BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL, PRINCIPAL BENCH, NEW DELHI

Original Application No. 510/2019

Aditya Singh Chauhan ... Applicant

Versus

State of Gujarat & Ors. ... Respondents

REPLY BY WAY OF AFFIDAVIT ON BEHALF OF RESPONDENT NO. 2

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REPLY BY WAY OF AFFIDAVIT ON BEHALF OF RESPONDENT NO. 2

I, Jayesh Vyas, age-adult, being the Chief Executive Officer, Narol Textile Infrastructure & Enviro Management (NTIEM), "ATPA Earth", Piplaj Pirana Road, Piplaj, Ahmedabad 382405, Gujarat, being the Respondent no.2 herein, do hereby solemnly affirm and state on oath as under: -

1. I am the Chief Executive Officer of the Respondent no.2 herein and I have gone through the record of the above-captioned case and therefore, I am conversant with the facts of the case. I have been duly authorized to file this Affidavit in Reply. The Respondent no. 2 is submitting this Reply to the Original Application No. 510 of 2019, pursuant to the Order dated 30.04.2025, passed by this Hon'ble Tribunal and the Order dated 08.04.2025 passed by Hon'ble Supreme Court in Civil Appeal No. 5144 of 2025, wherein the order dated 07.07.2020 passed by this Hon'ble Tribunal in the above captioned Original Application was set aside. The Original Application was restored, inter alia, by impleading the Respondent no. 2 and directing the parties to file their reply/response by way of affidavit. Hence this reply is being filed by the Respondent no.2. The Respondent no. 2 states that the present reply is being filed without prejudice to its rights and contentions in any other proceedings, and all averments made in the Original Application, save and except those specifically admitted herein, are vehemently denied as false, incorrect, and misleading. The Respondent no. 2 further craves leave to file a detailed or additional response to the present

Reply, if and when required, and to add, alter, modify, or delete any of the submissions made herein.

PRELIMINARY SUBMISSION AND OBJECTIONS:

1. It is respectfully submitted that the Respondent no. 2 is incorporated under section 8 of the Companies Act, 1956 and engaged predominantly in providing wastewater treatment services through Narol Textile Infrastructure and Enviro Management Common Effluent Treatment Plant (hereinafter referred as NTIEM CETP) to its member industries, all Textile Processing units, through a Common Effluent Treatment Plant (CETP) and caters to its 130 individual textile processing units which are mainly engaged in the processing of cotton and blended fabrics, denims, and synthetic textiles. The textile processing units directly employ 3 lakh people and indirectly employ 15 lakh people in Ahmedabad and have a combined turnover of ₹10,000 CR annually. Respondent no. 2 is committed to environmental protection and operates its Common Effluent Treatment Plant (CETP) in accordance with the environmental laws of the country. NITEM has been formed by the member industries and the Office bearers of CETP (members from the industries giving honorary services) have put their best efforts for the operation of CETP collectively and severally, with the help of appointed professionals and technicians. The office bearers are in executive positions for a short duration for pro bono work for the betterment of the industrial area, and also for appropriate environmental management in the industrial area.

2. The CETP is one of the innovative interventions promoted by Ministry of Environment, Forest and Climate Change (MOEFCC)-Government of India and Gujarat Pollution Control Board (GPCB) to support the small-scale industries to treat their complex trade effluents and also, to provide economies of scale for such treatment by allowing the medium and large-

scale industries to send their treated trade effluent to CETPs. Simultaneously, CETPs solve the problem of industries that do not have adequate land in their premises to set up an Effluent Treatment Plant. The NTIEM CETP, being run by the Respondent no. 2 was conceptualized in 2014 and commissioned in 2017, possessing a substantial treatment capacity of 100 million liters per Day (MLD), distinguishing it as one of Asia's largest common effluent treatment plants.

3. It is submitted that between 2014 and 2017, a 13 km, independent, dedicated, closed, and metered network pipeline to carry partially treated effluent from member industries' outlet to the 100 MLD CETP and a separate conveyance line for treated water from CETP to the point of discharge were built. Despite not being from the infrastructure and especially wastewater treatment field, Respondent no.2 was able to complete the development of 100 MLD CETP (one of the largest in Asia) and @ 220 MLD carrying capacity closed and metered pipeline spanning across **13** kms in a record time of 40 months only. Pertinently, only within 3 - 3.5 years, one of the largest CETP was built with an independent, dedicated, closed, and metered pipeline network to carry partially treated effluent from industry outlets to the CETP was completed. The commissioning of CETP was put on track in September 2017 and completed in March 2018.

4. It is submitted that the allegations raised by the Petitioner in their letter to the National Green Tribunal are factually incorrect and without basis. Since the NTIEM CETP is a substantial 100 million Litres Per Day (MLD) treatment facility. The Respondent no. 2 has been achieving the prescribed parameters, as recently observed by independent expert bodies. The initial challenges in meeting the norms immediately after the commencement of operations in 2017, particularly for a project of such magnitude, were

temporary and have since been effectively addressed through diligent efforts of Respondent no.2.

5. It is further submitted that for a common effluent treatment plant of this size a 6-month commissioning period is usually given as a part of the standard operating procedure as there are multiple practical issues which come up during commissioning which have to be solved one by one and because of the large scale, solving something as simple as motor balancing takes time as the size of the motors is several times larger than the usual ones. More importantly, the bacterial growth is a slow process and takes its time to develop to the required extent to reduce the organic load of the effluent.

6. The CETP had undertaken best practices as well as left no stone unturned to achieve the best outlet results within the GPCB permissible limits from April 2018 to April 2019, wherein first it tried to operate and maintain the CETP with its manpower, then it appointed expert consultants. Finally, the CETP came out with an international expression of interest in June 2019 and awarded the job of end-to-end operations and maintenance of the CETP to an expert American company JMSI LLC; which had extensive experience in operations and maintenance of wastewater treatment projects across 40+ countries.

7. It is submitted that the 100 MLD CETP is divided into 4 batteries of 25 MLD each. The CETP operations were optimized between August 2019 to December 2019 with the pilot trials being conducted during August 2019 and September 2019, inferences of the pilot trials being implemented on Battery 1 of 4 in October 2019 (i.e., results for 25 MLD flow handled in battery 1 was under permissible limits by October 2019), then for the second battery in November 2019 (i.e., results for 50 MLD flow handled in battery 1 and 2 was under permissible limits by November 2019), then for the third battery in December 2019 (i.e. results for 75 MLD flow handled

in battery 1, 2 and 3 was under permissible limits by December 2019) and finally the fourth battery in January 2020. Since January 2020, the CETP has been under compliance and continues to be under compliance so far.

8. It is further submitted that NTIEM CETP is one of the handful of CETPs in India that has achieved compliance within 20 months of commissioning and has stayed compliant consistently and continuously thereafter, except for the two parameters viz. TDS and Color. The compliance of CETP is ascertained by enforcing agencies like MoEFCC, GPCB, CPCB, AMC, and Sh-I auditors appointed by GPCB as directed by the Hon'ble Gujarat High Court during their regular and constant monitoring. It is further submitted that there are enough case studies of numerous CETPs that have achieved compliance after 10 - 15 years or even more, post their commissioning. Furthermore, the performance of CETP has always been acknowledged by the Joint Task Force appointed by the Hon'ble High Court of Gujarat, and there have been no negative comments about the performance by the Hon'ble High Court of Gujarat in the ongoing River Sabarmati case. It is also pertinent to mention herein that the treatment processes employed by CETP comprise ASP (activated sludge process- use of bacteria to decompose the organic load of the effluent), which is 25% based on chemical treatment and 75% on biological processes. Thus, it has the least environmental footprint in comparison to any other combination of technologies.

9. It is submitted that the CETP, through diligent efforts and continuous optimization, has consistently demonstrated its commitment to environmental compliance by achieving prescribed parameters, as substantiated by reports from independent expert bodies, including the National Environmental Engineering Research Institute-Nagpur (NEERI) and the Indian Institute of Technology, Mumbai (IIT-B). IIT-B was engaged by the Respondent no. 2 for a detailed evaluation of its existing treatment

scheme and to assess its upgradation plans. The aforesaid premier institute have carefully studied, acknowledged, and appreciated the efforts of Respondent no.2. IIT– B Powai-team has, during a site visit of CETP, witnessed the operation of CETP in detail, collected various samples of different stages of treatment, analyzed the results and after thorough study, have certified about the efficacy and the adequacy of CETP for treating the 100 MLD of effluent as per the norms prescribed by GPCB.). NEERI, Deutsche Gesellschaft füe Internationale Zusammenarbeit (GIZ) GmbH, Germany, Japan International Cooperation Agency (JICA), and Goa Pollution Control Board (GOAPCB) are institutes that have appreciated the functioning of the CETP. Therefore, the false and fabricated allegations of causing continuous and unchecked pollution, as vaguely alleged in the letter petition forming the basis of the present Original Application, are therefore vehemently denied. The Report from NEERI is annexed hereto and marked as **Annexure – R1**. Copy of Certificate from IIT-B is annexed hereto and marked as **Annexure – R2.**

10. The Respondent no. 2 has also made the following optimizations and upgradations on the advice of GPCB via NEERI report, despite achieving results before the recommendations were made, during the study was being undertaken, and even afterward.

Optimization Implemented	Design Numbers	Purpose of Implementation	Total Capital Expenditure
Screening System	Automated Screening System with 2.0 Peak Factor	To have efficient removal of large suspended particles with automated cleaning	INR 1.25 CR
Cooling Tower	130 MLD Cooling Tower for Reducing Temperature to below 35 Deg C	To further improve the biological treatment efficiency, as DO is inversely proportional to temperature	INR 7 CR

Standby Turbo Blower for aeration	Flow of 49,500 m3/hour at 1.2 bar pressure	To have 100% blower standby and to have power-efficient blower operations to reduce the overall carbon footprint	INR 3.75 CR
8 Primary Sludge Withdrawal Pumps	70 m3 / hour each upgraded from 40 m3 / hour each	To have a higher rate of sludge withdrawal in a shorter time, which improves settling in the primary clarifier as well as helps in planning and executing dewatering in an efficient manner	INR 0.30 CR
8 Secondary Sludge Withdrawal Pumps	70 m3 / hour each upgraded from 40 m3 / hour each	To have a higher rate of sludge withdrawal in a shorter time, which improves settling in the secondary clarifier as well as helps in planning and executing dewatering in an efficient manner	INR 0.30 CR
Alternate Treated Water Discharge Pipeline	2700 meters earlier pipeline shut down and was replaced with a 580-meter new pipeline, completely covered with M-50 concrete blocks on all sides	To eliminate the illegal discharges in our old pipeline, and also eliminate the very root cause	INR 2.5 CR
Automated Volute Screw Press (VSP)along with Slurry Pump	Fully automatic sludge dewatering system with variable feed control system	All ten Belt Presses were discarded and upgraded to the latest technology VSP in dewatering, along with handling the dewatered	INR 2.50 CR

		sludge automatically	
Sludge Shed, along with an additional concrete platform	Sludge shed and concrete platforms for @ 12,000 m2 area	An in-house sludge storage system to ensure enough provisions during the monsoon season	INR 4.5 CR
CFI 1 and CFI 2 modified the pipeline to prevent overflow in shock load conditions	To have better shock load handling capacity as during the monsoon season, the shock loads are	The treated water pipeline was passing from CFI 3 and 4, which led to complications during maintenance downtimes	INR 1 CR
Total			**INR 23.15 CR**

11. In addition to the above-mentioned works, a separate scope about the modernization of the CFICASS system has also been awarded. The total value of these works is INR 25 Crores, and execution is currently in progress. The objective of this modernization is to upgrade existing infrastructure in line with the latest technological advancements and to ensure that the facility remains future-ready.

12. It is respectfully submitted that Environmental Damage Compensation is levied under the Polluter Pays Principle for the damage caused by the discharge of treated / partially treated / untreated water which exceeds the permissible limits as given by the respective state pollution control board into the river / permitted discharge basin. In the present case, the permissible limits on the major parameters taken into account by GPCB in its Factual Report dated 31.01.2020 submitted to this Hon'ble Tribunal and in this Hon'ble Tribunal's order dated 06.02.2020 are COD (permissible limit below 250 mg/L), BOD (permissible limit below 30 mg/L), TSS (permissible limit below 100 mg/L), TAN (permissible limit below 50 mg/L) and pH (permissible between 6.5 to 8.5). In the case of Respondent no.2's

CETP, the treated water discharge is going to the river Sabarmati, and hence, the load is technically calculated based on Kg POLLUTANT LOAD / DAY (Kg COD / DAY, Kg BOD / DAY, etc.). NTIEM had a valid consent to establish (CTE) for 130 MLD capacity that expired, and it is in the process of applying for the extension of the said CTE.NTIEM has obtained valid consent to operate (CC&A/CTO) for 100 MLD capacity **marked as Annexure – R3**. As per the factual report submitted by GPCB to NGT, the following are the numbers (Note: - actual CETP Design Standards have been submitted to GPCB but have neither been a part of its factual report submission to Hon'ble NGT nor been considered while giving consent to operate to CETP.):

Parameter	GPCB set Permissible Inlet to CETP (mg/L)	Actual Average Inlet to CETP between Sept 2017 - Jan 2020 (mg/L)	Actual CETP Design Standards (mg/L)
BOD	500.00	363.33	700.00
COD	1,200.00	952.03	2,000.00
TAN	50.00	60.98	150.00
TSS	300.00	603.50	1,000.00

12. It is respectfully submitted that from the aforesaid table, it is evident that the Inlet Average Pollutant Load from the industries to the CETP was always significantly less than the CETP Design Standards, and apart from TSS, all other loads were also less than or almost equal to GPCB permissible inlet norms for the CETP. Furthermore, as per the Consent to Operate issued by GPCB to NTIEM, the following are the Permissible Pollutant Load numbers

Parameter	Maximum Permissible Outlet to CETP (mg/L)	Quantity (Liters/Day)	Permissible Pollution Load Discharge to River (KG/Day)
BOD	30.00	10,00,00,000.00	3,000.00
COD	250.00	10,00,00,000.00	25,000.00
TAN	50.00	10,00,00,000.00	5,000.00
TSS	100.00	10,00,00,000.00	10,000.00

13. It is respectfully submitted that in the formula to determine the environmental damage compensation, GPCB has arbitrarily chosen the R-factor to be 500 (the range is 100 - 500). As the R-factor chosen is Maximum, it implies that GPCB has considered the maximum pollution load on the river and damage to the river. It is respectfully submitted that maximum pollution to the river would have happened when there was no treatment at all, and the inlet effluent would be discharged into the river without any treatment. However, the above is not the case, and the data which GPCB has presented to this Hon'ble Tribunal itself reveals that the inlet parameters themselves were lesser than GPCB permissible inlet parameters and significantly lesser than CETP design standards, while the treatment efficiency as per their own records was on average 60% from September 2017 to January 2020.

Parameter	Average Inlet Between September 2017 to January 2020 (mg/L)	Average Outlet Between September 2017 to January 2020 (mg/L)	Average Treatment Efficiency (percentage)
BOD	354.84	170.23	64.24%
COD	948.24	538.18	58.81%
TAN	63.05	56.95	20.59%
TSS	618.04	374.15	72.47%

14. The following table details the specifics on the Hypothetical Maximum Pollution Load Discharge to River over and above the permissible discharge.

Parameter	Average Inlet (KG / Day) (Chosen the higher value of permitted inlet quality and quantity, and actual inlet quality and quantity to assume the worst possible scenario)	Permissible Discharge (KG / Day)	Hypothetical Maximum Pollution Load Discharge to River over and above the permissible discharge (KG / Day)
BOD	50,000.00	3,000.00	47,000.00
COD	1,20,000.00	25,000.00	95,000.00
TAN	6,305.10	5,000.00	1,305.10
TSS	61,804.00	10,000.00	51,804.00

15. Therefore, a comparison of the Actual Pollution Load Discharge to River over and above the permissible discharge as against the Hypothetical Maximum Pollution Load Discharge to River over and above the permissible discharge will be as follows:

Parameter	Hypothetical Maximum Pollution Load (KG / Day)	Actual Pollution Load to River (KG / Day)	Actual Load as % of Hypothetical Maximum
BOD	47,000.00	13,468.00	28.66%
COD	95,000.00	25,610.00	26.96%
TAN	1,305.10	408.06	31.27%
TSS	51,804.00	22,116.00	42.69%

16. It is respectfully submitted that that Environmental Damage Cost calculations, the R Factor often refers to a risk or regulatory multiplier that accounts for the equivalent environmental risk associated with specific pollutants or effluent discharge characteristics that have exceeded permissible discharge limits, therefore, the logical and fair tabulation of the R FACTOR as per the factual report will be as follows:

Parameter	Percentage / Ratio of Actual Pollution Load as against Hypothetical Worst Possible Scenario (A)	(A) x MAXIMUM R FACTOR = LOGICAL AND FAIR R FACTOR
BOD	23.63%	118.15
COD	24.03%	120.15
TAN	42.22%	211.10
TSS	41.92%	209.60

17. It is respectfully submitted that therefore, the logical and fair tabulation of the R FACTOR as per the factual report will be an average of all of the above i.e. 164.75. The environmental compensation for the past non-compliance as per the formula prepared by CPCB, is EC = PI x N x R x S x LF. (Where, EC-Environmental Compensation in Rupees, PI-Pollution Index of the Industrial Sector, N-Number of days the violation has taken place, R-Factor of EC in Rupees, S-Factor for scale of operation of industrial unit, LF-Location Factor). The R Factor of 250 was applied arbitrarily in the first place, and then it was erratically revised to be 500. This was not done, keeping the actual data in account.

18. It is further submitted that the commissioning time for a 100 MLD Common Effluent Treatment Plant (CETP) is a critical phase and depends on the

complexity of processes (e.g., chemical treatment, biological stabilization), the type of bacteria, their concentration, and their ability to decompose the organic load into simple compounds. Moreover, this process, being biological, is slow when compared to any chemical processes, influent variability, instrumentation, and automation. Based on international best practices, a realistic and technically sound commissioning schedule for a plant of this scale would include the following:

Phase	Typical Duration	Key Activities
1. Pre-Commissioning	1.5–2 months	Dry run of mechanical equipment, pump alignment, leak checks, valve testing, I/O testing, SCADA validation
2. Wet Commissioning	1–1.5 months	Introducing water without effluent, flushing pipelines, system pressurisation, tank filling, flow checks
3. Seeding and Biological Maturation	2.5–3.5 months	Biomass seeding, gradual loading of raw effluent, stabilization of MLVSS, SVI control, sludge wasting routine
4. Process Optimization	2–3 months (parallel)	Achieving desired treated water parameters, SCADA tuning
5. Full Load Ramp-Up	1–2 months	Gradual increase to full 100 MLD inflow, handling peak and diurnal variations, and regulatory sampling
	Total -@ 10 to 12 months	

19. It is further submitted that since the Respondent no. 2 has built the entire infrastructure in 3.5 years and achieved the discharge norms at all times since January 2020, it is only just and fair to grant 6 months for stabilization of processes to a CETP of this size and complexity. However, on the contrary, GPCB has taken the very first day of the operations as DAY 1 of non-compliance i.e., 06.09.2017, as mentioned in GPCB's factual report, which is not justified. Once the aforesaid facts are taken into consideration, the period of the alleged non-compliance itself reduces by 180 days to 727 days.

20. It is further submitted that this Tribunal vide order dated 15.11.2019 had directed GPCB to, " ***to recover cost of restoration on 'Polluter Pays' principle, the SPCB must reduce the pollution load by proportionately decreasing the capacity of the units contributing to said pollution. We are informed that there are 120-member industrial units. The SPCB may ensure that the load is reduced in such a way that the CETP outlets achieve the norms. The quantum of compensation should be as per laid-down norms, and the quantum of bank guarantee for the future should also be on that basis. The capacity may be restored once remedial steps are taken to ensure that outlet of CETP achieves the laid down norms."***

21. It is respectfully submitted that as per the order dated 15.11.2019 this Hon'ble Tribunal had issued directions to reduce the incoming load to the CETP by reducing the discharge from the industry to such a quantity by which the CETP is achieving norms at all times. In technical terms, the directions meant undertaking Hydraulic Capacity Evaluation of the CETP and then Proportional Reduction of flows from the member industries to match the inlet quantity as per the Hydraulic Capacity Evaluation. However, GPCB in complete contravention of the directions passed by this Hon'ble Tribunal, chose to arbitrarily tabulate the quantities mentioned in

the non-revised CCAs of the member industries at that time and then stated that the load should be reduced to 23 MLD. It is respectfully submitted that there was no evidence or any scientific basis to reduce the load to 23 MLD.

22. It is respectfully submitted that despite the fact that CETP was achieving all the norms even at 85 - 90 MLD flows in January 2020, and the hydraulic capacity evaluation was done by NEERI under the directions of GPCB in January 2022, the revision of consents was done as late as in February 2023. A simple evaluation, which was to be done in 2020, was done in 2022, i.e., two years later, and a simple revision of consents, which was to be done in 2020, was done in 2023, i.e., three years later. Because of these, there was a direct financial impact on the CETP as well as its member industries. Since the consent letter was not issued in 2020, the banker of the Respondent no.2 considered the same as a non - non-compliance and chose to levy a higher percentage of interest on the borrowings by the Respondent no. 2, and then reduced the same once the consent papers were submitted. Moreover, many of the members of the Respondent no.2 lost international buyers only because they did not have the requisite documents to be presented there.

23. It is respectfully submitted that on account of the alleged non-compliances, the Respondent no.2 has already paid fines to the tune of INR 95 lakh (Rupees Ninety five lakh only) which is also mentioned in the Factual Report by GPCB and the members of the Respondent on.2 have also paid more than INR 1,11,03,572/- (Rupees One crore, eleven lakh and three thousand and five hundred and seventy two only). It is further submitted that on account of delay in revising the consent to operate by GPCB as per actual hydraulic capacity when the requests itself were made in calendar years of 2020, 2021, and 2022, which were all either during or in the

aftermath of COVID-19, the Respondent no. 2 as well as its member industries suffered severe financial losses.

24. It is further submitted that the Respondent no. 2 has proactively taken every step to ensure that no pollution is caused on account of the Respondent no.2 and its member industries. The fact that discharge norms are being met by the Respondent no. 2 and that Respondent no. 2 is complying with all discharge parameters is evident from the yearly average from 2020 to 2025, which are as follows:

Year	**Outlet Flow (MLD)**	**pH**	**TSS (mg/L)**	**BOD (mg/L)**	**COD (mg/L)**	**TAN (mg/L)**
CCA Norms	100.00	6.5-8.5	100.00	30.00	250.00	50.00
2020	58.10	8.01	39.00	33.60	143.00	18.90
2021	79.60	7.90	38.00	27.40	148.00	28.80
2022	82.80	8.14	59.00	27.40	148.00	16.00
2023	88.00	7.99	69.00	28.90	242.00	40.00
2024	88.61	8.02	63.68	28.9	214.03	39.0
2025	94.45	8.04	94.49	32.6	204.74	39.4
Average of six years (2020 to 2025)	**81.93**	**8.02**	**60.53**	**29.8**	**183.30**	**30.35**

25. It is further submitted that in the past 12 months, 375 samples were collected, out of which 313 samples have all values under permissible limits (except colour and TDS) and 62 samples have values that exceed the permissible limits by a maximum of 10%. The Majority of 62 samples are of the Shastri Bridge Disposal Point; wherein other illegal discharges have also been observed. This was brought to the attention of all the enforcing agencies, which directed the Respondent no.2 to change the mode of disposal. It is submitted that following these directions in toto, the Respondent no. 2 changed the mode of disposal for Rs 2.5 Cr, and that post the change of river discharge point, there has been no such discrepancy observed. Furthermore, the overall river discharge load in terms of Kg pollutant per day by the Respondent no. 2 is significantly less than the permitted load.

26. Insofar as controlling inlet norms from all member industries is concerned, the Respondent no. 2 has deployed a dedicated team that works 24X7 i.e., round the clock to check all the sump rooms and the respective industry lines as well. The CETP Design Values are COD - 2,000 mg/L, BOD - 700 mg/L, TSS - 900 mg/L and TAN - 150 mg/L. Against these, the average inlet values are COD - 1,400 mg/L, BOD - 600 mg/L, TSS - 350 to 400 mg/L and TAN - 70 mg/L. Thus, there is enough hydraulic capacity buffer in day-to-day operations with the CETP. The member industries of the Respondent no.2 have been provided with flow meters and pH meters to check the quality and quantity of the effluent from their units. (Both the pH meters and the flow meters are calibrated by NTIEM every year through a renowned third party for maintaining the accuracy of the results). This is ascertained online through a robust SCADA (Supervisory Control and Data Acquisition) system to collect information on these two variables i.e. quality

and quantity of effluents from individual member industries' system and physically during monitoring by the Respondent no.2's technical team.

27. It is submitted that the Respondent no. 2 and GPCB has also identified several illegal units between the Respondent no.2's CETP Outlet and Respondent no. 2's Final Discharge Point in River Sabarmati in the latter half of 2023. That upon such discovery and identification, the Respondent no. 2 and GPCB took swift and prompt action in visiting sites and closing down illegal units. The Respondent no. 2 also filed for a revision of CTE to change the final discharge point in such a way that the 2700-meter pipeline from NTIEM Outlet to Final Discharge gets reduced to 180 meters only (400 meters inside CETP premises and 180 meters outside - total 580 meters). As such, GPCB amended CTE granted to Respondent no. 2 after Respondent no.2 submitted all requisite details and NOCs from respective departments. The Respondent no.2 also vide letter dated 13.12.23 obtained permission from the Department of Irrigation, Govt of Gujarat, for the new discharge outlet. GPCB had also increased vigilance in the area, which has resulted in no illegal discharge in the calendar year of 2024. Thereafter, the new pipeline was commissioned in August 2024, and the old pipeline was completely sealed then from both ends and the pictures related to it were submitted to GPCB. The team GPCB also ascertained this fact during its visit to the site. As such, on this date, there is no illegal discharge in Respondent no.2's line and all the discharges which were there in the old line have also been stopped as the entire line has been put out of operation by filling concrete and cement at the end of the pipeline and disconnecting it from the CETP boundary point as well. Copy of letter dated 13/12/23 obtaining permission from the Department of Irrigation, Government of Gujarat, is annexed hereto and **marked as Annexure – R4.**

28. It is respectfully submitted that the Respondent no. 2 at no point sought to attribute any deviations in environmental compliance to the illegal connections that were discovered along the CETP outlet line. Instead, acting in the spirit of absolute responsibility and environmental integrity, the Respondent no.2 took decisive and proactive steps to resolve the issue at its root. Although the original 2,700-meter outfall pipeline—commissioned merely seven years ago and designed for a lifecycle of 25–30 years—was a substantial capital asset, the Respondent no. 2 chose to abandon it entirely. A new outfall pipeline was conceived and executed with fresh capital infusion, reducing the total line length to just 580 meters, of which 400 meters lie within Respondent no.2's premises. This strategic move was not only aimed at strengthening compliance and eliminating ambiguity but also ensuring that no third party could exploit the old infrastructure for unauthorized discharge. The original pipeline was physically severed from the CETP boundary and sealed permanently with concrete from both ends, thereby closing all avenues of misuse. This demonstrates the Respondent no.2's unwavering commitment to regulatory compliance, environmental protection, and institutional accountability—voluntarily exceeding statutory obligations for the larger public good.

29. It is respectfully submitted that the Respondent no. 2 has implemented the project in good spirit and faith without any debate, since the Respondent no.2 is aware that suggestions made by GPCB and other instrumentalities were made so that the treatment processes of the Respondent no. 2 are further strengthened. It is most respectfully submitted that the Respondent no.2 is an organization with a different mindset when environmental compliances are considered. Respondent no.2 is achieving all outlet norms

while also having the lowest carbon emissions in the process. Thus, Respondent no.2 is not adopting any treatment technology that may reduce water pollution, but shall increase carbon emissions. Today, Respondent no.2 is one of the handful of CETPs that is achieving all results (except TDS and Color) to the satisfaction of all regulatory authorities at all times. Considering the magnitude of treatment and the complexity, it is a very significant achievement.

30. It is respectfully submitted that the Respondent no.2 was not given time to stabilize the system, and the same was also counted in the number of non-compliance days. Furthermore, the R Factor was randomly determined in the first place and then was arbitrarily increased thereafter without any technical basis or without even checking what GPCB's own data showed. The Respondent no. 2 was also asked to reduce the load tot 23 MLD without GPCB evaluating the hydraulic capacity as per this Hon'ble Tribunal's order and it was revised to 100 MLD after 40 months of CETP consistently and continuously operating between 80 to 100 MLD load while achieving all results although this Hon'ble Tribunal had clearly asked GPCB to restore the capacity once the remedial actions are taken.

31. It is further submitted that the Respondent no.2 has already paid fine to the tune of INR 95,00,000/- (Rupees Ninety-Five Lakh only) for the same violation in 2018 and 2019 and has been directly suffering losses of member's CCA documents not being revised in terms of higher interest payments to banks for term loans and loss of the permanent business opportunities especially in the international marked because of the important documents like CTE and CC&A of adequate capacities for compliance not being given.

32. It is further submitted that Respondent NTIEM CETP has obtained valid ISO:14001-2015 certification **marked as Annexure – R5**, CETP lab has obtained NABL certification ISO/IEC 17025:2017 **marked as Annexure – R6**. To run CETP even during power failures, NTIEM has DG set of 1250 KVA capacity and has obtained CTE of GPCB, the purchase order copy is **marked as Annexure – R7.**

33. That in view of the aforesaid facts and circumstances, it is most respectfully prayed before this Hon'ble Tribunal that concerning and keeping in view the track record of the Respondent no. 2 since 2014 and all the other facts and figures, this Hon'ble Tribunal may take into consideration the following calculation to avoid double jeopardy on Respondent no.2. It is most respectfully prayed that EDC be revised with the average R factor i.e., 162, and thereafter, the amount of fine already paid by the Respondent no. 2 as well as its member industries be deducted and then the actual EDC amount be calculated. Therefore, the actual calculation will be as follows:

> EC Actual = EC as per revised R Factor - EC already paid - EC already paid by the member industries for the same non-compliance
> = [80 X 727 days' x 164.75 x 1.5 x 1.5] = 2,15,59,185] - [95,00,000] - [1,11,03,572]
> = INR 9,55,613. (Rupees nine lakh fifty-five thousand six hundred thirteen only)

34. It is respectfully submitted that the Respondent no. 2 has to the best of its ability, placed qualitative facts within the knowledge of the Respondent no. 2, however, in case any aspect has been left out inadvertently on account of oversight, the Respondent no. 2 craves the leave of this Hon'ble Tribunal to file further reply.

Solemnly affirmed at Ahmedabad on this 26th day of August, 2025

DEPONENT

VERIFICATION

I, Jayesh Vyas, age-adult, being the Chief Executive Officer, Narol Textile Infrastructure & Enviro Management (NTIEM), "ATPA Earth", Piplaj Pirana Road, Piplaj, Ahmedabad 382405, Gujarat, being the Respondent no.2 herein, do hereby solemnly affirm and state that what is stated in the present Affidavit is on my instructions, and is true to my knowledge, information, and belief.

Solemnly affirmed at Ahmedabad on this 26th day of August, 2025.

DEPONENT

SR. No. B/02/1222/2025

L. M. MAKWANA
NOTARY
GOVT. OF INDIA

26 AUG 2025

NOTARY L.M. MAKWANA AHMEDABAD CITY GUJARAT STATE REG NO. 8934 GOVT. OF INDIA

SOLEMNLY AFFIRMED BEFORE ME

L.M. MAKWANA
NOTARY
GOVT. OF INDIA

26 AUG 2025

आयकर विभाग
INCOME TAX DEPARTMENT

भारत सरकार
GOVT. OF INDIA

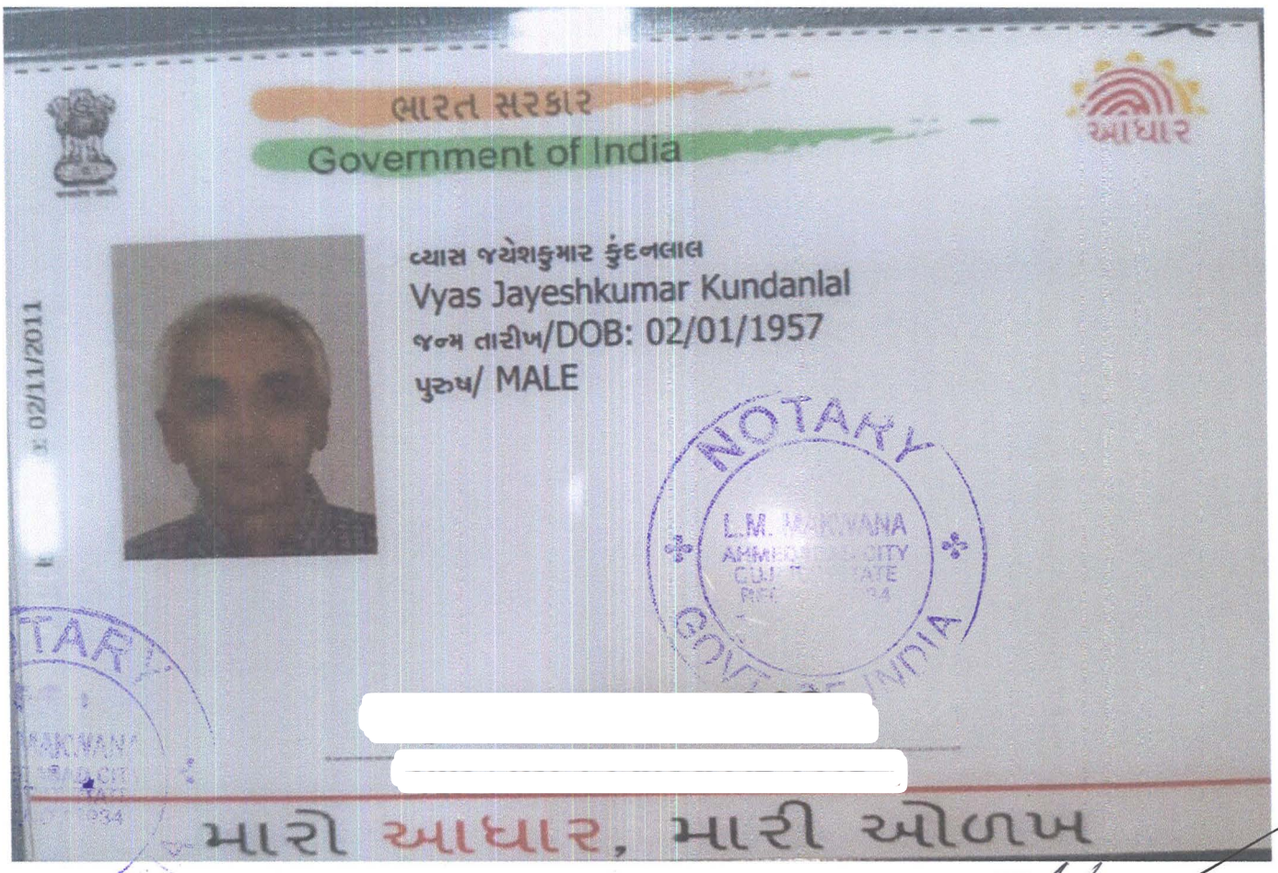
NAROL TEXTILE INFRASTRUCTURE &
ENVIRO MANAGEMENT

25/03/2010

Permanent Account Number

AADCN2226K

01042010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ANNEXURE - R1

Final Report

Adequacy Assessment Studies, Upgradation and Retrofitting of 7 CETPs in Ahmedabad, Gujarat

35.0 MLD CETP GESCSL Vatva

14.0 MLD CETP NEPL Naroda

0.45 MLD CETP GVMM Odhav

1.05 MLD CETP OGEPA Odhav

0.1 MLD CETP NDES Narol

1.20 MLD CETP OEPL Odhav

100 MLD CETP NTIEM Narol

Sponsor

Gujarat Pollution Control Board, Ahmedabad, Gujarat

GPCB

CSIR - National Environmental Engineering Research Institute,
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NEERI

September 2022

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10. Narol Textile Infrastructure & Enviro Management, (NTIEM)

The existing status including industrial effluent generation, details of civil and electro – mechanical equipment units, observations on functioning, performance evaluation based on secondary data is discussed for CETP NTIEM, in the subsequent sections.

10.1 Inventory of industries

CETP NTIEM is located at Gyaspur, Ahmedabad. The CETP is designed for 100 MLD capacity to meet the requirements of member industries. An inventory on CETP NTIEM member industries was carried out based on the secondary data provided by GPCB. The CETP receives effluent from 127 textile industries and there are no other industrial or sewage discharge received at the inlet of CETP.

10.2 Effluent generation

In order to assess the quantity of raw effluent discharged into CETP NTIEM, an analysis of one-month flow data was carried out. As per the secondary data received from GPCB on raw effluent generation, it was observed that on an average 98451.80 m^3/day raw industrial effluent was discharged to the CETP inlet collection tanks. One-week secondary data during January 2022 revealed that CETP received an average of 93.90 mld.

10.3 Treatment process

The CETP is designed for specific inlet & outlet discharge norms as presented in Annexure – 10.1. The process flow diagram of CETP NTIEM is presented in Figure 10.1. All the member units discharge their effluents into the collection tank though a bar screen. After this the effluent is pumped to equalization basins, from where it is pumped to flash mixer where flocculants are added. The effluent is then sent to primary clarifiers which allow settlable solids to settle and the clarified effluent called supernatant is sent to secondary biological process consisting of aeration and settling in a combined unit called “continuous flow integral clarifier activated sludge system” (CFICASS).

The supernatant obtained from CFICASS unit is stored in treated water collection tank and discharged into the river Sabarmati through separate pipeline. During the

overall treatment, sludge generated from primary clarifier and CFICASS unit is dewatered through volute press and dried using solar driers. The details of different treatment unit sizes implemented at CETP NTIEM are presented in Annexure – 10.2. Details of various electromechanical equipment including Transfer pumps, Mixers/Agitators, Aerators, blowers, and dosing pumps installed at the CETP are presented in Annexure – 10.3.

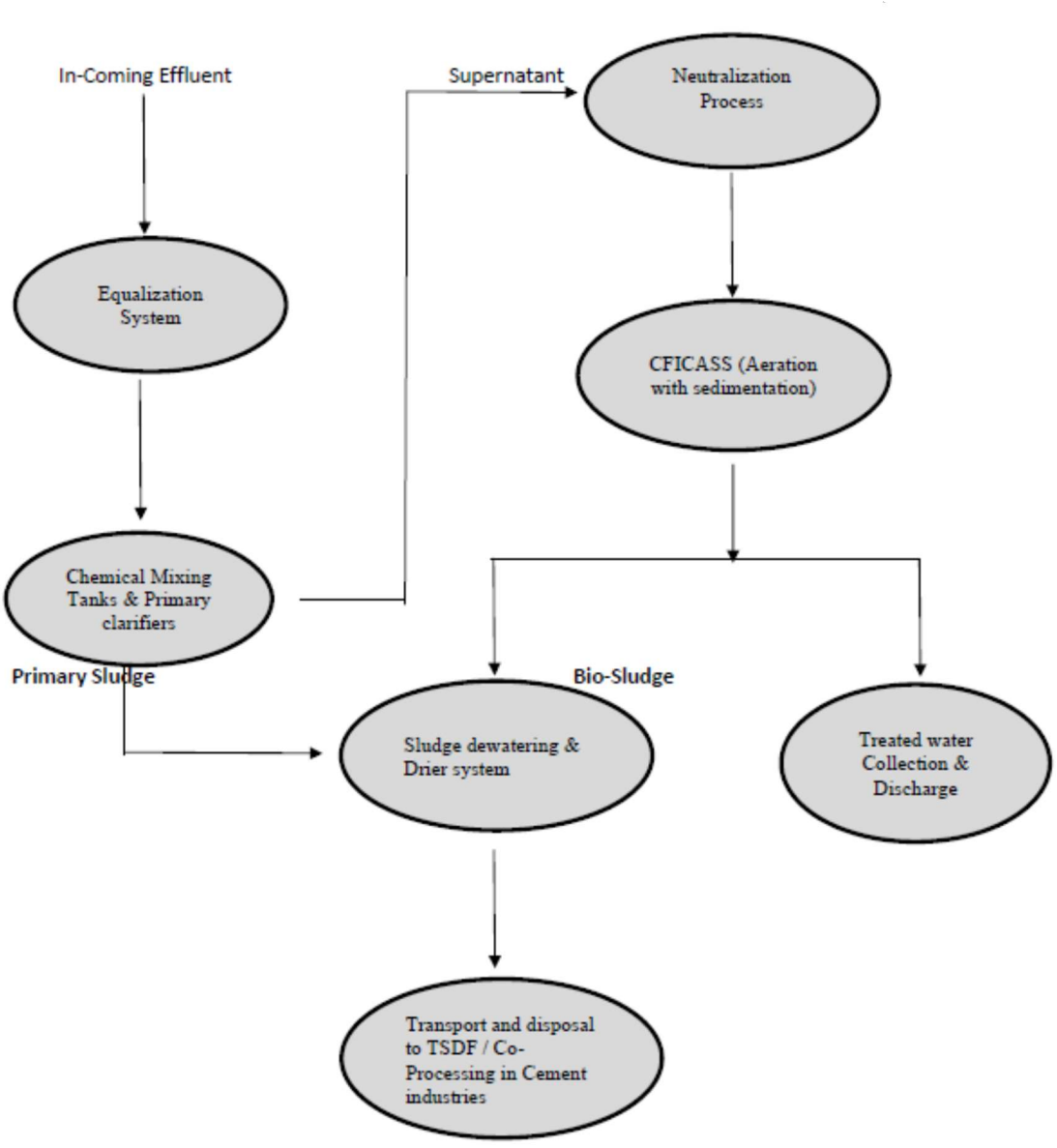

Figure 10.1: Process flow diagram of CETP NTIEM (Source: GPCB Ahmedabad)

10.4 Observations on functioning of NTIEM under existing operating conditions

CSIR-NEERI team visited NTIEM, Narol during January 05-06, 2022, to carry out sampling, field studies and assess the existing status of CETP for compliance with respect treated effluent standards for discharge into inland surface water under General Standards for Discharge of Environmental Pollutants Part-A: Effluents, (CPCB, 1986) and Gujarat State Pollution Control Board (GPCB) standards and thus made following observations with respect to CETP's overall functioning, operation, process control and maintenance.

1. The CETP receives inflow from 127 member industries with a designed hydraulic load of 98,451.8 m^3/d (98.452 MLD), which is almost the design capacity of the CETP. Hence, there is no provision for increasing the hydraulic load from member industries under the existing designed capacity of 100 MLD.
2. It was observed that the CETP was operating at 90.93 and 100.966 MLD during the monitoring days on January 5 and 6, 2022 respectively.
3. The CETP has installed electromagnetic flow meters at the inlets and the outlet of the CETP.
4. The CETP management informed about the augmentation of the CETP from 100 to 130 MLD. The consent for capacity augmentation is under process from GPCB (Annexure – 10.4).
5. It was observed that the equalisation basin has jet mixing with aeration system for mixing, however it is operated intermittently that results in settling of solids.
6. Out of 4 equalisation tanks, only 3 are used for equalisation of effluents from the member industries and remaining 1 tank is used for storing sludge. This reduces overall hydraulic retention time (HRT) from 10.56 to 7.92 hours.
7. The CETP uses polyelectrolyte for the primary treatment in the range of 50-100 kg/d with an average of 75 kg/d and poly aluminium chloride in the range of 25-45 Tonnes/d. Similarly, another polyelectrolyte for sludge dewatering in the range of 25-75 kgs/d with an average dose of 55 kg/d.
8. Log sheets and records are maintained for primary and secondary treatment, including chemical consumption and sludge handling from decanter.
9. It was informed that the quantum of sludge from the primary and the secondary treatment varied between 42.5 and 44.3 tonnes per d during the monitoring. The

dewatered and dried sludge is packed for disposal in TSDF and a part of the solids are sold to cement factories.

10. This secondary treatment is a modification of the conventional secondary biological treatment systems and is called Continuous Flow Integral Clarifier Activated Sludge (CFICASS).
11. The aeration is provided by an airlift mechanism @ 1600 kW to keep the mixed liquor in suspension. This system increases the cost of aeration for biological treatment and accounts for nearly 65% of the total power consumption.
12. The D.O during the monitoring period on January 5 and 6, 2022 was in the range of 0.96 – 1.6 mg/L as measured by Winkler's Method.
13. The MLVSS (mixed liquor volatile suspended solids) and mixed liquor suspended solids (MLSS) in the aeration tank varied between 3000 ~ 3500 mg/l and 3500 ~5000 mg/l respectively. It was informed that the MLVSS to MLSS ratio ranged between 0.85-0.92.
14. The sludge volume index of the mixed liquor from aeration tank varied between 390 – 720 ml/L, which is quite high and indicates poor settling. The usual range for SVI is between 50 – 150 ml/L for effective solids-liquid separation.
15. It was observed that temperature of wastewater in the equalisation varied between 39.0 & 42°C and the temperature of the final treated effluent discharged into the river ranged between 35 – 38.0°C.

10.5 Secondary Data on Performance of CETP

As per the scope of the work, secondary data on performance of CETP under existing operating conditions was collected to understand its functioning. Data on functioning of CETP directly reflects the approach and standard operating procedures. It is important to monitor the performance at various stages, however GPCB has mostly conducted monitoring of important parameters including pH, color, TSS, oil & grease, TDS, COD, BOD, NH_3-N, chloride, sulphides, heavy metals and phenolic compounds for inlet and outlet of CETPs for once or twice in a month. The secondary data on performance of CETPs was provided for the months during September – November 2021. Table 10.1 presents the secondary data on performance of CETP.

Table 10.1: Secondary data-based Performance of CETP vis-à-vis CETP Inlet Standards and Outlet Discharge Norms (Source: GPCB, Ahmedabad)

GPCB CETP Inlet Parameters Standards		Raw influent				Treated effluent values				GPCB Final discharge norms
Physical parameters		7-Sep	12-Oct	9-Nov	15-Nov	7-Sep	12-Oct	9-Nov	15-Nov	
pH	6.5 - 8.5	7.4	8.27	7.92	N.A.	7.71	8.55	7.9	7.6	6.5-8.5
Color (Pt-Co Scale)	100	75	90	45	80	100	60	75	80	100
Suspended solids	300	688	588	72	376	38	74	44	16	100
Oil & grease	10	2.4	2.4	1.6	N.A.	1.4	1.2	1.4	1.2	10
Total dissolved solids	-	5460	4308	4622	4166	3986	3584	3678	3970	-
Organic pollutants										
Sulphides	2	2.4	4.4	3.6	N.A.	1.6	3.2	2.4	1.2	2
Sulphate	--	431.0	125.0	260.0	N.A.	470.0	115.0	671.0	129.0	1000
Ammonical nitrogen	50	45.86	24.92	20.61	N.A.	17.53	17.81	6.78	19.38	50
Chlorides		1209	1068	1176	N.A.	1164	1210	1076	1452	600
Phenolic compounds	1	0.31	1.12	0.18	N.A.	0.36	0.18	0.31	0.16	1
BOD	500	276	315	125	N.A.	24	16	21	15	30
COD	1500	1089	1291	510	1137	108	120	101	137	250
BOD / COD		0.25	0.24	0.25	-	-	-	-	-	-
Heavy metals										
Total Cr	2	0.9	0.29	0.08	N.A.	0.13	BDL	0.1	0.04	2
Hexavalent Cr	0.1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.1
Mercury	0.01	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.01
Lead	0.1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.1

Secondary Data from GPCB

Cadmium	1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	1
Copper	3	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	3
Nickel	3	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	3
Arsenic	0.2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.2
Zinc	5	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.05
Boron	2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	2

*All values except otherwise specifically mention are in mg/L

Secondary Data from GPCB

The average flow during the first week of January 2022 was 93.90 mld. Thus, it was observed that the average operating flow vis-à-vis consent capacity of CETP during monitoring was 93.90 %.

The influent received at the CETP occasionally did not meet the prescribed **Inlet Norms** of the CETP as specified in the GPCB for parameters such as suspended solids (300 mg/L), sulphides (2 mg/L), and phenolic compounds (1.0 mg/L) as shown in Table 10.1.

Analysis of secondary data revealed that final treated effluent with respect to chlorides (600 mg/L), and sulphides (2.0 mg/L) were above the prescribed limits during September – November, 2021.

The biodegradability, measured as the ratio of BOD to COD of the raw effluent received at the CETP was 0.25 (Table 10.1) which is quite low.

All the heavy metals such were within the permissible limits as shown in Table 10.1.

10.6 Adequacy assessment studies

To evaluate the performance of CETP under existing operating conditions, adequacy assessment studies were conducted during January 5 – 6, 2022. Twelve hours composite samples with one-hour sampling interval were collected at the outlet of primary, secondary and tertiary treatments of the CETP. In addition, grab samples from inlet and final discharge points were also collected. Various sampling locations are presented in Table 10.2. The adequacy assessment studies at various treatment stages help to understand the functioning of CETP vis-à-vis environmental compliance norms and facilitates to identify the thrust areas, if any, for further improvements in treatment without incurring major capital expenditures; with minor design modifications, process adjustments, operators training and appropriate administrative actions.

Table 10.2: Various sampling locations at CETP NTIEM, Naroda

Sampling points	Location	Sampling Type (Grab/Composite)
1	Inlet of equalization tank	Grab & Composite
2	Outlet of equalization tank	Composite
3	Combined outlet of flocculating clarifier 1, 2, 3 & 4	Composite
4	Combined Final outlet from secondary clarifier to River	Composite
5	Filtrate from belt press to Eq. tank	Composite

10.6.1 Adequacy assessment of CETP; January 05, 2022

The performance of existing treatment system at various stages based on 12 hours composite sampling carried out is presented in Table 10.3. It was observed that inlet norms with respect to TSS, chloride, NH_3-N, FDS, phenol, sulphide and color were above the prescribed standards. After physico-chemical and second stage activated sludge process, the TSS and COD, concentrations in final treated effluent reduce from 600 to 24, and 936 to 239 mg/L respectively and were below the prescribed standards. Similarly, chloride concentrations after final treated effluent were also below the prescribed standards. On the other hand, BOD concentration after final treated effluent reduces from 389 to 30 mg/L and was just meeting the prescribed limit. The concentration of Fluoride at the inlet was found to be 0.55 mg/L, that reduced to 0.33 mg/L and was within the prescribed standards. The phenol concentration at the inlet was above the prescribed standards. The concentration of Fluoride at the inlet was found to be 2.46 mg/L, that reduced to 0.76 mg/L and was within the prescribed standards. The fixed dissolved solids (FDS) concentration at the inlet and outlet was found to be 3668 mg/L and 3640 mg/L respectively and were above the prescribed standards. However, the color concentrations in final treated was 471.85 Pt-Co Scale and was above the prescribed standards. Regarding heavy metals concentrations in final treated effluent, prescribed standard is specified only for Cr as shown in Table 10.4. The Cr concentration in final treated was below detectable limit (BDL).

Table 10.3: Performance of CETP NTIEM at various stages of treatment under existing operating conditions (12 hrs composite; January 05, 2022)

Parameter	Inlet of equalization tank	Inlet of equalization tank	Outlet of equalization tank	Combined outlet of flocculating clarifier 1, 2, 3 & 4	Combined Final outlet from secondary clarifier to River	Filtrate from belt press to Eq. tank	Discharge standards
pH	7.63	7.33	7.33	7.47	7.17	7.52	6.5 to 8.5
TSS	600	640	436	60	24	216	100
TDS	3,824	3,912	3,840	4,100	4,108	4,108	-
FDS	3,668.0	3,872.0	3,680.0	3,500.0	3,640.0	3,750.0	2,100
BOD	389	419	359	218	30	39	30
COD	936	894	917	596	239	259	250
Chloride	658	620	645	682	645	658	1,000
Phenol	2.40	2.35	--	--	0.76	--	1
Sulphide	2.6	2.4	--	--	--	1.8	2.0
Sulphate	356	348	--	--	--	283.0	1000.0
NH_3-N	58	67	58	22	17	78	-
TKN	131	84	76	56	48	174	-
TP	19	18	17.2	15	11	12	-
Fluoride	0.55	-	-	-	-	0.33	-
Colour (Pt-Co)	468.47	370.36	431.26	451.56	321.31	471.85	100

*All values except otherwise specifically mention are in mg/L

Table 10.4: Heavy Metals in CETP NTIEM under existing operating conditions (12 hrs composite; January 05, 2022)

Parameter	Inlet of equalization tank	Combined outlet of flocculating clarifier 1, 2, 3 & 4	Discharge standards
As	0.01	BDL	–
Cd	BDL	BDL	–
Co	BDL	BDL	–
Cr	0.32	BDL	2.00
Cu	0.57	BDL	–
Fe	BDL	BDL	–
Mn	BDL	BDL	–
Ni	0.02	BDL	–
Pb	BDL	BDL	–
Zn	BDL	BDL	–
B	BDL	BDL	–

*All values except otherwise specifically mention are in mg/L

10.6.2 Adequacy assessment of CETP; January 06, 2022

The performance of existing treatment system at various stages based on 12 hours composite sampling carried out is presented in Table 10.5. It was observed that inlet norms with respect to TSS, chloride, NH_3-N, FDS, phenol, sulphide and color were above the prescribed standards. After physico-chemical and second stage activated sludge process, the TSS, BOD and COD, concentrations in final treated effluent reduce from 580 to 28, 239 to 28 and 1129 to 229 mg/L respectively and were below the prescribed standards. Similarly, chloride concentrations after final treated effluent were also below the prescribed standards. The concentration of Fluoride at the outlet was found to be 0.29 mg/L and was within the prescribed standards. The phenol concentration at the inlet was above the prescribed standards. The concentration of phenol at the inlet was found to be 2.38 mg/L, that reduced to 0.68 mg/L and was within the prescribed standards. The fixed dissolved solids (FDS) concentration at the

inlet and outlet was found to be 3828 mg/L and 3892 mg/L respectively and were above the prescribed standards. However, the color concentrations in final treated was 336.53 Pt-Co Scale and was above the prescribed standards. Regarding heavy metals concentrations in final treated effluent, prescribed standard is specified only for Cr as shown in Table 10.6. The Cr concentration in final treated was below detectable limit (BDL).

Table 10.5: Performance of CETP NTIEM at various stages of treatment under existing operating conditions (12 hrs composite; January 06, 2022)

Paramete	Inlet of equalization tank	Outlet of equalization tank	Combined outlet of flocculating clarifier 1, 2, 3 & 4	Combined Final outlet from secondary clarifier to River	Filtrate from belt press to Eq. tank	Discharge standards
pH	7.26	7.31	7.42	7.00	7.52	6.5 to 8.5
TSS	580	444	92	28	380	100
TDS	3,880	3,824	3,992	4,084	3,760	-
FDS	3,828.0	3,680.0	3,876.0	3,892.0	3,604.0	2,100
BOD	239	269	194	28	42	30
COD	1,129	969	736	229	272	250
Chloride	620	620	682	658	658	1000
Phenol	2.38	–	–	0.68	–	1
Sulphide	3.4	--	--	--	2.0	2.0
Sulphate	458	--	--	--	378.0	1000.0
NH_3-N	58	67	58	53	67	-
TKN	131	84	75	84	50	-
TP	19	18	9	15	11	-
Fluoride	0.29				0.29	-
Colour	319.62	338.22	350.06	336.53	316.23	100

*All values except otherwise specifically mention are in mg/L

Table 10.6: Heavy Metals in CETP NTIEM under existing operating conditions (12 hrs composite; January 06, 2022)

Parameter	Inlet of equalization tank	Combined outlet of flocculating clarifier 1, 2, 3 & 4	Discharge standards
As	BDL	BDL	--
Cd	BDL	BDL	--
Co	BDL	BDL	--
Cr	0.47	0.13	2.00
Cu	1.76	0.20	--
Fe	1.96	0.69	--
Mn	BDL	BDL	--
Ni	BDL	0.61	--
Pb	BDL	0.02	--
Zn	0.29	0.15	--
B	BDL389	BDL	--

*All values except otherwise specifically mention are in mg/L

10.7 Adequacy assessment of CETP; Sludge analysis

10.7.1 MLSS & MLVSS in Sludge

Analysis of sludge in aeration tanks and returned activated sludge was also carried out to assess the functioning of aerobic process and active biomass fraction thereof. Table 10.7 presents MLSS and MLVSS concentrations of aeration tank and returned activated sludge (RAS) from secondary clarifier.

MLSS and MLVSS in aeration tank and secondary clarifier were 3588 & 3224 mg/L, respectively. Returned activated sludge (RAS) concentration from secondary clarifier was 6574 mg/L and MLVSS in RAS was 5672 mg/L. The volatile fraction in aeration tank and returned activated sludge was between 89.85 and 86.27% respectively.

Volatile fraction in aeration tank and secondary clarifier was observed to be satisfactory.

Table 10.7: Details of MLSS & MLVSS in CETP NTIEM
(January 06, 2022)

Sr. No	Sampling location	MLSS (mg/L)	MLVSS (mg/L)	MLVSS / MLSS (%)
1.	Aeration Tank	3588	3224	89.85
2.	Secondary clarifier outlet RAS	6574	5672	86.27

It is important to note that based on the secondary and primary data, the BOD:COD ratio for raw effluent varied between 0.25 and 0.21 – 0.42 respectively, which is quite good for biological treatment.

10.7.2 Heavy Metals in Sludge

Dewatered sludge sample from the sludge storage area consisting of primary & secondary sludge was collected and was analysed for leachable concentrations of different metallic and non-metallic constituents. Standard methods as per HOWM Rules, 2016 were followed for the determination of the leachable concentrations. Following two leaching tests were performed for different constituents as prescribed in the SCHEDULE II [rule 3 (1) (17) (ii)] of Hazardous & Other Waste (Management and Transboundary Movement) Rules, 2016.

- TCLP- Toxicity Characteristic Leaching Procedure
- WET- Waste Extraction Test

As per the above schedule, Class A is based on leachable concentration limits- [Toxicity Characteristic Leaching Procedure] (TCLP) & [Waste Extraction Test] (WET). The testing method for a list of constituents at A1 to A61 in Class-A is based on Toxicity Characteristic Leaching Procedure (TCLP) and for extraction of leachable constituents; USEPA Test Method 1311 is used. The testing method for a list of constituents at A62 to A79 in Class- A, is based on the Waste Extraction Test (WET) Procedure given in Appendix II of section 66261 of Title 22 of California Code regulation (CCR).

The results of the analysis in terms of leachable concentrations are presented in Table 10.8. The results confirms that constituents A1 to A61 in Class-A, from Schedule II (HWM 2016) including As, Ba, Cd, Cr, Pb, Mn, Se and Ag, which were determined based on Toxicity Characteristic Leaching Procedure (TCLP) for the combined sludge were within the permissible limits. Constituents of Class A62-A79 including Be, Cr, Co, Cu, Mo, Ni, Th, V, Zn and F are based on Waste Extraction Test (WET). The leachable concentrations of Cr and Cu in WET extracts of combined sludge exceeded the permissible leachable concentrations as shown and highlighted in Table 10. Accordingly, the combined sludge is classified as "Hazardous wastes" and its handling and disposal must be as per HOWM Rules 2016. The leachable concentrations of other constituents were found to be within the permissible limits.

Table 10.8: TCLP and WET analysis in dewatered sludge at CETP NTIEM as per as per Schedule II (HWM 2016)

	TCLP Analysis*								
As per Schedule II of HWM Rules 2016	Class	A1	A2	A3	A4	A5	A6	A8	A9
	Element	Arsenic	Barium	Cadmium	Chromium and/or Chromium (III) compounds	Lead	Manganese	Selenium	Silver
	Permissible Limits	5	100	1	5	5	10	1	5
Combined Sludge from sludge storage area		0.006	0.145	0.023	0.06	0.005	1.911	0.005	BDL

		WET Analysis*								
As per Schedule II of HOWM Rules 2016	Class	A63	A64	A65	A66	A67	A68	A69	A70	A71
	Element	Beryllium	Chromium	Cobalt	Copper	Molybden-um	Nickel	Thallium	Vanadium	Zinc
	Permissible Limits	0.75	5	80	25	350	20	7	24	250
Combined Sludge from sludge storage area		0.004	8.747	0.028	127.802	0.145	0.082	0.004	0.093	1.181

** All values are in mg/L; BDL: Below detection limits*

10.8 Recurring (O & M) costs

The recurring cost estimates for the functioning of CETP has been estimated based on the secondary data provided by GPCB, considering the expenditure on chemicals and power consumption, manpower expenses and maintenance and repairing costs. The costs incurred towards chemicals, energy, manpower, O & M and miscellaneous is based on actual consumption for the period December, 2021 and January 2022. Table 10.9 presents recurring cost estimates for an average flow of 93.90 MLD. The operating cost does not include other miscellaneous expenditure such as consent to operate & renewal and cost towards sludge treatment and disposal in TSDF. It is observed that the operating cost for treating 93.90 MLD is Rs 12.64 per m^3, which is quite low for textile industrial wastewater treatment.

Table 10.9: Recurring cost estimates for NTIEM (December 2021 – January 2022)

Description	Rs. Lakhs/month
Manpower	8.72
Chemical cost	5.11
Electricity Consumption	190.96
Repair and Maintenance	151.58
Total	356.37
Daily Expenditure (356.37/30)	11.87 L
Average CETP flow treated (m^3/d)	93900
Average operating cost (Rs/m^3)	~ 12.64

10.9 Conclusions and Recommendations

Based on the evaluation of secondary data on inventory of industries & CETP, recurring cost, performance of CETP and field investigation studies and collection of primary data on adequacy assessment of CETP under existing operating conditions, following conclusions and recommendations are made.

10.9.1 Conclusions:

1. Presently the CETP receives effluent from 127 textile industries and there is no other industrial or sewage discharge received at the inlet of CETP. The capacity of CETP is proposed to be augmented from 100 to 130 MLD.
2. The CETP has only physico-chemical process as primary treatment followed by secondary biological treatment systems referred to as Continuous Flow Integral Clarifier Activated Sludge (CFICASS) and there is no tertiary or polishing treatment system.
3. The sludge generated from primary and secondary treatment is combined and dewatered through Volute Press and dried using solar drier.
4. Secondary data on performance revealed that the CETP occasionally did not meet the prescribed **Inlet Norms** for parameters such as suspended solids, sulphides, and phenolic compounds as shown in Table 3.
5. Primary data on performance of CETP revealed that the 12 hrs composite influent samples do not comply the prescribed CETP **inlet norms** with respect to sulphide, TSS, phenol, chloride, NH_3-N, FDS and color as shown in Tables 10.3 & 10.5.
6. Primary data on performance of CETP after physico-chemical followed by secondary biological treatment indicated that it meets the prescribed discharge standards with respect to pH, TSS, BOD, and COD concentrations **after CFICASS treated effluent**. However, the color and FDS concentrations were above the prescribed discharge standards in the final treated effluent as shown in Tables 10.3 & 10.5.
7. Heavy metals concentrations as shown in final treated effluent were below the prescribed limits with respect to all the metals.
8. Though the MLVSS to MLSS ratio in aeration tank and returned activated sludge was above 85%, the sludge volume index was quite high and varied between 390 – 720 ml/L.
9. The Toxicity Characteristic Leaching Procedure (TCLP) studies for combined sludge sample indicated that the As, Ba, Cd, Cr, Pb, Mn, Se and Ag were within the permissible limits. However, the leachable concentrations of Cr and Cu in

WET extracts of combined sludge exceeded the permissible leachable concentrations as shown and highlighted in Table 10.8.

10. The overview of performance of CETP is as follows:

Overview of Performance CETP NTIEM						
Flow and Inlet TDS	Existing Treatment Units			O&M cost* (Rs/m^3)	Non-Complying parameters	Remarks
	Primary Treatment	Secondary Treatment	Tertiary Treatment			
100 MLD Influent TDS ~3,900 mg/L	Physico-chemical treatment - Flocculating clarifiers – 4 No	CFICASS (Continuous flow integral clarifier activated sludge system) TANK – 4 No	--	12.64	Color. Heavy metals - WET – Chromium & Copper	Present operating flow: 93.90%

*Based on the secondary data

11. The operating cost of CETP considering chemicals & energy consumption, maintenance & repair expenses, manpower cost and other major expenditure comes out to be Rs 12.64 per m^3 (Table 10.9), which is quite low for treating textile effluent.

10.9.2 Recommendations

(A) Short Term (NTIEM)

1. CETP NTIEM must strive to ensure influent quality in accordance to the prescribed CETP **inlet norms** to achieve desirable treatment efficiency.
2. Mixing in equalization tank must be operated continuously in order to prevent the settling of solids. In case of capacity augmentation, all the 4 equalisation tanks must be used for equalisation of raw effluent and the sludge should be stored separately prior to disposal.
3. **The temperature of the treated effluent should not exceed 5°C above the receiving water temperature as per the General Standards for Discharge of**

Environmental Pollutants Part-A: Effluents published by Central Pollution Control Board Norms for Discharge into Surface Waters.

4. The leachable concentration of Cr and Cu in WET extracts of combined sludge exceeded the permissible leachable concentrations as shown and highlighted in Table 10. Accordingly, the sludge is classified as "Hazardous wastes" and its handling and disposal must be as per HOWM Rules 2016 and it must not be stored at CETP site and immediately disposed-off in secured landfill of TSDF as per the Hazardous Waste Management Rules 2016.
5. The sludge, which is sent to cement industries must be tested for TCLP and WET as prescribed in the SCHEDULE II [rule 3 (1) (17) (ii)] of Hazardous & Other Waste (Management and Transboundary Movement) Rules, 2016.
6. NTIEM must also take all safety precautions and provide all safety gadgets to CETP staff.
7. It is recommended that the CETP association should encourage use of green dyes and processes in their industrial units and explore the feasibility for possible implementation under Indian conditions.
8. It is strongly recommended that logbook records of actual energy & chemical consumption, manpower expenditure and repair & maintenance cost must also be separately maintained for the smooth & efficient management of CETP. The third-party agency, which is granted annual O & M contract for the functioning of CETP may also be authorized to maintain such records under the supervision of NTIEM.

B) Long Term (NTIEM)

9. Since the final treated effluent quality with respect to TSS, COD and BOD just within the prescribed standards, it is recommended to adopt simple tertiary treatment such as slow sand filtration or chemically aided tertiary settling or any other, to achieve overall compliance of final treated effluent.
10. Owing to the facts that the operating cost of CETP for two stage treatment is only Rs 12.64 per m^3 and the TDS and color concentrations are also quite low; ~ 3800 – 4100 mg/L and ~ 320 – 470 Pt-Co scale respectively, hence it is

recommended to explore the feasibility of recycle/reuse of the treated effluent. Initially it may be implemented on pilot scale basis for a capacity of 100 – 200 m^3/d.

11. It is recommended that the NTIEM should also explore the possibility of segregating high TDS effluent and treat it separately.
12. Overall, the NTIEM must comply with all the prescribed inlet CETP norms, optimize chemicals and energy consumptions and strive to optimize operating cost, while also meeting all the prescribed effluent discharge standards.

C) Recommendations for GPCB

13. The CETP, NTIEM has inlet standard for NH_3-N, however there is no discharge standard prescribed for it. Owing to the fact that the textile industries prominently use nitrogen containing compounds, it is recommended that GPCB prescribes the discharge standard for NH_3-N as well.
14. It is observed that the prescribed inlet & outlet norms for some of the parameters such as color, oil & grease, sulfide, phenol and some heavy metals are same. Hence, it is recommended to review the prescribed inlet and outlet standards for such parameters.

Clarifications to comments of CETP NTIEM on draft report are appended in Annexure – 10.5.

Annexure – 10.1

Inlet and outlet Norms for CETP NTIEM, Narol as prescribed by GPCB
(Source: GPCB, Ahmedabad)

Parameters*	Inlet Norms	Outlet Norms
pH	6.5 to 8.5	6.5 to 8.5
Temperature	40°C	Shall not exceed more than 5°C above ambient water Temperature
Colour (Pt. Co. Scale)	100 units	100 units
Suspended Solids	300	100
Oil and Grease	10	10
Chlorides	600	1000
Phenolic Compounds	1	1
Sulphides	2	2
Ammonical Nitrogen	50	-
Total Chromium	2	2
BOD (5 days at 20°C)	500	30
COD	1200	250
Fixed dissolved solids	2100	2100
Sulphates	-	1000
Bioassay Test	-	90% survival of fish after 96 hours in 100% effluent

* All units are in mg/L, except otherwise specifically mentioned.

Annexure – 10.2

Details of unit sizes at CETP NTIEM
(Source: GPCB, Ahmedabad)

Sr. No	Description	Capacity (m^3)	Dimensions (LxBxH) m
1.	Pumping Station with MCC room	6636.61	26.00 dia x 12.50 height
2.	4-Way Distribution Chamber (Equalization Splitter Box)	330.00	12.50 x 4.80 x 5.50
3.	Equalization Tanks – 4 Nos	11137.50	45.00 x 33.00 x 7.50
4.	Equalization Pump House – 2 Nos	2352.90	25.30 x 10.00 x 9.30
5.	Chemical Mix Tanks Train -1	219.60	6.10 x 6.00 x 6.00
		108.00	6.00 x 3.00 x 6.00
6.	Chemical Mix Tanks Train -2	219.60	6.10 x 6.00 x 6.00
		108.00	6.00 x 3.00 x 6.00
7.	Chemical Mix Tanks Train -3	219.60	6.10 x 6.00 x 6.00
		108.00	6.00 x 3.00 x 6.00
8.	Chemical Mix Tanks Train -4	219.60	6.10 x 6.00 x 6.00
		108.00	6.00 x 3.00 x 6.00
9.	Flocculating Clarifier (Primary Clarifiers)	2886.33	35.00 x 3.00 SWD
		2886.33	35.00 x 3.00 SWD
		2886.33	35.00 x 3.00 SWD
		3174.97	35.00 x 3.30 SWD
10.	Neutralization Tank (Post clarifier pH Adjustment Tank) – 2 Nos	216.00	6.00 x 6.00 x 6.00
11.	CFICASS Splitter Box	337.50	4.50 x 12.50 x 6.00
12.	CFICASS (Continues Flow Integral Clarifier Activated Sludge System) Tank - 4Nos	33348.70	49.70 x 67.10 x 10.00
13.	Filtrate Water Tank	962.11	17.50 dia x 4.00 height + 1.0m F.B.
14.	CFICASS Compressor Shed	3114.05	12.35 x 24.6 x 10.25
15.	H2SO4 Dosing Shed	326.70	11.00 x 9.00 x 3.30
16.	Chemical Mix Tanks Blower Shed	153.61	7.70 x 5.70 x 3.50
17.	Primary Chemical Dosing Shed (Including Dosing Tanks &		55.0 x 10.0 x 11.2m (15.0 x 9.5 x 1.2m)- overhead water

Annexure – 10.2 continued……

Sr. No	Description	Capacity (m^3)	Dimensions (LxBxH) m
	Chemical Storage)		tank
18.	Secondary Chemical Dosing Shed (Including Ammonium Hydroxide Storage Tank and Polymer Dosing Tank & Nutrient Tank)		18.5m x 14m x 6.9m (Shed), 18.3x13.7x1.8m (NT)
19.	Sludge Dewatering Shed	100366.00	134.00 x 107.00 x 7.00
20.	Electrical Substation Room	3157.00	28.00 x 20.50 x 5.50
21.	Main Admin Building	6810.00	40.00 x 15.00 x 11.35
22.	Over Head Water Tank	468.75	12.50 x 12.50 x 3.00
23.	Drinking water tank	30.62	3.50 x 3.50 x 2.50

Annexure – 10.3

Details of Electro-mechanical equipment installed in NTIEM

Sr. No	Unit	Equipment	No.	Capacity (hp)
14.	Main Pumping Station	Main pump	4x294.90	1177.6
		Drain pump	2x7.37	14.74
		EOT	1	1.34
15.	Main Pumping Station Inlet chamber	Trimmer pump	2x147.45	294.9
16.	Pump House-A	pump	3x167.56	335.12
		EQT jet mixing pump	4x100.53	402.12
		EOT	1	1.34
17.	Pump House-B	pump	3x167.56	502.68
		EQT jet mixing pump	4x100.53	402.12
		EOT	1	1.34
18.	Primary clarifier - 1	Screw pump	2x7.37	14.74
		Clariflocculator bridge assembly	1	13.80
19.	Primary clarifier - 2	Screw pump	2x7.37	14.74
		Clariflocculator bridge assembly	1	13.80
20.	Primary clarifier - 3	Screw pump	2x7.37	14.74
		Clariflocculator bridge assembly	1	13.80
21.	Primary clarifier - 4	Screw pump	2x7.37	14.74
		Clariflocculator bridge assembly	1	13.80
22.	Primary Clarifier	Screw transfer pump	8x2.01	16.08
23.	PCDS	PAC dosing pump	5x2.01	10.05
		Poly dosing pump	5x2.01	10.05
		IR compressor	1	6.70
		EOT	1	1.34
24.	CFICASS Tank	Screw pump	8x10.05	80.4
25.	CFICASS Blower shed	Turbo blower	3x2144.77	6434.31
26.	ACF/PSF shed	Feed pump	2x40.21	80.42
		Feed pump	2x25.13	50.26
27.	Sludge shed	poly feeding pump	12x1	12

Annexure – 10.3 continued……

Sr. No	Unit	Equipment	No.	Capacity (hp)
		sludge feeding pump	8x7.37	58.96
		sludge feeding pump	12x7.37	88.44
		Belt Press machine	10x10.05	100.5
		Accura air Compressor	2x7.37	14.74
28.	CMT Tank	Agitator	4x7.37	29.48
29.	Neutralization Tank	Agitator	2x7.37	14.74
30.	PCDS	Agitator	9x3.01	27.01
31.	Sludge shed	Agitator	6x1	6
		Agitator	4x1	4
		Agitator	4x7.37	29.48
		Agitator	2x2.01	4.02
		Agitator	2x2.01	4.02
32.	Volute press - 1		1	3.35
33.	Volute press - 2		1	5.36
34.	Volute press - 3		1	7.37
35.	PAC Dosing shed	Pump	8x0.49	3.92
		Unloading pump	2x2.01	4.02
36.	CMT Blower shed	Root blower	2x100.53	201.06
37.	Sludge shed	Root blower	2x30.16	60.32
			Total (hp)	10615.86

Annexure – 10.4

Consent for capacity augmentation

GPCB

GUJARAT POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN
Sector-10-A, **Gandhinagar** 382 010
Phone : (079) 23222425
(079) 23232152
Fax : (079) 23232156
Website : www.gpcb.gov.in

BY R.P.A.D.
"Consent to Establish"
CTE Amendment No.94460

NO: GPCB/ABD/NL/CCA-232(2)/ID-34244/

TO,
NAROL TEXTILE INFRASTRUCTURE & ENVIRO MANAGEMENT
(OLD NAME: ATPA SWARNIM GUJARAT ENVIRO P. LTD.),
PIRANA SEWAGE FARM AREA,
VILLAGE-GYASPUR, NAROL,
AHMEDABAD: 382405.

Sub: Amendment to CTE under Section 25 of Water Act 1974 and Section 21 of Air Act 1981.
Ref: Your application for CTE-amendment Inward no-**138143** dated **04/05/2018.**

Sir,

Without prejudice to the powers of this Board under the Water (Prevention and Control of Pollution) Act-1974, t0he Air Act-1981 and the Environment (Protection) Act-1986 and without reducing your responsibilities under the said Acts in any way, this is to inform you that this Board grants **Consent to Establish-Amendment for the expansion of capacity of the existing CETP** located at **PIRANA SEWAGE FARM AREA, VILLAGE-GYASPUR, NAROL, AHMEDABAD: 382405**.

Sr. No.	Activity	Existing Capacity as per CCA dated 01/11/2017	Proposed Capacity as per CTE-amendment	Total Capacity after CTE-amendment
1.	Collection, Treatment and Disposal of partially treated effluent generated from member textile units.	100 MLD	30 MLD	130 MLD

❖ **SPECIFIC CONDITIONS:**

- The Validity period of the order will be up to **11/07/2023** from date of issue.
- Applicant shall comply with Terms of Reference (TOR) approved by SEIAA, Gujarat vide Order no. SEIAA/GUJ/TOR/7(h)/518/2018 dated: 24/05/2018.
- Applicant shall comply with conditions of Environment Clearance granted vide letter no. F No. 10-84/2012-IA-III dated 16/12/2013.

Annexure – 10.5

Clarifications to the comments: CETP NTIEM

Sr. No	Page No in Draft Report	Revised Pg. no. & Section	Comments	Clarifications
1.	40	Pg. 8, 4.1	Name has to be changed to NTIEM, instead of GESCSL.	Correction has been made and incorporated in the Final Report.
2.	40 - Point No.5	Pg 10, 4.4, point no. 5	Instead of "diffused aeration" -- "jet mixing with air" has to be mentioned	Correction has been made and incorporated in the Final report
3.	44- Table-13: Point No.4	Pg. 14, Table 4, point no 4	Location: "Combined outlet from CFICASS – Final Outlet Discharge to river"	Correction has been made and incorporated in the Final report after site visit and in consultation with GPCB.
1.	44-Table-13 Point-No 5	Pg. 14, Table 4, point no 5	Location: "Dewatering from Belt press (Sent back to the collection system for treatment)"	Correction has been made and incorporated in the Final report after site visit and in consultation with GPCB.
2.	45 – Paragraph-1	Pg. 14, Para 4.6.1	Based on the analysis report with location correction, these comments have to be revised appropriately as CETP meets the GPCB norms.	Correction has been made and incorporated in the Final report after site visit and in consultation with GPCB.
3.	45- para no 5.6.2	Pg. 15, Para 4.6.2	Based on the analysis report with location correction, the comments have to be revised appropriately as CETP meets the GPCB norms.	Correction has been made and incorporated in the Final report after site visit and in consultation with GPCB.
4.	47 – Table no 14	Pg. 17, Table 5, Column nos. 6 & 7	Column no – 6 & 7 – Column names / tiles to be changed as below Column -6 : "Combined outlet from CFICASS – Final Outlet	Correction has been made and incorporated in the Final report after site visit and

Annexure – 10.5 continued……

			Discharge to the river Sabarmati." Column -7 : "Dewatering from Belt press (Sent back to the collection system for treatment)"	in consultation with GPCB.
5.	48 - Table-no 16	Pg. 19, Table 6, Column nos. 6 & 7	Column no – 6&7 – Column names / tiles to be changed as below Column -6 : "Combined outlet from CFICASS – Final Outlet Discharge to the river Sabarmati." Column -7 : "Dewatering from Belt press (Sent back to the collection system for treatment)"	Correction has been made and incorporated in the Final report after site visit and in consultation with GPCB.

True Copy

ANNEXURE - R2

भारतीय प्रौद्योगिकी संस्थान मुंबई
पवई, मुंबई - 400 076, भारत
Indian Institute of Technology Bombay
Powai, Mumbai - 400 076, India

दूरभाष/Phone : (+91-22) 2572 2545
फैक्स/Fax : (+91-22) 2572 3480
वेबसाईट/Website : www.iitb.ac.in

IIT Bombay

7th September, 2022

To:
Mr. Jayesh K. Vyas
Chief Executive Officer,
Narol Textile Infrastructure & Enviro Management (NTIEM),
ATPA Earth, 170 Part,
Piplaj-Pirana Road, Piplaj,
Ahmedabad 382405, Gujarat
Mobile: +91 94279 58773
Office: +91 79 2970 8230
Email: jkvceo@ntiem.com

Title of the Project:
Evaluation of the Plan Prepared for Expansion and Up-gradation of the Environmental Infrastructure and Utilities in CETP Narol

SUBJECT: Interim Report (Phase-1) from IIT Bombay

Dear Mr. Vyas:

Greetings from ESED, IIT Bombay!

[1] Please find attached the "**Interim Report (Phase-1)**" for your consideration.

[2] At the outset, I take this opportunity to commend your 'performance monitoring team' for collecting the relevant vital parameters even through the lockdown period of COVID pandemic. They have truly done a superb job! I am thankful to all your engineers and technicians for being helpful and forthcoming in providing whatever was needed by us through the site visits as well as through our dozens of email communications and online progress assessment and discussion sessions.

[3] Those datasets have become probably the most helpful resources for IITB team. All the real-life daily monitoring data sets (provided by you) were subjected by my team to several kinds of statistical interpretation of performance-related vital parameters. Every test and interpretation made by us proved that the data sets provided by CETP Narol are robust, self-

consistent and utmost thoroughly monitored and curated. You can read more on our interpretations of the data in Chapter 2 of the attached Report.

[4] You are aware that I was an important part of two teams that evaluated all CETPs in India. For both of those projects, the teams were formulated by the CPCB and then MoEF (now MoEF&CC). In addition, I have studied some CETPs and given advice because of the orders from NGT Principal Bench and NGT Western Zone Bench. I may want to state one fact about all CETPs in our country. Typically, the working of CETP is complex and they have several issues on the fronts of design, operation, maintenance, business management and revenue collection. The CETP Norol seems to be showing rather excellent progress on all the fronts.

[5] The IITB team made efforts to analyze the real-life data obtained from CETP Narol (daily monitored values). I have assessed the performance of CETP Narol thoroughly and even modeled the performance of the present facility. I am convinced that approximately 68% of TSS and 33% of COD is removed from the wastewater in the Primary Settling Tanks. Additionally, 12% TSS and 56% COD is removed by the CFICASS Bioreactors. As a result, the wastewater treatment plant at CETP Narol, on average, decreases the TSS concentration from 335 mg/L to 68 mg/L and decreases the COD concentration from 1,479 mg/L to 169 mg/L. Clearly, the treatment plant is currently compliant with respect to the prescribed GPCB limits.

[6] Some of my more substantive conclusions are:

- ✓ The analysis of real-life daily monitoring data from CETP Narol suggests that, in order to achieve satisfactory treatment of the wastewaters received at CETP Narol, a combination of first-rate physico-chemical treatment (for separation of suspended solids in primary as well as secondary treatment) and a carefully managed aerobic biological degradation of COD in the Bioreactor is necessary.

- ✓ The summary of the performance of CETP Narol for selected days when it received approximately 100 MLD inlet flowrate during January 2021 to July 2022 (19 months) is presented in Table 3.1. The statistical analysis of the wastewater quality parameters at the inlet and outlet of CETP Narol are depicted in this Table. Upon inspection of the data presented in the Table, it can be concluded that on several days during the 19-month period, the CETP Narol has processed nearly 100 MLD flowrate satisfactorily. Clearly, the treatment plant is currently compliant with respect to the prescribed GPCB limits for 100 MLD flowrate.

[7] In the meantime, I will continue working toward more deep modelling activity on Equalization Tank, Primary Settling Tanks and Aerobic Bio-reactors and will formulate my opinion on any potential opportunities for further improvisation and expansion. Our work is in progress.

[8] While closing, I cannot hide my pleasure and satisfaction about the attitude of all the team at CETP Narol. I reiterate that the NTIEM team has enthusiastically shared all the data

required by IITB and the management appears to be genuinely interested in evaluating the performance of its CETP. I am convinced that the data provided by the NTIEM (CETP management team) are of high quality and genuine. The present CETP at Narol is indeed adequate and efficacious for treating a flow of 100 MLD.

Please do not hesitate to call me or write to me if you want any further information or clarifications. Looking forward,

Sincerely,

7th September, 2022

Dr. Shyam R. Asolekar
Professor
Indian Institute of Technology Bombay
Environmental Science and Engineering Department
(Preventive Environmental Management Group)
(Second Floor, Room 205)
Powai, Mumbai 400 076
+912225767867 (Direct Office Land-line)
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asolekar@iitb.ac.in, asolekar@gmail.com (Email)

INTERIM REPORT (PHASE - 1)

PROJECT TITLE:

EVALUATION OF THE PLAN PREPARED FOR EXPANSION AND UP-GRADATION OF THE ENVIRONMENTAL INFRASTRUCTURE AND UTILITIES IN CETP NAROL

Submitted to:

Narol Textile Infrastructure and Enviro Management
Piplaj 382405,
District: Ahmedabad
Gujrat

Submitted by

Prof. Shyam R. Asolekar
Environmental Science and Engineering Department
INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
POWAI, MUMBAI 400 076
Tel: +91 22 2576 7867 E-mail: asolekar@gmail.com

7th September 2022

DECLARATION

This ***Interim Report (Phase-1)*** is prepared for submission to **M/s Narol Textile Infrastructure & Enviro Management** under the commitments made by IIT Bombay to NTIEM in connection with the ongoing project entitled "Evaluation of the plan prepared for Expansion and Up-Gradation of the Environmental Infrastructure and Utilities in CETP Narol". This project was started on 24th May, 2022.

This ***Interim Report (Phase-1)*** represents the work completed at **M/s Narol Textile Infrastructure & Enviro Management (hereafter collectively referred to as "NTIEM")** by the undersigned during 24th May, 2022 and today.

All the data in were obtained from NTIEM, Ahmedabad. In addition, the undersigned declares that this *Report* represents his ideas – especially the interpretation of data, analysis of the CETP and the inferences drawn on the basis of the investigations and estimations performed in this project. Wherever others' ideas or words have been included, the original sources have been adequately cited and referenced to. The undersigned also declares that he has adhered to the principles of academic honesty and integrity and has not misinterpreted or fabricated or falsified any idea/data/fact/source in this submission.

Date:
7th September 2022

Prof. Shyam R. Asolekar
Environmental Science and Engineering Department
I.I.T. Bombay
Powai, Mumbai 400 076
+91 22 2576 7867 (Office)
+91 98204 10443 (Mobile)
asolekar@gmail.com

Chapter 1

The Motivation and Objectives of This Study

Narol Textile Infrastructure and Enviro Management (NTIEM) operates one of the India's largest Common Effluent Treatment Plants (CETPs) - which is dedicated to textile industries. Incorporated in 2010, NTIEM was formed to manage environmental issues in the textile industries of the Narol Textile Cluster. The Cluster consists of about 127 individual textile processors, spread across Narol, Shahwadi, Isanpur and Piplaj, engaged majorly in cotton and blended fabrics, denims and synthetic textiles. To ensure the industries in the cluster to achieve the prescribed compliance requirements, NTIEM has been involved in several environmental activities to facilitate them, including activities such as installation of CCTV cameras for better monitoring of Air Pollution Control Devices across the cluster, providing Continuous Ambient Air Quality Monitoring Station (CAAQMS) to member units. The industry Association also is desirous to expand and upgrade the environmental infrastructure at the CETP Narol – owned and operated by NTIEM.

1.1 The Background for the Proposed Expansion

The NTIEM Common Effluent Treatment Plant (CETP) has a present design capacity of 100 MLD and presently achieving all the permissible outlet limits since January 2020, except TDS and colour, for 75-85 MLD wastewater flowrate. This was achieved after appointing M/s JM Smith International LLC (JMSI), based in USA, as the Operation and Maintenance (O&M) contractor.

Due to the increase in global demand for the textile industries, NTIEM intends to upgrade the current capacity of the CETP from 100 MLD to 130 MLD so that the member units can expand their respective production capacities. NTIEM has already obtained the necessary Consent to Establish (CTE) for the proposed expansion from GPCB as well as Environmental Clearance Certificate (ECC) from MoEFCC, Government of India. M/s JM Smith International LLC (JMSI) has been interested with development of the "Expansion and Up-Gradation Plan" for the CETP Narol. The said plan includes augmentation and improvement of the treatment

processes as well as incorporation of new technologies to achieve the required modernisation and upgradation.

NTIEM intends to ascertain that the proposed "Expansion and Up-Gradation Plan" is the best possible approach for the proposed upgradation and expansion and the CETP, Narol will be able to treat 130 MLD flow conforming with the stipulated norms by GPCB. Accordingly, the project entitled "Evaluation of the plan prepared for Expansion and Up-Gradation of the Environmental Infrastructure and Utilities in CETP Narol" was envisaged and entrusted to IIT Bombay for giving the expert opinion.

1.2 The Overview of CETP Narol Facility

NTIEM is a company located in Narol in Ahmedabad, Gujrat. NTIEM was incorporated in 2010 to providing wastewater treatment services for 127 textile mill processors spread across Narol, Shahwadi, Isanpur and Piplaj. The cluster is spread across 500 hectares and produces about 2,800 million meters of fabric every year catering to markets in countries such as Europe, the United State of America (USA), the Middle East, China, Thailand, Turkey, Brazil, etc. Their CETP has been successfully achieving all the GPCB norms since January 2020, except TDS and color occasionally.

Aerial View of the CETP Narol operated by NTIEM

NTIEM has designated 11 sumps and the sump rooms are equipped with SCADA Automation for the 127 industries across the area. The member units pump out their partially treated effluent into these 11 sumps and the automation system ensures the flow of the influent wastewater to the CETP and the quality characteristics also gets reflected to the GPCB as well as CPCB portals directly.

The entire CETP can be divided into 4 important operational areas:

(a) Primary Treatment

(b) Secondary (Biological) Treatment - CFICASS

(c) Sludge Dewatering and Solar Sludge Dryer

(d) Chemical Dosing Systems

The partially treated wastewaters generated by the textile industrial units (member industries in the GIDC Narol) are brought by gravity flow to the Influent Pumping Station at CETP Narol - which is equipped with a Mechanical Fine Screen (MFS) to remove floating and suspended matter larger than 8 to 10 millimeters in size.

CETP is designed as a battery of four parallel operating trains, each handling 25 MLD in normal conditions and 33 MLD if one battery is down. Each of these four trains consists of four equalization tanks and four primary clarifiers. The pre-screened wastewaters are pumped to the respective Equalization Tanks.

Primary Treatment: Effluent is pumped to Chemical mix parallelly through equalization effluent pumps. Each Equalization Tank is paired with a single train of the Primary Treatment

System. This treatment includes different units such as coagulation, flocculation and gravity settling to remove residual suspended solids and colloid solids (*i.e.* color compounds and organics). The clarified supernatant is transferred to the Post Primary pH Adjustment Tanks, i.e. neutralization tanks by gravity overflow.

Secondary Treatment: The biological treatment approach is a Continuous Flow Integral Clarifier Activated Sludge System (CFICASS). The CFICASS incorporates the secondary clarifier into the aeration tank in the form of rows of 60° sloped wedges.

Its sludge recycling is accomplished using airlift pumps. Biomass is conditioned prior to clarification to enhance floc formation and remove scum or foam. There are no moving parts

in contact with effluent in the entire CFICASS system. Aqueous ammonium hydroxide and phosphoric acid are added in order to meet nutrient requirements for biological growth.

1.3 The Specific Objectives

The following five objectives are articulated for the project entitled "Evaluation of the Plan Prepared for Expansion and Up-gradation of the Environmental Infrastructure and Utilities in CETP Narol":

(1) To estimate pollution loads and hydraulic loads (i.e. inputs and outputs) subjected to all critical unit processes and unit operations using the available data and information by studying and compiling the data corresponding to the existing CETP of 100 MLD capacity.

(2) To develop a deeper understanding about the selected wastewater treatment equipment and unit operation in the existing 100 MLD CETP – especially focussing on those equipment and utilities which are to be augmented and upgraded in the proposed expansion.

(3) To study the design document and plan prepared for the proposed expansion and up-gradation of the existing 100 MLD CETP to 130 MLD capacity. Compare and contrast the proposed design with the learnings and inferences drawn from the investigations conducted in Objectives 1 and 2.

(4) To articulate the technical opinion regarding the suitability and adequacy of the proposed plan for expansion and upgradation of environmental infrastructure and utilities in the existing CETP Narol.

(5) Finally, to suggest methods to improve the proposed plan (if any) for expansion and upgradation to achieve higher than 100 MLD loads in the context of the expert opinion and the technical evaluation.

1.4 The Proposed Step-wise Work Plan for the Study

In the light of the objectives articulated in the preceding section, the following logic diagram (refer to **Figure 1.1**) is developed to present and discuss the components of work. It is evident that the issues involved in decision making would require a complex analysis based on the

observations made from the prevailing real-life CETP Narol – which is typically operated in the vicinity of 100 MLD flowrate in the recent times.

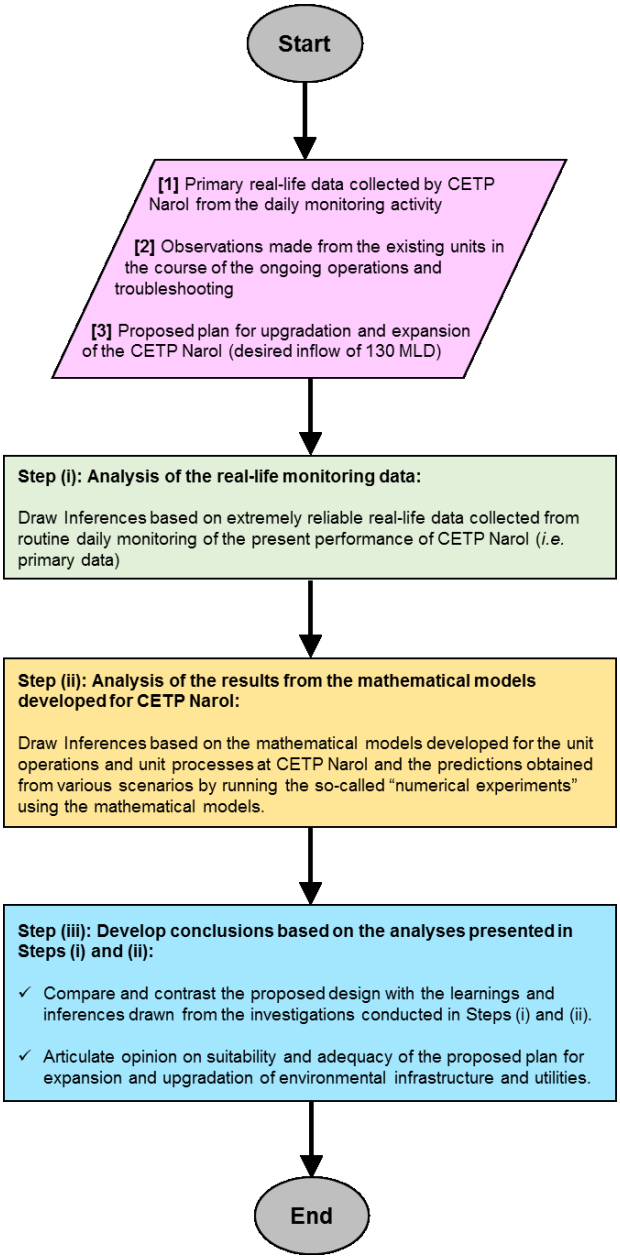

Figure 1.1: The outline of the logic diagram of the three steps planned in the present study:

Chapter 2

Analysis of the Present Quality Parameters Monitored at CETP Narol having100 MLD Capacity

There are two approaches to understanding the need and arriving at the viable solutions for upgrading each unit operation and unit processes. They can be summarised as follows:

Approach 1: One needs to make a critical analysis of the "present situation" *vis-à-vis* the sizes and capabilities of the most important units in CETP Narol. Upon analysis the candidate technology solutions for upgrading the unit operation and unit processes for handling 130 MLD flow, a decision can be made on the details of the up-gradation and expansion plan.

Approach 2: One can design a fresh 130 MLD CETP and compare and contrast the unit operation and unit processes with the existing treatment units and then prepare the detailed up-gradation and expansion plan.

"Approach 2" is considered the most relevant and useful for arriving at the fresh design and plan for a "greenfield project" or making decision on upgradation of the existing plant by simply comparing the unit operations and unit processes. In the present study, however, the "Approach 1" has been adopted. It is well understood that this approach is the most relevant and useful for arriving at the up-gradation and expansion plan for CETP Narol. It is clear that this approach is probably the best to develop the up-gradation and expansion plan for a "brownfield project".

2.1 The Data Used for Performance Analysis

The data for the past 2½ years *i.e.* January 2020 to July 2022 of the water quality parameters such as Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), Colour, Mixed Liquor Suspended Solids (MLSS), Mixed Liquor Volatile Suspended Solids (MLVSS), *etc.* were provided by NTIEM. A preliminary analysis is conducted to determine the pair-wise

correlation between the quality parameters with the hope to obtain deeper insights into the performance of the CETP Narol.

2.2 Correlation Between COD and Colour

The correlation between COD and Colour of treated water monitored at the outlet of the four Secondary Clarifiers for the Continuous Flow Integral Clarifier Activated Sludge System (CFICASS) is presented in **Figure 2.1**.

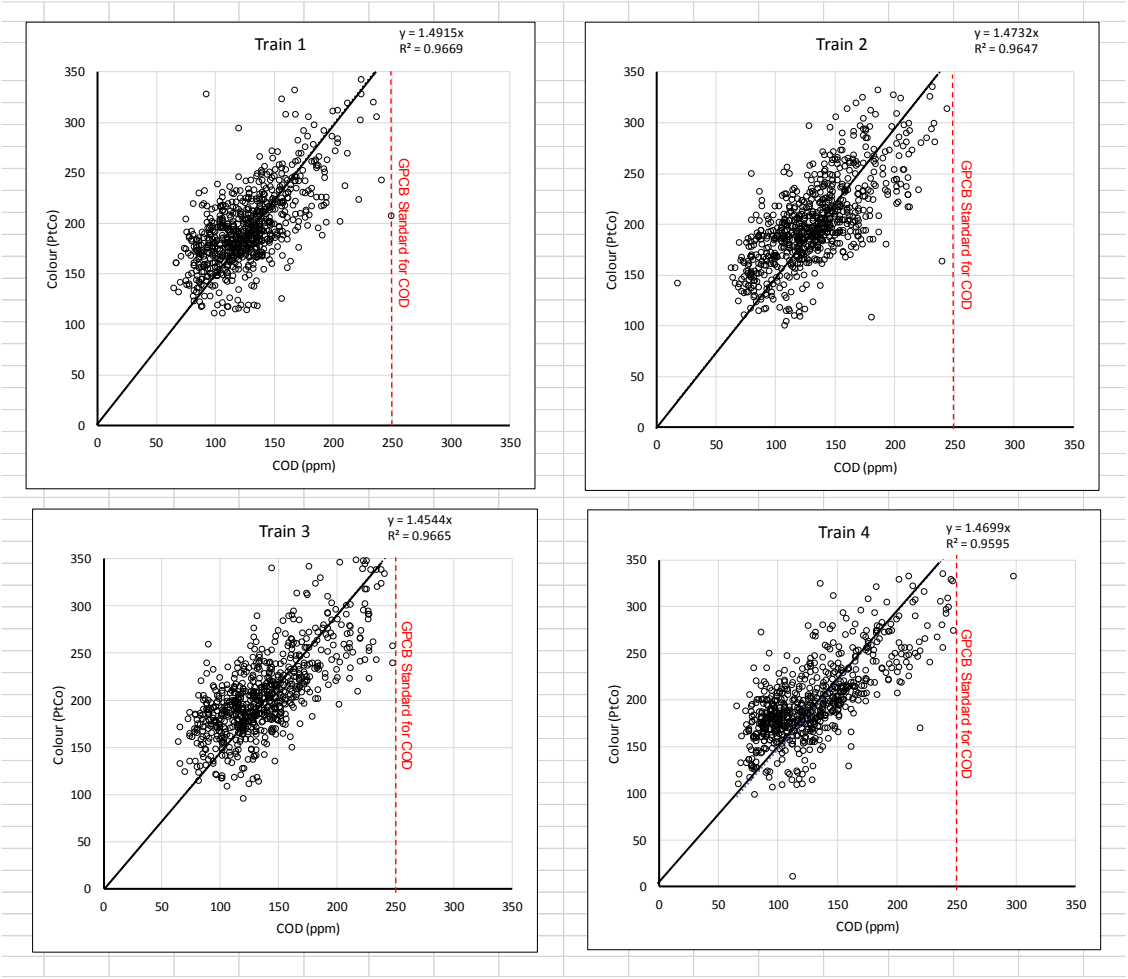

Figure 2.1: Correlation between Chemical Oxygen Demand (COD) and Colour (PtCo) at the outlet of the Secondary clarifiers of the *Continuous Flow Integral Clarifier Activated Sludge System* (CFICASS) *i.e.* at the outlet of the four trains of CETP Narol

The Figure clearly suggests that there is a direct correlation of Colour with COD at the outlet of the four *Continuous Flow Integral Clarifier Activated Sludge Systems* (CFICASS) after the aerobic biological wastewater treatment process.

It is hypothesized that the Colour of treated water could be 'zero' corresponding to 'zero' COD concentration in treated water. Accordingly, the linear fitting curve was passed through the origin *i.e.* (0,0) of the plot. As evidenced from Figure 2.1, it is clear that there exists a strong correlation between the Colour and COD of treated water at the outlet of CETP Narol (slope approx. 1.47 with $R^2 > 0.96$). Thus, the Colour in the wastewater is due to the compounds which cause COD in the wastewater.

2.3 Correlation Between MLSS and MLVSS

The correlation between Mixed Liquor Suspended Solids (MLSS) concentrations and Mixed Liquor Volatile Suspended Solids (MLVSS) concentrations at the outlet of the aeration tank in the four Continuous Flow Integral Clarifier Activated Sludge System (CFICASS) is presented in **Figure 2.2**. The Figure clearly suggests that there is a direct correlation of MLSS and MLVSS at the outlet of the aeration tank in the four Continuous Flow Integral Clarifier Activated Sludge System (CFICASS) after the aerobic biological wastewater treatment process.

It is hypothesized that the MLSS in biological reactor comprises of MLVSS (*i.e.* consortium of the active aerobic bacteria responsible for the biodegradation of organic waste) as well as some inert material – which is typically inorganics and refractory materials including clays and non-biodegradable particles. Accordingly, the slope of the linear fitted line would be "nearly 1" and the intercept of the fitted line on Y-axis would be the difference between MLSS and MLVSS. Thus, the fitted line would have the form $y = m\ x + C$; where y is MLSS, x is MLVSS, and C is the intercept on Y-axis (indicative of the inert inorganic matter).

As evidenced from Figure 2.2, it is clear that there exists a strong correlation between the MLSS and MLVSS of treated water at the outlet of the aeration tank (Slope = m = 1 having $R^2 > 0.93$). The intercept on the Y-axis (indicated by 'C'), as stated earlier, indicates the refractory inorganic material in the biological reactor – which is estimated to be approx. 600 mg/L in each CFICASS reactor. Such accumulation of inert inorganic solids in any activated sludge process

would be considered reasonable and unavoidable. Clearly, the aerobic biological degradation is apparently working fine in the prevailing four reactors referred to as *Continuous Flow Integral Clarifier Activated Sludge System* (CFICASS).

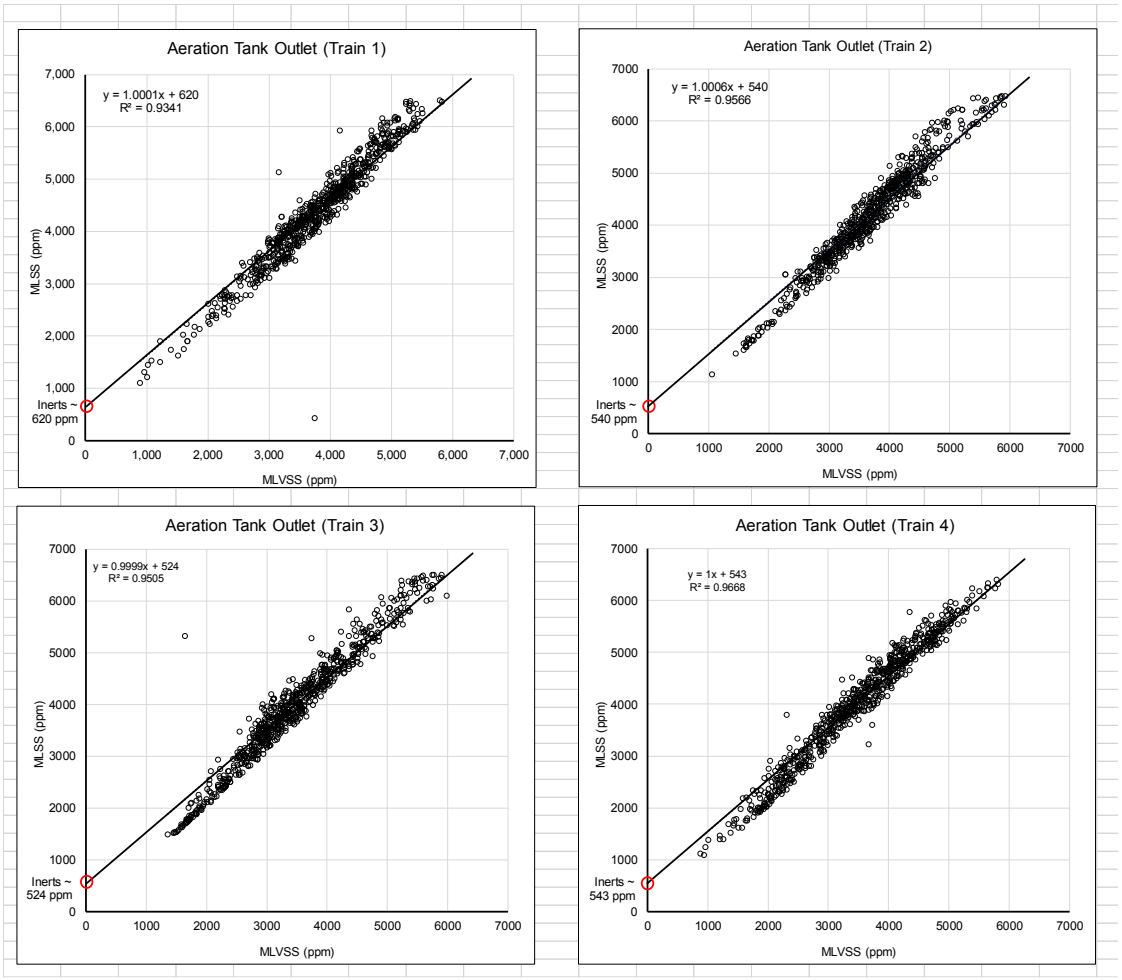

Figure 2.2: Correlation of Mixed Liquor Suspended Solids (MLSS) concentrations against the Mixed Liquor Volatile Suspended Solids (MLVSS) of the outlet treated water of the aerobic biological wastewater treatment process for the four Continuous Flow Integral Clarifier Activated Sludge Systems (CFICASS)

2.4 Correlation Between COD & BOD3 at the Inlet of CETP

Figure 2.3 depicts the correlation between Chemical Oxygen Demand (COD) concentrations and Biological Oxygen Demand (BOD3) concentrations at the inlet of the CETP Narol. (a) All the data for 1st January 2020 to 30th April 2022 are plotted and (b) The filtered data are considered for plotting (inlet COD concentrations in the range of 500 to 1,520 mg/L and inlet BOD3 in the range of 100 to 600 mg/L).

It is hypothesized that the BOD3 of wastewater at the inlet of CETP Narol would be 'zero' corresponding to the 'zero' COD concentration at the inlet. Accordingly, the linear equation was fitted to the daily monitoring data and the line was passed through the origin *i.e.* (0,0) of the plot. Thus, the best fit of the line would have the form y = m x; where; y is the Inlet BOD3 concentration and x is the Inlet COD concentration. The slope of the best fitted line, m, works out to be 0.27 – which is indicative of the fraction of easily biodegradable organic waste received at the inlet of CETP Narol.

As evidenced from Figure 2.3a, it is clear that there exists a reasonable correlation between the COD and BOD3 of the wastewater at the inlet of CETP Narol (Slope = m = 0.27 with $R^2 >$ 0.81). Recall that Figure 2.3a includes all the data from 1st January 2020 to 30th April 2022 and develops the linear best-fit correlation between BOD3 and COD values of wastewater at the inlet of CETP. The correlation suggests that approximately 27% of the organic waste received at the inlet of CETP can be readily biodegraded in presence of excess DO (condition simulated in the standard BOD3 tests). It is, therefore, inferred that the wastewater received at the inlet of the CETP is not easily biodegradable.

Similarly, Figure 2.3b presents the "filtered data" (inlet COD concentrations in the range of 500 to 1,520 mg/L and inlet BOD3 in the range of 100 to 600 mg/L) from 1st January 2020 to 30th April 2022 and develops the linear best-fit correlation between BOD3 and COD values of wastewater at the inlet of CETP. As evidenced from Figure 2.3b, it is clear that there exists a reasonable correlation between the COD and BOD3 of the wastewater at the inlet of CETP Narol (Slope = m = 0.24 with $R^2 > 0.85$). Once again, the correlation suggests that approximately 24% of the organic waste received at the inlet of CETP can be readily biodegraded in presence of excess DO (condition simulated in the standard BOD3 tests). The filtered data, too, confirms that the wastewater received at the inlet of the CETP is not easily biodegradable.

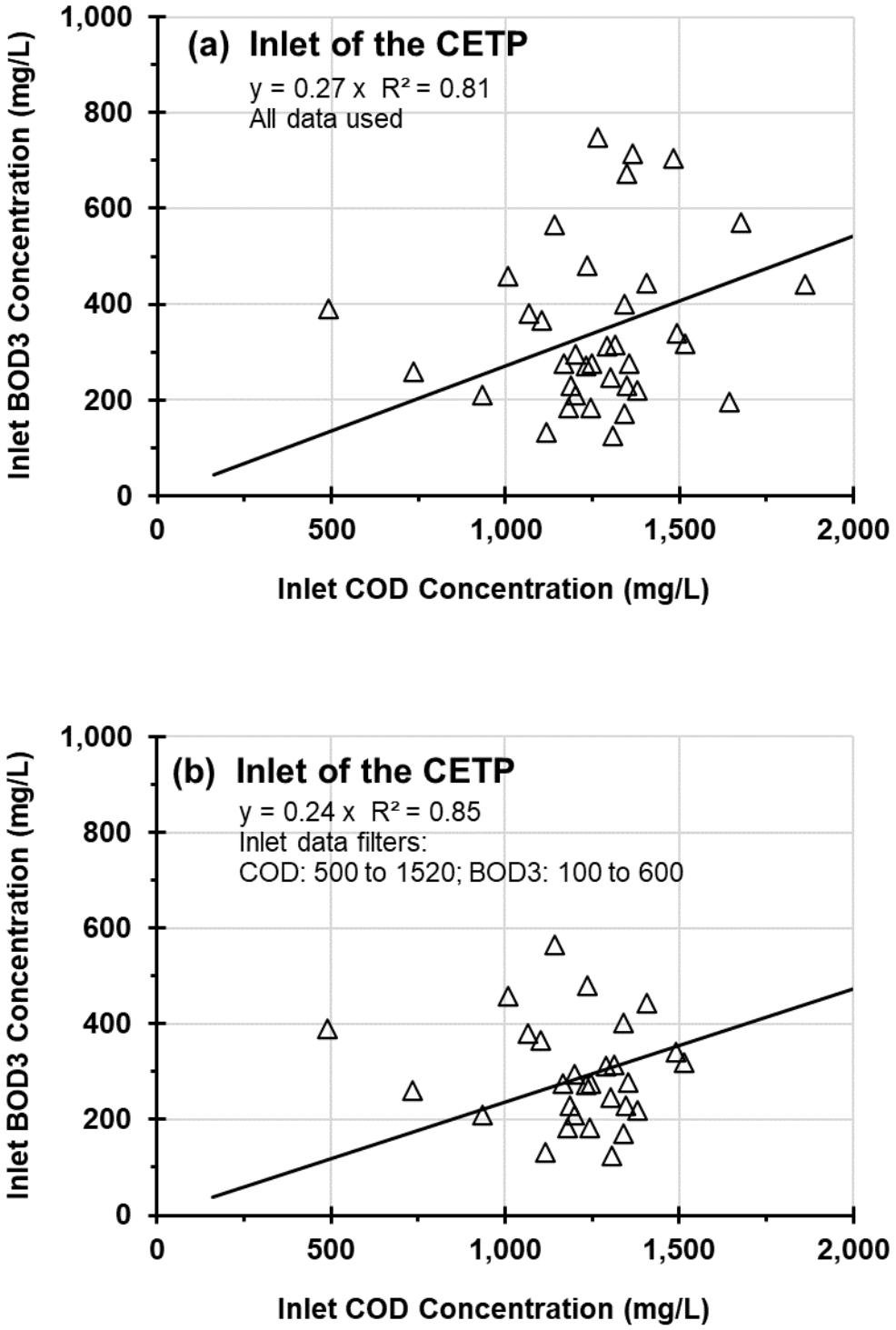

Figure 2.3: Correlation between Chemical Oxygen Demand (COD) concentrations and Biological Oxygen Demand (BOD3) concentrations at the inlet of the CETP Narol. (a) All the data for 1st January 2020 to 30th April 2022 are plotted and (b) The filtered data are considered for plotting (inlet COD concentrations in the range of 500 to 1,520 mg/L and inlet BOD3 in the range of 100 to 600 mg/L).

The two linear best-fit cases presented in Figure 2.3 (a & b) endorse the view that:

- ✓ There exists a reasonable correlation between the COD and BOD3 of the wastewater received at the inlet of CETP Narol (with $R^2 = 0.81$ and 0.85).
- ✓ The linear regression between all the data as well as the filtered data, endorse that the wastewater received at the inlet of the CETP is not easily biodegradable (biodegradable fraction = 0.27 and 0.24).

2.5 Correlation Between COD & BOD3 at the Outlet of CETP

Figure 2.4 depicts the correlation between Chemical Oxygen Demand (COD) concentrations and Biological Oxygen Demand (BOD3) concentrations at the outlet of the CETP Narol. (a) All the data for 1st January 2020 to 30th April 2022 are plotted and (b) The filtered data are considered for plotting (outlet COD in the range of 75 to 200 mg/L; outlet BOD3 in the range of 20 to 60 mg/L).

In this case, too, it is hypothesized that the BOD3 of treated water at the outlet of CETP Narol would be 'zero' corresponding to the 'zero' COD concentration at the outlet. Accordingly, the linear equation was fitted to the daily monitoring data and the line was passed through the origin *i.e.* (0,0) of the plot. Thus, the best fit of the line would have the form $y = m x$; where; y is the Outlet BOD3 concentration and x is the Outlet COD concentration. The slope of the best fitted line, m, works out to be 0.26 – which is indicative of the fraction of easily biodegradable organic waste discharged at the outlet of CETP Narol.

As evidenced from Figure 2.4a, it is clear that there exists a reasonable correlation between the COD and BOD3 of the wastewater at the outlet of CETP Narol (Slope = m = 0.26 with $R^2 > 0.91$). Recall that Figure 2.4a includes all the data from 1st January 2020 to 30th April 2022 and develops the linear best-fit correlation between BOD3 and COD values of treated water at the outlet of CETP. The correlation suggests that approximately 26% of the organic waste discharged at the outlet of CETP can be readily biodegraded in presence of excess DO (condition simulated in the standard BOD3 tests). It is, therefore, inferred that the treated water discharged at the outlet of the CETP is not easily biodegradable.

Similarly, Figure 2.4b presents the "filtered data" (inlet COD concentrations in the range of 20 to 60 mg/L and inlet BOD3 in the range of 75 to 200 mg/L) from 1st January 2020 to 30th

April 2022 and develops the linear best-fit correlation between BOD3 and COD values of treated water at the outlet of CETP.

As evidenced from Figure 2.4b, it is clear that there exists a reasonable correlation between the COD and BOD3 of the treated water at the outlet of CETP Narol (Slope = m = 0.28 with $R^2 >$ 0.95). Once again, the correlation suggests that approximately 28% of the organic waste discharged at the outlet of CETP can be readily biodegraded in presence of excess DO (condition simulated in the standard BOD3 tests). The filtered data, too, confirms that the treated water discharged at the outlet of the CETP is not easily biodegradable. The two linear best-fit cases presented in Figure 2.4 (a & b) endorse the view that:

- ✓ There exists a reasonable correlation between the COD and BOD3 of the treated water discharged at the outlet of CETP Narol (with $R^2 = 0.91$ and 0.95).
- ✓ The linear regression between all the data as well as the filtered data, endorses that the treated water discharged at the outlet of the CETP is not easily biodegradable (biodegradable fraction = 0.25 and 0.28).

At this point, one may make one interesting observation that the fraction of easily biodegradable organic waste is lower than the fraction found at the inlet of the CETP. However, Figure 2.3a and Figure 2.4a are analysing entirely different datasets and, therefore, the comparison between the biodegradable fractions at the inlet and outlet cannot be considered prudent or admissible for multiple reasons. Several operation parameters of CFICASS bioreactor, including hydraulic retention times in Zones 1, 2 and 3, and fluctuations of concentration of wastewaters received at the inlet of CETP are known for directly and indirectly influencing the kinetics in different zones of the bioreactor.

Typically, one would expect the lower biodegradable fraction (indicated by the ratio of BOD3 to COD) at the outlet of any biological wastewater treatment plant when compared with the fraction at the inlet of the bioreactor. The comparison between the biodegradable fractions (indicated by the ratio of BOD3 to COD at the inlet as well as the outlet of any biological wastewater treatment plant) at the inlet and outlet of the CETP cannot be considered prudent or admissible for multiple reasons. Owing to the serious complexities and limitations on account of the datasets from the real-life monitoring; apparently, the statistical tool employed in this analysis is far from adequate. As a result, this study cannot conclusively resolve anything by comparing the biological fractions at the inlet *versus* outlet of the CETP with satisfactory statistical confidence.

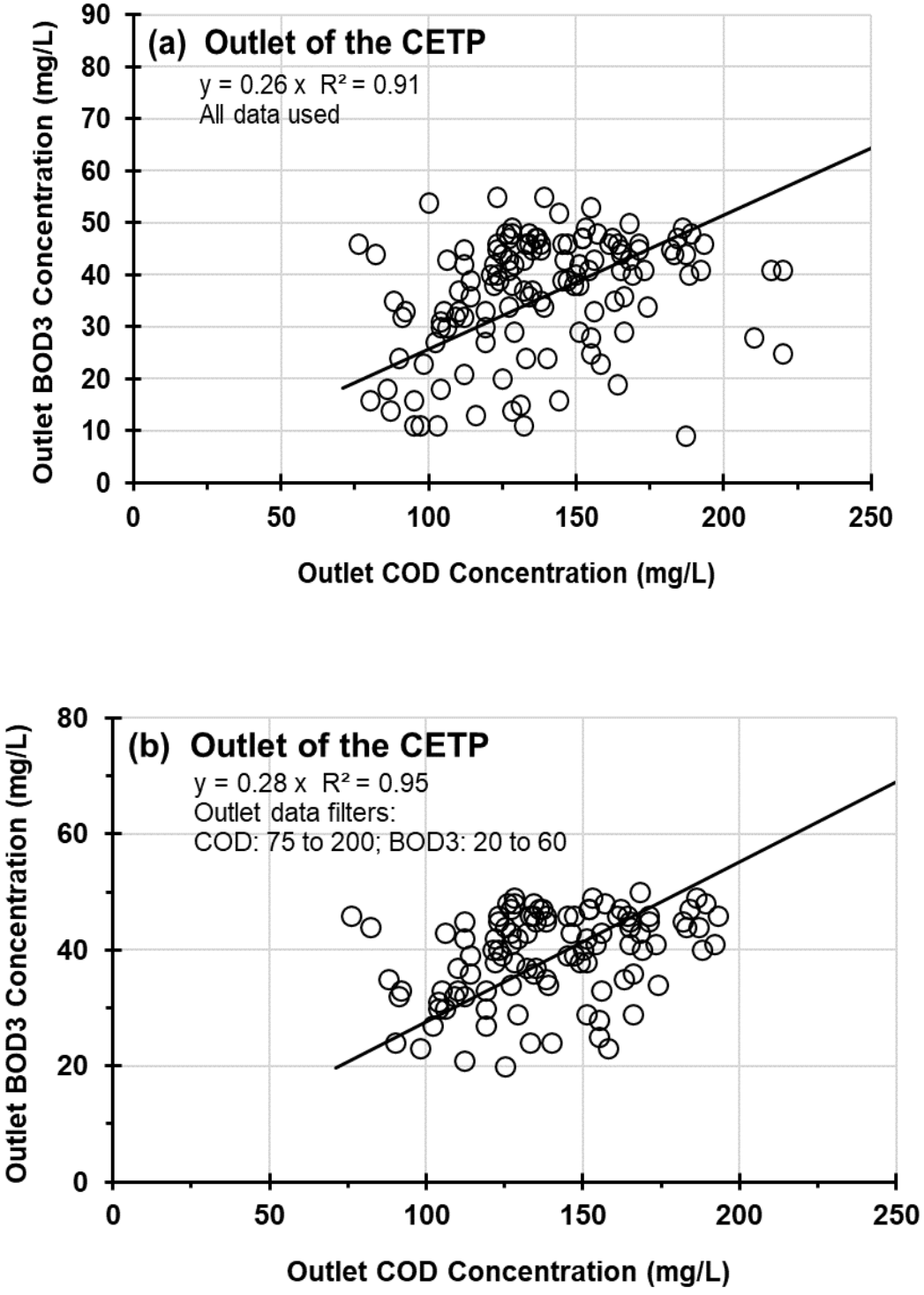

Figure 2.4: Correlation between Chemical Oxygen Demand (COD) concentrations and Biological Oxygen Demand (BOD3) concentrations at the outlet of the CETP Narol. (a) All the data for 1st January 2020 to 30th April 2022 are plotted and (b) The filtered data are considered for plotting (outlet COD in the range of 75 to 200 mg/L; outlet BOD3 in the range of 20 to 60 mg/L).

2.6 Correlation Between ∆COD & ∆TSS Across the PST

The daily monitored data provided by NTIEM, between 1st May 2022 to 30th June 2022 are used for estimating ΔCOD and ΔTSS. The range of COD concentrations at the inlet of PST is found to be in the range of 1,250 to 1,625 mg/L and COD concentrations at the outlet of PST is found to be in the range of 850 to 1,150 mg/L. Similarly, the inlet TSS concentrations in the range of 290 to 400 mg/L and TSS at the outlet of PST is in the range of 85 to 150 mg/L. The correlation between removed Chemical Oxygen Demand (ΔCOD) concentrations and removed Total Suspended Solids (ΔTSS) concentrations at the outlet of the Primary Settling Tank (PST) of the CETP Narol is presented in **Figure 2.5**.

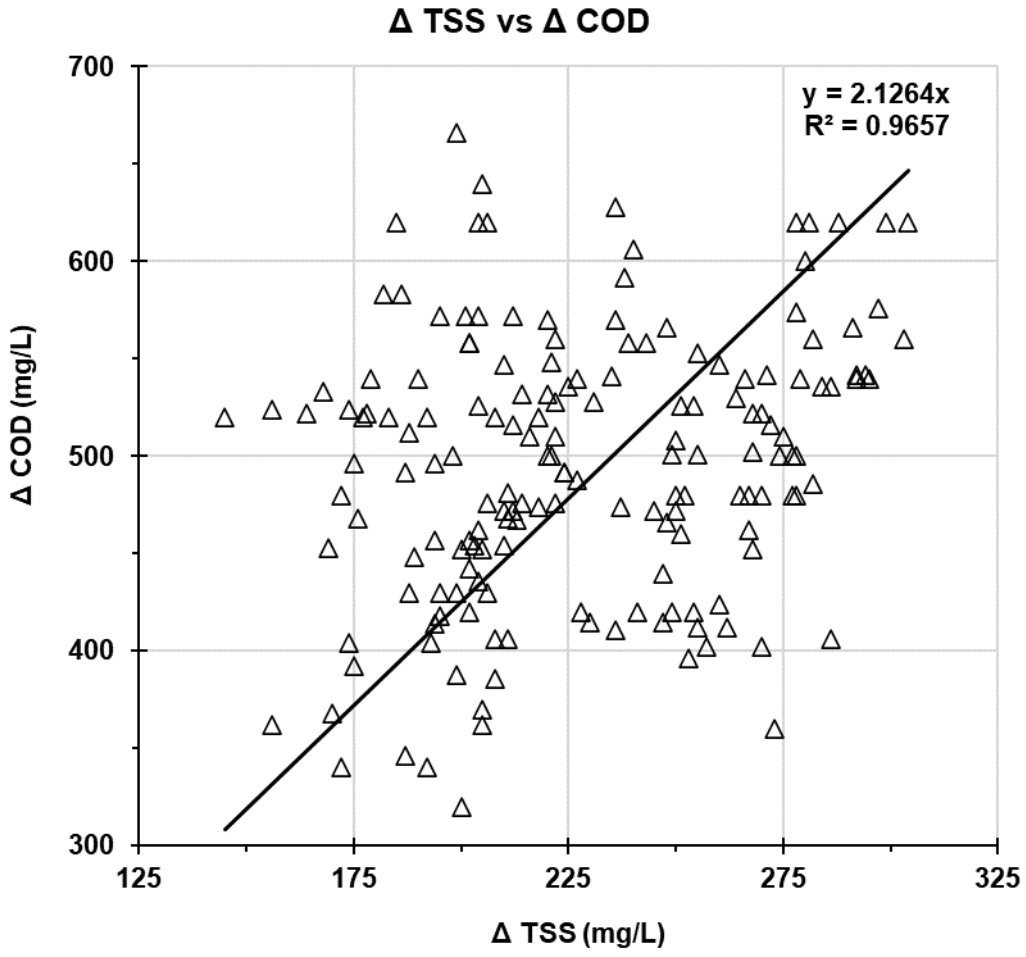

Figure 2.5: Correlation of removed TSS (Δ TSS, mg/L) in Primary Clarifier with the removed COD (Δ COD, mg/L) in Primary Clarifier by comparing TSS and COD data at Inlet and Outlet of Primary Clarifier. The daily monitoring data from the Primary Clarifiers in the four trains of CETP Narol between 1st May 2022 to 30th June 2022 are used for determining Δ TSS and Δ COD values across the four Primary Clarifiers.

It is hypothesized that the COD removal in the PST is due to the settling of TSS forming solids. Therefore, the ΔTSS *versus* ΔCOD regression line was passed through (0,0) *i.e.* when ΔTSS could be 'zero' corresponding to 'zero' ΔCOD in treated water. As evidenced from the Figure, it is clear that there exists a strong correlation between the ΔTSS and ΔCOD of treated water at the outlet of PST at CETP Narol (slope approx. 2.1264 with R2 > 0.96). Thus, it can be inferred that all the TSS removed in Primary Settling Tank results in removal of the proportionate COD in the process of settling.

2.7 Bird's Eye View of Progressive Treatment in CETP Narol

Table 2.1 depicts a bird's eye view of the progressive treatment of wastewater taking place for the present situation (*i.e.* 83 MLD flow). The values in the red text corresponds to the daily quality monitoring values collected by NTIEM between 1st May 2022 to 30th June 2022 for TSS and COD concentrations.

Since the Equalization Tank typically dampens the fluctuations in flowrate as well as the concentrations of the pollutants, the averages of flow and concentrations at the inlet and outlet will be identical. Further, the average ΔTSS is found to be 227 mg/L and the average ΔCOD is 487 mg/L across the Primary Settling Tank (PST). Based on the findings of the previous section, it is understood that all the TSS removed correspond to proportionate COD removal with a ΔCOD: ΔTSS ratio = 2.1264.

It can be concluded from the Table, approximately 68% of TSS and 33% of COD is removed from the wastewater in the Primary Settling Tanks. Additionally, 12% TSS and 56% COD is removed by the CFICASS Bioreactors. As a result, the wastewater treatment plant at CETP Narol, on average, decreases the TSS concentration from 335 mg/L to 68 mg/L and decreases the COD concentration from 1,479 mg/L to 169 mg/L. Clearly, the treatment plant is currently compliant with respect to the prescribed GPCB limits.

Therefore, the "Prorated ΔTSS" can be conveniently estimated using this ratio for the corresponding observed ΔCOD. Similarly, the "Prorated ΔCOD" can be estimated using the same ratio for the corresponding observed ΔTSS. It can be seen that the prorated values for ΔTSS (229 mg/L) and ΔCOD (482 mg/L) are nearly equal to the observed values of ΔTSS (227 mg/L) and ΔCOD (487 mg/L).

One of the high points of the above relationship of ΔTSS and ΔCOD is the prediction of "composition of wastewater" at the outlet of PST. Accordingly, the effort is made to bifurcate the COD concentrations in two categories, *namely*: [1] the "COD associated with TSS in wastewater" and [2] "Dissolved COD in wastewater" at the exit of PST. This became possible by using the ratio of COD:TSS (2.1264) and the average TSS and COD concentrations observed at the outlet of PST. Clearly, the COD removal *via* removal of settled solids in PST corresponds to the altered "COD concentration associated with TSS in wastewater" as well as the "Dissolved COD in wastewater" at the exit of PST.

Table 2.1: Bird's Eye View of Progressive Treatment achieved in Present scenario (83 MLD inflow) in CETP Narol. The values in red text are monitored values between 1st May 2022 to 30th June 2022.

Sr. No.	Description	ET Outlet	PST Outlet	Bioreactor Outlet
1	TSS Range	290 to 400	85 to 150	33 to 107
2	Average TSS	335	108	68
3	Std Dev TSS	36	16	17
4	TSS removal		227	41
5	% TSS removal		68	12
6	Prorated TSS removal		229	
7	COD:TSS Ratio (Actual)	**2.1264**		
8	COD Range	1,250 to 1,625	850 to 1,150	120 to 270
9	Average COD	1,479	992	169
10	Std Dev COD	94	71	31
11	COD removal		487	823
12	% COD removal		33	56
13	Prorated COD removal		482	86
14	Estimated COD in wastewater associated with TSS	712	230	144
15	Estimated COD in wastewater in dissolved form	767	762	25

Further, the bioreactor reduces the average COD concentrations from 992 mg/L to 169 mg/L through biological treatment as well as probably through the settling of non-biological TSS (along with settling of the flocs of bacteria) in the secondary clarifier. This can be clearly observed, for the present scenario *i.e.* 83 MLD average inlet flowrate, the %COD removed increased from 33% to 89% in the bioreactor while the %TSS removed (of non-biological origin) also increased from 68% to 80%.

2.8 Evidence of Satisfactory Performance at 100 MLD Inflow Based on the Daily Monitoring Data

It was recognised at the outset that the issues involved in interpreting the real-life data collected by CETP Narol would require a complex analysis based on the observations made from the prevailing real-life CETP Narol – which is typically operated in the vicinity of 100 MLD flowrate in the recent times. The IITB team made efforts to analyse the real-life data obtained from CETP Narol (daily monitored values). All the relevant vital parameters are being monitored daily by CETP Narol – even through the lockdown period of COVID pandemic. Those datasets have become probably the most helpful resources for IITB team.

In summary, the analysis of real-life daily monitoring data from CETP Narol suggests that, in order to achieve satisfactory treatment of the wastewaters received at CETP Narol, a combination of first-rate physico-chemical treatment (for separation of suspended solids in primary as well as secondary treatment) and a carefully managed aerobic biological degradation of COD in the Bioreactor is necessary.

Table 2.2 and **Table 2.3** present the data on performance at about 100 MLD inlet flowrate. These are the selected data in the vicinity of 100 MLD inlet flowrate – which are filtered from the daily monitoring data at the inlet and outlet of CETP Narol during January 2021 to July 2022 (19 months). Upon inspection of the data presented in the following Tables, it can be concluded that on several days during the 19-month period, the CETP Narol has processed nearly 100 MLD flowrate satisfactorily. Clearly, the treatment plant is currently compliant with respect to the prescribed GPCB limits for 100 MLD flowrate. The technical team at CETP Narol is currently making efforts to optimise the performance. Work is in progress.

Table 2.2: Performance at about 100 MLD inlet flowrate: The daily monitoring data at the inlet of CETP Narol during January 2021 to July 2022 (19 months).

Sr. No.	Date	Inlet Flow	pH	TDS	TSS	COD	BOD	Color	TAN
		MLD	--	mg/L	mg/L	mg/L	mg/L	PtCo	mg/L
1	01-Jan-21	106	8.68	3,740	332	1,442		596	
2	06-Jan-21	96	7.98	3,690	320	1,456		694	
3	07-Jan-21	95	8.39	3,950	528	1,478		782	
4	08-Jan-21	96	8.47	3,780	470	1,400		796	
5	11-Jan-21	97	8.23	3,690	388	1,452		796	
6	19-Jan-21	96	7.92	3,760	418	1,432		740	
7	20-Jan-21	95	8.06	3,740	390	1,410		672	49.8
8	21-Jan-21	97	8.81	3,720	320	1,368		590	
9	22-Jan-21	96	7.82	3,810	372	1,404		654	
10	23-Jan-21	95	8.12	3,740	334	1,440		726	
11	24-Jan-21	96	7.98	3,790	401	1,442		714	
12	25-Jan-21	97	8.32	3,920	558	1,504		668	
13	27-Jan-21	97	9.05	3,730	424	1,492		642	
14	28-Jan-21	98	8	3,890	445	1,486		538	
15	29-Jan-21	103	8.46	3,710	420	1,472		706	
16	30-Jan-21	98	8.21	3,960	506	1,432		634	
17	31-Jan-21	99	7.48	3,870	474	1,566		810	
18	04-Feb-21	96	7.9	3,560	702	1,362		754	
19	05-Feb-21	105	7.76	3,780	725	1,458		698	
20	06-Feb-21	98	8.71	3,690	591	1,458		680	46.2
21	07-Feb-21	97	8.13	3,970	697	1,498		764	
22	08-Feb-21	96	8.13	3,960	622	1,514		722	
23	11-Feb-21	96	8.17	3,760	679	1,402		740	
24	17-Feb-21	97	8.28	3,860	456	1,498		646	
25	18-Feb-21	98	8.13	3,890	620	1,480		642	
26	21-Feb-21	95	7.76	3,880	616	1,442		668	
27	25-Feb-21	97	8.47	3,910	651	1,530		732	
28	26-Feb-21	97	8.39	3,840	640	1,374		786	
29	27-Feb-21	98	8.24	3,920	628	1,408		744	42.6
30	28-Feb-21	99	8.19	3,810	640	1,426		628	
31	06-Mar-21	98	8.01	4,830	764	1,546		708	
32	10-Mar-21	96	8.26	3,870	686	1,536		628	
33	13-Mar-21	95	8.23	4,120	639	1,445		558	
34	17-Mar-21	98	7.94	4,520	648	1,415		662	
35	18-Mar-21	100	8.26	4,260	316	1,392		448	
36	23-Mar-21	97	8.61	4,010	431	1,520		666	
37	24-Mar-21	97	8.48	4,310	372	1,511		654	
38	25-Mar-21	97	8.68	4,040	441	1,462		726	
39	26-Mar-21	100	8.23	4,260	402	1,414		802	
40	27-Mar-21	99	7.92	4,160	209	1,478		692	49.7

Sr. No.	Date	Inlet Flow	pH	TDS	TSS	COD	BOD	Color	TAN
		MLD	--	mg/L	mg/L	mg/L	mg/L	PtCo	mg/L
41	08-Apr-21	96	8.25	3,780	212	1,590		524	
42	12-Aug-21	97	7.3	3,730	228	1,186		526	
43	25-Aug-21	96	7.6	3,770	215	1,142	566	626	43
44	28-Aug-21	100	7.31	3,680	217	1,202		738	
45	29-Aug-21	96	7.12	3,590	206	1,490		502	
46	02-Sep-21	106	7.22	3,270	169	1,070		511	
47	03-Sep-21	98	7.08	3,410	157	1,222		582	
48	07-Sep-21	96	7.55	3,650	170	1,247	276	1002	46
49	14-Sep-21	99	7.37	3,350	176	1,128		606	
50	16-Sep-21	97	7.75	3,560	178	1,168		740	
51	17-Sep-21	100	6.98	3,270	163	1,356		1014	
52	22-Sep-21	107	7.09	3,320	210	1,140		582	
53	24-Sep-21	98	7.15	3,830	235	1,048		662	
54	25-Sep-21	95	7.07	3,760	216	1,382		624	
55	26-Sep-21	95	7.62	3,440	224	1,104		504	
56	27-Sep-21	99	7.11	3,320	214	1,192		866	
57	28-Sep-21	97	8.19	3,360	196	1,124		740	
58	29-Sep-21	104	7.41	3,260	188	1,164		596	
59	30-Sep-21	98	8.08	3,540	169	1,332		654	
60	12-Oct-21	96	7.74	3,620	426	1,314	315	592	25
61	18-Nov-21	95	7.94	3,380	427	1,198		948	
62	27-Nov-21	99	7.64	3,670	563	1,232		872	
63	07-Dec-21	95	7.76	3,680	482	1,250		448	
64	08-Dec-21	95	7.75	3,700	393	1,304		806	
65	09-Dec-21	99	7.51	3,470	677	1,362		796	
66	10-Dec-21	99	7.64	3,720	493	1,302	246	760	49
67	11-Dec-21	95	7.38	3,900	512	1,210		652	
68	14-Dec-21	98	7.37	3,660	396	1,226		482	
69	15-Dec-21	97	8.08	3,620	503	1,198		632	
70	16-Dec-21	97	7.97	3,780	434	1,348	230	760	41.3
71	18-Dec-21	97	7.71	3,520	388	1,314		656	
72	22-Dec-21	96	7.79	3,890	397	1,240		544	
73	23-Dec-21	97	7.79	3,730	368	1,300		604	37.6
74	24-Dec-21	106	7.55	3,540	401	1,300		586	
75	25-Dec-21	102	7.85	3,920	399	1,320		640	
76	26-Dec-21	97	7.49	3,610	465	1,300		840	
77	27-Dec-21	100	7.93	3,590	409	1,240		740	
78	28-Dec-21	96	7.57	3,660	377	1,420		720	
79	29-Dec-21	106	7.67	3,690	412	1,120		582	
80	30-Dec-21	101	7.46	3,960	400	1,380		758	
81	31-Dec-21	101	8.17	3,710	383	1,160		502	
82	01-Jan-22	97	7.82	3,770	369	1,180		518	
83	02-Jan-22	98	7.69	3,740	397	1,360		796	
84	06-Jan-22	102	7.74	3,600	386	1,180	183	542	31.4

Sr. No.	Date	Inlet Flow	pH	TDS	TSS	COD	BOD	Color	TAN
		MLD	--	mg/L	mg/L	mg/L	mg/L	PtCo	mg/L
85	07-Jan-22	106	7.93	3,610	402	1,342		552	
86	08-Jan-22	104	7.57	3,680	399	1,356		738	46.5
87	09-Jan-22	101	7.77	3,800	416	1,392		778	
88	12-Jan-22	107	7.42	3,960	337	1,480		622	
89	20-Jan-22	97	8.34	3,620	450	1,320		566	
90	24-Mar-22	96	7.7	3,770	390	1,564		714	
91	21-Apr-22	96	7.46	3,940	390	1,270		596	
92	11-May-22	96	7.68	3,720	290	1,498		816	
93	08-Jul-22	99	8.69	3,760	374	1,426		454	
94	26-Jul-22	98	8.48	3,420	380	1,184		666	36.5
95	27-Jul-22	98	8.57	3,530	337	1,130		644	
96	28-Jul-22	97	8.19	3,460	320	1,378		784	
	Average	98.2	7.91	3750	410	1350	303	675	42
	Std Dev	2.96	0.45	252.75	151.82	132.63	124.51	113.32	7.21
	Max	107	9.05	4830	764	1590	566	1014	50
	Min	95	6.98	3260	157	1048	183	448	25
	Count	96	96	96	96	96	6	96	13

Table 2.3: Performance at about 100 MLD inlet flowrate: The daily monitoring data at the outlet of CETP Narol during January 2021 to July 2022 (19 months).

Sr. No.	Date	Outlet Flow	pH	TDS	TSS	COD	BOD	Color	TAN
		MLD	MLD	mg/L	mg/L	mg/L	mg/L	PtCo	mg/L
1	01-Jan-21	106	7.89	3,780	80	214		256	
2	06-Jan-21	96	7.85	3,810	71	192	41	227	
3	07-Jan-21	95	7.88	3,820	47	184	47	237	
4	08-Jan-21	96	7.9	3,850	40	188	40	244	
5	11-Jan-21	97	7.9	3,820	68	236		274	
6	19-Jan-21	96	8.19	3,770	34	145	39	204	
7	20-Jan-21	95	7.94	3,840	29	140	–	198	30.9
8	21-Jan-21	97	7.98	3,790	26	146	–	200	
9	22-Jan-21	96	8	3,810	15	145	–	219	
10	23-Jan-21	95	7.89	3,730	28	155	–	215	
11	24-Jan-21	96	7.94	3,810	30	155	–	219	
12	25-Jan-21	97	7.91	3,820	40	161	46	215	
13	27-Jan-21	97	7.89	3,840	93	218	–	232	
14	28-Jan-21	98	7.93	3,760	35	173	41	224	
15	29-Jan-21	103	8.13	3,880	27	156	33	217	
16	30-Jan-21	98	7.89	3,930	42	166	36	214	
17	31-Jan-21	99	7.9	3,850	31	165	45	212	
18	04-Feb-21	96	7.97	3,830	76	221	–	247	
19	05-Feb-21	105	8.02	3,760	46	172	–	235	
20	06-Feb-21	98	8	3,790	38	169	40	231	57.7
21	07-Feb-21	97	7.99	4,100	41	155	25	217	
22	08-Feb-21	96	8.09	4,110	22	155	28	197	
23	11-Feb-21	96	8	3,960	23	132	–	206	
24	17-Feb-21	97	8.08	3,930	42	148	–	210	
25	18-Feb-21	98	8.03	4,160	42	167	–	217	
26	21-Feb-21	95	8.1	4,050	52	155	–	217	
27	25-Feb-21	97	8.14	4,120	44	180	–	223	
28	26-Feb-21	97	8.19	4,080	42	184	–	235	
29	27-Feb-21	98	8.19	4,130	43	197	–	211	40.9
30	28-Feb-21	99	8.2	4,050	45	156	–	216	
31	06-Mar-21	98	8.08	4,690	55	150	40	230	
32	10-Mar-21	96	7.97	3,830	49	172	–	215	
33	13-Mar-21	95	7.98	4,380	44	168	–	220	
34	17-Mar-21	98	7.88	4,560	25	135	37	193	
35	18-Mar-21	100	7.87	4,590	28	137	–	204	
36	23-Mar-21	97	7.99	4,120	33	137	–	191	
37	24-Mar-21	97	7.98	4,150	38	135	–	189	
38	25-Mar-21	97	8.02	4,130	27	127	–	193	
39	26-Mar-21	100	7.94	4,220	27	130	–	197	
40	27-Mar-21	99	8.05	4,230	34	138	–	200	16.3

Sr. No.	Date	Outlet Flow	pH	TDS	TSS	COD	BOD	Color	TAN
		MLD	MLD	mg/L	mg/L	mg/L	mg/L	PtCo	mg/L
41	08-Apr-21	96	7.91	3,970	31	132	–	187	
42	12-Aug-21	97	7.68	3,630	30	86		208	
43	25-Aug-21	96	7.8	3,640	30	102	27	184	
44	28-Aug-21	100	7.64	3,630	58	173		296	
45	29-Aug-21	96	7.63	3,660	77	206		292	
46	02-Sep-21	106	7.64	3,430	11	96		183	
47	03-Sep-21	98	7.66	3,300	24	91		167	
48	07-Sep-21	96	7.7	3,430	29	140	24	209	
49	14-Sep-21	99	7.45	3,290	59	147		208	
50	16-Sep-21	97	7.79	3,340	26	132		188	
51	17-Sep-21	100	7.42	3,460	29	152		212	
52	22-Sep-21	107	7.43	3,220	26	130		181	
53	24-Sep-21	98	7.41	3,490	28	127		173	
54	25-Sep-21	95	7.45	3,450	36	140		182	
55	26-Sep-21	95	7.41	3,540	27	129		179	
56	27-Sep-21	99	7.43	3,370	51	153		195	
57	28-Sep-21	97	8.04	3,290	21	113		154	
58	29-Sep-21	104	8.07	3,350	20	110		144	
59	30-Sep-21	98	8.08	3,350	26	123		135	
60	12-Oct-21	96	8.1	3,450	57	144	16	172	17.81
61	18-Nov-21	95	7.71	3,630	46	220		307	
62	27-Nov-21	99	7.88	3,680	30	124		250	
63	07-Dec-21	95	8.2	3,640	40	150		251	
64	08-Dec-21	95	8.12	3,630	43	172		211	
65	09-Dec-21	99	7.78	3,660	38	163		201	
66	10-Dec-21	99	7.96	3,650	38	151	29	215	28.78
67	11-Dec-21	95	7.97	3,660	44	172		225	
68	14-Dec-21	98	7.9	3,730	43	164		205	
69	15-Dec-21	97	8.25	3,650	37	144		195	
70	16-Dec-21	97	8.21	3,680	27	129		181	33.2
71	18-Dec-21	97	7.94	3,730	39	136		187	
72	22-Dec-21	96	7.94	3,750	43	138		192	
73	23-Dec-21	97	8.08	3,720	39	147		213	29.6
74	24-Dec-21	106	7.82	3,750	41	156		205	
75	25-Dec-21	102	8.08	3,740	49	147		230	
76	26-Dec-21	97	7.84	3,700	45	175		191	
77	27-Dec-21	100	8.06	3,690	51	175		224	
78	28-Dec-21	96	7.81	3,690	54	166		217	
79	29-Dec-21	106	8.08	3,690	37	156		196	
80	30-Dec-21	101	7.91	3,710	32	138		201	
81	31-Dec-21	101	8.12	3,720	33	129		194	
82	01-Jan-22	97	7.82	3,800	37	147		219	
83	02-Jan-22	98	7.96	3,730	56	147		242	
84	06-Jan-22	102	7.98	3,700	55	164	19	228	39.93

Sr. No.	Date	Outlet Flow	pH	TDS	TSS	COD	BOD	Color	TAN
		MLD	MLD	mg/L	mg/L	mg/L	mg/L	PtCo	mg/L
85	07-Jan-22	106	8.21	3,770	48	168		223	
86	08-Jan-22	104	8.16	3,690	51	179		231	38.9
87	09-Jan-22	101	8.13	3,770	57	188		209	
88	12-Jan-22	107	7.8	3,810	36	147		190	
89	20-Jan-22	97	7.93	3,780	46	165		223	
90	24-Mar-22	96	8.02	3,800	55	173		258	
91	21-Apr-22	96	8.12	3,810	50	143		215	
92	11-May-22	96	8	3,960	72	173	24	247	
93	08-Jul-22	99	8.39	3,790	39	130		173	
94	26-Jul-22	98	8.34	3,190	17	130		158	14
95	27-Jul-22	98	8.36	3,360	36	104		163	
96	28-Jul-22	97	8.4	3,320	32	96		167	
	Average	98.2	7.95	3770	40	153	34	210	32
	Std Dev	2.96	0.21	283.75	14.65	28.30	9.00	29.50	12.21
	Max	107	8.4	4690	93	236	47	307	58
	Min	95	7.4	3190	11	86	16	135	14
	Count	96	96	96	96	96	20	96	11

Chapter 3

Phase-1: Conclusions and Highlights

Based on the above results, the following highlights are articulated:

It was recognised at the outset that the issues involved in decision making would require a complex analysis based on the observations made from the prevailing real-life CETP Narol – which is typically operated in the vicinity of 100 MLD flowrate in the recent times. The IITB team made efforts to analyse the real-life data obtained from CETP Narol (daily monitored values). All the relevant vital parameters are being monitored daily by CETP Narol – even through the lockdown period of COVID pandemic. Those datasets have become probably the most helpful resources for IITB team. The following are the highlights of the analyses presented in the preceding sections of this Chapter:

a) Correlation between COD and Colour at the outlet Secondary Clarifiers (*i.e.* CFICASS Bioreactor outlet):

   It is hypothesized that the Colour of treated water could be 'zero' corresponding to 'zero' COD concentration in treated water. The linear regression between Colour (PtCo units) and COD (mg/L) revealed a strong correlation between the Colour and COD (evidenced by slope approx. 1.47 with $R^2 > 0.96$). Thus, the Colour in the treated wastewater appears to be due to the compounds which cause COD in the wastewater.

b) Correlation between MLSS and MLVSS at the outlet of the aeration tank in the four Continuous Flow Integral Clarifier Activated Sludge System (CFICASS):

   It is clear that there exists a strong correlation between the MLSS and MLVSS of treated water at the outlet of the aeration tank (Slope = m = 1 having R2 > 0.93). The intercept on the Y-axis (indicated by 'C'), indicates the refractory inorganic material in the biological reactor – which is estimated to be approx. 600 mg/L in each CFICASS reactor. Such accumulation of inert inorganic solids in any activated sludge process would be considered reasonable and unavoidable. Clearly, the aerobic biological degradation is apparently working fine in the prevailing four bioreactors referred to as Continuous Flow Integral Clarifier Activated Sludge System (CFICASS).

c) Correlation between COD and BOD3 at the Inlet and Outlet of CETP:

The correlations between Chemical Oxygen Demand (COD) concentrations and Biological Oxygen Demand (BOD3) concentrations at the inlet (as well as at outlet) of the CETP Narol apparently suggests a linear best-fit model of the form y = m x. The linear best-fits endorse the view that:

- ✓ There exists a reasonable correlation between the COD and BOD3 of the wastewater received at the inlet as well as the water discharged at the outlet of CETP Narol.
- ✓ The linear regression between all the data as well as the filtered data, endorse that the wastewater received at the inlet as well as the water discharged at the outlet of the CETP is not easily biodegradable.
- ✓ As a result, in order to achieve satisfactory treatment of the wastewaters received at CETP Narol, a combination of first-rate physico-chemical treatment (for separation of suspended solids in primary as well as secondary treatment) and a carefully managed aerobic biological degradation of COD in the Bioreactor.

d) Correlation between ΔCOD & ΔTSS across the Primary Settling Tank:

The ΔTSS *versus* ΔCOD values estimated across Primary Settling Tank were used to perform linear regression – which suggested a strong correlation between ΔTSS and ΔCOD of treated water at the outlet of PST at CETP Narol (slope approx. 2.1264 with R^2 > 0.96). Thus, it can be inferred that all the TSS removed in Primary Settling Tank results in removal of the proportionate COD in the process of settling.

e) Bird's Eye View of Progressive Treatment of 83 MLD (average inflow) in CETP Narol:

The daily wastewater quality monitoring data, collected by NTIEM between 1st May 2022 to 30th June 2022, are used in constructing the overall picture of the for progressive treatment of wastewater in CETP Narol for the present situation (*i.e.* in the vicinity of 100 MLD flow). Two Equalization Tanks (Vtotal = 20,800 m3) are being typically used in the recent times and the tanks apparently dampen the fluctuations rather adequately in flowrate as well as concentrations of the pollutants. The average values of all parameters are used corresponding to Primary Settling Tanks (PST) and CFICASS Bioreactors to track the progressive treatment at CETP Narol. Based on the statistical analysis of real-life monitoring data, it is understood that all the TSS removed correspond to proportionate COD removal with a ΔCOD: ΔTSS ratio = 2.1264.

Approximately 68% of TSS and 33% of COD is removed from the wastewater in the Primary Settling Tanks. Additionally, 12% TSS and 56% COD is removed by the CFICASS Bioreactors. As a result, the wastewater treatment plant at CETP Narol, on average, decreases the TSS concentration from 335 mg/L to 68 mg/L and decreases the COD concentration from 1,479 mg/L to 169 mg/L. Clearly, the treatment plant is currently compliant with respect to the prescribed GPCB limits.

In summary, it can be concluded that:

1. The analysis of real-life daily monitoring data from CETP Narol suggests that, in order to achieve satisfactory treatment of the wastewaters received at CETP Narol, a combination of first-rate physico-chemical treatment (for separation of suspended solids in primary as well as secondary treatment) and a carefully managed aerobic biological degradation of COD in the Bioreactor is necessary.

2. The statistical summary of the performance of CETP Narol for selected days when it received approximately 100 MLD inlet flowrate during January 2021 to July 2022 (19 months) is presented in **Table 3.1**. The statistical analysis of the wastewater quality parameters at the inlet and outlet of CETP Narol are depicted in this Table. Upon inspection of the data presented in the Table, it can be concluded that on several days during the 19-month period, the CETP Narol has processed nearly 100 MLD flowrate satisfactorily. Clearly, the treatment plant is currently compliant with respect to the prescribed GPCB limits for 100 MLD flowrate.

The technical team at CETP Narol is currently making efforts to optimise the performance. Work is in progress.

Table 3.1: Summary of Performance at about 100 MLD inlet flowrate: The statistical analysis of the wastewater quality parameters at the inlet and outlet of CETP Narol during January 2021 to July 2022 (19 months).

Parameter	Unit	Average Value	Standard Deviation	Max Value	Min Value	Data Points
Inlet of CETP Narol						
Inlet Flow	**MLD**	98.2	2.96	107	95	96
pH	--	7.91	0.45	9.05	6.98	96
TDS	**mg/L**	3750	252.75	4,830	3,260	96
TSS	**mg/L**	410	151.82	764	157	96
COD	**mg/L**	1350	132.63	1,590	1,048	96
BOD	**mg/L**	303	124.51	566	183	6
Color	**PtCo**	675	113.32	1,014	448	96
TAN	**mg/L**	42	7.21	50	25	13
Outlet of CETP Narol						
Outlet Flow	**MLD**	98.2	2.96	107	95	96
pH	--	7.95	0.21	8.4	7.4	96
TDS	**mg/L**	3770	283.75	4,690	3,190	96
TSS	**mg/L**	40	14.65	93	11	96
COD	**mg/L**	153	28.30	236	86	96
BOD	**mg/L**	34	9.00	47	16	20
Color	**PtCo**	210	29.50	307	135	96
TAN	**mg/L**	32	12.21	58	14	11

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End of the 'Interim Report (Phase-1)'
(Dated on 7th September 2022 by Prof Shyam R. Asolekar)
(Last Page)

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ANNEXURE – R3

GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN, SECTOR 10-A,
GANDHINAGAR - 382010,
(T) 079-23232152

GPCB

By R.P.A.D

In exercise of the power conferred under section-25 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution)-1981 and Authorization under Hazardous Waste (Management and Trans boundary Movement) Rules'2016 framed under the Environmental (Protection) Act-1986.

And whereas Board has received on line consolidated application **Inward ID No: 263195 dated 23/09/2022** for **Renewal** the consolidated consent and authorization (CC&A) of this Board under the provisions / rules of the aforesaid Acts Consent & Authorization is hereby granted as under.

CONSENTS AND AUTHORISATION:
(under the provisions /rules of the aforesaid environmental acts)

TO,
M/s. Narol Textile Infrastructure & Enviro Management (NTIEM),
(Old Name: ATPA Swarnim Gujrat Enviro Pvt Ltd),
34 Paiki, Gyaspur - Pirana Sewage Farm Area,
Vill–Gyaspur, Narol , Ahmedabad.

1. **Consent Order No.: AWH- 124634 date of Issue: 25/02/2023**
2. The consents shall be valid up to **30/09/2027** for use of outlet for the discharge of trade effluent due to operation of CETP plant as under:

Sr. No.	Product	Quantity
1.	**Collection, Treatment of partially treated effluent generated from member textile units and Disposal**	**100 MLD**

3. **SPECIFIC CONDITION:**

3.1 **Industry shall comply with the Solid Waste Management Rules-2016.**
3.2 **Industry shall not carry out any activities which attracts provision of Rule 9 of Hazardous & Other wastes (Management &Transboundary Movement) Rules-2016.**
3.3 **Unit shall strictly obey/comply the orders by Hon'ble High Court of Gujarat in WPPIL 98 of 2021 from time to time.**
3.4 **Unit shall not carry out any kind of production activity covered under EIA – Notification – 2006 without obtaining prior EC from competent authority.**
3.5 **Applicant shall comply with Terms of Reference (TOR) approved by SEIAA, Gujarat vide Order no. SEIAA/GUJ/TOR/7(h)/518/2018 dated: 24/05/2018.**
3.6 **Applicant shall comply with conditions of Environment Clearance granted vide letter no. F No. 10-84/2012-IA-III dated 16/12/2013.**
3.7 **Applicant shall maintain daily log book for operation of CETP, quantity and quality of effluent received from member units, quantity of inflow to the CETP, quality and quantity of effluent at final outlet etc.**

4. **CONDITIONS UNDER THE WATER ACT:**

4.1 Water Source: **Borewell.**
4.2 The quantity of the water consumption by CETP for domestic purpose shall not exceed **20 KLD.**
4.3 The quantity of the domestic effluent from the CETP shall not exceed **20 KLD.**

4.4 **TRADE EFFLUENT:**

4.4.1 CETP shall receive 100 MLD trade effluent conforming to following CETP inlet norms from their member units.

PARAMETERS	CETP INLET NORMS
pH	6.5 TO 8.5
Temperature	40^0 C
Colour (Pt.Co.Scale) in units	100 units
Suspended Solids	300 mg/L
Oil and Grease	10 mg/L
Chlorides	600 mg/L
Phenolic Compounds	1 mg/L
Sulphides	2 mg/L
Ammonical Nitrogen	50 mg/L
Total Chromium	2 mg/L
BOD (5 days at 20^0C)	500 mg/L
COD	1200 mg/L
Fixed Dissolved Solids	2100 mg/L

4.4.2 The treated effluent received from the member units shall be further treated in CETP comprising of primary and secondary treatment facility. The treated effluents conforming to the GPCB norms mentioned below shall be discharged in to mixing chamber of final disposal point at Pirana STP of Ahmedabad Municipal Corporation through NTIEM pipe line & shall be mixed with treated sewage before disposal into river Sabarmati. In no case effluent shall be discharged into Environment by any means.

PARAMETERS	GPCB NORMS
pH	6.5 TO 8.5
Temperature	Shall not exceed more than 5^0 above ambient water temperature
Colour (Pt.Co.Scale) in units	100 units
BOD (5 days at 20^0C)	30 mg/L
COD	250 mg/L
Fixed Dissolved Solids	2100 mg/L
Chlorides	1000 mg/L
Sulphate	1000 mg/L
Suspended Solids	100 mg/L
Oil and Grease	10 mg/L
Phenolic Compounds	1 mg/L
Sulphides	2 mg/L
Ammonical Nitrogen	50 mg/L
Total Chromium	2 mg/L
Bio-Assay Test	90% survival of fish after 96 hours in 100% effluent

4.4.3 All the effluent treatment units shall be operated and maintained efficiently so that the treated effluent always conforms to the CETP outlet norms.

4.4.4 Domestic effluent generated from CETP shall be treated along with industrial effluent.

4.5 **GENERAL CONDITIONS FOR CETP:**

4.5.1 The CETP of NTIEM shall submit details of their member units along with production details, booked load with CETP and quantity effluent conveyed to CETP.

4.5.2 CETP shall accept the effluent only from the authorized textile industrial units.

4.5.3 The applicant shall be responsible for collection of treated effluent from the member units only & subsequent conveyance of the collected effluent up to the CETP and up to final discharge point.

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4.5.4 Collection of partially treated effluent conforming to the Inlet norms from the textile member units & subsequent conveyance of the collected effluent upto the CETP to be located at, Gyaspur Narol area shall be through underground dedicated pipeline.

4.5.5 The CETP shall ensure the provision of temper proof online pH & flow meter along with SCADA system and auto samplers for treated effluent received from each member unit and data of same is available all the time.

4.5.6 The CETP shall provide SCADA system attached to GPCB server for inlet & outlet of CETP. Records thereof shall be maintained.

4.5.7 The project proponent shall install 24 x 7 Online Continuous Effluent Monitoring System with respect to standards prescribed in Environment (Protection) Rules, 1986 as amended from time to time as per the directions of CPCB and connected to SPCB and CPCB online servers and calibrate these system from time to time according the equipment supplier specification through labs recognized under Environment (Protection) Act, 1986 or NABL accredited laboratories. Furthermore a third party monitoring shall be conducted regularly.

4.5.8 The applicant shall have only one outlet for the discharge of its treated effluent meeting with the GPCB norms and no effluent shall be discharged without requisite treatment. Convenient easy approach shall be provided at the final outlet as well as all the sump rooms for ease of sampling.

4.5.9 CETP shall ensure that any illegal drainage connection for disposal of industrial effluent or sewage is not connected to the collections, treatment and disposal system of this CETP. The CETP shall devise a mechanism for identification of any illegal connection throughout their underground pipeline network and to inform GPCB as well as other concerned authorities in this regard.

4.5.10 Operation and maintenance schedule/ plan of the underground conveyance pipeline shall be devised and regular maintenance of the underground pipeline shall be carried out to avoid any spillage or leakage during conveyance of the effluent.

4.5.11 The applicant shall keep accurate records of their member units in respect of quality and quantity of effluent received and discharge in separate logbooks.

4.5.12 Magnetic flow meters shall be installed at the outlet of each of the member unit as well as at various stages of inlet & outlet of CETP to measure the quantity of effluent at each stage of common effluent treatment plant.

4.5.13 The applicant shall instruct & make sure that every member shall make storage facilities to store the effluent for at least 48 hours in an impervious acid/alkali proof brick lining tank /HDPE tank.

4.5.14 The applicant shall constitute a monitoring committee for monitoring of the effluent discharged by its members in the drainage system.

4.5.15 In case of power failure, stand-by D.G. set having power generation capacity equivalent to the requirement of power to run the CETP, all the SCADA system, flow meters etc. shall be installed, so that CETP shall always be operated round the clock and data shall be available even in case of power failure also.

4.5.16 The Environmental Management Unit / Cell shall be setup to ensure implementation and monitoring of environmental safe guards and other conditions stipulated by statutory authorities. The Environmental Management Unit / Cell shall directly report to the Chief Executive of the organization and shall work as a focal point for internalizing environmental issues. This cell shall also coordinate the exercise of the environmental audit and preparation of the environmental statements.

4.5.18 The applicant shall intimate the occurrence of any accident/ breakdown, event resulting in discharge of poisonous, noxious or polluting matter or the likely hood of the same into a river stream or well, to the Regional Office under the intimation to the Member Secretary in accordance with the Section 31(1)of the Water Act.

4.5.19 Control rooms equipped with SCADA computers, wireless system, telephone system, emergency vehicle, shall be provided. The control room will be mannered from 24 hours round the clock.

4.5.20 Necessary clearance for the adequacy & safety measures shall be obtained from the concerned authority.

4.5.21 The applicant shall comply with the provisions of all the laws of land including safety, disaster management.

4.5.22 CETP shall establish the onsite Laboratory facility.

4.5.23 CETP shall provice& operate fogger system or other appropriate system for abetment of foul odour.

4.5.24 Adequate plantation of indigenous local tree spices shall be carried out within the CETP premises in such a way that the density of plantation is at least 1000 trees per acre of land and a green belt of 10 meters width shall be developed all along the periphery of the CETP. Appropriate plant spices shall be selected to control the odor caused during the plant operation

4.5.25 The concentration of Noise in ambient air within the premises of industrial unit shall not exceed following levels:

4.5.26 Between 6 A.M. and 10 P.M.:75 dB (A)

4.5.27 Between 10 P.M. and 6 A.M.:70 dB (A)

4.5.28 CETP shall comply with all the conditions of notifications, memorandums, NGT orders, Honorable court orders and directives issued by Board from time to time.

4.5.29 The CETP shall explore the possibility of reusing treated effluent for gardening, irrigation, flushing, reuse by member industries etc.

4.5.30 PP shall ensure proper signage and display boards highlighting safety measures in the proper operation of the plant.

4.5.31 No Changes in installed capacity, quality or quantity of effluents as agreed upon in the initial MoU between the operator and the member units, addition of any new member units shall be carried without prior approval of the ministry.

4.5.32 The Management of the CETP and the individual member shall be jointly and severally responsible for conveyance and pre-treatment of effluents. Only those units shall be authorized to send their effluents to the CETP which have a valid consent of the Pollution Control Board.

5. CONDITIONS UNDER THE AIR ACT:

5.1 There shall be no use of fuel. Hence, there shall be no flue gas emission.

5.2 There shall be no process gas emission from manufacturing process & other ancillary operation:

5.3 Ambient air quality within and outside the premises of the unit shall conform National Ambient Air Quality standards notified by MoEF vide notification dated 16/11/2009 and mainly to the following standards:

Sr. No.	Pollutant	Time Weighted Average	Concentration in Ambient air
1.	Sulphur Dioxide (SO_2), µg/m^3	Annual 24 Hours	50 80
2.	Nitrogen Dioxide (NO_2), µg/ m^3	Annual 24 Hours	40 80
3.	Particulate Matter (Size less than 10 µm) OR PM_{10} µg/ m^3	Annual 24 Hours	60 100
4.	Particulate Matter (Size less than 2.5 µm) OR $PM_{2.5}$ µg/ m^3	Annual 24 Hours	40 60

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5.4 The applicant shall provide portholes, ladder, platform etc at chimney(s) for monitoring the air emissions and the same shall be open for inspection to/and for use of Board's staff. The chimney(s) vents attached to various sources of emission shall be designed by numbers such as S-1, S-2, etc. and these shall be painted/displayed to facilitate identification.

5.5 The industry shall take adequate measures for control of noise levels from its own sources within the premises so as to maintain ambient air quality standards in respect of noise to less than 75 dB (A) during day time and 70 dB (A) during night time. Daytime is reckoned in between 6 a.m. and10 p.m. and night time is reckoned between 10 p.m. and 6 a.m.

5.6 The applicant shall provide proper ventilation and exhaust facilities so as to maintain healthy working atmosphere within the factory premises.

5.7 The gaseous emission from DG set, if any shall be dispersed through adequate stack height as per CPCB standards. Diesel generating sets shall be installed, in the downwind directions.

6. Authorization under Rules 6(2) of Hazardous and other Wastes [Management & Transboundary Movement] Rules – 2016. [Form -2]

6.1 **Number of authorization: AWH- 124634 date of Issue: 25/02/2023.**

6.2 **M/s. Narol Textile Infrastructure & Enviro Management (NTIEM)** is hereby granted an authorization to operate facility for following hazardous wastes on the premises situated at **34 Paiki, Gyaspur - Pirana Sewage Farm Area, Vill–Gyaspur, Narol, Ahmedabad.**

Sr. No.	Waste	Schedule category	Quantity	Facility
1	ETP sludge	I-35.3	250 MT/day	Collection, Storage, Transportation, Disposal at authorized TSDF Site and/ 1000 MT/month Co- processing at Cement Plant
2	Discarded Containers/ Barrels/ Drums	I-33.1	500 nos./day	Collection, Storage, Transportation Disposal by selling to authorized Decontaminators.
3	Used/ Spent Oil	I-5.1	0.05 KL/day	Collection, Storage Transportation Disposal by selling to Authorized Recyclers.

6.3 The authorization is granted to operate a facility for collection, storage, transportation and ultimate disposal of Hazardous wastes as above.

6.4 The authorization is subject to the conditions stated below and such other conditions as may be specified in the rules from time to time under the Environment (Protection) Act-1986.

6.5 The authorization shall be in force for a period up to **30/09/2027.**

6.6 Any unauthorized change in personnel, equipment or working conditions as mentioned in the authorization order by the persons authorized shall constitute a breach of this authorization.

6.7 An application for the renewal of an authorization shall be made as laid down in rule 5 (7) (ii).

6.8 CETP shall have to manage waste oil; discarded containers etc. as per the Rules 2016 and shall apply for Authorization/submit details for all the applicable waste as per the Rules 2016 within 15 days.

6.9 The person Authorized shall not rent, lend, sell, transfer or otherwise transport the hazardous and other wastes except what is permitted through this authorization.

6.10 The person authorized shall implement Emergency Response Procedure (ERP) for which this authorization is being granted considering all site specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time.

6.11 The person authorized shall comply with the provisions outlined in the Central Pollution Control Board guidelines on "Implementing Liabilities for Environmental Damages due to Handling and Disposal of Hazardous Waste and Penalty".

6.12 CETP shall comply any other conditions as per the Guidelines issued by the Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.

6.13 Records of waste generation, its management and annual return shall be submitted in Gujarat Pollution Control Board in Form-4 by 30th day of June of every year for the preceding period April to March.

6.14 The waste generator shall be totally responsible for collection, storage, transportation and ultimate disposal of the waste generated.

6.15 Empty drums and containers of toxic and hazardous material shall be treated as per the guidelines published for "Management & Handling of discarded containers". Record of the same shall be maintained and forwarded to Gujarat Pollution Control Board regularly.

6.16 CETP shall take all concrete measures to show tangible results in waste generation, waste reduction/avoidance, reuse and recycle. Action taken in this regard shall be submitted within 03 months and also along with Form – 4.

6.17 CETP shall have to display the relevant information with regard to hazardous waste as indicated in the Hon. Supreme Court's order in W.P. No: 657 dated 4th October 2003.

6.18 The occupiers of facilities shall not store the hazardous and other wastes for a period not exceeding ninety days. Prior permission of the Board shall be obtained for extension of the storage period.

6.19 The occupier shall maintain the records of generation, sale, storage, transport, recycling, co processing and disposal of hazardous waste and make available during the inspection.

6.20 The transportation of the hazardous waste shall be carried out in GPS mounted dedicated vehicles.

6.21 Unit shall abide by any other conditions for compliance as per the Guidelines issued by the Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.

6.22 Annual return shall be filed by June 30th for the period ensuring 31s. March of the year.

7. GENERAL CONDITIONS:

7.1 Any change in personnel, equipment or working conditions as mentioned in the consents order/form should immediately be intimated to this Board.

7.2 In case of any accident, details of the same shall be submitted in Form – 11 to Gujarat Pollution Control Board.

7.3 Whenever due to accident or other unforeseen act or ever, such emissions occur or is apprehended to occur in excess of standards laid down such information shall be forthwith reported to Board. concerned Police Station, Office of Directorate of Health Service, Department of Explosives, Inspectorate of Factories and local body.

7.4 As per "Public Liability Insurance Act – 91" company shall get insurance policy, if applicable.

7.5 In case of failure of pollution control equipments, the production process connected to it shall be stopped. Remedia action/measures shall be implemented immediately to bring entire situation normal.

7.6 The environmental management unit/cell shall be setup to ensure implementation and monitoring of environmental safeguards and other condition stipulated by statutory authorities. The environmental management cell/unit shall directly report to the chief executive of the organization and shall work as a focal point for internalizing environmental issues. These cells/units also coordinate the exercise of environmental audit and preparation of environmental statements.

7.7 The environmental audit shall be carried out. The environmental statements pertaining to the previous year shall be submitted to this Board latest by 30th September every year.

7.8 CETP shall abide to directions, guidelines, circulars issued by Hon'ble NGT, Hon'ble Court, MoEF, CPCB and GPCB.

7.9 In case of change of ownership/management the name and address of the new owners/partners/directors/proprietor shall immediately be intimated to the board.

GPCB

GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN, SECTOR 10-A,
GANDHINAGAR - 382010,
(T) 079-23232152

7.10 CETP shall have to display on-line data outside the main factory gate with regard to quantity and nature of hazardous chemicals being handled in the plant, including wastewater and air emissions and solid hazardous wastes generated within the factory premises.

7.11 Disposal system for storm water shall be provided separately. In no circumstances storm water shall be mixed with the industrial effluent.

7.12 In case, at any point of time, it is found that the industry has submitted any false or misleading information or data or document, which is material to take decision on the application, the Board reserves the right to review and/or revoke the consent/authorization. This may result in withdrawal of this consent and attract action under the provisions of Environmental laws.

7.13 The Board reserves the right to review and/or revoke the consent and/or make variations in the conditions, which the Board deems, fit in accordance with Section 27 of the Act.

7.14 The industry shall strictly abide to the assurance/undertaking submitted during processing of the application.

7.15 The Board may revoke or suspend the consent, if implementation of any of the above conditions is not found satisfactory.

7.16 All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, etc. shall be obtained, as applicable by project proponents from the respective competent authorities.

For and on behalf of
Gujarat Pollution Control Board

J. B. Pandya
11/05/23

(J. B. Pandya)
Scientific officer

NO: GPCB/ABD/CCA/NL-232(12)/ID: 34244/ **Date:**

Issued to:

M/s. Narol Textile Infrastructure & Enviro Management (NTIEM),
(Old Name: ATPA Swarnim Gujrat Enviro Pvt Ltd),
34 Paiki, Gyaspur - Pirana Sewage Farm Area,
Vill–Gyaspur, Narol , Ahmedabad

True Copy

ANNEXURE – R4

GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN, SECTOR 10-A,
GANDHINAGAR - 382010,
(T) 079-23232152

GPCB

BY R.P.A.D.

"Consent to Establish"
CTE Amendment No. 129978

NO: GPCB/ ABD/CCA/NL-232(13)/ID: 34244/

TO,
M/s. Narol Textile Infrastructure & Enviro Management (NTIEM),
(Old Name: ATPA Swarnim Gujrat Enviro Pvt Ltd),
34 Paiki, Gyaspur - Pirana Sewage Farm Area,
Vill–Gyaspur, Narol , Ahmedabad.

SUB: Amendment in CTE of this Board.
REF: 1. Your CTE - Amendment application Inward No. 289876 dated: 19/10/2023.
2. CCA order No: GPCB/ABD/CCA/NL-232(12)/ID: 34244/741823 Date: 11/05/2023.

Sir,

Without prejudice to the powers of this Board under the Water (Prevention and Control of Pollution) Act-1974, the Air Act-1981 and the Environment (Protection) Act-1986 and without reducing your responsibilities under the said Acts in any way, this is to inform you that this Board grants amendment in **Consent to Establish** for re-routing the existing 2250 meter long treated effluent discharge pipeline and for change in location of discharge point of treated effluent into river Sabarmati i.e at latitude : 22°58'25"N longitude : 72°31'41"E through about 450 meter re-routed 'the aboveground' pipeline from the premises of CETP located at **34 Paiki, Gyaspur - Pirana Sewage Farm Area, Vill–Gyaspur, Narol, Ahmedabad** with following conditions.

1. The consent shall be valid up to **18/10/2030.**
2. There shall be no change in the existing effluent treatment capacity of the CETP and the effluent discharge quantity from the CETP, after proposed CTE- amendment.

3. **SPECIFIC CONDITIONS:-**

3.1 **Industry shall comply with the Solid Waste Management Rules-2016.**
3.2 **Industry shall not carry out any activities which attracts provision of Rule 9 of Hazardous & Other wastes (Management & Transboundary Movement) Rules-2016.**
3.3 **Unit shall strictly obey/comply the orders by Hon'ble High Court of Gujarat in WPPIL 98 of 2021 from time to time.**
3.4 **Unit shall not carry out any kind of production activity covered under EIA – Notification – 2006 without obtaining prior EC from competent authority.**
3.5 **CETP shall lay down complete 'above the ground' pipeline for disposal of treated industrial effluent.**
3.6 **CETP shall completely remove old (Existing) pipeline after commissioning of proposed pipeline. Photographs of stepwise removal of existing pipeline shall be submitted.**
3.7 **CETP shall lay down complete new pipeline, in no case any part of the old (Existing) pipeline shall be utilized or merged with the proposed new aboveground pipeline.**
3.8 **CETP shall comply with the Orders/directives passed by the Hon'ble Gujarat High court in the matter no: WPPIL- 98/2021 related to River Sabarmati.**
3.9 **CETP shall establish pipeline monitoring cell to prevent illegal activity in CETP conveyance pipeline.**

3.10 **CETP shall provide OCEMS and auto sampler at the outlet (final discharge point) of conveyance pipeline into river Sabarmati.**

3.11 **CETP shall obtain all the necessary permissions from Urban local body; revenue department or any another concerned department/competent authority for laying down effluent discharge pipeline.**

3.12 **CETP shall submit weekly progress report of the installation of the proposed conveyance pipeline along with documentary evidences, photographs etc.**

3.13 **CETP shall be abiding by the directions/ orders of Hon'ble NGT and Hon'ble High Court of Gujarat with regards to the proposed discharge point into river Sabarmati.**

4. All the other conditions of the existing CCA order no: **AWH- 124634 date of Issue: 25/02/2023** shall remain unchanged.

5. You are directed to comply with these conditions in true spirit

For and on behalf of
Gujarat Pollution Control Board

J. B. Pandya

(J. B. Pandya)
Unit Head, Ahmedabad East

GOVERNMENT OF GUJARAT
NARMADA WATER RESOURCES WATER SUPPLY & KALPSAR DEPARTMENT
OFFICE OF THE EXECUTIVE ENGINEER
AHMEDABAD IRRIGATION DIVISION
C-BLOCK, 9TH FLOOR, M.S BUILDING,VASTRAPUR, AHMEDABAD- 52
Phon No (079- 29609266) P (079 27913086)Fax (079-27912506)
E-mmail: eeaidn121@gmibdom

S.K.Khant
Exe. Engr.

જા.નં.અસિંવિ/પીબી/પરવાનગી/(NTIEM)/૨૭૬૮ /સને ૨૦૨૩ તા.૨૩/૧૨/૨૦૨૩.

પ્રતિ,

મેનેજરશ્રી,

નારોલ-ટેક્ષટાઈલ્સ ઈન્ફ્રાસ્ટ્રક્ચરએન્ડ એન્વાયરો મેનેજમેન્ટ,

૧૭૦/પાર્ટ શાહપુર ગોપાલપુર,

પેટ્રોલપંપ સામે, પીરાણા રોડ, પીપળજ,

અમદાવાદ

વિષય :- નારોલ-ટેક્ષટાઈલ્સ ઈન્ફ્રાસ્ટ્રક્ચરએન્ડ એન્વાયરો મેનેજમેન્ટ (NTIEM)ના કોમન એફલુઅન્ટ ટ્રીટમેન્ટ પ્લાન્ટ (CETP)ની એફલુઅન્ટ ડીસ્ચાર્જ લાઈન સીફટીંગ કરવા બાબત.

અનુ :- (૧) વિભાગીય કચેરીના પત્રાંક : અસિવિ/પીબી/વા.બં/(NTIEM)/૨૫૯૨ સને ૨૦૨૩ તા.૨૨/૧૧/૨૩

(૨) નારોલ-ટેક્ષટાઈલ્સ ઈન્ફ્રાસ્ટ્રક્ચરએન્ડ એન્વાયરો મેનેજમેન્ટ (NTIEM)ની તા.૨૨/૧૧/૨૦૨૩

(૩) નારોલ-ટેક્ષટાઈલ્સ ઈન્ફ્રાસ્ટ્રક્ચરએન્ડ એન્વાયરો મેનેજમેન્ટ (NTIEM)ના સી.ઈ.ઓ. શ્રી વ્યાસ જયેશ કુંદનલાલ ની નોટરાઈઝડ બાંહેધરી પત્ર તા.૧૨/૧૨/૨૦૨૩

(૪) ના.કા.ઈશ્રી, વાસણા બંધ પેટા વિભાગ, અમદાવાદના પત્ર જા.નં. વા.બં./પી.બી./પરવાનગી/(NTIEM)/૩૮૩/સને ૨૦૨૩ તા.૧૩/૧૨/૨૦૨૩

ઉપરોક્ત વિષય પરત્વે સાદર જણાવવાનું કે, અનુપત્ર નં.-૧ થી નારોલ-ટેક્ષટાઈલ્સ ઈન્ફ્રાસ્ટ્રક્ચર એન્ડ એન્વાયરો મેનેજમેન્ટ (NTIEM)ના મોજે : ગ્યાસપુર, અમદાવાદ સીટી ખાતેના કેમીકલ એફલુઅન્ટ ટ્રીટમેન્ટ પ્લાન્ટ (CETP)ની એફલુઅન્ટ ડીસ્ચાર્જ લાઈન સીફટીંગ કરવા અંગેની રજુઆત ના.કા.ઈશ્રી, વાસણા બંધ પેટા વિભાગીય કચેરી દ્વારા સ્થળ ચકાસણી કરી ધોરણસર કાર્યવાહી કરી પરવાનગી આપવામા વાધા સરખું ન હોવાનું જણાવી અત્રે આગળની કાર્યવાહી અર્થે સાદર કરેલ. જે વિગતો મુજબની રજુઆર ગ્રાહ્ય રાખી, અત્રેથી આપની બાંહેધરી મેળવી ધોરણ અનુસારની કાર્યવાહી કરવાની પરવાનગી આપવામા આવે છે. જેની જાણ થવા વિનંતી છે.

કાર્યપાલ ઇજનેર
અમદાવાદ સિંચાઈ વિભાગ
અમદાવાદ

True Copy

ANNEXURE - R5

Certificate of Registration

This certificate has been awarded to

Narol Textile Infrastructure & Enviro Management

Head Office-ATPA Earth, 170-Part, Opp. IOC Petrol Pump, Saijpur-Gopalpur, Pirana Road, Piplej, Ahmedabad-382405, Plant Address-NTIEM CETP, 34 Part, Near Animal Health Foundation, Gyaspur Village, Narol, Ahmedabad, Gujarat, 382405, India

in recognition of the organization's Environmental Management System which complies with

ISO 14001:2015

The scope of activities covered by this certificate is defined below

Treatment of Partially Treated Effluent Received from Member Industries as per Gujarat Pollution Control Board Norms and its Discharge After Treatment

Certificate Number **124747/A/0001/UK/En**

A certificate number of 0001, confirms the Client has a single site Certified & the site is their Head Office or Main site in relation to the Certified scope with URS. A certificate number of 0002, or greater (e.g.: xxxx/B/0002/UK/En) refers to a client that has more than one site certified with URS, as such, the following statement shall apply - 'The validity of this certificate depends on the validity of the main certificate'.

Date of Issue of Certification Cycle	Issue Number	Certificate Expiry Date	Certification Cycle
31 January 2023	**1**	**30 January 2026**	**1**
Revision Date	**Revision Number**	**Original Certificate Issue Date**	**Scheme Number**
31 January 2023	**0**	**31 January 2023**	**n/a**

For detailed explanation for the data fields above, refer to http://www.urs-holdings.com/logos-and-regulations

Issued by *Mukesh Singhal - On behalf of the Schemes Manager*

True Copy

ANNEXURE - R6

National Accreditation Board for Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

ANALYTICAL LABORATORY OF NAROL TEXTILE INFRASTRUCTURE & ENVIRO MANAGEMENT (NTIEM) - CETP

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

34-PART, GYASPUR, AHMEDABAD, GUJARAT, INDIA

in the field of

TESTING

Certificate Number: TC-16086

Issue Date: 16/05/2025 **Valid Until:** 15/05/2029

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of thislaboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Entity: NAROL TEXTILE INFRASTRUCTURE & ENVIRO MANAGEMENT

Signed for and on behalf of NABL

Anita Rani
Director

N. Venkateswaran
Chief Executive Officer

True Copy

NTIEM
Promoting Sustainable Development

Narol Textile Infrastructure & Enviro Management

To,

Date: 30.05.2025

M/s Supernova Engineers Limited
F-2, B Wing, First Floor, Shapath Hexa,
Opp. Gujarat High Court, Nr Sola Bridge,
Sarkhej – Gandhinagar Highway,
Ahmedabad.

Work Order for DG Set

Billing & Other details:

Sr. No.	Particular	Details
01	Billing Name	Narol Textile Infrastructure & Enviro Management (NTIEM)
02	GST Number	24AADCN2226K1ZN
03	Billing Address	170 – Part, "ATPA Earth", Saijpur – Gopalpur, Opp. IOC Petrol Pump, Piplaj – Pirana Road, Piplaj, Ahmedabad - 382405
04	Working site	NTIEM – CETP
05	Vendor's Ref. No.	Offer No: SEL/RS/SP/1250 (S)/25-26/76/OFFER(REV2)
06	Vendors Contact Details	79-66111136/37/38/39/40 Email: marketing@supernovagenset.com

Item Description:

Sr No.	Description	Qty.	Unit Price (Rs.)	Price (Rs.)
1	1) SUPERNOVA DG Set model SP1250 (S) (1250kVA Standby/ 1000 kWe) comprising Perkins Diesel Engine Model 4008-30TAG3 coupled with 1250kVA Leroy Somer/Crompton AC Generator and Acoustic Enclosure, all standard accessories and AMF Logic Controller Panel 2) Acoustic Enclosure for 1 No. 1250kVA (S) DG SET Detailed technical specifications are attached to this WO.	1	70,00,000/-	70,00,000/-
			Total:	70,00,000/-
			GST@18%	12,60,000/-
			Final Amount:	82,60,000/-

Amount in words: Eighty-Two Lakh Sixty Thousand Rupees and paisa nil only.

170 - Part, Saijpur-Gopalpur, Opp. IOC Petrol Pump, Pirana Road, Piplaj, Ahmedabad-382 405 (Guj.)
Ph. : +91 79 29708230 **E-mail :** contact@ntiem.com **Website :** www.ntiem.com
CIN : U37200GJ2010NPL060003

Terms and Conditions:

- **GST:** Included in the final price
- **Freight & Insurance:** Included
- **Delivery period:** 4 6 Weeks from the date of receipt of WO with advance
- **Payment terms:** 20% Advance along with PO, 70% with 100% taxes and duties shall be against PI before dispatch,10% against the start of DG Set or within 15 days from the date of supply, whichever is earlier
- **Warranty:** 26 months from the date of shipment or 24 months from the date of commissioning or 6000 running hours, whichever occurs first. The warranty covers the cost of replacing defective parts or of having such parts repaired or of obtaining equivalent parts whichever is the lowest. A defective part or product in the sense of this warranty is a part or product that is found to have an inherent defect that existed in it at the time of delivery.
- Any disputes arising out of or relating to this Agreement shall be subject to the exclusive jurisdiction of the courts in Ahmedabad.

Thanking You.

For, Narol Textile Infrastructure & Enviro Management

Bhavesh Brahmbhatt
Chief Accountant

Vipul Patel
Manager

N I Kapadia
DGM

J K Vyas
CEO

Akash Sharma
Director

Deepak Jain
Director

Rajesh Bindal
Director

170 - Part, Saijpur-Gopalpur, Opp. IOC Petrol Pump, Pirana Road, Piplaj, Ahmedabad-382 405 (Guj.)
Ph. : +91 79 29708230 **E-mail** : contact@ntiem.com **Website** : www.ntiem.com
CIN : U37200GJ2010NPL060003

SUPERNOVA ENGINEERS LIMITED
(An ISO 9001 : 2015 certified company)

Registered Office : F-2, B Wing, First Floor, Shapath Hexa , Opp. Gujarat High Court, Nr Sola Bridge, Sarkhej – Gandhinagar Highway, A'ad-060
T: +91-79- 66111136/37/38/39/40, E: marketing@supernovagenset.com W: www.supernovagenset.com

PROPOSAL
Offer No: SEL/RS/SP/1250 (S)/25-26/76/OFFER(REV2)
Date: 30/05/2025
To,
M/s. Narol Textile Infrasturcture & Enviro Management
170 Part,ATPA Earth ,Saijpur Gopalpur,
Opp. IOC Petrol Pump, Pirana Road,
Piplaj ,Ahmedabad-382405

Email id : vipulmanager@ntiem.com

Sub: Your requirement of 1250kVA D.G Set Standby duty with AMF Logic Controller Panel & Acoustic Enclosure.

Dear Sir,

We are thankfully acknowledging the receipt of your valued inquiry. In this context, we take this as an opportunity to introduce ourselves as one of the leading established & proven GENSET manufacturer based in India. The present range rolling off, from our most modern assembly line comprises of fuel efficient, rugged & reliable GENSET ranging **20kVA to 2250kVA**

The GENSETS manufactured by us undergoes stringent quality measures and as a result of which we produce State-of the-Art finest GENSETS. Against your requirement of Generator, we are pleased to submit our most competitive proposal for **1250kVA Standby Supernova Diesel Generating Set powered by PERKINS Diesel Engine** coupled with **Crompton/Leroy Somer** Alternator and Acoustic Enclosure.

We hope that you shall find our techno-commercial offer as most competitive and quite in line with your requirement. Please do acknowledge the receipt of our offer immediately.

Assuring you the best of our services and attention at all times.
Thanking you, yours faithfully,
For SUPERNOVA ENGINEERS LTD.

SAGAR PATEL
9173003565

SUPERNOVA ENGINEERS LIMITED
(An ISO 9001 : 2015 certified company)

Registered Office : F-2, B Wing, First Floor, Shapath Hexa , Opp. Gujarat High Court, Nr Sola Bridge, Sarkhej – Gandhinagar Highway, A'ad-060
T: +91-79- 66111136/37/38/39/40, E: marketing@supernovagenset.com W: www.supernovagenset.com

FUEL SYSTEM:

Unit Injection System, Electronic Speed Governor, Full Flow spin-on Twin Fuel Filters, Fuel Lift Pump, Fuel Pre-filter with Element & Flexible braided Fuel Pipes.

INTAKE & EXHAUST SYSTEM:

Air Filter, Air Cooled Exhaust Manifold, and Turbocharger.

COOLING SYSTEM:

Engine driven fan, Radiator, Radiator Guard, Gear driven Coolant Pump, Thermostat and Integral piping.

STARTING SYSTEM:

24 V DC Electric Starter Motor, Battery Charging D.C. Alternator.

2.0 A. C. GENERATOR:

Crompton/Leroy Somer range Industrial A.C. Generator of **1250kVA**, 3 phase, 4 wire, 415 V, 0 8 P.F., 1500 RPM, 50 Hz,

The A. C. Generator shall be

- Salient pole, Brush-less & revolving field type.
- Synchronous, self-excited, self-regulated,
- Self- ventilated, Screen Protected Drip Proof,
- 2/3rd Pitch Winding,
- Enclosure: IP23,
- Class of Insulation 'H' with Temperature rise limited to class 'H'

The A.C. Generator shall be Horizontal foot mounted single bearing type and shall be fitted with Automatic Voltage Regulator (AVR) for Voltage regulation of +/- 1%. The AVR shall be fitted inside the Alternator terminal box and pre-wired. The A.C. Generator shall meet the requirements as per IEC 60034-1.

2.1 MOUNTING:

The Engine & A.C. Generator described above shall be directly coupled, aligned and mounted on rigid M.S. Fabricated Base Frame.

3.0 PERIPHERALS:

3.1 Fuel Storage Day Tank(990liters) Fabricated from MS Sheet Steel and shall be complete with:
- Level Indicator
- Air vent
- Drain Outlet with dead plug

3.2 Fuel supply & return Flexible Hose with adopter

3.3 Residential Silencer.

3.4 Exhaust Flexible Expansion bellow/Pipe

3.5 180AH TATA Make Lead Acid Batteries with:

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T: +91-79- 66111136/37/38/39/40, E: marketing@supernovagenset.com W: www.supernovagenset.com

ANNEXURE-II

SCOPE OF SUPPLY FOR AMF LOGIC CONTROLLER PANEL

1. **DG controller have following features :**

Engine control:
- Engine Start
- Engine Stop
- Fault reset
- Fault acknowledge

Engine Parameter Monitoring:
- Lube Oil Pressure
- Water Temperature
- Speed (RPM)
- Running Hours

Engine Protections:
The controller shall have following Engine Protection with Engine Shut-down:
- Low Lube Oil Pressure
- High Water Temperature
- Over Speed
- Engine fail to start

Electrical Parameter Monitoring of DG Set:
The controller shall have following Monitoring facility:
- Voltage L1,L2,L3
- Ampere L1,L2,L3
- Frequency
- Active Power (KWe) L1,L2,L3
- Power Factor (PF) L1,L2,L3
- Energy (KWh)

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ANNEXURE-IV

PRICE SCHEDULE

Sr. No.	Description	Qty.	Unit Rates in Rs. Basic Price in INR
1.	**SUPERNOVA** DG Set model **SP1250 (S) (1250kVA Standby/ 1000 kWe)** comprising **Perkins** Diesel Engine Model **4008-30TAG3** coupled with **1250kva Leroy Somer/Crompton** AC Generator and **Acoustic Enclosure** and all standard accessories – As per specifications mentioned Annexure I. AMF Logic Controller Panel – As per specifications mentioned Annexure II.	1 No.	**Rs. 70,00,000/-**
2.	**Acoustic Enclosure for 1 No. 1250kva (S) DG SET** – As per specifications mentioned Annexure III.	1 No.	

NOTE: EXCLUSION FROM SCOPE OF SUPPLY

1) ALL CIVIL WORK SUCH AS FOUNDATION SUPPORT STRUCTURE ETC
2) EXHAUST PIPING OUTSIDE THE ACOUSTIC ENCLOSURE
3) LOCAL ACB PANEL
4) ANY POWER CABLING
5) ANY CONTROL CABLING
6) EARTHING (4 No. EARTH STATION) 2 FOR BODY & 2 FOR NEUTRAL ALONG WITH EARTHING STRIPS
7) ANY CONSUMABLES SUCH AS DIESEL
8) RECD EMISSION KIT
9) ELECTRICAL APPROVAL
10) UNLOADING FOR DG WITH ACOUSTIC ENCLOSURE
11) ANY APPROVAL FROM THE STATUTORY BODIES
12) ANY CHANGES IN TAXES/DUTIES AT THE TIME OF DISPATCH WILL BE ON BUYER'S ACCOUNT

SUPERNOVA ENGINEERS LIMITED
(An ISO 9001 : 2015 certified company)

Registered Office : F-2, B Wing, First Floor, Shapath Hexa , Opp. Gujarat High Court, Nr Sola Bridge, Sarkhej – Gandhinagar Highway, A'ad-060
T: +91-79- 66111136/37/38/39/40, E: marketing@supernovagenset.com W: www.supernovagenset.com

The warranty does not cover any incidental, consequential or related costs such as costs for traveling, transport, extra costs due to the installation in making the products accessible, docking and cranes, loss of use, loss of income, loss of time, loss of property, personal injury, or damages on other parts or goods than the indicated products delivered by SUPERNOVA & its respective principals.

This warranty applies only if the services and spares during the warranty period are entrusted to Supernova Engineers Ltd. The warranty shall become null and void if the services and spares during the warranty are done by any other party.

JURISDICTION:

With the acceptance of this proposal by you the contract shall be construed as having been entered into at Ahmedabad (India) alone and no other courts will have jurisdiction to try any or all suits in respect of claims arising out off or under the said contract or in any way relating to the same

NOTE:

Equipment specifications & the prices offered are subject to change without notice. The price, duty & sales tax prevailing at the time of delivery of GENSETS from our respective works will be applicable irrespective of when the order was placed, accepted or payment received.

Any entry form/way bill required to enter the goods at your premises same has to be provided by buyer.

Any statutory changes in taxes and duties will be on customer's account.

We hope that you shall find our techno-commercial offer as most competitive and quite in line with your requirement.

Awaiting for your most prestigious order at the earliest.

Thanking you, we remain

Yours faithfully,

FOR SUPERNOVA ENGINEERS LIMITED,

Sagar Patel
9173003565

True Copy

Gmail Ryan Singh <adv.singhryan@gmail.com>

Service of the Reply/ Counter Affidavit on behalf of Respondent no. 2 in OA No. 510 of 2019 pending before Hon'ble NGT

1 message

Ryan Singh <adv.singhryan@gmail.com> Sat, Aug 30, 2025 at 11:43 AM
To: Nidhi Jaswal <nid.jaswal@gmail.com>, mscb.cpcb@nic.in, ccb.cpcb@nic.in
Cc: Dharita Malkan <advocatedharitamalkan@gmail.com>

Dear Concern,

Kindly find attached the Reply/ Counter Affidavit on behalf of Respondent no. 2 i.e., M/s Narol Textile Infrastructure and Enviro Management in the matter entitled ***"Aditya Singh Chauhan vs. State of Gujarat"*** Original Application No. 510 of 2019 pending before the Hon'ble National Green Tribunal.

Regards
Ryan Singh
Advocate for Respondent no. 2

Reply by way of Affidavit.pdf
19088K