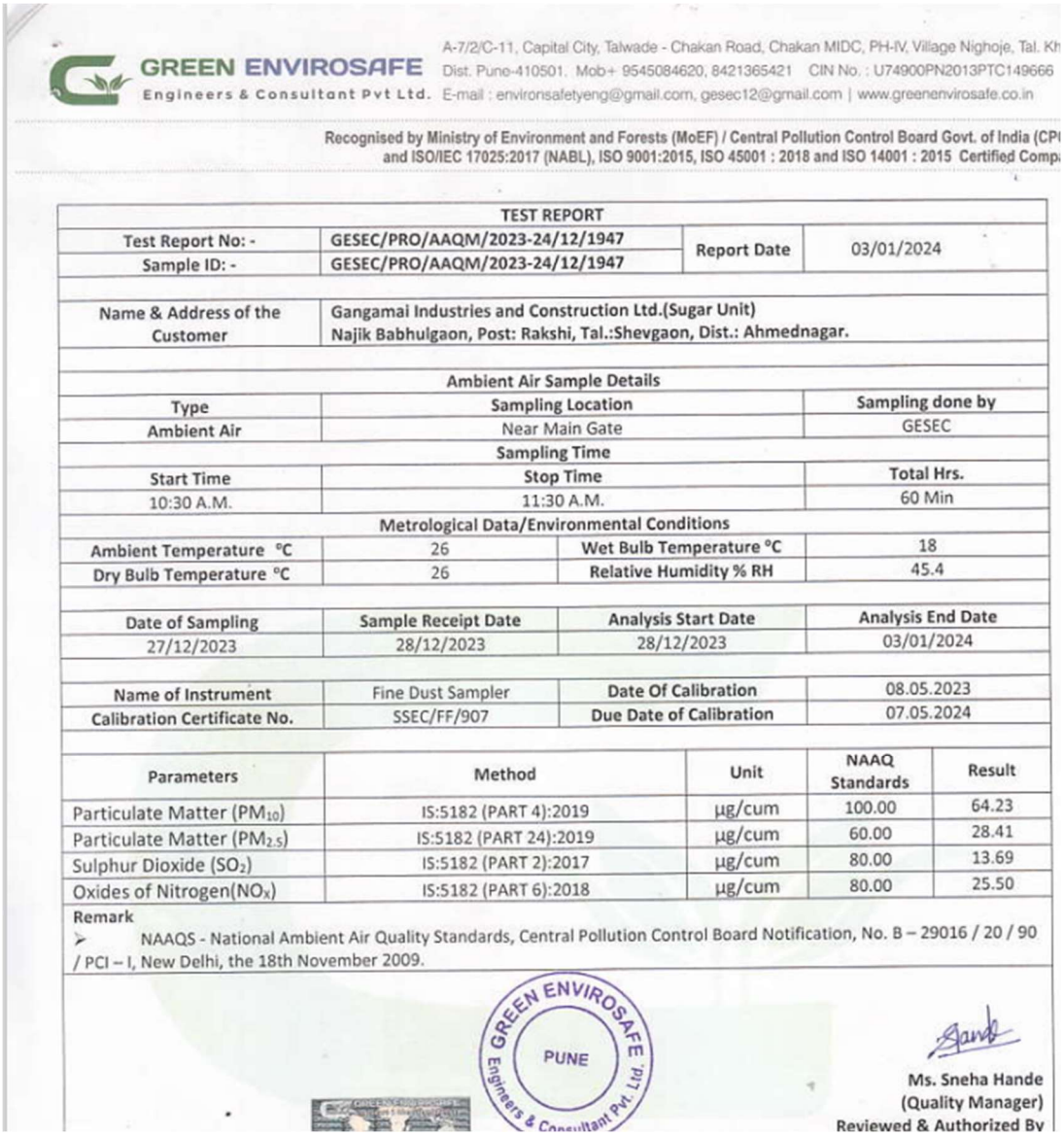
Calender	PM Avg	Flow Avg	Totalizer Avg	Daily Totalizer Avg	BOD Avg	COD Avg	pH Avg	TSS Avg		
Plant	GIACL	GIACL	GIACL	GIACL	GIACL	GIACL	GIACL	GIACL		
Station	Stack 1_ 140 TPH 30 TPH Boiler	ETP Outlet Flow	ETP Outlet Flow	ETP Outlet Flow	ETP Outlet	ETP Outlet	ETP Outlet	ETP Outlet		
Units	mg/Nm3	m3/hr	m3	m3/day	mg/l	mg/l	pH	mg/l		
Range	0 - 150			0 - 463	0 - 100	0 - 250	5.5 - 8.5	0 - 100		
01-01-2024 00:00:00	55.23	19.2240	20563.0884	162.20 P	76.50 <	153.00 <	7.53 <	40.79 <		
02-01-2024 00:00:00	55.33	18.4139	21011.6911	156.46 P	76.50 <	153.00 <	7.53 <	40.79 <		
03-01-2024 00:00:00	58.90	19.3856	21448.2377	147.95 P	76.50 <	153.00 <	7.53 <	40.79 <		
04-01-2024 00:00:00	60.00 <	20.3481	21910.0654	150.57 P	76.50 <	153.00 <	7.53 <	40.79 <		
05-01-2024 00:00:00	60.00 <	16.4853	22416.5402	62.71 P	76.50 <	153.00 <	7.53 <	40.79 <		
06-01-2024 00:00:00	57.35 <	18.9453	22720.0371	107.48 P	26.85 < R	72.11 < R	7.57 <	38.51 <		
07-01-2024 00:00:00	72.48 <	18.6456	23273.0406	164.86 P	1.87 < R	6.94 <	7.58 <	38.24 <		

Page 1 of 3 http://115.114.10.246:8080/enviroconnect Generated By : GSAIL 18-04-2024 17:23:02

Performance of electromagnetic Flow meter

Appendix 1 -Calibration Details

A. Fine dust sampler



GREEN ENVIROSAFE
Engineers & Consultant Pvt Ltd.

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Dist. Pune-410501. Mob+ 9545084620, 8421365421 CIN No. : U74900PN2013PTC149666
E-mail : environsafetyeng@gmail.com, gesec12@gmail.com | www.greenenvirosafe.co.in

Recognised by Ministry of Environment and Forests (MoEF) / Central Pollution Control Board Govt. of India (CP
and ISO/IEC 17025:2017 (NABL), ISO 9001:2015, ISO 45001 : 2018 and ISO 14001 : 2015 Certified Comp

TEST REPORT

Test Report No: -	GESEC/PRO/AAQM/2023-24/12/1947	Report Date	03/01/2024
Sample ID: -	GESEC/PRO/AAQM/2023-24/12/1947		
Name & Address of the Customer	Gangamai Industries and Construction Ltd.(Sugar Unit) Najik Babhulgaon, Post: Rakshi, Tal.:Shevgaon, Dist.: Ahmednagar.		

Ambient Air Sample Details

Type	Sampling Location	Sampling done by
Ambient Air	Near Main Gate	GESEC

Sampling Time

Start Time	Stop Time	Total Hrs.
10:30 A.M.	11:30 A.M.	60 Min

Metrological Data/Environmental Conditions

Ambient Temperature °C	26	Wet Bulb Temperature °C	18
Dry Bulb Temperature °C	26	Relative Humidity % RH	45.4

Date of Sampling	Sample Receipt Date	Analysis Start Date	Analysis End Date
27/12/2023	28/12/2023	28/12/2023	03/01/2024

Name of Instrument	Fine Dust Sampler	Date Of Calibration	08.05.2023
Calibration Certificate No.	SSEC/FF/907	Due Date of Calibration	07.05.2024

Parameters	Method	Unit	NAAQ Standards	Result
Particulate Matter (PM_{10})	IS:5182 (PART 4):2019	µg/cum	100.00	64.23
Particulate Matter ($PM_{2.5}$)	IS:5182 (PART 24):2019	µg/cum	60.00	28.41
Sulphur Dioxide (SO_2)	IS:5182 (PART 2):2017	µg/cum	80.00	13.69
Oxides of Nitrogen(NO_x)	IS:5182 (PART 6):2018	µg/cum	80.00	25.50

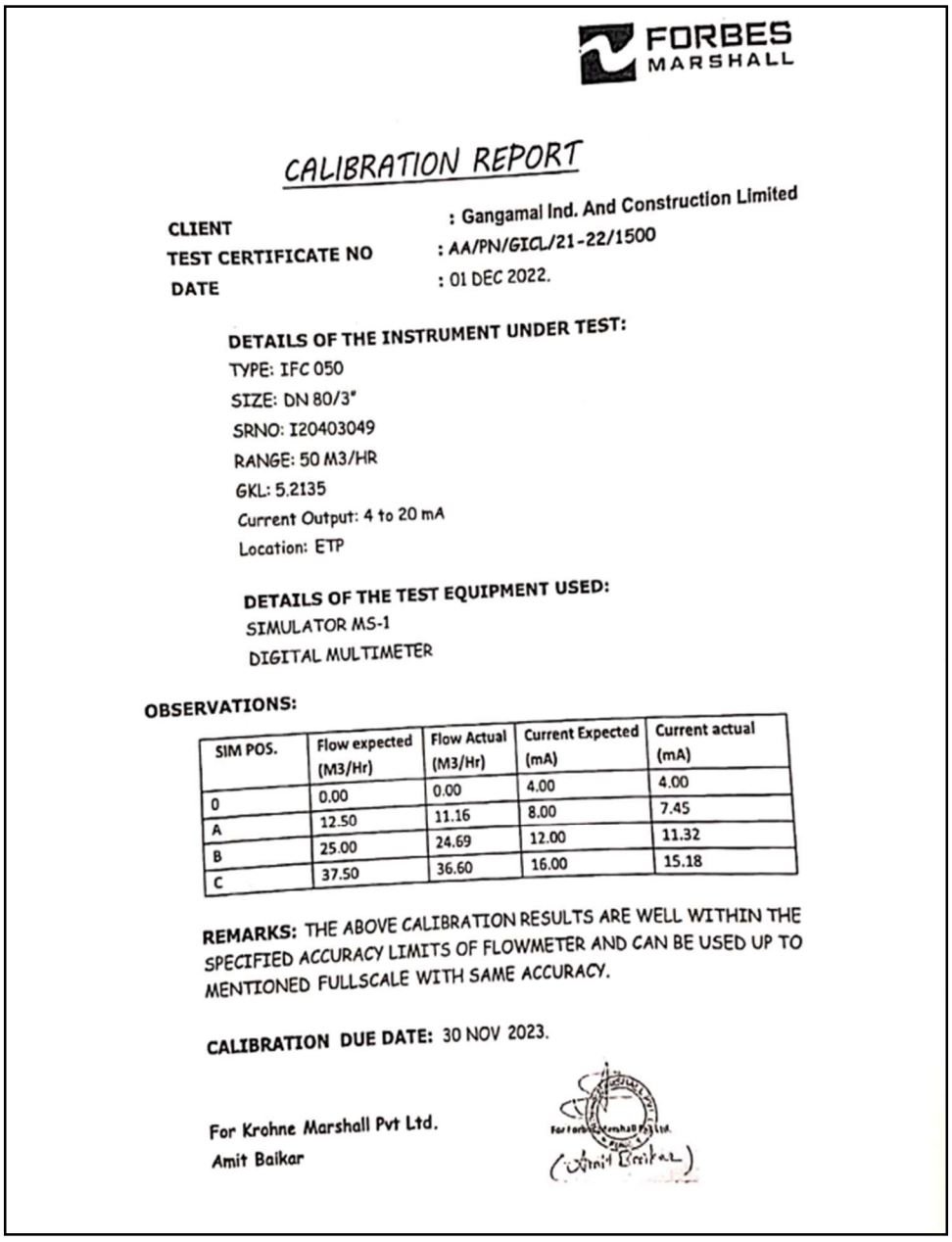
Remark

- NAAQS - National Ambient Air Quality Standards, Central Pollution Control Board Notification, No. B – 29016 / 20 / 90 / PCI – I, New Delhi, the 18th November 2009.

GREEN ENVIROSAFE Engineers & Consultant Pvt. Ltd. PUNE

Ms. Sneha Hande
(Quality Manager)
Reviewed & Authorized By

B. Calibration: Digital Multimeter



FORBES MARSHALL

CALIBRATION REPORT

CLIENT : Gangamal Ind. And Construction Limited
TEST CERTIFICATE NO : AA/PN/GICL/21-22/1500
DATE : 01 DEC 2022.

DETAILS OF THE INSTRUMENT UNDER TEST:

TYPE: IFC 050
SIZE: DN 80/3"
SRNO: I20403049
RANGE: 50 M3/HR
GKL: 5.2135
Current Output: 4 to 20 mA
Location: ETP

DETAILS OF THE TEST EQUIPMENT USED:

SIMULATOR MS-1
DIGITAL MULTIMETER

OBSERVATIONS:

SIM POS.	Flow expected (M3/Hr)	Flow Actual (M3/Hr)	Current Expected (mA)	Current actual (mA)
0	0.00	0.00	4.00	4.00
A	12.50	11.16	8.00	7.45
B	25.00	24.69	12.00	11.32
C	37.50	36.60	16.00	15.18

REMARKS: THE ABOVE CALIBRATION RESULTS ARE WELL WITHIN THE SPECIFIED ACCURACY LIMITS OF FLOWMETER AND CAN BE USED UP TO MENTIONED FULLSCALE WITH SAME ACCURACY.

CALIBRATION DUE DATE: 30 NOV 2023.

For Krohne Marshall Pvt Ltd.
Amit Baikar

Appendix 2 - Details of flow meter

V Notch – inlet gutter

Outlet Flow meter

Multiparameter Analyzer

Flow meter Display

Appendix 3 -Water quality test for both Effluent and Treated water

TEST REPORT

Test Report No: GESEC/PRO/WW/2023-24/12/1954	Report Date	03/01/2024
Sample ID : GESEC/PRO/WW/2023-24/12/1954	Sample Details	ETP Untreated
Gangamai Industries and Construction Ltd. (Sugar Unit) Najik Babhulgaon, Post: Rakshi, Tal.:Shevgaon, Dist.: Ahmednagar.	Type of Sample	Waste Water
	Volume Of Sample	1 Lit plastic bottle
	Sample Status	Sealed
	Sample Collected By	GESEC
	Date of Sample Collection	27/12/2023
	Sample Receipt Date	28/12/2023
	Analysis start Date	28/12/2023
	Analysis End Date	03/01/2024

Parameters	Results	Unit	Standard Method
pH	3.49	--	APHA 4500 H+,B 24th ED:2023
Suspended Solids (SS)	165.20	mg/lit	APHA 2540 D 24th ED:2023
Total Dissolved Solids (TDS)	2982.14	mg/lit	APHA 2540,C,24th ED:2023
Chemical Oxygen Demand (COD)	2741.77	mg/lit	IS 3025 (Part 58) , 2019
Biochemical Oxygen Demand (BOD)	1305.69	mg/lit	IS 3025 (Part 44), 2019
Chlorides as Cl-	695.24	mg/lit	APHA 4500 Cl- B,24th ED:2023
Sulphates as SO_4^{--}	541.87	mg/lit	APHA 3025 (Part 24) ;2019
Oil & Grease	<5	mg/lit	IS 3025 (Part 39), 2019

GREEN ENVIROSAFE Engineers & Consultant Pvt. Ltd. PUNE

Ms. Sneha Hande
(Quality Manager)
Reviewed & Authorized By

Effluent Water quality

TEST REPORT

Test Report No: GESEC/PRO/WW/2023-24/12/1955	Report Date	03/01/2024
Sample ID : GESEC/PRO/WW/2023-24/12/1955	Sample Details	ETP treated
Gangamai Industries and Construction Ltd. (Sugar Unit) Najik Babhulgaon, Post: Rakshi, Tal.:Shevgaon, Dist.: Ahmednagar..	Type of Sample	Waste Water
	Volume Of Sample	1 Lit plastic bottle
	Sample Status	Sealed
	Sample Collected By	GESEC
	Date of Sample Collection	27/12/2023
	Sample Receipt Date	28/12/2023
	Analysis start Date	28/12/2023
	Analysis End Date	03/01/2024

Parameters	TREATED	MPCB LIMIT	Unit	Standard Method
pH	7.58	5.5 - 9.0	--	APHA 4500 H+,B 24th ED:2023
Suspended Solids (SS)	63.91	100	mg/lit	APHA 2540 D 24th ED:2023
Total Dissolved Solids (TDS)	1120.58	2100	mg/lit	APHA 2540,C,24th ED:2023
Chemical Oxygen Demand (COD)	86.95	250	mg/lit	IS 3025 (Part 58) , 2019
Biochemical Oxygen Demand (BOD)	27.01	100	mg/lit	IS 3025 (Part 44), 2019
Chlorides as Cl^-	196.35	600	mg/lit	APHA 4500 Cl- B,24th ED:2023
Sulphates as SO_4^{--}	148.02	1000	mg/lit	APHA 3025 (Part 24) ;2019
Oil & Grease	<5	10	mg/lit	IS 3025 (Part 39), 2019

Remark:
- BDL – Below Detectable Limit.
- All above results are well within the MPCB Limit.

GREEN ENVIROSAFE Engineers & Consultant Pvt. Ltd. PUNE

Ms. Sneha Hande
(Quality Manager)
Reviewed & Authorized By

Treated water Quality